

A TREATISE
OF
THE MATERIA MEDICA.

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Cullen, William

PROFESSOR CULLEN'S

TREATISE

OF

THE MATERIA MEDICA.

WITH LARGE ADDITIONS,

INCLUDING

MANY NEW ARTICLES,

WHOLLY OMITTED IN THE ORIGINAL WORK.

BY BENJAMIN SMITH BARTON, M. D.

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Mat. Med.

TREATISE

A

THE MATERIA MEDICA

MATERIA MEDICA

DISTRICT OF PENNSYLVANIA, TO WIT:

BE IT REMEMBERED, That on the eleventh day of November, in the thirty-seventh year of the Independence of the United States of America, A. D. 1812. Edward Parker, 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:

“ Professor Cullen’s Treatise of the Materia Medica. With large additions, including many new articles, wholly omitted in the original work. By Benjamin Smith Barton, M. D. one of the Physicians to the Pennsylvania Hospital, and professor of Materia Medica, Natural History, and Botany, in the University of Pennsylvania. In two volumes.

In conformity to the act of the Congress of the United States, intituled, “ 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 also to the 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.”

D. CALDWELL,

Clerk of the District of Pennsylvania.

A TREATISE
OF THE
MATERIA MEDICA.

PART II.
OF MEDICINES.

IN composing this Treatise, I proposed to divide it into two parts ; the one treating of Aliments, the other of Medicines : and having now finished as well as I can what relates to the first, I proceed to the second.

I have endeavoured above to explain the difference of these two subjects ; and although, with respect to the substances to be comprehended under each, they are not to be strictly distinguished, as it sometimes happens that the same substance may belong to both subjects ; yet I maintain, contrary to the practice of writers on the materia medica, that such substances should be considered under the different views that may be taken of them as aliments or medicines ; and that these should be considered separately, to avoid distracting the student by different views presented at the same time.

It is therefore that my readers will find here several substances under the title of Medicines, which were treated of before under that of aliments. This, however, was necessary upon my plan, and will I hope be found useful.

With respect to the order in which medicines are to be considered, I have endeavoured above to determine what is the most proper plan for the purpose ; and accordingly I have given a table explaining the whole of it. I am now to follow that plan ; and therefore proceed, in the first place, to treat of Astringents.

CHAPTER I.

OF ASTRINGENTS.

ASTRINGENTS are such substances as, applied to the human body, produce a contraction and condensation in the soft solids, and thereby increase their density and force of cohesion. If they are applied to longitudinal fibres, the contraction is made in the length of these; but if applied to circular fibres, they diminish the diameters of the vessels or cavities which the fibres surround.

The operation of astringents in general, in condensing the solid, appears from their use in the tanning or making of leather, in which they are so frequently employed.

The same operation also appears from their antiseptic power, which seems to depend upon their preserving the firmness and cohesion of the animal substances to which they are applied, for a much longer time than the firmness would have continued in these substances without such application.

By what means astringents produce the contraction of the solid parts of animal bodies, is not very evident. It does not seem to be by introducing a matter into their substance; and in some cases it seems to be rather by absorbing and abstracting their fluid parts. In some cases, where the substances applied are such as coagulate the fluids of the human body, as acids and alcohol, we can readily understand how the same should condense and contract the solids formed of the same fluids which those matters coagulate. It does not, however, appear, that other astringents, void of acidity, act in the same manner; and their operation must be referred to an attraction taking place between these astringents and the particles of the animal solid.

In forming a table of medicines according to their several operations on the human body, it seemed proper to distinguish them as they operate upon the simple solid, which is much of the same nature in the dead as in the living body; or as they operate upon the sensible and moving solids, which have their qualities and powers only as they exist in a living body. This distinction, on many occasions, will be necessary and useful, but we cannot follow it throughout; and on these occasions, where the medicines at the same time operate upon both the simple and living solid, the consideration of their operation cannot be taken separately.

This is the case with respect to our present subject, as astringents often operate upon the solids of both kinds. This, indeed, has not been always observed; and it has been commonly supposed, that astringents act more upon the simple than upon the living solid: and therefore, that they act almost only on the parts to which they are immediately applied. A very learned physician, in writing on hemorrhagy, has this expression: "I do not lay any great stress upon the use of internal astringent remedies, because it does not appear likely from reasoning that they should do any service; and I am far from being convinced by experience that they ever do, except perhaps in hemorrhagies of the *primæ viæ*." HEBERDEN in *Med. Trans.* vol. ii. 432. This, however, I cannot hold to be just; and by the corrugation and constriction of the whole mouth and fauces, which happens from a small portion of astringents being applied to a small part of the tongue, I hold it to be demonstrated that astringents act upon the sentient nerves; and therefore that the astringent effects may be communicated from one part to very distant parts of the body. The same conclusion appears clearly to be formed from this, that astringents taken into the stomach show their effects in other parts of the body so quickly, that they can hardly be supposed to have passed further than the stomach itself; and therefore their sudden effects in distant parts must be ascribed to an astringent power communicated from the stomach to those other parts*.

It may, indeed, be alledged, that the astringent matter is in some cases carried further than the stomach, and into the course of the circulation: but it must still be observed, that in many of those cases the quantity of matter introduced is so small, that when again diffused in the mass of blood, and equally distributed to the different parts of the body, it is obvious, that the portion of it applied to a particular part cannot be sufficient to produce any effect upon it; and therefore the effects which appear must be ascribed to the general operation on the stomach. Of all this doctrine, and particularly of the propagation of astringent power from the stomach to other parts, we have a strong proof in this, that some of the most simple astringents taken into the stomach very soon after prevent the recurrence of a paroxysm of an intermittent fever, which implies a very general operation on distant parts.

As it is, therefore, established, that astringents act upon the mov-

* See the Editor's subsequent observations on the powers of *saccharum saturni*

ing fibres, as well as upon the simple solid, it will be readily conceived, that to their operation on the former their most considerable effects on the living body are to be ascribed. As they contract the moving fibres, and increase their force of cohesion, they must increase their contractility, or what I call their tone, and they are, therefore, often properly named Tonics; and upon the same ground are fitly enough named Strengtheners or Roborants: which under these titles will be more fully considered hereafter.

The matter of astringents has been variously judged of, and generally supposed to consist of acid and earth. In the astringents of an acerb taste, such a composition seems to be evident; and the supposition is confirmed by observing, that an astringent quality is produced by certain combinations of acid and earth, as in the case of Alum. We must not, however, conclude this to be a general proposition, as in many cases a combination of acid and earth produces matter of very little astringent power, as happens in the case of acids joined with calcareous earths; and in one case an acid joined with an absorbent earth, as in magnesia alba, produces matter of a purgative quality. We cannot, therefore, admit of this general proposition, that astringents are formed by a combination of acid and earth. With respect to the greater part of the vegetable astringents, the presence of an acid is by no means evident; and it is certain, that in the greater part of them, the quantity of acid is not so much as to saturate the earthy or other parts of the matter in their composition: for the whole substance of the astringent appears still to be a powerful absorbent of acids, capable of abstracting them from other substances with which they are joined, as we shall show more fully presently.

This leads me to say in what manner we discover an astringent quality to be in certain bodies.

In the *first* place, we discover it most certainly by their effects on the human body, and that by the taste they give in the mouth; a sense of constriction not only in the parts with which they come immediately in contact, but also in the whole of the internal surface of the mouth and fauces. This sense of constriction is different from different substances; and I believe its degree may be taken as a mark of the power which such substances may exert as astringents in the stomach, or other parts of the body.

In the *second* place, we discover an astringent quality in bodies by their being applied to a solution of green vitriol, in which they produce a black colour. This we suppose to be owing to the astringents abstracting the acid of the vitriol from the iron it was be-

fore joined with ; and that therefore the iron falls down in the form of a black powder. I shall not insist further on the theory of this operation, but shall endeavour to apply it to our purpose.

As experiments show that astringent substances applied to the solution of vitriol produce more suddenly a black colour, and that of a greater degree of blackness, in proportion to the other marks they give of their astringency, so we may employ this experiment to determine the power of astringency in different substances. For this purpose, the learned BERGIUS, in his late Treatise on the Materia Medica, has given us his experiments of the application of almost every vegetable substance to the solution of green vitriol ; and I have much reason to believe, that his experiments have been accurately made and faithfully reported. From them, I think we learn what I have just now alledged, that the astringent power is in proportion to the suddenness with which they strike a black colour, and to the degree in which they produce it. By this the learned author points out what substances are the most powerful astringents ; and in like manner, what are the weaker kinds of the many which formerly entered promiscuously into our lists of astringents ; and I shall hereafter make use of his experiments in determining the astringent power of particular substances.

But before I enter upon this, I think it proper to observe here, that every substance which strikes a black colour with a solution of green vitriol, is not to be considered as an astringent ; for it may happen that a small portion of astringent matter may be present in substances in which a matter of contrary quality truly prevails ; and there cannot be a stronger instance of this than in the herb Malva, the juice of which strikes some black colour : and from the experiments of BERGIUS, it will appear that the same happens with respect to many other vegetable substances which have not been, nor cannot be, considered as astringent matters.

A *second* observation to be made is, that certain astringents, which otherwise give proof of their astringent power, do not strike a black colour with the solution of vitriol, or do it more weakly than in proportion to their astringent powers. We have an instance of this in the juice of quinces, and some other acerb substances ; which is probably owing to this, that the astringent matter in these substances is saturated with the acid that is already present in them.

What judgment, concerning the nature of vegetables, may be formed from the different colours which are produced by them, when applied to the solution of vitriol, remains yet to be inquired into.

The general effects of astringents on the human body are expressed above in the definition; but in what different states of the body, that is, in what diseases they are to be employed, is yet to be said.

In all cases of general debility, they may be supposed to be useful; and in that state which has been called a Cachexy, and which often forms the beginning of dropsy, the preparations of iron formed by a combination of an acid with that metal have been employed with much benefit: but I do not know of any other simple astringent, that in the same case has been employed with advantage. In one case, their power in taking off the atony of the system is very remarkable, and that is in the case of intermittent fevers. In another place, in my *First Lines of the Practice of Physic*, I have shown that the recurrence of the paroxysm of intermittent fevers depends upon the recurrence of a state of atony in the system, and that the paroxysm is prevented by various means of obviating the recurrence of that atony; and a frequent experience has showed the power of astringents in this respect. It is true, that, even for this purpose, their tonic powers are much increased by their being combined with bitters, as we shall explain in another place; but in the mean time, as the most simple astringents frequently answer the purpose, it does not prevent our perceiving that astringents by themselves are capable of increasing the tone of the moving fibres over the whole body.

Astringents are considered as especially useful in restraining excessive evacuations: and, in the first place, hemorrhagies, or the evacuations of red blood; and I have no doubt of their being fitted for this purpose, or of their truly answering it: but I must own, that there is no practice in which I have been more frequently disappointed, than in the employment of astringents in the case of hemorrhagy. I ascribe my failure to this, that though astringents taken into the stomach give some increase of tone over the whole system; yet they are not powerful enough for producing such constriction in distant parts, as may be sufficient for overcoming the increased impetus of the blood in the vessels. This, however, I would assert with respect to certain astringents only, and allow that there may be in the different kinds more or less power of propagating their effects from the stomach to distant parts, as I shall endeavour to take notice of when treating of particular astringents.

On this subject I imagine it is proper to observe, that the different effects of astringents will depend on the nature of the hemorrhagy to which they are applied. Hemorrhagies may depend upon the increased action of the vessels forcing an opening or rup-

ture in their extremities, or the same disease may depend upon a loss of tone in the extremities of the blood-vessels, allowing them to be opened without any increase in the action of the vessels; and merely by the ordinary, or perhaps even a less than usual, impetus of the blood in them. In these two kinds of hemorrhagies the effects of astringents must be different. In the former, they may not only be ineffectual, but may be actually hurtful, by increasing the tone and action of the vessels; and it is only the latter case to which they are properly adapted, and can be useful, as will be better understood from the doctrine concerning Menorrhagia, which I have delivered in my *First Lines of the Practice of Physic*.

Astringents are also employed in restraining the excess of serous evacuations; and are therefore employed in the case of diarrhœa. Here their efficacy is evident; and will be readily accounted for by their being immediately applied to the parts affected. But it is extremely necessary here to take notice of an error very generally prevailing in writers on the materia medica, in their relating the virtues and powers of astringents. They very generally mention the virtues of astringents as equally adapted to diarrhœa and to dysentery; but I maintain that these two diseases are very different from one another: so that while diarrhœa consists in an increased evacuation from the exhalents and excretories on the internal surface of the intestines, which may be restrained by astringents applied, the dysentery consists or depends upon an increased constriction in a considerable portion of the intestinal canal, which must be increased by the application of such astringents. This is now well understood; and practitioners very universally observe, that astringents are not only ineffectual, but very hurtful, in dysentery; and therefore we assert, that the marking of astringents as equally adapted to both diseases is a pernicious error.

Beside diarrhœa, astringents are said to be suited to the restraining of other serous evacuations; but I must say, that in practice I have been as much disappointed in these cases as in the case of hemorrhagy; and upon the same ground, that the effects of astringents taken into the stomach are not propagated so powerfully to distant parts as to produce the constrictions required in them. This I have had occasion to observe with regard to the *Leucorrhœa*, or Fluor albus. For the cure of this disease, I find forty remedies recommended by writers on the materia medica; but I have met with forty cases of it, in which not one of those remedies were of any service.

I believe the most part of practitioners have had occasion to ob-

serve the same inefficacy of internal astringents in the case of glects, or serous evacuations from the urethra in males; and therefore will judge with me, that materia medica writers have been much too liberal in ascribing virtues to astringents in those cases. How far a distinction is to be made in those cases with respect to different astringents, I shall consider hereafter.

It may be supposed by some, that there is an analogy between those cases of increased serous evacuations, and the excessive discharge of a serous fluid from ulcers; and, therefore, that to remedy this, internal astringents may be employed. I believe the propriety of this measure may be well founded; but at the same time, it does not appear that the good effects in these cases depend upon a constriction produced on the extremities of the vessels pouring out the fluids, so much as upon restoring the tone, perhaps the inflammatory state, of the vessels, that is necessary to the production of laudable pus.

In mentioning the general effects of astringents, I must not omit their singular power of relieving the symptoms which attend the presence of a calculus in the urinary passages. Among the dissertations of DE HEUCHER, formerly a professor at Wittemberg, there is one under this title, *Calculus per adstringentia pellendus*. In this he shows, that almost at all times, and by the most eminent physicians, astringents have been employed in calculous cases. He is, indeed, intent upon showing that astringents have been employed in promoting the excretion of calculi; but I presume that, in the cases in which those remedies appeared successful, the calculous matter was only supposed to be evacuated, because the patient was relieved from the symptoms that he formerly laboured under. But we now know that these symptoms may be relieved, without the stone's having been dissolved or evacuated: and among other medicines that may operate in this manner, I believe astringents may be reckoned. A proof of this appears in the use of the leaves of the *Uva ursi*; which, not only from the experiments of the late DE HAEN, but also from my own, I have found to be often powerful in relieving the symptoms of calculus. This plant is manifestly a powerful astringent; and in what manner this, and other astringents, are useful in the cases mentioned, may be difficult to explain; but I shall offer a conjecture on the subject. I suppose their effect to depend upon their absorbing acid in the stomach. Their powerful attraction of acid we have mentioned above: and that thereby they may be useful in calculous cases, is rendered probable by this, that the medicines which of late have

been found the most powerful in relieving the symptoms of calculus, are a variety of alkalines, which are known to do this without their acting at all in dissolving the stone†.

When we have thus said in what diseases astringents are useful, it is proper to remark, that materia medica writers mark them as useful in a disease, in which we would alledge, both from theory and experience, that they are of no use at all; that is, in the case of hernia, which in our opinion does not depend upon any laxity of the intestinal canal, but upon the laxity of the containing teguments; to which we believe the operation of internal astringents can hardly reach.

After mentioning the diseases in which astringents are supposed to be useful, it is proper for me to observe that they are improperly employed in restraining evacuations, whether of blood or of serous fluids, when these evacuations can be truly considered as critical, or as necessary to relieve a plethoric state of the system, except when the evacuations proceed to an excess that threatens to be in danger of inducing death, or at least of inducing a great and dangerous debility. In such cases, the judicious practitioner will balance between the consequences to be apprehended: but we cannot miss to remark here, that the Stahlians, and other German physicians, by supposing plethora and cacochymy more frequently than they exist, have limited the employment of astringents too much.

Astringent matter is very generally present in the vegetable kingdom, and sometimes in all the different parts of plants; but most frequently in their barks, sometimes in the roots, more rarely in the leaves, and more seldom still in the flowers; though there are exceptions to all of these as general rules.

With respect to the pharmaceutical treatment of astringents, we in the first place observe, that they are most useful when they are taken in their entire state, and when given, as the common language is, in substance; and we are persuaded that the gastric liquor extracts them more powerfully than any other menstruum we could apply. It is, however, on many occasions, proper to employ them in a liquid form; and for that purpose they have been treated by distillation, infusion, and decoction.

Astringents very rarely consist of odorous or volatile parts. They are very universally of a fixed nature, and nothing rises from them in distillation with water; and even in those cases where their

† See *Chap. xxi. of ANTILITHICS.

odorous and volatile parts arise, it is found that no part of the astringent quality is at the same time communicated to the distilled water; and therefore the distilled waters drawn from astringents formerly kept in the shops, were on that account absolutely inert.

Astringents are properly enough treated by infusion, and readily yield their qualities either to an aqueous or spirituous menstruum. The extract obtained by water is in larger proportion than that obtained by spirit: but that the astringency is greater in the one than in the other is not certainly determined; and the choice of the infusions is made rather according as the menstruum is more or less adapted to the purpose of the medicine, than by any consideration of the astringent power extracted by it.

Astringents are also treated by decoction in water; and in this way a stronger impregnation can be obtained than by infusion: but it appears to me that the astringent matter is extracted in a more entire state by infusion, and that in decoction there is always some decomposition takes place; with what effect, however, on the substance as a medicine, we cannot certainly determine.

Having thus treated of astringents in general, I proceed now to give some remarks on the particular astringents that have been, or may be, employed, and that in the order of the general catalogue of medicines that has been prefixed.

PARTICULAR ASTRINGENTS.

BOLUS RUBRA.

THE bolus armena stood in our dispensatory lists long after we had ceased to import any such substance from the east; but it is now entirely omitted in our British catalogues.

A number of similar earths, under the titles of *Terræ Sigillatæ*, or sealed earths, still hold a place in foreign catalogues; but they are now entirely neglected in Britain, and we retain of the bolar earths the *Bolus Gallica* only.

This, however, I expect will also be expunged; for I cannot perceive in it any sort of medicinal quality. Applied to the tongue in a dry and powdery state, by absorbing the moisture of the part, they give some sense of austerity and astringency; but upon a more complete diffusion, that entirely disappears; and as they are not soluble in any of the animal fluids, I cannot believe in their exerting any astringent power even in the alimentary canal.

I have never found them of any use; and I must have better authority than that of the late Dr HILL to make me believe that they

have ever been of service in diarrhœas and dysenteries. See HILL's *Materia Medica*, page 180. These earths discover no alkaline part in their composition that can be dissolved by vegetable acids, and therefore they cannot be useful as absorbents of acid in the stomach; and much less do they discover any acid that can be the foundation of Dr BOERHAAVE's character of *Laudatissimæ boli*. See Aph. 88. at the end of the paragraph. Nor can I find any foundation for the opinion of his commentator VAN SWIETEN, page 128. that by correcting putrid matters, they are useful in dysenteries attended with much putrescency.

CRETA.

MANY physicians would introduce here this and many other absorbent earths, as they suppose these, when combined with acids, to prove astringent: but so far as I can judge by the sensible qualities of such compounds, their astringent quality is very inconsiderable; and the effects of absorbents in inducing costiveness, even when used very largely, we have not observed. Their effects, either in this way or in curing diarrhœa, if truly observed, we would ascribe rather to their correcting acidity than to their astringency. See what I have said above on astringents in general.

ALUMEN.

I do not think it my business here to give any account of the practices by which this substance is produced from several fossil matters, as this has been done already by several writers more scientifically than I could; nor do I think it necessary, after MARGRAAF, to give any account of the peculiar part of *Clay*, that, with the vitriolic acid, enters into the composition of alum. It is enough for me, that this is a substance very well known; and that in the same state in which it is employed in various arts, and as commonly exhibited in our shops, it is sufficiently pure and fit for the purposes of medicine.

Here we consider only its use in medicine, and chiefly as an astringent of the most powerful kind. It is used both internally and externally. With respect to its internal use, I am surprised to find that it seems not to have been employed with other astringents in diarrhœa. Some *materia medica* writers indeed mention its being suited to cure this disease; but I have not met with any practical writer who prescribes it in such cases. Governed like other practitioners by imitation and habit, I have seldom employed it; but I have employed it so much as to make me judge that in diarrhœas it may be used with advantage.

It has been given internally, chiefly in the cases of hæmorrhagy from the lungs or from the uterus. In the case of hæmoptysis I have not found it useful; and this I believe happened from the hæmoptysis being always an active hæmorrhagy, in which astringents seem to be always hurtful. But in menorrhagia, and other uterine hæmorrhagies, which often depend upon a laxity of the vessels of the uterus, it may be of service; and we have often found it to be so. It should be given at first in small doses, as it is ready to irritate the stomach: and in several instances I have found it rejected by vomiting; and what is more extraordinary, I have known large doses of it operate as a purgative. In urgent cases, however, the doses must be frequently repeated and increased, for it has been only from large quantities given, that its effects have appeared to be considerable. We begin by giving it in doses of five grains; but have gone the length of a scruple, and have given such a dose several times in a day.

Alum has been frequently employed in the Fluor albus, and particularly on the recommendation of Dr THOMSON, *Medical Essays*, IV. 38.; but I have been very often disappointed of its effect.

It was strongly recommended by Dr MEAD for the cure of diabetes; but in our hospital the serum aluminosum has been frequently employed in diabetes without success.

Among the other remedies of intermittent fevers, alum joined with nutmeg has been mentioned; and the analogy with other tonic powers renders it a probable remedy. I have tried it, by giving a large dose of it an hour or a little more before the coming on of a paroxysm; and in some instances it has prevented this: But both the alum and nutmeg were disagreeable to the stomach, and prevented a repetition, when more agreeable and more certain medicines were at hand.

Since the time that HELVETIUS wrote *Des Pertes de Sang*, and proposed alum as a specific for the cure of these, it was long common to employ alum in the form proposed by HELVETIUS, that is, as fused with a certain proportion of Sanguis draconis, supposed to be an astringent: but as this is a medicine not soluble in the human fluids, and therefore absolutely inert, it has been justly rejected. If, as Dr LEWIS supposed it to be, more slowly dissolved in the stomach, and therefore introducing the alum more gradually, it might be proper; but we are persuaded that the Sanguis draconis rather prevented the operation of the alum altogether: and if the slow introduction is to be studied, this may be obtained by smaller doses than even those above mentioned. The Edinburgh

college have thought proper to continue the title of Pulvis Stypticus, that our practitioners had been long accustomed to ; but they have added a more valuable astringent than the dragon's blood, that is, the gum Kino, which does not make in colour or dose a medicine different from the composition formerly kept in the shops.

Alum is more frequently used externally than internally, particularly in gargles, in relaxations of the uvula, and other swelling of the mucous membrane of the fauces, when there is not at the same time any acute inflammation present ; but I have known it employed in every state of the cynanche tonsillaris with some advantage. In many persons who are liable to be affected with this swelling from slight applications of cold, we have known the disease prevented, or soon removed, by the use of a decoction of oak bark, to a pound of which half a dram of alum and two ounces of brandy were added. The same gargle, without the spirits, is useful in the case of spongy swelled gums and loose teeth, from scurvy or other causes.

Alum is also useful in curing the ophthalmia membranarum, and seems to me more powerful for this purpose than either white vitriol or sugar of lead. It is commonly employed in the form of the coagulum aluminosum ; but I have found the solution in water to be still more effectual, employing from two to five grains of alum to the ounce of water.

Burnt alum has been much employed as an escharotic for consuming proud flesh in ulcers ; but it is not near so powerful as the preparations of either mercury or copper.

FERRUM SIVE CHALYBS, *Iron or Steel.*

The term Mars, introduced by the chemists, is very frequently employed.

Both titles stand in the catalogue of the London college : and in preparing the rubigo, they seem to have preferred the chalybs ; but on what foundation we cannot perceive. We suppose it to be quite indifferent whether the one or the other is employed ; but if we were to give any preference, we should think it due to the iron in its soft malleable state, or in what we call Forged Iron.

As Iron, like all other metals, in its solid and entire state, is not active with regard to our bodies, without being corroded or dissolved by saline matters, so we judge it to be rendered active only by being combined with acids. It has been common enough to give the entire metal, brought by filing into a fine powder, and with very good

effects, as a medicine. This, however, we do not consider as any exception to our general rule : for we are persuaded that there is constantly present in the human stomach a quantity of acid capable of dissolving iron ; and we hold this to be a proof of it, that we never knew iron given in its metallic or slightly corroded state, without producing a blackness in the stools, which to us always presumes a previous solution of the iron in acids.

As this combination with acids is necessary, so physicians and chemists have diversified this combination a hundred ways : and we do not know a preparation of iron for the purpose of medicine that has not been prepared by a combination with acids, or by bringing the iron into a state that rendered it readily soluble by the acid of the stomach ; and Dr LEWIS very properly observes, that Prussian blue, though truly containing a quantity of iron, as it is not soluble in any acid, is the least promising of all the medicinal preparations*.

I do not think it necessary to enumerate here the various preparations that have formerly stood, or still stand, in our dispensatories, as they all agree in the same medical virtue, and are only proper as convenient for being exhibited in different forms. The Edinburgh college have endeavoured to make an improvement in preparing a spirituous tincture, as the tinctures of that kind formerly prepared were liable in keeping to let fall a portion of what they had dissolved, and of thereby becoming constantly weaker the longer they were kept. The college, as taught by Dr BLACK, have obviated this, by ordering the tincture to be made of the squamæ ferri, as a portion of iron deprived of its phlogiston, and therefore entering into a more strict union with the acid.

Iron combined with acids becomes an astringent substance ; and upon its astringent and tonic powers its medicinal virtues entirely depend : for by increasing the tone of the vessels it increases their vigour and activity.

We do not think it necessary here to take any notice of the doctrine of MENGHINI, concerning the iron constantly present in the blood of animals, or the manner in which it is introduced into it. We think it is enough to say, that his experiments, both on men and brutes, show clearly that iron introduced into the stomach, and

* Notwithstanding what Dr Cullen has said in the preceding paragraphs, it is now sufficiently ascertained by accurate observations, that iron in its metallic state is readily soluble in the healthy gastric juice of the stomach, without the intervention or aid of the acetous or any other acid, either as present in the stomach itself, or in combination with the metallic medicine.—See our note on the subject of ACID in Vol. i.

acting there, has the power of increasing appetite, and the vigour of the circulation.

Physicians formerly supposed that iron had a double power of sometimes increasing and sometimes restraining evacuations, and fancied that different preparations possessed these different powers : but in this they were mistaken, as we have maintained above, that every preparation soluble in acids has the same astringent and tonic power ; and the *Croci*, which were distinguished as aperient or astringent, have commonly neither the one nor the other quality.

It is, however, still true, that the same preparation, as Dr LEWIS has judiciously observed, may sometimes exert an aperient and sometimes an astringent power, according to the state of the body they are applied to. If, for example, a retention of menses depends upon a weakness in the vessels of the uterus, chalybeate medicines, by invigorating the force of the vessels, may cure the disease, and may thereby appear to be aperient : and, on the contrary, in a menorrhagia, when the disease depends upon a laxity of the extreme vessels of the uterus, iron exhibited, by restoring the tone of these vessels, may show an astringent operation.

By considerations of this kind, the inutility or propriety of the medicinal preparations of iron may be determined. In all cases of active hemorrhagy, they must be hurtful ; and in cases of hemorrhagy from external violence, I would judge them to be useless, if not hurtful. In cases of a general flaccidity, as it is frequently marked under the title of Cachexy, and in all cases of evacuations from laxity, whether sanguine or serous, they are likely to be the most effectual remedies.

We are persuaded that the good effects of the preparations of iron have been often missed by their being given in too small doses. The saline preparations, in large doses, are ready to irritate the stomach ; and both on this account, and on some other considerations, it may be always proper to begin with small doses, and to increase them by degrees : but we have often found, that no great benefit is to be obtained but when large quantities, either by the size of the doses, or by the long continuance of them, have been thrown in. We have found the simple rust as effectual as any other preparation, and we have always found the stomach bear it better than any other. We begin with a dose of five grains, but increase it gradually to what the stomach easily bears. We have been informed of its being given to the quantity of six drachms in one day ; but we have hardly found any stomach that would bear the third

part of that quantity without much sickness. I think the stomach commonly bears it better by some aromatic being joined with it.

CUPRUM, *Copper*. By the chemists, *Venus*.

I have no doubt of putting this metal into the list of astringents; for though it possesses very strongly stimulant powers, which often prevent our perceiving its astringency, yet we can, by employing the milder preparations of it, or perhaps by preparing it so as to take away the whole of its stimulant quality, obtain its tonic effects.

The late BARON VAN SWIETEN tells us, that he had met with a preparation of copper, in which the stimulant powers of it had been entirely taken away; and when taken into the stomach excited no nausea, but excited a certain thrilling *formicationem* over the whole body, extending to the very points of the fingers; and this medicine had proved useful in epilepsies, which I think is the same thing as if he had said it possessed a tonic power. I have not yet discovered the method of making such a preparation of copper; and therefore I employ either a small dose of the blue vitriol or a combination of copper with sal ammoniac, which I consider as a milder preparation than the combination of the copper with an acid. I give the blue vitriol in the dose of a quarter or half a grain according to the age of the person; and in repeating the medicine twice a-day, I increase the dose to what the stomach will bear without vomiting, but allow it to go so far as to occasion some sickness and even nausea. This medicine continued for some time, has proved an useful tonic in certain cases of epilepsy and hysteria. On some occasions it has proved diuretic; and on some others anthelmintic. The combination of copper with an ammoniacal salt, I learned from the *Acta Naturæ curios*: and first introduced it into the practice of this country; and it now stands in our Dispensatory under the title of the *Cuprum ammoniacum*. In many instances it has proved a cure of epilepsy, and thereby discovered its astringent and tonic power. It is employed in the same manner as I have said above of the blue vitriol, by beginning with small doses of half a grain, and increasing these by degrees to what the stomach will bear. I find it commonly more manageable than the blue vitriol; and in many instances have carried the dose to five grains, and in some still further. In many cases it has proved a cure of epilepsy; but in many others it has entirely failed in being such. When, in the course of a month, it has not shown any good effects, I desist from its further use, as I suspect that large quantities of copper introduced may, like lead, prove hurtful to the body: and therefore

in cases of periodical epilepsy, after giving the medicine constantly during one interval, if the disease still continues, I afterwards give the medicine only for some days before an expected accession ; and in this manner I have had success.

In using preparations of copper, we must consult the various writings on the use of copper-vessels in the kitchen. There have now been many published, and are well known. The facts they have related prove beyond a doubt, that copper introduced into the body to a certain quantity may prove very mischievous, though their violent effects may not at first appear ; but when they do appear, they have been often fatal. What quantity of it is necessary to render it poisonous, I cannot exactly determine ; but I know that used in considerable quantity, in such doses as have been mentioned above, it has not discovered its deleterious effects : but at the same time, I am so well persuaded of its deleterious tendency, that it seemed incumbent on me to give the caution I have just now mentioned ; and its escharotic powers, when used externally, sufficiently confirm my suspicions.

The escharotic powers of the preparations of copper have been known and employed from the most ancient times for cleansing foul ulcers, and bringing them to discharge a laudable pus ; but since the introduction of the use of mercury in the 16th century, the preparations of this have been more commonly employed. The operations of copper and mercury seem to be very much the same ; and whether the one is preferable to the other, I cannot determine : but in some cases I have found the copper succeed, when the mercury before employed had appeared less effectual ; but whether this depended upon any peculiar power in the one substance more than in the other, or upon the different degree of acrimony in the different preparations employed, I am at a loss to determine : but think the surgeons ought to attend more particularly to this subject.

When the preparations of copper are applied to an entire surface, they manifestly discover an astringent power ; and upon that footing they have been injected into the urethra in gonorrhœas and gleet ; with what propriety it is not my business to determine here, the question being with respect to astringents in general, and not with respect to copper in particular.

The astringent powers of the preparations of copper have especially appeared in the application of them to the eyes ; and we have known a weak solution of verdegris useful in restraining inflammation : but it is so ready to prove irritating to that sensible organ, that a great deal of nicety is necessary in the employment of it ; and we

seem to have a milder preparation in the aqua sapphirina. It is, however, absurd, to order this preparation in such a manner as to allow the strength of it to be liable to much uncertainty; and the Edinburgh college have properly ordered it so as it may be brought to a standard. It has commonly been supposed, that the aqua sapphirina was suited to take off specks or opaque spots that appear upon the cornea, and which has been supposed to imply an escharotic power: but this certainly is seldom the case; and it seems to act only by an astringent power, diminishing the impetus of the fluids in the vessels which terminate in the opaque spot.

In another respect, the operation of the preparations of copper upon the eyes may be mistaken. It has been common to introduce a portion of verdegris into the ointments, which, in cases of ophthalmia, are applied to the edges of the eye-lids; and this may be supposed to be on the footing of astringents: but as the application is especially employed in cases of the ophthalmia tarsi, in which there is almost always some excoriation of the tarsus, it is probable that the verdigris acts here as an escharotic.

*ARGENTUM, *Silver.*

[The nitrate of silver, or silver in combination with the nitric acid, has within a few years, and especially since the first publication of this treatise, acquired considerable reputation as an *internal* remedy, in various affections, but especially in the disease of epilepsy. On this subject, the observations of Dr SIMS, Dr CAPPE, Dr WILSON, Dr JARDINE, and several other physicians, both in Europe and in America, may be consulted with advantage. These observations leave us no room to doubt, that this nitrate is a medicine well adapted to some cases of the disease in question; that it has sometimes cured the disease; and, in particular, that it has often moderated the violence of the attack, and lengthened the intervals between the paroxysms.

It must be obvious, from the highly corrosive and active nature of this medicine, that it will always be necessary to use it with caution; and that the doses must, for some time, be very small. By degrees, however, these may be increased, until, at length, the patient may take, with impunity and with advantage, doses of two or more grains, two or three times in the course of the twenty-four hours. I have heard of its having been given to the extent of eight grains, in the course of a day, to an epileptic patient, not more than eight years old, and with great advantage. I have myself given it, if not with advantage, at least without visible inconvenience, to the

amount of six grains in the day, to an adult epileptic. In one case of epilepsy, which I treated with this medicine, it afforded evident relief to the patient, invigorating the constitution, though it did not essentially change or moderate the violence of the paroxysms.

The nitrate of silver, as well as the two preceding, and some of the succeeding, articles, might with more propriety be referred to the head of TONICS.—See chap. iv. CORROSIVES.]

PLUMBUM, *Lead.* Saturn.

THE astringent powers of the saline preparations of this metal are now sufficiently ascertained; but at the same time it is equally well known, that all these preparations, and the vapours exhaled from the metal itself, or its calces introduced into the body, discover a sedative power, extremely noxious to the human system. It is therefore difficult to determine how far we can employ the astringent and tonic operation of this metal, and be at the same time secure against its deleterious powers, especially as these deleterious powers do not always immediately discover their operation, and very often only after they have long remained latent and unheeded in the body.

Thus Dr HUNTERMARK, formerly a professor at Leipsic, in the appendix to the 7th volume of the *Acta Naturæ curiosorum*, has given us a dissertation *de sacchari saturni usu interno salutari*: and I have no doubt that the learned professor had, upon some occasions, found the saccharum saturni moderate the activity of the system in fevers; for it appears that other preparations of lead had formerly been employed in fevers by other practitioners: but hardly any body now a-days will think, that Dr HUNTERMARK, or those other practitioners, were sufficiently aware of, or attentive to, the consequences to be apprehended; and therefore that they could warrant us in any case against these being very mischievous.

This seems to be so much the case at present, that hardly any practitioner will now think of employing any preparations of lead as internal medicines: but in proportion as the favour for these has declined, that for its external use has greatly increased. We are, however, at a loss to determine, positively, what is its operation, or to explain, in many cases where its effects are evident, how the supposed operations could produce them. It is the writing of Mr GOULARD of Montpellier that has raised these doubts. It is difficult to deny facts positively asserted; but we find in GOULARD's writing so many facts not confirmed by our own experience, so many marks of partiality to the medicine he recommends, and so much frivolous

theory by which he supports it, that his credit with me is indeed very little. I am much of opinion, that nobody can consult him with safety, without attending to the very judicious and ingenious criticism published on the subject by Mr AIKEN of Warrington; and I am disposed to leave my readers to be most properly informed of the virtues of lead applied externally in lotion, poultice, or ointment, to Mr AIKEN's work. I have only this to observe, that Mr AIKEN seems disposed to think, that the saline preparations of lead externally applied, never enter into the system in such quantity as to affect the general system in the same manner as they commonly do when introduced by the mouth, or when the vapours of lead are applied. But Dr PERCIVAL has given us a fact that may lead us to believe, that Dr AIKEN's opinion is not well founded; and we judge it to be very probable, that though lead applied to the entire surface can hardly enter in such quantity as to be noxious to the system, yet that, when applied to an ulcerated surface capable of a promiscuous absorption, it may be taken in, in such quantity as to affect the general system.

[The subject of lead is deserving of much more attention than the author of the treatise has bestowed upon it. Indeed, some of the preparations of this metal, and especially those formed by its union with the acetous acid, or vinegar, may be considered as among the most important articles of the materia medica.

I shall not take up any time with inquiring how far the *sacharum saturini* may be a remedy adapted to all the diseases in which it has, at various times, been used, and strongly recommended by the practitioners of different countries, and especially by those of France, Germany, and Italy. I cannot doubt that HUNTERMARK and others have found it useful in fevers: and I have myself known it to produce a great and salutary decrease of the heat of the body, while it has, at the same time, remarkably diminished the frequency and force of the pulse. Might not this preparation of lead be tried, with advantage, in obstinate cases of intermittent and remittent fevers? I believe it a remedy well suited to some cases of *subsultus tendinum*. It has afforded much relief and performed cures in cases of dysentery, diarrhœa, and cholera, especially cholera of children. It has cured fluor albus and gonorrhœa. Agricola and others have thought it well adapted to epilepsy, especially when occurring in children. It promises to be of use in tetanus. The illustrious Morgagni has spoken of it (rather vaguely) as a remedy for melancholia.

But it is chiefly in cases of hæmorrhages of red blood, that the *sacharum saturni* has been employed by physicians: I mean as an

internal medicine. The observations of the respectable Dr Reynolds of London are well known: and the experience of other physicians has, I think, sufficiently established the vast and unequalled powers of this article, as a sedative or astringent, in dangerous bleedings from various parts of the body.

In many cases of such bleedings, but especially in those from the uterus, intestines, and lungs, I have exhibited the acetate of lead, generally in combination with a pittance of opium, and sometimes with a portion of ipecacuanha. Seldom have I been disappointed in my expectations of benefit from the medicine, which, of all the articles of the materia medica, seems to me to possess the greatest command over the movements of the arterial system. In no instance have I perceived any dangerous effects, and rarely any temporary inconvenience, from the employment of lead. I do not doubt, indeed, that it is an article capable of essentially endangering the system, and even destroying life: and, accordingly, would not advise the young practitioner to continue the internal employment of lead for more than a few days in succession; and it is fortunate, that in a great majority of cases it is not necessary to persist in its use for any considerable length of time: for it almost always shows its good effects very soon.

In regard to the dose of the saccharum saturini, this must essentially depend upon the violence of the hæmorrhage. In alarming bleedings from the uterus, intestines, and lungs, I have often given it to the extent of two or three grains twice or thrice in the day. In a case of epistaxis, which threatened the life of the patient, I ventured, at once, on a dose of eight grains, and had no cause to regret my intrepidity.

I will not trouble my readers with many speculations about the mode of action of lead in hæmorrhages, and other diseases. If it act by virtue of its astringent power, it affords a prominent exception to Professor Cullen's observations, that in the active hæmorrhages astringent medicines "may not only be ineffectual, but may be actually hurtful, by increasing the tone and action of the vessels"; and that it is only to bleedings depending upon a loss of tone in the extremities of the blood-vessels, allowing them to be opened without any increase in the action of the vessels, "that the same astringents are properly adapted, and can be useful."* A large proportion of the hæmorrhages, in which I have exhibited lead, were cases of an active kind.—But, indeed, it appears to me, that the theory which sup-

* See Page 7.

poses that lead cures these hæmorrhages by virtue of an astringent power must be deserted : and it may be further observed, in concluding this subject, that the number of *passive* hæmorrhages, or such as are supposed to exist without any increase in the action of the vessels, is very inconsiderable.]

ZINCUM, *Zinc.*

THAT the saline preparations of this metal act as astringents, we know very well from the operation of white vitriol, so very frequently applied to the eyes. It has been used in different proportions; and when in large proportions, it certainly proves very irritating: but it may certainly be used with great safety in a greater proportion than that of two grains to the ounce of water, as it is in the aqua vitriolica of the last edition of the Edinburgh dispensatory; and the London college seems to be of that opinion.

The flores zinci, as a matter liable to be corroded by the acid of the stomach, and thereby rendered active, has been lately, upon the authority of the late excellent Dr GAUBIUS, introduced into frequent practice as an antispasmodic, or, as I consider it, as an astringent and tonic. It has now been frequently employed here in epilepsy, hysteria, and some other spasmodic diseases, as the chorea, and others. In epilepsy, they never answered with Dr GAUBIUS himself; nor have they, that I know of, here, though given in much larger doses than he seems ever to have employed. In my own practice, I have not found them of remarkable benefit, nor do I find my fellow-practitioners giving a more favourable report; and in consequence the employment of them in practice here becomes less and less every day.

In remote parts of the country, in which the flores zinci were not to be had, I have frequently prescribed the vitriolum album; and in some cases with as good effect as in any of those in which I had employed the flores zinci. We cannot dismiss the subject without observing, that from the experiments of Mr HELLOT, it appears clearly that zinc introduced into the body in a certain quantity may prove a violent poison; and I leave it with practitioners to consider what caution this should give in the large or long continued employment of zinc as a medicine.

* BISMUTHUM, *Bismuth.*

[A preparation of this metallic body, called the white calx or oxide of bismuth, has begun to solicit much of the attention of physicians, both in Europe and in America. It is particularly re-

commended as a medicine of great powers, in gastrodynia, pyrosis, and other affections of the stomach. It may be given in doses of four or five grains, twice or thrice a-day; and is conveniently exhibited in combination with the gum-tragacanth, or some similar substance. I think the reputation of the medicine is not yet fully established: and my own trials with it, in a few cases, do not enable me to say any thing essentially in favour of it.]

*ARSENICUM.

[SEE the end of the chapter on TONICS.]

VEGETABLE ASTRINGENTS.

THESE are a very numerous set; and in the indigene plants of Britain an astringent quality is very general. Formerly a great number of them were employed in medicine, and as such stood in our dispensatory lists: but the astringent quality is in different plants in very different degrees; and those in which it is weak have been of late neglected in practice, and for that reason omitted in our lists. For the same reason, perhaps, I might omit them here; but, both because their being omitted in practice is not always well founded, and because they still remain mentioned in materia medica writers of the latest date and best reputation, we shall think it necessary to take notice of some of them, if it were for no other purpose than to prevent students from being misled by the materia medica writers they might otherwise consult.

In arranging the vegetable astringents, as in every other class of medicines, I have thrown them together, as far as I could, according to their botanical affinities; that is, as they belong to the natural orders, as these are established by LINNÆUS, or by professor MURRAY. Where that could not be properly done, I have done it by their sensible qualities, or some other analogies; all which will appear from the catalogue prefixed, and which will give a clear view of the order in which I am to pursue my subject. I begin the present with considering the natural order of the SENTICOSÆ; and taking these in the alphabetical order of the names under which they stand in pharmaceutical lists, I begin with

AGRIMONIA.

THIS is now omitted both by the London and Edinburgh colleges, but in no other lists that I have observed. It is still in every materia medica writer; and these have always, and do still favour it with more attention than we think it deserves. It has some astringent

gent powers; but they are feeble, and should not hold the place of many which we know to be more powerful in every intention in which it has been, or could be, employed. If we did not know well the disposition of the most judicious writers on the materia medica to repeat after others, we should be surprised on finding Dr HALLER and professor MURRAY, repeating after an author of so little credit as CHOMEL, that he had cured a schirrous liver by means of agrimony; and it seems equally frivolous in SPIELMANN to tell us, that FORRESTUS had by agrimony broke down a stone in the bladder, and brought it away in pieces with the urine.

I may have frequent occasion for such criticisms; but I doubt much if my readers will have patience to admit of them.

ALCHEMILLA.

I have inserted this for the same reasons I inserted the above, though this has still less than that pretensions to a place any where; and I do not believe the authority of BALDINGER will again bring it into use.

ARGENTINA.

THE leaves of this intitle them to a place in a list of astringents; but their qualities are weak, and they are therefore properly neglected in practice. Upon the credit of TOURNEFORT, I have tried them in the fluor albus, but without success. I did not indeed always join with them, as he did, the broth of crabs; but in some trials even with this my success was no better. The roots are very different from all those of the same order. They are more succulent, and have much sweetness, with some astringency, but without any of the rank flavour of parsnips, with which they have been frequently compared. From their saccharine state, we might presume upon their being nutritious; and they have been often eaten when boiled, and on some occasions have supplied the want of other aliment. See LIGHTFOOT's *Flora Scotica*.

CARYOPHILLATA.

THE root of this is considerably astringent, with some aroma, when it has been recently raised in the spring-season and from a dry soil. The sensible qualities of this root are not, however, so great as to lead us to suppose its powers in the human body to be very considerable. But see how we may be deceived in this respect. A Danish physician, supported by the testimony of some of the most eminent physicians of that country, has represented the roots of the

caryophyllata as a powerful remedy in intermittent fevers: and besides enumerating many cases in which it had alone made a cure, he enumerates several in which it made a cure when the Peruvian bark had failed: And these experiments have been confirmed by that of other physicians in Germany and Sweden, particularly by WEBER professor at Kiel.

This is all very strong, and hardly any one at first sight would doubt of it: but some scepticism is to be admitted in such cases. It is acknowledged even by BUCHAVE and WEBER, that this root failed in several instances where the Peruvian bark proved a remedy. The Swedish experiments have not been so favourable as those of the Danes and Germans to the credit of the caryophyllata. With the former in very few instances it succeeded, and in very many it failed. Considering the fallacy of experience, and particularly the fallacy of the experiments given us by the inventors of new medicines, we must be doubtful of those made by the partizans of the caryophyllata, till further experience, free from the prejudices of the day, shall have been made, or till we shall have had a sufficient opportunity of making experiments for ourselves; which, from the scarcity of intermittents in this city, we have not yet had an opportunity of making.

FRAGARIA.

THE fruit of this plant has been, and will be, considered in another place. The virtues of the leaves and root, though the same with these of the order, are too inconsiderable to be taken notice of anywhere.

QUINQUEFOLIUM.

THIS is a plant supposed to have been known to HIPPOCRATES, and employed by him, as it has been frequently since by others, in the cure of intermittent fevers. On the same footing as of other astringents, we can readily admit of this; but the sensible qualities of the quinquefolium do not lead us to think that it is to be preferred, or that it is even equal to other plants of the same order.

ROSA.

THIS is of many different species, and the materia medica writers have treated of many of them in particular: but we can find little foundation for this; and it appears that those writers, from their partiality to a fragrant flower, have bestowed more attention upon the whole genus than their medical virtues deserve. All the species discover an astringency which, agreeable to the principles of LIN-

NEUS on the subject of colours, is most considerable in the red rose, and in these, as in their most austere state, before they are quite blown. But even in their most perfect state, the astringency is not so considerable as to give them much efficacy in practice. The infusum and tinctura are elegant preparations; but their effects depend more upon the vitriolic acid added to them than upon the power of the roses.

With respect to the roses, the *syrupus e rosis siccis* is perhaps more powerful than the tincture. The practice has been to prepare this syrup with honey rather than sugar; but we cannot find any advantage to arise from the honey. The last edition of the Swedish pharmacopœia orders the *mel rosaceum* to be made without boiling; but that diminishes the astringent power of the medicine: and the pharmacopœia Danica neglect this power altogether, when they order the medicine to be made with the distilled water. Vinegar can hardly be impregnated with the astringent quality of roses; and we think the *acetum rosaceum* to be hardly of more power than the simple vinegar.

The virtue of roses is supposed to be found especially in the conserve made of them; and it is sufficiently probable that they will have the greatest effect when they are given in substance, and in considerable quantity. Some strong testimonies are given of their effects in phthisical cases; and it is not improbable that astringents internally given may contribute to the cure of certain ulcers: but we must own that it is in few instances only that we have seen the considerable effects of the conserve of roses in cases of phthisis pulmonalis: and in the cases in which we have supposed it useful, it has always been joined with a diet of milk and farinacea, and gentle exercise in the open air. So that it was uncertain how much was to be imputed to the roses: and this we think was also the case with CRUGER, living upon barley-water and wheaten bread alone. We are clearly of opinion with professor MURRAY, that a smaller proportion of sugar would improve it as a medicine; that instead of three parts of sugar to one of roses, as in our dispensatory, it would be better with an equal part only as in the Swedish; with one and a half as in the Russian; or at most with two parts as in the Danish pharmacopœia.

If any of the species have any purgative quality, it is very inconsiderable; and the syrup prepared upon this supposition does not at all deserve the place it has so long had in our shops. The cordial and analeptic powers, so often celebrated in roses, are entirely

on the footing of other grateful odours, to be taken notice of elsewhere.

The fruit of the *rosa silvestris* is commonly taken notice of under the general title of *Rosa*; but that is not agreeable to our plan, and must be taken notice of elsewhere: but there is a production of the rose-plant, a fungus or gall growing upon it, known under the name of *Bedeguar*, which belongs to the title of astringents, as it is possessed of and celebrated for its astringent power; but it has hardly yet got a place in our dispensatories, and we are quite unacquainted with its powers.

TORMENTILLA.

THIS root, by its sensible qualities, and by its striking black with green vitriol, appears to be one of the strongest astringents of this order; and therefore it has been justly commended for every virtue that is competent to astringents. I myself have had several instances of its virtues in this respect; and particularly I have found it, both by itself and as joined with gentian, cure intermittent fevers; but it must be given in substance and in large quantities.

STELLATÆ.

APARINE.

THIS formerly stood in our dispensatory lists, but is now omitted in all those in which any correction has been attempted, and seemingly with great propriety. We expect, however, that at least materia medica writers will excuse us if we repeat any facts which have been asserted: and therefore I inform my readers that GIROLAMO GASPARI, a physician at Feltri, published at Venice in the year 1731 a small volume, under the title of *Nuove et erudite Osservazioni Mediche*: in which he tells us he had employed the aparine in scrophulous tumours and sores with great success, and that he had heard of others who had done the same; but this practice has not been taken notice of or confirmed by any other writers that I know of; and in some trials that I have myself made, it has been of no service.

GALIUM.

THE flowers of the *Galium luteum* have an agreeable odour, and their taste very gently acid and astringent; but I am uncertain if what grows in this country is the same with what grows elsewhere. The acidity and astringency of our plants is very inconsiderable;

and no pains which Dr YOUNG or I could take, found them to coagulate milk; and BERGIUS, in the Swedish plant, neither found any acidity, nor found it in three several trials to coagulate milk. He tells us also, in contradiction to BORRICHIVS, that in distillation it afforded no acid; but I imagine his experiment was different from that of BORRICHIVS, as this was without addition, whilst that of BERGIUS was with the addition of water. In the latter kind of distillations, an acid does not immediately arise, as it does in the former from almost every vegetable; and if BORRICHIVS found an acid arise more readily from the galium than from the acetosa, we would ascribe it to the succulency of the latter, as plants give out always first their more purely aqueous parts.

With respect to the virtues of the flowers of the galium in epilepsy, though it has been asserted by several, I am very doubtful of its power; and in several trials they have entirely disappointed me.

RUBIA TINCTORUM.

THE sensible qualities of this root do not give any favourable opinion of its medical virtues; and till lately it has not been much employed in practice: but within these fifty years, it has become very remarkable for its effect in giving its colour to the bones of animals who are fed upon it. This, with its giving colour also to the milk and urine of animals, shows that its colouring matter is carried into the mass of blood in considerable quantity, and distributed through every part of the system; and if we can suppose any active powers in such a matter, the circumstances mentioned would lead us to believe, that a matter so largely applied might be a very powerful medicine. We do not, however, find, that these powers have been yet ascertained; and the effects that large quantities of this root given to brute animals have in producing great disorders in their system, must render us doubtful of its general salutary tendency. That it may promote urine, we can believe from the testimony of many authors; but at the same time from my own experience I can assert, that, in many trials for this and other purposes, such an effect is not constant, nor has ever occurred to me.

As to its power and utility in the cure of jaundice, though it was employed by SYDENHAM, and formerly by the Edinburgh college, we pay no regard to it; considering the fallacy which has so generally taken place with respect to the medicines employed in this disease. As it takes so readily to the bones, it is speciously enough supposed that it might particularly operate upon these; and accordingly it has been recommended as a remedy in rickets, par-

ticularly by some French writers, who are with me of very doubtful authority. It does not, however, seem to have been known to the Italian practitioners, nor to Dr BOERHAAVE, nor to his commentator: and in several trials we have seen made with it, its effects have not at all been evident. Of late it has come into some repute as an emmenagogue; and I have received some testimonies of its effects as such from some physicians of this country, whose judgment I very much respect; but in all the trials that I have made with it, it has failed: and I know of other practitioners in this country, who, after several ineffectual trials made with it, have now entirely deserted its use.

VAGINALES.

ACETOSA.

THE acid juice found in the leaves of this plant is to be considered in another place; and it is the root only that can have a place here. This has some astringency, but too little to be employed in practice, where so many more powerful are readily to be had.

LAPATHUM.

UNDER this title the leaves and roots of a number of different plants have been employed; and in their qualities and virtues approach nearly to one another. In the leaves there is more or less of acid, which we are to consider in another place; and in their roots there is more or less of astringency, which gives them a place here. Which of them are the most powerful astringents, we find it difficult to determine. Dr ALSTON's account of the hydrolapathum is very strong, and appears to be well founded; but we know little of their employment in practice. The laxative quality, supposed to be in some of them, we know from trial to be very inconsiderable; and the virtues of the oxylapathum for the cure of the itch, we know also from trials to be none at all. The decoction may, like that of other astringents, be usefully employed in washing old ulcers; but the lapathum does not appear to have any peculiar power in this respect.

BISTORTA.

THIS, both by its sensible qualities and by the colour it gives with green vitriol, and by the extracts it affords, seems to be one of the strongest of our vegetable astringents, and is justly commended for every virtue that has been ascribed to any other. As such

we have frequently employed it, and particularly in intermittent fevers, and in larger doses than those commonly mentioned in materia medica writers. Both by itself and along with gentian, we have given it to the quantity of three drachms in one day.

Formerly the rheum stood in our list in this place; but as it is hardly ever employed for the sole purpose of astringency, and always or chiefly for its purgative quality, I have now referred it to what I think its proper place.

FILICES.

THESE comprehending what have been called the Capillary plants, form a natural order in botany, and in medicine show the power of a natural order, by having very much the same virtues. I have set down only two or three which had lately a place in our dispensatory lists, though in most of those of later date they are omitted.

ASPLENIUM.

THE several species of this show a slight astringency; for which, however, they do not deserve to be employed. In other respects they show no active powers; and there is nothing more ridiculous than their having been so long considered as pectorals.

FILIX MAS.

THE root of this plant has been long celebrated as an anthelmintic, but its sensible qualities do not promise much; and as it has hardly ever been employed but with some drastic purgatives, it is therefore to me still doubtful if it has any specific power in killing worms either of one kind or another. We more readily enter into this opinion, because in several trials of it made in this country, in cases of worms, the stomach bears considerable quantities of it without any uneasiness; but when given by itself, it had no sensible effects.

ACERBA.

I HAVE set down a number of fruits that agree in their sensible qualities; which are such as lead me to give them a place here among the astringents. They might also have had a place amongst the nutritia; but they are very seldom brought to our tables; and if at all employed, it is in medicine as astringent substances.

This country affords few of them; and therefore of several of them I have no exact knowledge of their qualities: but this country affords one of the most powerful of the whole, and that is the PRUNUS

SILVESTRIS, which I have often found an agreeable and useful astringent. It was formerly prepared as an inspissated juice; but as in that state it is less soluble and less readily active, the preparation of it has been properly changed into the form of a conserve; but I must remark, that in this both Colleges have in my opinion employed a larger proportion of sugar than is any ways necessary.

SUCCI INSPISSATI

UNDER this title I had formerly set down two particulars, the ACACIA and HYPOCISTUS, which are now no longer known in our shops, and they seem to be properly neglected, as by the accounts given of them they seem to have no peculiar properties; and their power as astringents is no greater than what we can find in other substances more within our reach.

TERRA JAPONICA.

THE production of this drug, formerly not well ascertained, is now put beyond all doubt by the labours of the ingenious Mr KER. See *London Medical Observations*, vol. v. p. 148. This substance is still frequently employed in practice, entering into several official compositions; and we judge it, when genuine, to be a powerful astringent: but whether it is so much more powerful than several British substances, as to engage us to employ this brought from a distant country, and very liable to be adulterated, we cannot positively determine.

Mr KER informs us, that this substance forms a considerable part of an ointment very much used in Indostan. The other ingredients of that composition are considerably astringent; and the whole leads me to make this reflection, that astringents are more frequently useful and necessary in ulcers than our surgeons have commonly thought: and that the use of them, so frequently commended by materia medica writers, is not upon such a slight foundation as I have formerly been ready to imagine.

[* This is, unquestionably, an important article, and I believe deserving of the praises which have been bestowed upon it. I have found it of evident service in some cases of obstinate intermittents. In these cases, however, I have commonly combined with the terra, the powder of gentian or columbo. In many cases of diarrhoea and fluor albus, it will be found an invaluable remedy. I have not, in general, employed the tincture, but have preferred a watery solution or suspension of the gum-resin, through the intervention of gum-arabic and sugar. It often purges. In fluor albus it may be advan-

tageously used, in the shape of injection : and gonorrhœa often yields to the medicine, in the same form.*]

SANGUIS DRACONIS.

This I have left standing in my list, because it remains still in all our dispensatory lists, though it seems very doubtful if it deserves a place. As it is absolutely insoluble in watery menstruums, it may be doubted if it be soluble in the animal fluids : and though it may be dissolved in spirits, and thus introduced into the stomach, the aqueous fluids which it meets with there must immediately precipitate it into an inert substance. We are therefore upon the whole, clear, that it should be expunged from our materia medica list. See what we have said above in the article of Alum upon the subject of the Pulvis Stypticus.

KINO.

This is a new acquisition to the materia medica ; and it has been adopted by the Edinburgh college as an officinal, but by no other college that I yet know of.

We are informed by Dr FOTHERGILL, that it is a gum which exudes from incisions made in the trunks of a certain tree called Pau de Sangué, growing in the inland parts of Africa ; but the botanical account of this tree we have not yet met with.

Both by its sensible qualities, and by its striking black with a solution of green vitriol, we have grounds for supposing it a powerful astringent : and we have found it prove to be such in several instances of diarrhœa. I am informed also by a good hand, of its having been useful in some uterine hæmorrhagies, particularly those after child-bearing. In some cases of fluor albus I have been disappointed of its effects, when employed by itself ; but the Edinburgh college have properly joined it with alum in the pulvis stypticus : and this composition proves one of the most powerful astringents I have ever employed. We are clear that, in making the tincture, the kino may be taken in larger proportion than it is in the dispensatory. As we have this gum, it is in larger proportion soluble both in watery and spirituous menstruums. The brandy tincture ordered by the Edinburgh college is a sufficiently agreeable and powerful medicine ; but in many cases the menstruum prevents its being given so largely as it may be in substance or in watery infusions.

CORTICES.

The astringent quality of vegetables is more frequently lodged in their barks than in any other part of them ; and there are per-

haps very few barks of a hard consistence in which there is not more or less of an astringent quality. This quality, however, is often joined with others of a more active kind, which prevents their being used as astringents; and I have therefore set down in my list only a few, in which a simple astringency prevails, and that of a powerful kind.

CORTEX GRANATORUM.

The strong styptic taste of this bark, and the black colour it strikes with green vitriol show sufficiently its astringent power; and it is commonly supposed to be among the strongest of this kind. As at the same time it gives out such a large portion of its substance to water in infusion or decoction, it seems to be particularly fit for affording a liquid astringent; and I have frequently found it particularly useful in gargles, in diarrhœa, and in external applications. That it is so powerful an astringent internally used as to be more dangerous than others I cannot perceive; and that it has ever had the power of suppressing the menses in females seems to me very doubtful.

CORTEX QUERCI.

THIS is the bark that is considered as the most powerful of the vegetable astringents; and its universal use and preference in the tanning of leather renders the opinion very probable. Accordingly it has been much employed as an astringent medicine, and commended for every virtue that has been ascribed to astringents, either internally or externally employed; but except its degree of power, it has no peculiar qualities to distinguish it from other astringents. I have frequently employed the decoction with advantage in slight tumefactions of the mucous membrane of the fauces; and in several persons liable upon a slight application of cold to a prolapsus uvulæ, and a cynanche tonsillaris. In many cases this decoction, early applied, has appeared useful in preventing those disorders which otherwise were wont to arise to a considerable degree. I have indeed almost constantly joined a portion of alum to these decoctions; but I have frequently found that a solution of alum alone, of the strength it could be conveniently employed in, did not prove so effectual.

I have employed the oak-bark in powder, giving it to the quantity of half a dram every two or three hours during the intermissions of a fever; and, both by itself and joined with camomile flowers, have prevented the return of the paroxysms of intermittents.

All these virtues, in a considerable degree, are found to belong to the cupulæ or scaly cup which embraces the bottom of the acorns.

GALLÆ.

ALTHOUGH these substances are the work of animal, we consider them as entirely of a vegetable, nature, and put them here immediately after the oak bark, as they are an excrescence from the same tree, and a substance of the same qualities with the bark we have been just now treating of. It is supposed to be the most powerful of vegetable astringents; and I am ready to believe it to be so, though it has not been employed so often, or in such a variety of cases, as many others have been. About the beginning of this century,* in some parts of France the Gallæ had got a reputation for the cure of intermittent fevers; and it was pointed out as a proper object of attention to the Academy of Sciences; who accordingly appointed Mr POUFART to inquire into the matter. His report may be seen in the Memoirs for the year 1702. It amounts to this, that in many cases the galls cured the intermittents; but that it failed also in many cases in which the Peruvian bark proved effectual. BERGIUS is of opinion, that the practice with the galls is very mischievous; but in employing them with gentian or other bitters I met with no bad consequences.

In this country of late a particular use of galls has prevailed. Finely powdered, and mixed with eight times their quantity of hog's lard, they are made into an ointment; which, applied to the anus, has been found to relieve hemorrhoidal affections; and we have known some instances of its being useful.

As, however, it has been more frequently employed by the vulgar than by the advice of our physicians and surgeons, we cannot say how far it has been universally safe; but so far as I can learn, it has not been commonly hurtful: and there is reason to believe it to have been certainly useful in the cases of Exania, that is, in cases of a topical rather than of a systematic affection.

VISCUS.

THOUGH it is pretty certainly established that the misletoe does not differ in its qualities from a difference of the trees on which it grows, yet if it was to be mentioned at all, I thought best to do it in this place, as it is almost always the viscus quernus that has been pointed out by writers.

Although, upon the recommendation of COLBATCH, this plant was not very long ago in high repute for the cure of epilepsy, his facts

* The 18th century.

have so entirely lost their credit, that it is entirely omitted both by the London and Edinburgh colleges. As still, however, remaining in the lists of several of the lately improved pharmacopœias, we have given it a place here. It is, however, only to say, that from its sensible qualities, and from several trials made with it in practice, that it seems to be a substance of very little power in medicine.

I am surprised at Dr HALLER's quoting so many authors for the accounts of its virtues; and humbly think that he might not only have omitted the report of its effects against the power of witchcraft, but also of the many others which he quotes.

LIGNUM CAMPECHENSE.

THIS wood is of a considerably astringent quality, and its use in dyeing is a sufficient proof of it. It has not, however, been employed, except in the case of fluxes, and it is alleged to have been very useful in dysenteries; but we judge this to have been at the end of these only, when the disease was in the state of diarrhœa; for it was from the employment of this very medicine in the beginning of dysenteries, that I learned what mischief arose from the use of astringents in the beginning of that disease.

It is employed in decoction or in extract; and it was in both shapes that I observed it to have the effects just now mentioned. Dr ALSTON has given this opinion, that if the lignum campechense be useful in fluxes, it is not by its astringency: but upon what that opinion was founded I cannot perceive; for it is certainly an astringent, and I cannot discover any other quality in it by which it can be medicinal.

In the table of medicines which I made out for my lectures on the materia medica, and which was published with the spurious edition of those lectures, after throwing the astringents into assortments as well as I could, I set down a number of substances which I could not refer to any general heads; and I was then, like many other persons, treating of the materia medica, willing to multiply my subjects: but now, not willing to admit any but those of some power and efficacy, I have omitted a great number of my former list; such as the *Anchusa*, *Brunella*, *Hypericum*, *Plantago*, *Sanicula*, and *Sedum*, as not deserving a place here. Some of the others, as the *Millefolium* and *Uva Ursi*, I refer to other titles; and therefore of my former list there remain only the few following to be taken notice of here.

BALAUSTIA.

THESE flowers discover no other quality than that of astringent; but they shew this in a considerable degree. I am, however, of BERGIUS's opinion, that they are less powerful than the bark of the fruit.

LYTHRUM.

THIS has been hardly known as a medicine till the late Dr DE HAEN published his experience of it in his *Ratio Medendi*. His testimony in its favour is very strong, and it is confirmed by some others. Mark, however, the fallacy of experiment: Professor MURRAY found it useful in the case of lientery; but in other cases it seems frequently to have failed: and HEUERMAN, in employing the flowers, found it rather to increase the diarrhœa, and otherwise to raise so much disorder, that he ceased to employ them. From the sensible qualities of the whole, either with respect to astringency or mucilage, I would not expect much from it; and from some trials made, I have no opinion of its efficacy.

After thus enumerating particular astringents, I have set down in my list some general titles of medicines that have a place elsewhere, but which may be, or are supposed to be, useful as astringents. And, in the first place,

ACIDS, as *Astringents*.

ACIDS have a very various and complicated operation, according to their different degrees of concentration, which will be considered when we come to treat of them in their proper place; and here we are only to view them as they belong to our present title of astringents.

Acids, under a certain degree of concentration, as they coagulate the fluids, so they harden the solids composed of these, and thus prove astringent. Whether, however, the astringency which they show even in a very diluted state depends upon their coagulating power, I dare not assert; for they certainly show it in a state in which they do not coagulate the fluids. Although, from the effect of vinegar upon the lips, we can readily discover their astringent power, yet how this is consistent with a stimulant power, which the same state of acid also shows, we cannot readily say, but shall consider it hereafter.

The astringent power which acids exert upon the vessels of the skin is supposed to go deeper, and to affect the subjacent muscu-

lar fibres so far as to be useful in recovering the relaxation and weakness that takes place in the case of sprains. I believe, however, that their operation in this case is only by a communication from the vessels of the skin to those of the subjacent parts; by which they are useful in preventing the afflux of fluids to the part, and the tumour that would thence arise: and it is in this manner that they are particularly useful in contusions.

The acid commonly employed for these purposes is vinegar: but whether a more concentrated acid might not be employed, I cannot certainly determine. From some trials, however, I am disposed to judge that the fossil acids under a certain degree of dilution might be employed with advantage.

In another view, acids are supposed to act as astringents, as they are employed internally for restraining hemorrhagy, and practitioners have frequently found them in this manner useful. But considering the quantities in which only they can be introduced, we cannot suppose that they are so distributed in the mass of blood as that they can act as astringents upon the open blood-vessels; and therefore their effects here must be ascribed to their refrigerant power, to be considered more fully hereafter.

Although not mentioned in my present catalogue, there are some titles given in that annexed to the spurious edition of my lectures, which it may be proper to repeat here.

AUSTERE WINES.

THIS title only leads me to observe, that acids joined to astringents produce the qualities of austere and acerb, and in certain cases seem to increase the astringency. Wines, therefore, which have some austerity, are justly supposed to be more astringent than the smooth and sweet wines. From hence there may be a choice of wines in certain cases of disease; but the astringent power of wines can never be considerable, and must be generally counteracted by the alcohol that is at the same time present. It is therefore, that, to obtain the astringent virtue of wines, they must be exposed to such a heat as may dissipate their alcohol while their astringent matter remains; and thus what are called Burnt Wines, joined with the aromatic astringency of cinnamon, sometimes prove an useful medicine.

BITTERS, *as Astringents.*

BITTERS certainly do sometimes show the effects of astringents, and therefore I judge it proper to mention them here; but how far

they are, or in what manner they act, as astringents, I refer to be considered in my next chapter, which is to treat of tonic medicines.

SEDATIVES, *as Astringents.*

EVERY body knows that sedatives, and particularly opium, are employed in restraining excessive evacuations; and therefore this has been supposed, and frequently spoken of, as an astringent: Certainly, however, neither in opium, nor in any other narcotic sedative, can any astringent quality be discerned; and there is hardly any doubt that their operation in restraining excessive evacuations is entirely by suspending the irritability and action of those moving fibres, whose increased action produced the evacuation. How far they are properly employed in place of the proper astringents, I shall consider hereafter under the title of Sedatives.

There is another kind of sedatives which are frequently employed for restraining excessive hæmorrhagy, and might therefore also be considered as astringents. These are the several neutral salts, and particularly nitre; all of which I am to consider hereafter under the title of Refrigerants. In the mean time it will be plain, that their operation in restraining hæmorrhagy cannot be ascribed to any astringent quality, which they do not in any way discover, but must be owing to their general power of diminishing the activity of the sanguiferous system, which we shall consider in its proper place.

BALSAMICS, *as Astringents.*

BALSAMICS have been employed for restraining the evacuations that occur in gonorrhœas, gleet, and fluor albus, and therefore show the effects of astringents. It will be obvious, however, that they do not this by any proper astringent power; and in what manner they do it, I shall endeavour to explain in its proper place hereafter.

CHAPTER II.

OF TONICS.

THE treating of these here breaks in upon our general plan of considering separately the medicines which act upon the simple solids, and those which act upon the nerves and moving fibres; but I have found that such a plan could not consistently, or with ad-

vantage, be every where followed, and that in some instances it would be better to consider medicines by the affinity of their effects rather than by their manner of operating.

It is this that has led me, after considering astringents, to treat here of tonic medicines; which, by giving firmness and strength to the whole system, and thereby to particular parts, have an effect analogous and similar to that of astringents: and I shall have occasion to observe, that by the astringent and tonic power combined, some of the most valuable purposes of both are with greater certainty to be obtained.

We enter, therefore, now upon the consideration of tonics: and shall, in the first place, inquire a little into their manner of operating; in the next place, consider the effects that are in common to a great number of them; and, in the third place, treat of the pharmaceutic treatment and administration which may also be in common to many of them. After all this, I shall enumerate the chief of the substances that may be referred to this head, in order to determine in what degree they possess the general properties, or what may be peculiar to each of them.

We have already taken pains to show that the tone of the moving fibres may depend partly on the mechanism of these fibres, but probably also upon the inherent power or state of the nervous fluid, as particularly modified in those fibres. If this last position be well founded, it will follow that, whilst on different occasions the tone of the moving fibres may be stronger or weaker, this may depend upon the state of the nervous power in the moving fibres being for the time different; and as this power may be acted upon and variously changed by substances applied to the body, we may allow that there are substances which, applied to the moving fibres, may induce that state of the nervous power upon which their tone depends.

Astringents, we have observed, prove often tonics with regard to the moving fibres; and it will be readily presumed, that they have that effect by acting upon the solid part of the fibre: but we shall find, that there are tonic medicines which discover no astringent quality; and therefore their action must be upon the inherent power.

These are the substances which are especially to be called Tonics: and I now proceed to inquire what these substances properly are.

With respect to this, it appears pretty clearly, that the tonic power of substances is chiefly the same quality that gives them their bitter taste: for, except the astringents, I know no other sub-

stances possessed of tonic power but the bitters. These indeed have frequently other qualities combined with the bitter, as that of aromatic, saline, narcotic, purgative, or otherwise variously stimulant; and these other qualities are often so prevalent in the composition of certain substances, as to prevent our employing their bitter quality as a tonic: but we can, upon many occasions, distinguish the bitter from all these other qualities, and find that the purest bitter, or what is free from all other qualities, is possessed of a considerable tonic power: And therefore we conclude, that, except in so far as astringents may be such, the proper tonics are the bitters, and perhaps these only. We go on, therefore, now to consider them as such.

Bitterness is a simple perception that cannot be defined, but must be referred to a matter of experience in which mankind are commonly agreed. What is the nature of the substances possessed of it in a chemical view we cannot determine, or at least we can only in a negative way distinguish it from other matters.

Thus we can say, that bitterness does not depend upon any volatile parts, for the purest and strongest bitters have no smell; and if there are some bitters which give a smell, that again is commonly lost on drying, while the bitter taste and quality remain entire.

In another view, the bitters are without volatile parts, as the purest kinds of them give out in distillation no essential oil; or if some of them do, the oils are without bitterness, and show very clearly, that the bitterness of the entire substance did not depend upon the essential oil in their composition.

We learn also, otherwise, that bitterness does not depend upon any such oil in the composition of their substance, as some of the strongest bitters are quite free from any acrid or aromatic quality.

Neither can I find any thing distinctly saline in the composition of bitters. There are hardly any of them which to our taste discover any saline matter except in a few substances, in which some acid happens to be conjoined; but the strongest bitters are absolutely free from any such quality: and so far are acids from entering into the composition of the bitter, that we shall hereafter show the combination of acid to have a tendency to destroy the bitter quality. With respect to any other saline matters to be alleged in the composition of bitters, it is true, that, by particular processes, saline matters can be extracted from bitter substances; but as these saline substances are not extracted, but produced by a destruction of the original mixture, and as nobody has shown that the saline matters are in any certain proportion to the bitterness of the sub-

ject, or that they modify it in any certain manner, we cannot make use of any such analysis in explaining the natural composition of bitters.

Upon the whole, I must allege, that in a chemical view, we cannot explain the nature of bitters. It is a composition *sui generis*, that we can in many cases distinguish from all others; and if in any case we have learned to change its condition, it is from particular experience, and not from any knowledge of its constituent parts.*

Before we enter upon what experience has taught in this respect, it will be proper to consider the various purposes in medicine to which bitters may be applied. And as in this view the bitters in their operation on the human body have many of them the same qualities and virtues in common, we think it may be useful to consider, in the first place, what these common qualities are.

First, then, the most obvious operation of bitters is, that being taken into the stomach, they increase the appetite for food, and promote the digestion of it. But we take it for granted, that these functions depend upon the tone of the muscular fibres of the stomach; and therefore may suppose, that the improvement of these functions depends upon an increase of tone in those fibres. And farther, as loss of appetite and indigestion can often be distinctly perceived to occur from a loss of tone in the stomach; so bitters, as they are often effectual in curing these disorders, may be presumed to do it by restoring the tone of this organ.

The correcting the acidity and flatulence of the stomach, may be ascribed to the power of bitters in checking acescent fermentation, which they do out of the body; and the relieving the stomach from abundant mucus or phlegm, as it is called, may be ascribed to the power of bitters in dissolving viscid animal fluids. As it is, however, probable that both the prevalence of an acescent fermentation in the stomach, and a superabundance of mucus in it, are commonly owing to a loss of tone; so the correction of those disorders may be ascribed more properly to the tonic power of bitters with respect to the human body, than to their chemical qualities.

There is, then, hardly any doubt, that bitters are powerful tonics with respect to the stomach; and there being as little doubt, that the state of the stomach is commonly communicated to the other parts of the system: so it is sufficiently probable, that by an improvement of digestion, the vigour of the system may be in general

* The chemical nature of bitterness, which some writers have been pleased to call a principle, (*principium amarum*) has lately been investigated, by several eminent chemists.

improved; and that also the tone, and consequently the activity of the whole of the moving fibres, may be increased.

It has been commonly supposed, that bitters are useful in resolving visceral obstructions: and if they shall be found to do so, I would maintain that they have no considerable operation upon the state of the fluids, and therefore that their effects in curing visceral obstructions must be ascribed entirely to their tonic power; although it may not be improper by the way to remark here, that in all cases where I could find the existence of visceral obstructions well ascertained, I have seldom or never found any benefit from bitters, though largely employed.

On the same occasions that *materia medica* writers recommend bitters as useful in visceral obstructions, they particularly recommend and extol their use in the jaundice: but that the judgment of these writers in this matter is fallacious, we have endeavoured already to show.

In speaking of the power of tonics in resolving visceral obstructions, we must observe, that upon the tonic power of bitters in strengthening every where the extremities of the vessels is founded their utility, so frequently reported in the cure of dropsy. As this disease so frequently depends upon a loss of tone in the whole system, which gives the state of cachexy, and thereby that laxity of the exhalents which constitutes the hydropic diathesis; so, if such a state does not depend upon some considerable and fixed visceral obstructions, it is obvious, that our tonic bitters may be of great service, may obviate a coming on dropsy, or even cure it when formed.

It has been alleged, that bitters sometimes operate as diuretics. And as the matter of them appears to be often carried to the kidneys, and to change the state of the urine, so it is possible, that in some cases they may increase the secretion: but in many trials we have never found their operation in this way to be manifest, or at least to be any ways considerable. In one situation, however, it may have appeared to be so. When in dropsy, bitters moderate that exhalation into the cavities which forms the disease, there must necessarily be a greater portion of serum carried to the kidney; and thereby bitters may, without increasing the action of the kidney, seem to increase the secretion of urine.

That the tonic power of bitters in the stomach is communicated to the other, and even the most distant parts of the system, appears strongly, from their being a cure of intermittent fevers, and a special means of preventing the return of their paroxysms.

I have explained elsewhere, and need not repeat here my opinion, that the recurrence of the paroxysms of intermittent fevers depends upon the recurrence of an atony in the extremities of the arterial system. It is from hence, accordingly, that the recurrence of paroxysms is prevented by stimulants and by astringents; and if the same is also done by bitters, it must be by a tonic power communicated from the stomach to the most distant parts of the system. In this case, however, the bitters do not act as stimulants, for they do not increase the frequency of the pulse, nor the force of the circulation; nor do they act as astringents, because they do not always possess any such quality; and therefore they must in such cases act purely as tonics.

To prove the operation of tonics in curing intermittents to be an operation on the nervous system, we maintain it to be a communication from the stomach; for their effects, after being taken in, often appear sooner than they can be supposed to be carried further than into the stomach, and certainly sooner than the quantity employed can be distributed, so as to have any local effects on the parts affected by the morbid state.

It may be remarked here, that the effects of bitters are more certainly obtained by their being combined with astringents, which, however, does not derogate from the power of the simple bitter; for from my own experience, as well as from the report of other writers, I know that the most pure and simple bitters are often sufficient for the purpose.

They are by some writers said to have been useful in continued fevers; and if these fevers have been of the putrid kind, and attended with great debility, we may readily allow the fact; and that some reports of their having been useful even in the plague itself are probably well founded.

Their use, however, in continued fevers is somewhat ambiguous, as tonic medicines must promote the phlogistic diathesis of the system; and therefore, wherever such diathesis prevails, our tonics must be hurtful.

Bitters have been sometimes spoken of as sudorifics; and though they do not stimulate the sanguiferous system, yet as they invigorate the force of this system, they must determine it more fully to the surface of the body, and probably support perspiration; but so far as I can perceive, they never occasion sweating, except by the assistance of a sudorific regimen, that is, by their being taken in a very diluted state, considerably warm, and in considerable quantity, while the person lies a-bed closely covered up.

In mentioning the operation of bitters on the stomach, I should have taken notice of their effects when further carried on in the alimentary canal. And with respect to these, it may be observed, that we have always found a large dose of bitters prove pretty certainly laxative; and this, with the analogy from bile, makes me judge, that bitters, besides their tonic power, have a peculiar power of stimulating the intestinal canal: and, therefore, that they may be useful, as is alleged, in spasmodic colics, or in dispositions to that disease, and particularly that they may be useful in dysentery; in which some constriction of the intestines taking place, renders purgatives and laxatives so generally necessary.

Another virtue ascribed to bitters is their proving emmenagogue; but I have never perceived that they had any specific power determining them to the uterus. In cases of chlorosis, their tonic power is certainly useful; but I have never known that these alone afford a cure.

Several writers take notice of bitters in general, and of some of them more particularly, as resolving the coagulations produced by falls and contusions; but as we do not believe in their power of changing the state of the fluids, so we cannot trust to their operation in this case; and I have not met with any experience to establish it.

There remains only one operation of bitters internally employed; and that is their proving anthelmintic, and a poison for worms. There is one instance reported of their even mitigating the pains arising from a tænia; but we do not find any account of their ever expelling that kind of worm. It is said to be the lumbrici teretes to which they are especially adapted; but from REDI's experiments it appears, that bitters are not an immediate poison to those animals; and Professor MURRAY properly observes, that if the semen santonicum, according to BAGLIVI's experiments, operates more quickly, it must be by something else than its bitterness that this seed operates. I am uncertain if I have ever been possessed of the best kind of this seed; but must say, that what I have seen has hardly ever appeared to me to be a powerful medicine.

After considering, in so many instances, the internal use of bitters, we must observe, that they have also their virtues when externally employed. They have been commended for cleansing and healing foul ulcers; and in that way we have found them useful. They are certainly antiseptic, though not of the most powerful kind; but in checking the progress of gangrene, they have often been useful.

They are universally employed in fomentations for discussing tumours; but in cases where the skin is entire, the more pure bitters which have no volatile parts can hardly be of much service. It is therefore the bitter joined with some aromatic parts in their composition which only can be useful here; and if even these can do much more than warmth and moisture alone, is with me very doubtful.

The operation of bitters hitherto considered seem, so far as they go, to be tolerably explained: but there is an effect of them still to be mentioned which gives more difficulty; and that is, their being a cure of the gout that has been often ascribed to them.

The fact is certain; and there are accounts from the time of GALEN to the present, which show that the use of bitters, such for example as the Portland powder, continued for some time, has prevented the return of paroxysms of inflammatory gout, which had before, in the same persons, been frequent: but in what manner they do this is truly difficult to explain.

The pathology of the gout under its various states and circumstances is truly a difficult subject; and except it be DR STAHL and his followers, all other physicians, very universally attached to a humoral pathology, have supposed the gout to depend upon a peculiar morbid matter present in the body; which, however, is neither proved in fact, nor explains the phenomena of the disease.

In my *First Lines* I have given a different view of the subject; but am afraid that, to the most part of physicians, little attentive to the motions of the nervous system, I have involved the subject in still greater obscurity. I cannot indeed obviate this here; but, well persuaded of the truth of the general doctrine, shall try it, by endeavouring to explain in what manner bitters operate in seemingly curing the gout.

I believe it to be very evident to every body, that the phenomena of the gout have a constant connection with the state of the stomach, and particularly that a certain strength of tone in this organ is necessary to produce a paroxysm of inflammatory gout. At the same time, however, I am of opinion with DR SYDENHAM, that every paroxysm of inflammatory gout is introduced by a state of atony in the stomach. How this atony gives occasion to the recovery and exertion of tone I cannot indeed explain; but as it appears in fact to be so, I would allege, that though the previous atony be a necessary step in the series of phenomena, it is only when in a moderate degree, and may be easily overcome by the *vis medicatrix nature*; but that if the atony go to a certain greater degree, no inflamma-

tory paroxysm ensues ; and the person remains in that state which I have called the atonic gout ; and it seems as if bitters, long continued in use, actually produce this greater degree of atony, so that they prevent inflammatory paroxysms.

This is the explanation I would give of their effects in this way ; but I own it is difficult to explain how bitters, which are otherwise in so many cases the most powerful tonics, should have in this a contrary operation. Without venturing, however, to offer any theory of this, I rest upon it as a matter of fact, that bitters actually destroy the tone of the stomach. I dare not determine, whether the loss of tone mentioned is produced merely by the repetition of their tonic operation, or by a narcotic quality which has been suspected in wormwood and other bitters, and which appears pretty strongly from the poisonous quality that is found in the strongest bitter we are acquainted with ; that is, the *Faba Sti Ignatii*. I am truly of opinion, that somewhat deleterious in the whole of the bitters is to be suspected. But I prosecute this subject no farther here ; and shall rather enter upon a question of more importance, which is, to determine whether this remedy for curing the gout can be safely employed.

On this subject it appears clearly, that, from very ancient times down to the present, such a medicine has at different periods been recommended and employed for the gout ; and, as always on its first coming into use, it seems to have been of service, it might have been expected, that if it had not in its consequences been found hurtful, the use of it should have been continued with every gouty person ; so that this disease should have long ago ceased to be one of the *opprobria medicorum*. We find, however, that whilst at one period it has been in high favour, at another it seems to have been entirely neglected ; and this I can only impute either to its often failing, or to its being often attended with consequences more grievous than the pains of the gout. That the latter was the case, we may presume from the accounts of the ancients, who, though they recommend the remedy in certain constitutions as highly useful, allow that in other cases it had been highly pernicious ; and in this respect I would take the account of *COELIUS AURELIANUS*, as quoted by *DR CLEPHANE*, to be very general.

The effects of it in modern times have been very much upon the same footing. It is possible that several persons may have taken the Portland powder, and other bitters, with seeming great advantage ; but I have not had opportunity to know the sequel of the whole of such persons lives, so as to say positively how far in any

case the cure continued steady for a life of some years after, or what accidents happened to their health.

But I have had occasion to know or to be exactly informed of the fate of nine or ten persons who had taken this medicine for the time prescribed, which is two years. These persons had been liable for some years before to have a fit of a regular or very painful inflammatory gout, once at least, and frequently twice, in the course of a year : but after they had taken the medicine for some time, they were quite free from any fit of inflammatory gout ; and particularly, when they had completed the course prescribed, had never a regular fit, or any inflammation of the extremities, for the rest of their life.

In no instance, however, that I have known, was the health of these persons tolerably entire. Soon after finishing the course of their medicine, they became valetudinary in different shapes ; and particularly were much affected with dyspeptic, and what are called nervous complaints, with lowness of spirits. In every one of them, before a year had passed after finishing the course of the powders, some hydropic symptoms appeared, which gradually increasing in the form of an ascites or hydrothorax, especially the latter joined with anasarca, in less than two or at most three years proved fatal. These accidents happening to persons of some rank, became very generally known in this country, and has prevented all such experiments since. In illustration and confirmation of all this, see Dr CLEPHANE'S Observations in London Med. Observ. vol. i. art. 14. Chirurgical Pharmacy, page 341. HALLERI Epistola, vol. v. p. 5. and GAUBIUS, in the Works of the Harlem Society, vol. iv.

Before quitting the subject of the gout, we must remark, that in many writers on the materia medica, reports are to be found of benefit received from bitters in cases of stone and gravel. I have never tried them with that view ; but from the affinity that subsists between the gout and stone, I can readily believe, that the bitters that are found for some time to prevent the paroxysms of the gout, may also prevent paroxysms of the stone.

After having thus considered the general virtues of bitters, I am to offer some general remarks with respect to their administration and pharmaceutic treatment.

The medicinal part of bitters of every kind may be extracted by either watery or spirituous menstruums, and such extractions may have the virtues of the substance from which they have been taken : but I maintain, that hardly in any case they ever have it in the same degree ; and that, wherever it can be admitted, the bitter in substance is the most effectual, and in some cases the only effectual,

mode of exhibiting it. This every body knows to be the case with the Peruvian bark; and I have found the same to be the case in all my attempts to substitute other bitters in place of that bark.

There are cases, indeed, in which the stomach will not bear either the bark or bitters in substance, and therefore it becomes often necessary to obtain their virtues in a liquid form; in the management of which, however, several particulars demand attention.

By infusion in water, and even in cold water, bitters give out their virtues; but to cold water they never give a strong impregnation, though it be generally the most agreeable to the palate and stomach. Warm water, though under the boiling heat, extracts more powerfully than cold, and the more as its temperature is warmer. With respect to every temperature, this is especially to be attended to, that by infusion bitters suffer a gradual decomposition, and consequently the matter extracted is different according to the length of time that the menstruum has been applied; so that the temperature being given, what is extracted in the first hours is a lighter and more agreeable matter than what is extracted after many hours infusion.

This we have tried with several bitters, infusing the same quantities of the bitter in the same quantity of water, and setting all of them in the same degree of heat for six, for twelve, for twenty-four, and for forty-eight, hours. In every experiment, it appeared that the impregnation was stronger according to the length of time employed in infusion, and at the same time that the harshness of the taste was sensibly increased. This, however, was remarked, that the difference of the impregnation was not so remarkable in the longer infusions as in the shorter; and therefore the impregnation did not appear in the forty-eight hours so much in proportion stronger than that of twenty-four hours, or so great as that of twenty-four compared with that of six. On the other hand, it appeared that the harshness of taste increased according as the infusion was longer; and therefore the harshness of taste was not so much increased from the twenty-four hours above that of six, as it was in the forty-eight hours infusion above that of twenty four. From all this we conclude, that an infusion of twenty-four hours is sufficient for impregnation, and that little harshness will be produced by infusions of a shorter time; and therefore a sufficiently useful, and the most agreeable, infusion of bitters in cold water, or even of warm water under the boiling heat, will be that of twenty-four hours, or perhaps less. The London college, in limiting their infusions even

of boiling water to a single hour, seem to be more nice than is necessary.

The treatment of bitters by cold infusion in wine, is, with respect to extraction, much on the same footing with the treatment by water. It does not appear that wine extracts the medicinal qualities more powerfully than water, or in any instance gives a more efficacious medicine, excepting where the wine concurs in the intention of it as a medicine. It is, therefore, almost only for the purpose of a more agreeable medicine that bitters are infused in wine.

A still more powerful extraction is made of bitters by a boiling heat; and here also the same difference arises from the length of time employed in decoction. With respect to bitters, it is certain that decoction extracts more powerfully than infusion: but by dissipating any aromatic parts that were joined with the bitter, and by extracing more of the earthy part, and what may be called a coarser bitter, decoctions are always more disagreeable than infusions; and therefore what we call extracts, which are always prepared by decoction, are always less agreeable to the stomach than the bitter in substance. It appears to me that decoction decomposes the substance of what is extracted; for it is seldom that decoctions do not upon cooling deposite a part of what they had suspended before, and that also a matter different from the entire substance. What is exactly the nature of the matter impregnating decoction, has not been duly examined; but we say no more of that here, as it is pretty certain that bitters are never treated by decoction, so as to be either agreeable or very useful medicines.

Besides the ordinary treatment by infusion or decoction, bitters may be treated by the application of water in two other ways. One is, by what I call a Trituration, in the manner of the *COMTE DE LA GARAYE*. In this practice, the substance is broken down into very minute parts; but so far as I can perceive, without any decomposition or division of its constituent parts.

The only separation which seems to be made is that of the more soluble from those of a firmer texture; and so far as these more soluble parts possess the medicinal qualities of the subject, they are obtained very entirely, and that in a state more than any other agreeable to the human stomach. They seem to be much in the same state as they are obtained by an infusion in cold water; which by a proper evaporation affords the same sort of matter that is obtained by the *COMTE DE LA GARAYE*'s apparatus. In either way, we may obtain an efficacious and an agreeable medicine; but it is to be

doubted, if the expence incurred in the preparation will ever allow it to come into much use.

The other management of the application of water, different from the common, is that by the use of a digester. Decoctions are commonly made in open vessels, or in vessels not so accurately closed as to prevent the dissipation of volatile parts; but this can be obviated by the use of a digester: and though in the glass digester we employ, the heat applied can be conveniently no more than that of boiling water, yet we find that medicinal substances can be extracted by this apparatus as powerfully as by decoction, and with this advantage, that the volatile parts which either were a part of the substance that is to be extracted, or were added to it for the purpose of rendering it a more agreeable or a more effectual medicine.

Bitters are universally extracted by spirit of wine, and even by a proof-spirit, not so largely indeed for the most part as by water, but in most instances their medicinal parts are extracted more purely; and the tinctures, when they can be employed in tolerable quantity, seem to be more efficacious medicines than any infusions or decoctions in water.

With respect to the tinctures made with a proof-spirit, the same things are to be observed as of those made with water, that there is a gradual decomposition of the substance, and therefore that the tinctures made by a short infusion are more agreeable than those that have stood longer. It should have been observed before, that a spirituous menstruum extracts those bitters that have any aromatic joined with them, more entirely and effectually than is done by water; but in obtaining the spirituous extract, if this be done by drawing off the spirit by distillation, this advantage is commonly entirely lost.

With respect to both the extractions by water and by spirit, this is to be remarked, that the most agreeable bitter is to be obtained by a short infusion; and a stronger impregnation of the same agreeable bitter is only to be got by a repeated cohobation of the same menstruum upon fresh parcels of the same material.

This further is to be remarked, that watery infusions, if made tolerably strong, prove very disagreeable; and the employment of the tinctures with rectified spirit will always be limited by the menstruum; and therefore the tinctures made with proof-spirit will always give the most convenient extraction: and I have found that the employing a digester for brandy tinctures makes a more powerful extraction than can be got by long infusion, and that with very little trouble.

Having now said what relates to bitters in general, we proceed to examine how far the general virtues prevail in the particulars of our list, or under what peculiar modifications they are to be found.

PARTICULAR BITTERS.

GENTIAN.

I BEGIN with this root, because I find it to be a most simple and pure bitter, more perfectly free from any of that aromatic or astringent quality which is so frequently conjoined with others: At the same time it is a pretty strong bitter, and has every virtue that has been ascribed to bitters in general, which we have detailed above.

It has been at all times, and still is, much employed in medicine: and with respect to its pharmaceutic treatment and administration, every thing that we have said above with respect to bitters in general is applicable to this. There is some variety in the formulæ; but the differences are of no importance. DR WHYTE'S tincture has been justly commended; but the virtues of it depend more upon the Peruvian bark than upon the gentian.

The febrifuge virtues of gentian have by some writers been made equal to those of the Peruvian bark: but in many cases the gentian alone has fallen short of that; but joined with galls or tormentil in equal parts, and given in sufficient quantity, it has not failed in any intermittents of this country in which I have tried it.

A medicine has been long famous and much employed in this country under the title of STOUGHTON'S Elixer. The present elixer stomachicum, or tinctura amara of the last editions of the Edinburgh dispensatory, resemble it very exactly, and I am certain has all the virtues of it. This, however, as DR SHAW has advised, may be further improved, by pouring the tincture upon a fresh parcel of the materials in half the quantity of those first employed.

There has been some question about the species of gentian most fit to be employed. The *gentiana lutea* is chosen by the British dispensatory; but if in Germany they employ the *gentiana rubra*, it will make very little difference. In Norway they employ the *gentiana purpurea*, and perhaps with advantage. For some time past we have had the root of this species imported into this country under the title of *Cursuta*, so named from the Norwegian name of it, *Skarsote*. Some persons have thought it a stronger bitter than the common gentian, or root of the *gentiana lutea*: but I know of no experiments made for proving this; and it appears to me in its sensible qualities to be very much the same with the common gentian.

CENTAURIUM MINUS.

As this is a species of gentian, it has the virtues of the genus, and has been commended for all the same qualities as gentian or other bitters. The centaury, therefore, is not very scientifically introduced, as commonly done, into the same compositions with the gentians. Professor MURRAY properly observes, that as an indigenous plant it may be properly preferred to a foreign drug; but I find it inconvenient to employ the centaury, as in an equal weight it takes up more of the menstruum than the root of the gentian: and if it is to be taken out by expression, it spoils the elegance of the infusion or tincture. Dr LEWIS has justly observed that the petals are insipid, or at least have very little bitterness; and it is therefore improperly that the summitates are commonly prescribed. It is said that the extract of this plant is less agreeable than that of gentian; but I find no difference between them, and think it should be constantly substituted for that of gentian, as it may be more cheaply prepared.

* CHIRONIA ANGULARIS.

[*THIS is the vegetable, called centaury, which is so much employed in the practice of the United-States. It is, in all respects, equal to the centaurium minus: in some respects, it is superior. Its flowers (*corollæ*), which are large, are not insipid, but very considerably bitter, and therefore properly employed, along with the *folia*, and other parts of the plant.*]

* FRASERA.

[*THIS is a North-American vegetable, and a new accession to the materia medica. It is well known by the name of *columbo*. Its root is a pretty pure bitter, and is deserving of the attention of practitioners, especially American.*]

QUASSIA.

WE can find nothing in this wood but a pure and simple bitter. In several specimens I have found the bitterness to be pretty strong; but for the most part it is, to my taste, not more bitter than the *columbo*, nor even than good gentian. We are obliged to professor MURRAY for his compilation on the subject of quassia; but after all that has been said by him and Mr EBELING, we find hardly any virtues ascribed to quassia which have not been to other bitters. Upon the whole, I believe quassia to be an excellent bitter, and that it

will do all that any pure and simple bitter can do : but our experience of it in this country does not lead us to think it will do more ; and the extraordinary commendations given of it are to be ascribed to the partiality so often shown to new medicines, and especially by those who first introduce them, and by those who have a connection with the country from whence they are brought.

SIMARUBA.

I insert this here, partly because it is a species of the same genus with the preceding article, and partly, but especially, because it seems to be very nearly of the same qualities ; for we can perceive nothing in it but that of a pure and simple bitter.

The virtues ascribed to it in dysentery have not been confirmed by my experience or that of the practitioners of this country ; and leaving what others are said to have experienced to be further examined and considered by practitioners, I can only at present say, that my account of the effect of bitters in the dysentery will perhaps explain the virtues ascribed to the simaruba. In dysentery, I have found an infusion of camomile flowers a more useful remedy.

MENYANTHES.

THIS is a strong bitter, without discovering either by taste or smell any peculiar acrimony combined with it. Its juice strikes a black colour with the solution of green vitriol, which implies some astringency ; but the same is not discovered by the taste or any of its effects. We consider it as a very pure bitter ; and as it is of a strong kind, we suppose it to have all the virtues that have been ascribed to any other bitters ; though upon account of its strong taste, it is less agreeable than some others.

Dr ALSTON's observation on this plant deserves to be remarked : " I knew it (he says) to have very remarkable effects in the gout in keeping off the paroxysms, though not to the patient's advantage." This is to be collated with, and added to, what we have said above on the use of bitters in curing the gout.

This plant has been said to lose its strength by drying ; but that seems to be a mistake, for I have often, and most commonly, used it in its dry state with all the advantages I could expect.

I have had several instances of its good effects in some cutaneous diseases, of the herpetic or seemingly cancerous kind. It was taken by infusion in the manner of tea.

CARDUUS BENEDICTUS.

THIS is a simple and very pure bitter, but not a very strong one, and has therefore none of the extraordinary virtues that have been ascribed to it. It is said to be extracted most agreeably by infusion in cold water; but I find that boiling water, if not applied above twenty-four hours, makes it hardly less agreeable, and is much stronger than the former.

LUPULUS.

THIS is a pure and simple bitter, though not without something odorous and aromatic in the flowers, which are the parts employed. Their use in preparing malt liquors is well known. The same effect of preserving these liquors for a long time without acescency may be obtained by other bitters; but none of them are so agreeable as the hop. This might also be agreeably employed in medicine; but we have no particular experience of its use.

[*The hop is a powerful and durable, but by no means a pure bitter. Besides the aroma which enters into the composition of the flowers, it is now ascertained, by many experiments and by actual observations, that they contain, in considerable quantity, a narcotic principle, capable of producing all the phenomena of opium; and this principle, it is probable, will be found to be chemically the same as the narcotic matter of opium.]

The hop is, unquestionably, a powerful tonic. The flowers may be employed in substance; but they are more commonly used in infusion or decoction. In order to obtain the narcotic principle, we use a spirituous menstruum. This forms the *tinctura lupuli*.*]

FABA STI IGNATII.

THIS is the most intense bitter we are acquainted with, and in a very small dose it has the effect of curing intermittent fevers. Whether it operates as a pure bitter, or as having combined with it a narcotic power, I will not determine; but we have mentioned this in another place as an example of such a combination, and as a ground for suspicion that all the bitters have more or less of a narcotic quality. However this may be, our present subject belongs to a genus of poisonous plants, and is therefore hardly to be employed where any safer remedies are known.

FUMARIA.

THIS is not commonly enumerated among the bitters; but it deserves to be so, for this is its only sensible quality: and though it is more disagreeable than many others, it is without acrimony or astringency. It is omitted in the London dispensatory, but retained in ours, and in every other that I know of. I have found it useful in many cases in which bitters are prescribed; but its remarkable virtues are those of clearing the skin of many disorders. For this it has been much commended; and I have myself experienced its good effects in many instances of cutaneous affections, which I would call *Lepra*. I have commonly used it by expressing the juice, and giving that to two ounces twice a-day: but I find the virtues remain in the dried plant, so that they may be extracted by infusion or decoction in water; and the foreign dispensaries have prepared an extract of it to which they ascribe all the virtues of the fresh plant.

It has been frequently observed with respect to this extract, that after being kept for some time it shows a crystallization upon its surface, which is a saline matter of the nitrous kind, and this in much larger proportion than in any of the other bitter extracts. Whether this contributes to its peculiar virtues, I leave it to the learned to determine.

COLUMBO.

THIS is a root that we have become acquainted with within these forty years; and since the account given of it by the learned Dr *PERCIVAL*, it has come to be frequently employed in practice. When first brought into Holland, it was introduced as a remedy in dysentery; and both in Holland and in Germany it was employed in that disease with much commendation. Dr *PERCIVAL* informs us, that he had sometimes found it useful in dysentery; but he does not speak of it as of much importance in that disease: and so far as I can learn, the employment of it in that way has not prevailed in Britain.

I find this root to be a strong and agreeable bitter, and have employed it in many instances of dyspepsia with great advantage. In stopping vomiting it has frequently answered, but in many it has failed entirely; and even in cases where there seemed to be a redundancy of bile. With respect to its peculiar power of changing the acrimony, or correcting the putrescency of the bile which Dr *PERCIVAL* ascribes to it, neither the experiments of *EBELING*, in his

dissertation on the quassia, nor some that I have made, show it to be more powerful than other bitters; and therefore do not allow me to think it has any specific power in that respect.

[*The history of the vegetable which furnishes us with this valuable medicine is not yet completely made out. Dr ROXBURGH has informed me, that he believes it to be a species of *menispermum*, or moon-seed. But he has seen only one of the sexes of the plant, which is a native of Mosambique, in Africa. This article must not be confounded with the columbo of North-America, which is the *Frasera officinalis*, already mentioned.*]

CHAMÆMELUM.

UNDER this title we have two plants whose flowers are employed, as marked in our list; and there is some question which ought to be preferred. The virtues are precisely of the same kind; but I have always judged the Roman or double-flowering camomile to be the strongest: and if any regard is to be had to the essential oil, this certainly affords the greatest quantity; and I am informed, that in warmer climates where it is a native, the qualities of it are much stronger than with us.

These flowers have been long celebrated as stomachics; and I have found them answer both in powder and in infusion the purposes of any other bitters. Before the introduction of the Peruvian bark, they were much employed in the cure of intermittent fevers; and our celebrated countryman Dr PITCAIRN was of opinion, that their powers in this respect were equal to those of the Peruvian bark.

HOFFMAN seems to have thought them a very effectual, and at the same time a safer, remedy. I have accordingly employed them; and agreeable to the method of HOFFMAN, by giving, several times during the intermission, from half a dram to a dram of the flowers in powder, have cured intermittent fevers. I have found, however, that these flowers were attended with this inconvenience, that, given in a large quantity, they readily run off by stool, defeating thereby the purpose of preventing the return of paroxysms; and I have found, indeed, that without joining with them an opiate or an astringent, I could not commonly employ them.

This quality of the camomile in moving the intestines renders them often useful in flatulent and spasmodic colic; and upon the same ground I have found them useful in dysentery, and rather hurtful in diarrhœa.

* ZANTHORHIZA, AND HELLEBORUS TRIFOLIUS.

[*THESE two vegetables, belonging to the order *Ranunculaceæ* in the system of M. DE JUSSIEU, seem worthy of the attention of American physicians. They are pretty pure bitters; but I am not certain, that they possess any peculiar virtues. It is only the fibrous root of the helleborus that we employ; but the root and the bark, with the wood, of the zanthorhiza are made use of.*]

TANACETUM.

BOTH the herb and flowers have been employed, but the herb is the stronger of the two, and may be employed for any of the purposes of bitters, but does not seem to be near so strong a bitter as camomile and several others already mentioned. It had almost gone out of use, till lately it was again brought into practice as a powerful remedy against the gout; and as such was employed by many persons in this country. I was not living in this city when the cases occurred to Dr CLARK, which he mentions in the Physical and Literary Essays, nor have I learned what was the fate of these persons afterwards; but I have since learned, or have been informed, of many persons of this city, who have drank of Tansy tea as a remedy for the gout. Of these, however, I have known several who have taken it without any advantage, and some others who reported that they had been relieved from the frequency of their gout: but I know of none who have employed it in such quantity, or for such a length of time, as might lead me to expect those consequences which I have mentioned before as following the use of the Portland powder.

ABSINTHIUM.

THIS is one of the most famous among the bitter plants, and has been used with much commendation for every purpose of bitters. It is an odorous plant, and gives out in distillation an essential oil, which, however, has not any bitterness; and therefore cannot be supposed to contribute any thing to the effect of the plant. When indeed it is entirely dissipated in making the extract, this retains the bitterness of the plant; and, in my opinion, all the virtues depending upon it. Some physicians make a choice among the species, and prefer the Romanum or Ponticum to the Absinthium vulgare; but the Edinburgh college are of opinion, that there is no foundation for this; and that the absinthium vulgare, as the more powerful bitter, is always to be preferred. They have erred, however, in prescribing the summitates, as I truly find the leaves to afford a stronger bitter.

than the flower and tops. In the *tinctura absinthii*, the college have given an example of the proper treatment of bitters, in order to obtain a lighter and more agreeable bitter, and at the same time a stronger impregnation. I am of opinion, that they should have employed the same management in other cases; but in the example of wormwood, they have allowed both infusions, especially the second, to be for too long a time. The *pharmacopœia Rossica* has copied exactly that of Edinburgh, and has very properly directed the other bitter tinctures of *carduus benedictus* and *centaury* to be made upon the same plan of double infusion. In the *pharmacopœia Danica*, the *essentia absinthii* is too much and injudiciously compounded. Neither the *pharmacopœia Danica*, in adding the zedoary, nor the Swedish, in adding the galanga, to their bitter tinctures, have in my opinion judged very properly. With respect to the *absinthium*, there is a question, whether it is imbued with any narcotic power? LINDENSTOLPE, and his commentator STENZELIUS, have asserted it very strongly; but there seems to have been a peculiar idiosyncrasy in the instances they mention; and we should not mind their account, if the same opinion of its narcotic power had not been also delivered by some others.

On the other hand, however, LINNÆUS informs us, that persons taking wormwood every day for six months together, observed no such narcotic effects. I have not had an opportunity of making proper experiments; but to me, with BERGIUS and GLEDITSCH, the odour of wormwood seems *temulentans*, that is, giving some confusion of head: and formerly, when it was a fashion with some people in this country to drink *PURL*, that is, ale in which wormwood was infused, it was commonly alleged to be more intoxicating than other ales. This effect is improperly supposed to be owing to its volatile parts, for the reasons I have given above: but I am more ready to admit the general doctrine of a narcotic power, as I believe, from several considerations, particularly from the history of the *Portland Powder*, that there is in every bitter, when largely employed, a power of destroying the sensibility and irritability of the nervous power.

To wormwood, as to every other bitter, has been ascribed an anthelmintic virtue; and this has been supposed to be more considerable in the seed of a certain wormwood than in any other bitter: but of this I have said enough above, when treating of the general qualities of bitters.

ABROTANUM.

THIS, as a species of the same genus *Artemisia* Linnæi, has certainly the same virtues as the other species of it. It contains, however, less of the bitter, but more of the aromatic; and if it deserves, as professor MURRAY thinks, to be more employed than it has been, it must be on account of its aromatic and volatile parts; of which, however, the peculiar virtues are not yet well ascertained. These qualities, however, give a probable reason for its being frequently employed, as it commonly is, in fomentations.

There were formerly two herbs under the title of *Abrotanum* in our dispensatory lists, under the improper distinction of *Mas et Fœmina*, but the latter of a different genus, and in every respect of inferior virtue, which is now omitted in the British dispensatories, and indeed in most others.

SCORDIUM.

THIS plant has a bitter joined with some volatile parts; but neither of these qualities are considerable enough to retain it in the present practice. It was formerly much celebrated as an alexipharmic; but we do not allow this to be a term of any clear and determined meaning: and in most instances think it has been an imaginary power, that is not supported by any clear or well ascertained experience.

There are two other species of the *teucrium*, the *Chamædryis* and *Chamæpitys*, which have formerly had a place in our dispensatory lists; but they are now omitted in that of Edinburgh: and though they still hold a place in that of London and many other dispensatories, I do not expect to see them brought again into practice, as their qualities, whether as bitter or aromatic, are by no means considerable. They have been celebrated for antarthritic virtues, and make a part of the Portland powder; but they are manifestly not the most powerful or valuable part of that composition. When employed by themselves, as they have sometimes been, I would make the same remarks with respect to them as I have made with respect to the Portland powder, or other medicines that have been proposed for the cure of the gout.

ARISTOLOCHIA.

WHICH of the species of this genus are to be preferred I cannot determine; and believe the difference between the *rotunda*, *longa*, and *tenuis*, is not considerable, though the latter seems now to be

preferred by both the colleges of London and Edinburgh. They are all of them considerably bitter, with more acrimony than in any other of the bitters commonly employed. Its name seems to have arisen from the supposition of its emmenagogue virtues, and in some cases of retention and chlorosis, as a warm and stimulating medicine, I have found it useful; but in cases of suppression I never found it of any use: and the commendation of it by the ancients in promoting the lochia, facilitating birth, and promoting the exclusion of the secundines, is very ill founded, and affords a remarkable example of their imperfect knowledge, and an example, which, if followed, would lead to a mischievous practice.

The aristolochia has been long commended as a cure for the gout. It makes a considerable part of the Portland powder, and has often been employed by itself in the same manner as that powder, to be taken every day for a great length of time. It has the same power of preventing fits of the gout, and commonly with the same consequences; of which many instances are recorded by the physicians of Germany. To this purpose I would make only one quotation from the late learned and experienced WERLHOFF, first physician to his late majesty for the electorate of Hanover. The quotation is taken from his *Cautiones Medicæ*, page 346 of his works, published by WICHMAN. After speaking of the power of diet in the cure of the gout, he has the following words:

“Si diæta minus sufficiat, in declinatione, sed lenta longaque nimis, ad maturandam firmandamque integritatem, et ad præcavendam reversionem nimis subitam, veterum illæ antidoti amaræ tonicæ, apud Sennertum, Schneiderum *de Catarrhis*, WALTHERUM in *Sylva Medica*, collectæ, quas inter præcipue aristolochiæ species, rotundo, cava, longæ, et clematidis, memorari merentur, experientiam moderatarum laudum testem reperiunt. BRUNNER *de pancr. secund.* p. 143. elegantur, ut solet, et distincte, ‘tincturæ, inquit, illius antipodagricæ ex rad. aristol. longæ, aut pilularum, aut pulverum amaricantium usu per annum continuato, paroxysmi podagrici in nonnullis mitigantur, in aliis penitus extinguuntur. Nimirum longo amaricantium usu, acore stomachi emendato, refracto, et attemperato, fructus exinde propullulantes sponte cadunt sua. Sed et nimio amaricantium horum usu fermentum stomachi adeo debilitatem esse memini, ut nonnulli appetitum amiserint, cibos non concoxerint, mortem hinc potius, quam sanitatem, accelerarint, malique et infausti remedii, sævas dederint pœnas.’ Nempe spiritus vini, sulfure amaricante saturatus, qui opio haud valde absimilis est (de cujus abusu paritur noxio, v. idem BRUNNERUS ibidem, p. 80.

seq). et inflammans insuper, et impense exsiccans, haud satis tutus ita continuato usu videtur. Neque ideo illam ex vini spiritu potulentam tincturam sive infusionem, usurpare pro eo scopo ausim, quum, licet corrigat, et adversus paroxysmos roboret ipsum remedium amarum, ignea vicissim et elastica spiritus vini indoles materiei augendæ, perturbandæ, et visceribus incendendis apta est, ceteroqui etiam vino ipso magis incongruens. V. quæ de noxa infusionis ejusmodi ex aristolochia longa habent Ephem. Curios. noviss. A. 3. p. 62. seq. Ipsa vero pulverum amarorum cumulata assumptio, quamvis moderatori, pro *ευφορία* et indicatione, usu tuta, stomachum tandem abusu gravat, tonumque et digestionem arte nimis diu roborare affectando, naturam tandem suam rite agere vel prohibet, vel desuescere facit, vel etiam, incenso ultra digestionis vim appetitu, diætæ erroribus accitis, in coctionis negotio fatiscere patitur. Atque haud scio an, perpetuo et nutricao quasi amaræ medicinæ usu, quæ in alimentum corpori nata haud videtur, alienior tandem ipsis succis nostris crasis imprimi possit: licet id non fiat, si medice utaris, et obtento scopo omittas."

Although it may not be easy either to explain or vindicate all the reasonings in this long quotation, yet it would have been improper to abridge it, or to refer merely to WERLHOFF's works, which I could not suppose to be in the hands of many of my readers; and I am at the same time persuaded, that any person who has the least disposition to enter into the question concerning the use of bitters in the gout, will find in the above quotation some illustration and confirmation of what I had before delivered on the subject.

SERPENTARIA VIRGINIANA.

THIS as a species of aristolochia is placed here, and it has very much of the qualities of the genus; but by certain accidents, this and the other species of aristolochia have been considered as very different. The serpentaria, both in taste and flavour, is more agreeable than the other species, and it is by its sensible qualities of bitterness and aromatic acrimony that we can account for the virtues justly ascribed to it.

Both these qualities render it antiseptic, and powerfully tonic; and therefore suited to prevent gangrene. The same qualities will account for its cure of intermitten fevers, especially when combined with Peruvian bark and astringents.

By its aromatic acrimony it proves a powerful stimulant to the system; and therefore may be useful also in some cases of continued fevers; but as the cure of either intermitten or continued fe-

vers by stimulants alone is an ambiguous and dangerous practice, so in the former it is only safe when joined with the bark; and the use of it in continued fevers is to be employed with much caution. The common opinion of its alexipharmic powers, both with respect to it and all the others which have gone under the same title, is an incorrect and false notion liable to much abuse, and which I myself have had occasion to observe. The stimulant power of the serpentaria is especially suited to the low and advanced state of the typhus only; and even then it will be more safely joined with the bark, than employed for its stimulant power alone. It is certainly owing to this ambiguity in its use, that it is not nearly so much employed in practice as it was some forty years ago.

CORTEX AURANTII.

THIS by an oversight was omitted in our catalogue, but must be taken notice of here.

Aurantium or *Orange*. It is a species of the citrus; and that with the lemon, being the species chiefly imported, is that which is employed by us in medicine. The fruit affords an agreeable acid, to be mentioned hereafter; but our business here is only with the yellow rind of the fruit. It is properly reckoned among the bitters, and seems to have the virtues in common to these; but with its bitter it contains a considerable portion of a volatile aromatic oil, very different from any other that is combined with other bitters, except what is found in the lemon. The combination of this oil with the bitter in the orange-peel, gives it certainly peculiar virtues that are not, however, clearly ascertained; and it is rarely that this peel is with us employed except in compositions with the other bitters, which prevents us from discerning its peculiar virtues.

Formerly the unripe fruit, before they came to contain any juice, were employed in the shops under the title of *Aurantia Curaslaventia*; and in that state they contain a stronger bitter than the peel of the grown fruit, though to me they do not show so much of the aromatic as the latter. I doubt much if the Edinburgh college have not done improperly in omitting the Curaso apples which formerly stood in their list.

With respect to the virtues of the peel as presently employed, it is very probable that both by its bitter and aromatic parts it may be particularly useful in restoring the tone of the stomach when it has been much impaired; and I have had several observations that justify this opinion; but it does not appear so often as it should, because we employ it almost only in its dried state, and in too small

proportion, as we take it dried with a part of the white inert substance that is also in the rind of the orange.

Although I have no particular experience of it, it is probable enough that the orange-peel employed by itself may be useful in curing intermittent fevers. It is not, however, so probable to me, that it has ever been useful in moderating or restraining uterine hemorrhagies; and upon the authority of others I have employed it, but without success: and as the decoction made according to the prescription by Dr WHITE had still much bitterness, I judge it to have been rather hurtful.

Here I might mention the lemon-peel as a bitter; but it has less of that quality than that of the orange; and therefore if it be employed as it is in the infusum gentianæ compositum of the London college, I take it to be on account of its aromatic rather than its bitter qualities.

Among the bitters I am disposed to mention the leaves of the orange tree, which have of late been much recommended as a cure of epilepsy.

Of these, however, I have had little opportunity of making trials; and the few I have made were without success. The sensible qualities of those leaves are bitter and aromatic; but in both respects weaker than in the orange-peel; and there is nothing in them that would lead me to expect any specific virtue.

ARNICA.

As this plant is not a native of Britain, and we have found some difficulty in procuring it from abroad, I have not been able to make it a subject of my own observation. In this situation I think it safer to refer my readers to writers on the subject, and particularly to COLLIN'S dissertation upon it, than to give from them a compilation which must be short, and might be imperfect.

CASCARILLA.

I HAVE been uncertain where to place this substance, whether here with the aromatics or with the tonics; and I am of opinion that the latter is its proper place. It approaches to the aromatics by its essential oil; but its bitter, to be extracted by either water or spirit, is its most considerable part.

It was introduced into practice in the last century as a medicine of great value, both in continued and in intermittent fevers; and the STAHLIANS, fond of any thing as a substitute for the Peruvian bark, against which they had declared so strongly, received the cas-

carilla, and employed it much in practice, and have given many testimonies of its efficacy ; but these testimonies have not been supported by other practitioners since ; and particularly in this country we have found it a very weak substitute for the Peruvian bark. BERGIUS says of it, “Ast fatendum illum in ipsis febribus parum facere, neque tertianis vernalibus certo mederi.” Our experience in this country is suitable to this ; and in several trials it has entirely failed. What BERGIUS adds to the passage quoted, “Sed in hæmoptysi sæpe prodest,” is not supported by our experience ; and in hemorrhagies of all kinds, it seems to be rather hurtful, as might be expected from its aromatic and bitter qualities, while it does not in any instance discover an astringent power. It may be allowed to be of tonic and stomachic power ; but even in this way its virtues are not peculiar nor considerable : and there is no just foundation for the prejudices which the German physicians have conceived in its favour.

* ANGUSTURA.

[*This is the bark of a South-American tree, which has now very deservedly a place in several of the European pharmacopœias. It is one of the heating bitters, and along with these properties there is united a considerable degree of astringency. As a general tonic, adapted to the cure of intermittent and similar fevers, angustura appears to me greatly inferior to the Peruvian bark : but even in some varieties of these fevers, it may have advantages over this bark. It is, certainly, a medicine well suited to many conditions of the system ; and, among others, to the low stages of fevers, in which the serpentaria and cascarilla have so often been given with advantage.

After angustura, I might, with propriety, set down some species of magnolia, and especially those which are mentioned in the catalogue. These seem to possess much of the general qualities of angustura, and perhaps are little if at all inferior to it in usefulness.

Here also, though certainly inferior in power to the magnolias, it may be right to mention the American *liriodendron tulipifera*, a stupendous tree belonging to the same natural order as the genus just mentioned. I have elsewhere spoken of the properties of the bark of this tree, which is the principal part employed in American practice. See my *Collections*, &c.*]

CORTEX PERUVIANUS.

THIS is one of the most considerable articles of the materia medi-

ca; and as the most frequently employed, so it has been very frequently the subject of writings and of much discussion. There is some general agreement amongst practitioners with respect to many of its virtues; but the agreement is not universal, and many disputes still subsist with respect to the circumstances and manner in which it is to be administered.

Upon many of these points it is incumbent on me here to offer my opinion; which I shall accordingly do upon the principles I have already laid down, and as it appears to me to be confirmed by an attentive and often repeated experience. I have an aversion to controversy, and shall not therefore enter into any; more especially with many of the frivolous writers who are to be met with upon this subject.

As the foundation of the whole of my doctrine, I consider the Peruvian bark, which, like other writers, I shall commonly speak of under the simple title of the Bark, to be a substance in which the qualities of bitter and astringent are conjoined. These are sufficiently obvious, and seem to be universally allowed. It may also have somewhat of an aromatic quality; but this certainly is not considerable, and I shall not take any further notice of it.

As a bitter and astringent conjoined, I consider the bark as a powerful tonic. As we have before shown that these qualities in their separate state give tonic medicines, so it will be readily allowed, that, conjoined together, they may give one still more powerful; and as such we are now to consider the bark in its effects and virtues, according as these appear in the various cases of disease.

The first to be taken notice of is, its operation on the stomach. In many cases dyspeptic symptoms manifestly arise from a loss of tone in the muscular fibres of the stomach; and in such cases, as other bitters are, so the bark is a remedy, and one of the most powerful. Nobody doubts of its being a tonic with regard to the stomach; and it is equally well known that the state of the stomach is readily communicated to the rest of the system. It is in no instance, however, more remarkable than in the cure of intermittent fevers. That the bark in this case operates by a tonic power exerted in the stomach, I have endeavoured to explain in my *First Lines of the Practice of Physic*; and have met with nothing in any writing to make me doubt of the truth of my doctrine. It may, indeed, have its imperfections, and may not sufficiently explain the whole of that variety of phenomena, which may occur in such a diversified and complicated system as that of the human body; but in attempting any general doctrine, we must begin with attempting it as adapt-

ed to the most general and ordinary course of things. This I hope is done in my doctrine respecting fevers, and of the operation of the bark in the cure of intermittents: nor shall I think it shaken by its not obviously explaining those irregularities that may happen in the course of fevers, and in the use of the bark; and especially those pointed out by the indigested views of some practitioners, little aware of the many fallacies to which almost every observation upon these subjects is exposed.

We proceed therefore upon the supposition that the bark possesses a tonic power, and that the action of this power in the stomach sufficiently explains its operation in preventing the recurrence of the paroxysms of intermittent fevers: for I see no foundation for referring it to any mysterious and unexplained specific power; which, however, some writers seem still disposed to maintain. I hold it to be established as a fact, that both astringents and bitters, in their simple and separate state, have proved often sufficient to prevent the recurrence of the paroxysms of intermittent fevers; and that they more certainly do it when combined together. Both these facts I have not only from the testimony of the most creditable authors, but from particular experiments made by myself for the purpose of ascertaining them: And though I should admit what is frequently alleged on this subject, that such remedies are frequently insufficient, I consider it as a frivolous argument, as a different degree of power does not affect the general question concerning the nature of that power. Nobody certainly will maintain, that pale bark is not capable of curing agues, because it is not so powerful as red bark.

Having thus established the nature and operation of this medicine, we proceed to consider the various questions that have arisen with respect to the use of it in intermittent fevers. It would now be superfluous to consider the objections which were formerly made to its use in general. Although these objections had for a long time some weight with some of the most eminent practitioners, it is presumed that every doubt and difficulty of that kind is now removed; and whilst it is allowed to be a very safe and very powerful remedy, the only questions which remain respecting it are, In what circumstances it may be most properly employed?

The first question that occurs is, at what time, in the course of the disease, it may be most safely given? Dr BOERHAAVE's rule for exhibiting the bark was, "Cum morbus jam aliquo tempore duravit;" and his commentator is at great pains to inculcate the propriety of this general rule. In this, indeed, both of them follow

Dr SYDENHAM: but both SYDENHAM and VAN SWIETEN allow there may be exceptions to the general rule: as when an intermittent affects persons under great debility; or when, for example, the paroxysms are attended with symptoms of a dangerous kind: and in such cases every practitioner will certainly take the first opportunity he can find of exhibiting the bark.

This, however, does not touch the general question with respect to intermittents in which there is no prevailing debility, and where the paroxysms are not attended with any dangerous or even unusual symptoms. In such cases the question still remains, Whether the bark may be exhibited without waiting for any repetition of paroxysms? And I am persuaded that, for the most part, it may. Dr. SYDENHAM's consideration of the fermentationis nisu desputanti, seems to be absolutely without foundation: and I cannot either perceive that there is any morbid matter to be evacuated during the paroxysms, or that the bark can do any harm by suppressing any natural excretions, as the Stahlians have commonly supposed. It therefore appears to me, that the bark may be exhibited very early in the course of the disease.

This general question, however, always involves another; which is, Whether the bark may be exhibited without a certain preparation of the body, that may fit it to receive the bark with greater safety? With respect to this, as we confidently suppose that the bark given in moderate quantity is not ready to disturb the natural functions of the animal œconomy; so, if these be all in a sound condition, we cannot perceive that any preparation of the body is necessary for the reception of this medicine: It shall only be observed, that to render the stomach more fit to receive the quantity of bark which may be necessary, it may be proper, by a gentle vomit, to free it from accidental indigestion, and to excite its activity before the bark is thrown in.

In another case also, when, from the circumstances of the season, and from certain appearances, there is reason to suspect any redundancy of bile, it may be proper to evacuate this by a gentle purgative. This is the explanation to be given of the common opinion of the necessity of clearing the first passages before exhibiting the bark; but I must beg leave to maintain, that such preparation is not always necessary; and that, wherever the state of the disease urges an immediate exhibition of the bark, it may be often dangerous to lose time upon the supposed necessity of previously clearing the first passages; or at least, when this is done, it will always be allowable, and even proper, without waiting for the repetition of

paroxysms, to put an end to the course of the disease by the use of the bark.

Although, when there is no debility in the patient, nor dangerous symptoms attending the paroxysms, the exhibition of the bark, in complaisance to popular opinion or medical prejudice, may be sometimes delayed; yet if the paroxysms seem to be anticipating their periods, and more especially if they are increasing in their duration, it will be always advisable to stop the course of them by an immediate exhibition of the bark.

There may still, however, be some exceptions to this general doctrine; not only when there are marks of internal inflammation present, but even when there are marks of a general inflammatory diathesis in the system. This I believe to be always aggravated by the tonic power of the bark; and in such cases, accordingly, the bark may not only be hurtful, but, as I know from experience, will be ineffectual, till, by blood-letting and other antiphlogistic measures, the inflammatory diathesis is removed or much abated. This is the explanation of the 762d Aph. of BOERHAAVE: "Hinc et venæsectio nocet per se semper prodest alias casu, ut et tenuis exactaque diæta." It is especially in the case of vernal intermittents that a phlogistic diathesis occurs; and therefore, that upon this and other considerations, the exhibition of the bark in these may be most safely delayed; but still it must be allowed that, even in these, it may often be exhibited very early.

There is another consideration which practical writers have mentioned as a reason for avoiding the exhibition of the bark; and that is, when there are marks *obstructi admodum hujus illiusve visceris*.

That there may not be cases of this kind to forbid the exhibition of the bark, I have not sufficient experience to determine; but I am well persuaded that it would be very dangerous to admit of any general rule on this subject. I am convinced that it is in the cold stage of fevers that accumulations of blood are formed in the liver and spleen; that such accumulations are increased by every repetition of a cold stage, and consequently by the repetition of paroxysms; and I am therefore clearly of opinion, that even considerable obstructions of the viscera, if without inflammation, ought not to prevent the exhibition of the bark in such quantity as may prevent the return of paroxysms.

I am more fully of this opinion, because I cannot perceive in what manner the bark can aggravate the obstruction. Its action as an astringent is very inconsiderable, and is fully balanced by its bitterness, which most physicians suppose to have a resolvent and ape-

rient power. The question has several times occurred to me, in the case of persons who, having frequently laboured under intermittents, had tumours and indurations remaining in the hypochondria, and had, when in that condition, a return of the intermittent fever. In such cases I have freely employed the bark, and never found it increase the affection of the liver or spleen: and in other such cases I have constantly found, that the avoiding the bark, and admitting therefore the repetition of paroxysms, brought on disorders which frequently proved fatal.

When, from these considerations, it is determined to exhibit the bark, the next question that occurs is, Taking the period as consisting of the intermission and paroxysm, at what time of such period the bark is most properly to be given? With respect to this, I believe that when the use of the bark was first introduced, the practice was to give a large dose of it a little before the time of an expected accession; and the efficacy of this practice has given occasion to many, to imagine that the bark employed by these first practitioners was of a superior quality to that commonly employed since. We cannot, however, find otherwise any proof of this superiority of the bark then employed; and it is certain that the same pale bark which has been commonly since employed, and given in the same quantity, and at the same time of the period, has shown very often the same effects. Some eminent practitioners have since opposed this practice; but we are persuaded it has been rather from theory than from observation that they have done so.

Although I would not rigorously insist on the employment of a single dose near to the time of accession, yet I am strongly of opinion, that the nearer the exhibition is brought to that time, it will be the more certainly effectual. To explain this, not commonly understood, we must remark, that the effects of the bark on the human body are not very durable. I have had opportunities of observing, that a considerable quantity of bark given, was not sufficient to prevent a relapse in a few days after. I have likewise found, that, in quartan fevers, a large quantity of bark given on the first day of intermission was not so effectual in preventing the returns of the disease, as a smaller quantity given on the second day. In tertians, supposing a certain quantity necessary to be given to prevent the return of a paroxysm, we have found that, by following the practice of SYDENHAM, in abstaining from the exhibition of the bark for some hours immediately preceding accession, though large quantities had been given before, would often fail in preventing it; while on the other hand, a smaller quantity, given nearer to that time, would

more certainly answer the purpose. In many cases, where the accession happened in the morning, I have found that a large quantity given the day before, if not continued during the night, would often fail, when a smaller quantity given during the night, and in the morning, would more certainly succeed; and whenever I met with tertians which had their accessions at noon or after it, I have thought it unnecessary to trouble my patients during the time of intermission on the day before, always finding that a smaller quantity given in the morning or forenoon after, by being thus brought nearer to the time of accession, was more effectual.

From all these observations I am satisfied, that giving a large dose of the bark immediately before the time of accession is the most proper practice: but as that dose must not be under two drams of pale bark, so there are some stomachs which will not bear even that quantity, or a larger that might be necessary. It is commonly, therefore, convenient to give smaller doses, but to give them every hour, for some hours near to the times of accession.

I have not had much occasion to practise upon intermittent fevers since the use of the red bark became common; but being well persuaded of the superior powers of this species or variety of bark, I think the use of it will particularly favour the practice we have recommended, of giving a due quantity of bark as near as possible to the times of accession.

Having thus said all that seems necessary with respect to the use of the bark in *intermittent*, we proceed to say that it is equally useful and necessary in *remittent fevers*. These have been considered by the Nosogolists as of a different order from the intermittents; but, as I judge, very improperly. They arise from the same cause; that is, from marsh effluvia; they prevail at the same seasons; and it is common for the intermittent and remittent fevers to pass mutually into the form of one another. They show therefore the strictest affinity, and found a strong presumption, sufficiently confirmed by experience, that they may be cured by the same remedy.

The only difficulty in admitting this was, the opinion which prevailed very early with respect to the use of the bark; that it was not to be given during the time of paroxysms, and therefore not in those fevers which had no intermission. I believe that this opinion was in the main well founded and proper, with respect to the paroxysms of genuine intermittents; but no other remedy having been found for remittents, the consideration of the analogy induced practitioners to employ the bark in these also. And in spite of prejudices, MORTON and TORTI established the practice; and there is

now no longer any doubt of its propriety. We have only to add, that though I would not rigidly assert that the bark can never be safely given during the exacerbation or hot stage of fevers, yet I maintain, with the most part of practitioners, that the time of remission is especially to be chosen; and according as that time is known to be longer or shorter, the doses of the bark are to be as large as the patient's stomach will easily bear, so that a due quantity may be thrown in during the time of remission.

Such may be the use of the bark in properly and evidently remittent fevers; but the use of it has been extended also, especially of late, to continued fevers: and there may still be a question, In what species, or in what circumstances of these, it may be properly employed? Which we shall endeavour to answer as well as we are able.

When intermittent fevers have changed into remittents, and these have become of a very continued form, or when either this transition has been manifestly perceived, or that, from the place of the patient's habitation, from the season of the year, and from the nature of the prevailing epidemic, there is reason to conclude that a fever has arisen from the same marsh effluvia which produce intermittent or remittent fevers in their ordinary form; in such case, fevers, however continued in their form they may then seem to be, may still be considered as of the intermittent kind, and be treated by the bark in the same manner that we have shown may be done in remittent fevers of little distinct remission. There are, however, truly very few continued fevers of this kind which do not, being carefully observed, discover some remissions, and therefore give no proper occasion to a question about the use of the bark, arising from their continued form.

Such a question, however, occurs with respect to continued fevers of another kind. There is a fever commonly occasioned by the application of cold, but perhaps also from other causes, to which we have given the name of Synocha; and which, from its symptoms, we judge to be always attended with a considerable degree of phlogistic diathesis. In such fevers, agreeably to our opinion of the tonic power of the bark, we maintain that it cannot be properly or safely employed. And farther, as the same kind of fever attends all genuine phlegmasiæ, that is, pyrexia joined with topical inflammation; so the bark is not admissible in any of those. Some writers, indeed, mention its salutary effects in various cases of pneumonic inflammation, and such perhaps may occur; but I never found the bark safe in any such inflammatory affection, except when

this was not the primary disease, and indeed only when it was accidentally combined with an intermitten, putrid, or nervous fever.

That there may be such combinations is well known; and though there may be some degree of phlogistic diathesis present, it may not be in such a degree as to give the principal indications in the cure of the disease: so, in such cases, the bark may be employed as suited to that principal indication.

In one case of an inflammatory disease, the bark has been considered as an ambiguous remedy; and that is the case of acute rheumatism. As I consider this disease as especially consisting in a phlogistic diathesis, I hold the bark to be absolutely improper, and have found it manifestly hurtful, especially in its beginning, and in its truly inflammatory state.

But it is possible, that after rheumatism has continued for some time, and especially after the use of antiphlogistic remedies and sweating, the inflammatory state may be abated, and the disease, in consequence, admit of considerable remissions, and become a periodical disease. The bark, in such cases, may prove a proper remedy, and I have sometimes found it to be so; but it requires some caution: for in some instances, where even a remission was evident and appeared particularly by a copious sediment in the morning's urine, I have exhibited the bark with a bad effect, as the exacerbations became more violent, and the remissions less considerable, insomuch that I was obliged to have again recourse to antiphlogistic remedies and sweating.

In another case of acute rheumatism, the bark may prove a remedy; and that is when the rheumatism is combined with, and makes a part of, an intermitten fever, as that and other phlegmasiæ may sometimes be; and here the conduct may be the same as I have already said to be proper in such cases.

I know of no other cases of acute rheumatism in which the bark may be employed; but there are certain circumstances of the human body, in which pains of the joints resembling rheumatism may occur, and in which perhaps the bark may be useful. So far, however, as I know such cases, they are without any phlogistic diathesis, and therefore not properly acute rheumatism. I have met with some cases of hysteric women troubled with pains and tumours of the joints, so much resembling rheumatism, that I have thought it necessary to try blood-letting; but though the blood was drawn in the manner most proper to show an inflammatory crust, yet no such

crust in any degree appeared, and therefore such cases do not exclude the use of the bark.

The question concerning the use of the bark in inflammatory fevers does not give much difficulty; but there is another kind of continued fever, in which the question is much more puzzling. This is the fever arising from a contagion produced by a certain state of human effluvia. It is this that I have named a Typhus: and which always puts on a very continued form. It is very commonly attended with symptoms of putrescency in the fluids; and always, in some part of its course, with symptoms of a general debility in the system. In the former case they are called Putrid, and in the latter case Nervous fevers.

It is in these that a difficult question arises with respect to the use of the bark; and this, considered as an antiseptic and tonic, would seem to be well adapted to both cases. But in considering the question, this is to be observed, that both the putrid and nervous fevers may be combined, especially in their commencement, with a phlogistic diathesis in the system. With this state, as I have said already, I hold the bark to be incompatible; and therefore judge it to be always improper in the beginning of that kind of fever, which, in my Nosology, I have named a Synochus. I can by no means concur with certain authors, who maintain, that in the fevers we are speaking of, as soon as the *primæ viæ* have been cleared by an emetic and purgative medicine, we may immediately employ the bark, and trust the cure of the disease entirely to it. I have frequently observed the mischievous consequences of such a practice, from its aggravating the inflammatory state of the system, and determining to local and fatal inflammations of the brain and lungs.

It is perhaps possible, that a typhus of the nervous or putrid kind may be without any, or much, of the inflammatory diathesis; and when at the same time the symptoms of debility and putrescency are not only considerable, but also appear early, I would allow that the bark may be employed very soon in the course of the disease. This, however, I take to be a very rare case: and my observations lead me to judge, that in the beginning of all putrid fevers, and, by the testimony of authors, even in the plague itself, that more or less of an inflammatory diathesis sometimes takes place. We find this to subsist commonly for the first week of our epidemic fevers; and, therefore, that it is seldom safe to employ the bark during that period. We commonly find that the symptoms requiring its use do not appear till the second week; and even then, till the symptoms of debility and putrescency appear pretty distinctly, the bark can-

not be safely employed. When, however, very early, the symptoms of putrescency appear in any degree, it will always be allowable to employ the bark; and, though no clear symptoms of putrescency appear, it will be equally proper in the second week of nervous fevers, when the symptoms of debility are anywise considerable, and when at the same time the system is very free from any appearances of an inflammatory state. To sum up the matter, we are clearly of opinion, that when fevers can be ascertained to be entirely of the putrid or nervous kind, wine and bark are the remedies to be depended on; and that, if either of these remedies have seemed to fail, it has been commonly owing to the necessary quantities not having been thrown in.

We must not omit this opportunity of observing, that there are two cases of our epidemic fevers in which the bark is either useless or hurtful. The first is, when, after much headach, a delirium arises; which is somewhat of the phrenetic kind, increased by taking wine, and is attended with a redness and inflammatory state of the eyes. In such cases, we suspect some inflammation of the brain; and dissections have shown it to be so: and in all such I have found the bark manifestly hurtful. Another case of our fevers is, when in their advanced state, with much delirium, there is much subsultus tendinum, with frequent convulsive twitchings of the limbs. In whatever manner this may be explained, I have found that opium is the proper remedy; and it is commonly necessary to give it in considerable quantity.

After treating of the use of the bark in the more simple fevers, we are now to consider it in the more complicated, and particularly in the exanthematic kind.

With respect to these, they are commonly, and, as we may say, naturally, of an inflammatory nature; but in a manner we cannot explain; a putrid diathesis frequently appears in them. In their genuine inflammatory condition, the bark is not only an unnecessary, but a hurtful substance; but when any putrid diathesis appears, it is absolutely required, and the distinction of these cases is always to be carefully studied.

In the small-pox, from an opinion of the bark being favourable to suppuration, it has been employed even during the eruptive fever; but I have hardly ever observed a case in which it seemed to be proper. Allowing the bark, in certain circumstances, to be favourable to suppuration, it does not appear clearly that these circumstances ever occur during the eruptive fever. It is possible that the eruptive fever of the small-pox may be of the putrid kind, in which

therefore the bark might be allowable; but have hardly ever been able to ascertain such a case: and upon the supposition of its being the case, I have found the exhibition of the bark to be hurtful. In my opinion, it is only after the eruption, that, by the confluence of the pustules and other circumstances, we can discern the putrid diathesis which requires the bark; and when none of these circumstances are present, as in most cases of a distinct small-pox, though these be very numerous, the bark in large quantity is very hurtful.

In the secondary fever, the same distinction is to be observed; and as it is most commonly the consequence of the confluent small-pox, so it is very generally of a putrid kind, admitting of the bark: but there is also a secondary fever sometimes happens after a distinct small-pox, which is of the inflammatory kind, to be treated by blood-letting and other antiphlogistic measures; and in which, therefore, the bark would be hurtful.

The measles are very constantly and considerably of an inflammatory nature; and must therefore require still more caution in the use of the bark. I have never seen this disease in Scotland of the putrid kind; but no doubt there may be such as DR WATSON has described, and in which the bark would certainly be proper.*

With respect to Erysipelas, the case is much the same. I have very constantly found it to be more or less of the phlegmonic kind; and in this country have hardly seen it in any degree putrid. In erysipelas I have therefore found the bark generally hurtful: but, from the account of authors, it appears to be sometimes of a putrid nature; although, as I judge, especially, perhaps only, when it accompanies other diseases of a putrid kind; and in such cases the bark may be a necessary remedy.†

In the Scarlatina, there is generally more difficulty in determining this question. In the species of scarlatina that is properly

* It may be doubted whether such a disease as putrid measles do really exist. It seems to be ascertained, that the disease described under this name, by the learned DR WATSON, was no other than scarlatina anginosa. The distinction between measles and this disease, even in its milder and more obvious form, is not always easily determined. Even MORTON has sometimes confounded them.

† From the accounts of several eminent English practitioners, it is sufficiently ascertained, that the bark is well suited to many cases of erysipelas that occur in London, and other parts of England. I have myself seen this disease in its putrid form, in the vicinity of Philadelphia: but very generally the disease has shown itself in the shape of a true *phlegmasia*, and as such I have treated it, without the aid of bark.

named Anginosa, and which has been the most frequent with us, there are cases exactly the same with the cynanche maligna, in which the bark is the remedy to be depended upon. But I maintain that there is a scarlatina, and even a scarlatina anginosa, in which the bark is superfluous, and has been often hurtful. How these cases are always to be distinguished is difficult to say; but an observing and skilful practitioner, by the difference of symptoms, and especially by the nature of the prevailing epidemic, will commonly be able to do it.

We say nothing here of the military eruption, considering it to be always a symptomatic affection, to be treated with or without the bark, according to the nature of the primary fever.

Among other diseases complicated with fever, the dysentery is to be taken notice of as a disease in which the propriety of using the bark does not seem to be very clearly ascertained. When this disease is of its proper nature; that is, depending chiefly upon a constriction of the colon, and frequently in its beginning attended with some phlogistic diathesis, the use of the bark appears to me to be absolutely pernicious. I have indeed said above, that even in this state, bitters, by their laxative quality, may frequently be useful: but such a quality in the bark is very uncertain; and therefore the analogy with bitters will hardly imply the use of a bitter that may be in this way of uncertain effect, and may be in danger, by its tonic and inflammatory powers, of proving hurtful. In the beginning of dysentery, we judge the bark to be improper; but in the advanced state, when some symptoms of putrescency appear, or when the disease has changed in some measure into the state of diarrhœa, the bark may possibly be employed with advantage.

In another case of dysentery, which sometimes happens; that is, when it puts on a tertian type, and may be considered as a part of the tertian fever, at the same time epidemically prevailing, the bark may become an absolutely necessary remedy.

There is another disease complicated with fever, in which I find the use of the bark to be somewhat nice and difficult; and that is in catarrhal affections. In these, arising, as they commonly do, from cold, an inflammatory diathesis is, I believe, constantly present; and this seems to reject the use of the bark altogether. But there are two cases in which it may be admitted; the one is, when the catarrhal affection is combined with an intermittent fever: and I have often observed the most frequent and violent fits of cough-

ing to be joined with the paroxysms, and particularly with the cold stage of such paroxysms. In such cases I not only do not avoid the bark, but fly to it with more haste.

There is also another case of catarrhal affection in which the bark is of great service. This is in those habitual and frequently returning catarrhs, which depend upon a weak and imperfect perspiration by the skin, and this again upon a weaker force in the action of the heart and arteries. In these cases I suppose there is a greater determination to, and a greater than usual accumulation of, fluids, in the lungs; and that these circumstances and their effects are only to be obviated by invigorating the system of the aorta, for which I hold the bark and riding to be the most effectual means.

Another case of complicated fever, on which I would here remark, is that of hæmorrhagy; in which the use of the bark is, in my opinion, very inaccurately ascertained, but may, I think, be determined in this manner. When the hæmorrhagy is of the active kind, that is, accompanied with a phlogistic diathesis, the bark is a pernicious medicine, and I have always found it to be so. Accordingly, as the hæmoptysis appears to me to be very universally of the active kind, so I have constantly found the bark to be very hurtful in all the species of it that I have ever met with. There are, however, cases of passive hæmorrhagy, a frequent instance of which occurs in the menorrhagia, where the disease depends upon a laxity of the extremities of the uterine vessels, which are therefore readily opened by every irritation applied to the system, or to the diseased part. In such cases, the bark is the most proper, and, when the remote and exciting causes can be avoided, an effectual remedy. Upon this subject two remarks may be made: One is, that though a hæmorrhagy may seem to be excited by irritation, it is not therefore to be immediately concluded to be of the active kind, and therefore forbidding the use of the bark. The other remark is, that the bark, in passive hæmorrhagy, does not act as an astringent, in which way its powers are very inconsiderable, but as a tonic, which might be hurtful in any hæmorrhagy of the active kind.

After mentioning catarh and hæmoptysis, I am, in some measure, necessarily led to say something with respect to the use of the bark in the Phthisis Pulmonalis. This disease is so constantly attended with a phlogistic diathesis, that I am disposed to reject the use of the bark in it altogether. There are, however, practitioners who are of a different opinion; but I can assert, that in nine

cases out of ten, in which I have seen it employed, it proved manifestly hurtful.

There are, however, circumstances of the phthisis we spake of, in which the bark has been useful. I have met with cases, in which, with all the symptoms of phthisis, the exacerbations of the hectic were marked with more or less of a cold stage, and regularly, at stated periods, commonly quotidian, but sometimes tertian. In such cases, I have given the bark with the effect of preventing the return of such paroxysms for some time, and at the same time with the relief of almost all the other symptoms of the disease. I never, however, in such cases, made a complete cure; for, in spite of large exhibitions of the bark, the paroxysms, in less than a fortnight or three weeks after they had been stopped, always returned: and though they were again and again, by the same means, stopped, they returned with greater violence, and proved fatal, with all the ordinary symptoms of phthisis.

As the Phthisis Pulmonalis depends so often upon tubercles of a peculiar nature, which with no probability can be resolved by the bark; so this is another reason for my avoiding the use of it in this disease. But whether there be cases resembling very exactly the phthisis from tubercles, in which however there are none present, and therefore a more curable disease, and perhaps admitting the use of the bark, I cannot positively determine; but am disposed to believe that there are cases, with all the symptoms of phthisis pulmonalis, without tubercles, and depending upon a successive formation, and healing again of small vomicæ; in which case the bark may possibly be useful. In all the cases of convalescence which happen after a purulent expectoration, I judge the disease to have been of this kind.

To finish my consideration of the use of the bark in febrile diseases, I must next mention the noted cure of gangrene, which is frequently, though not always, connected with fever.

The theory of this has been considered as very mysterious, but seems to me that it may be made very plain. In all the cases in which I have observed the cure of gangrene by the bark, I have found that it was by exciting a degree of inflammation and suppuration around the gangrened part; and that, by this, the dead part was separated from the living, and thus disposed to be thrown off. This is sometimes, and perhaps might be often, done by an effort of nature; but this is commonly prevented by the loss of tone in the gangrenous spreading into the neighbouring parts. It is this, how-

ever, that is prevented, by the bark supporting and invigorating the tone of the neighbouring parts, and producing the inflammation we have mentioned.

This may serve to explain the different operation of bark in different cases of gangrene. Whenever it arises from causes producing a loss of tone, and thereby a gangrene in any part, the bark is likely to be effectual in stopping its progress; but where the gangrene arises from the acuteness and violence of inflammation in the part, there the bark is likely to be not only ineffectual but hurtful. The theory of Sir John Pringle may be found to be nearly the same, and might be expressed in the same language with that we have employed. In the 39th page of his Appendix, 4to edition, he has the following words: "Thus the bark will fail in a gangrene, if the vessels are too full, or the blood is too thick: But if the vessels are relaxed, and the blood resolved or disposed to putrefaction, either from a bad habit, or from the absorption of putrid matter, then is the bark specific." The whole of the observations I have had an opportunity of making in cases of gangrene have fully confirmed this doctrine.

I have now concluded what relates to the use of the bark in febrile disorders, and shall next take notice of its use in some chronic cases: but after what I have said above of tonics in general, and of bitters more particularly, it only remains to say here, that in the cases to which tonics are adapted, the bark, as one of the most powerful, must be especially proper.

There are two diseases seemingly depending on the laxity of the system; and therefore it has been supposed that the bark might be, and it is alleged that it had been, actually useful in the cure of of them. These are the diseases of scrophula and rickets. I have no doubt that in both a considerable degree of laxity and flaccidity takes place in the system; but I am very far from thinking that either of the diseases consists alone, or even chiefly, in this circumstance; and if it was proper here, I could render it probable that these diseases depend upon certain peculiar conditions of the system, which do not arise from, and indeed rather induce a general laxity of, the whole: and I would particularly assert, that what has been said with respect to the affinity between the two diseases appears to me to be an erroneous judgment. But whatever may be in this, I cannot conveniently enter into controversy here; and do not think it necessary, as I must add that, in all the instances I have seen, and they are not a few, of the use of the bark in these diseases, I have never seen clearly any benefit derived from it.

It is much more probable that spasmodic diseases, depending upon a weakness of tone in the system, should be often cured by the use of the bark. Accordingly, it has been much employed in many of these, and particularly in cases of epilepsy; but in this I have been often disappointed. When epilepsy depends upon organic affections of the brain, I believe no remedy is to be found for it; or when this disease is connected with a plethoric state, and is excited, as it frequently is, by an occasional turgescence of the blood in the vessels of the brain, I think neither the bark nor any other tonic can be properly or safely employed. It is only when epilepsy depends upon a mobility of the system that we can expect the bark to prove a remedy; and in such cases it may possibly have often proved useful: but I have hardly found it to be so, and am of opinion, that the fossil tonics, as chalybeates, cuprum ammoniacum, flowers of zinc, or white vitriol, are always found more effectual.

There is indeed one convulsive disorder in which I have found the bark remarkably useful: and that is the chorea, which I believe to depend upon a state of mobility at a certain period of life. In this disease, I think the preparations of copper and zinc cannot be employed with safety so often, or rather so long, as might be necessary; and therefore, that chalybeates and bark are the safer remedies: And we are of opinion that the latter is more safe than the former.

[* I have had no experience with the bark in tetanus; but I am willing to believe, that it has on some occasions been found of essential use in this formidable spasmodic disease, especially in the symptomatic affection arising from wounds, and other lesions. It must not, however, be forgotten, that when the bark has been exhibited in tetanus, wine has commonly been given, very liberally, along with it. See the observations of Dr RUSH, and some other (especially American) physicians.*]

In another convulsive disorder, the chincough, we know the bark to be often an effectual remedy; but there is some difficulty in determining the proper time for its exhibition. Where the disease is yet recent, and the contagion perhaps still acting, it is often hurtful; but when the disease is more advanced, and the force of the contagion is probably gone, and the disease continues by the force of habit only, I am pretty certain that the bark will then soon put an end to it, providing only that no congestion has been formed, or continues in the lungs.

With respect to asthma, my doctrine must be the same as with respect to epilepsy. When the asthmatic paroxysm depends upon

an occasional turgescence of blood in the vessels of the lungs, the bark is an improper, and may be a hurtful medicine ; but when the asthma depends upon the mobility of the system, as in the hysteric asthma of Sir JOHN FLOYER, the bark is an useful remedy ; and in some instances I have found it to be so.

There remain to be mentioned some spasmodic affections, in which the bark has been much celebrated. These are commonly named Hysteric, and are of very various form. In these cases in which such paroxysms as I have described in my First Lines, under the title of Hysteria, appear, I take this to be the genuine form that may be strictly so named ; and to be a disease of one determined kind, and occurring perhaps only, at least especially, in females of a sanguine and somewhat plethoric temperament. But without prosecuting the history of the disease any farther, I must maintain what I have had confirmed by experience, that, in the form mentioned, the bark is not a remedy adapted to it.

There are, however, a great number of ailments which are frequently named hysteric, or more commonly nervous diseases, that are of very great diversity ; and, by their symptoms, not to be brought under any general character. If therefore we are to attempt any thing with regard to their general nature, it must be by presuming to establish a general cause. This I allow to be an uncertain plan ; but I do not know at present how to do better. In attempting this, I would refer the nervous diseases to one, or rather two general causes : The one is, a weakness of tone, and thence a mobility of system, in sanguine temperaments, or in such as are not manifestly melancholic ; and the other is, in melancholic temperaments, a more or less torpid state of the nervous power prevailing ; in consequence of which, various irregularities in the functions of the nervous system arise.

All this would need much explanation, but I cannot attempt that here ; and I do not think myself sufficiently prepared to enter upon it fully. The only use I shall make of it at present, is to say, that wherever morbid affections of the chronic kind can be perceived to depend upon a weakness of tone and mobility of the system, chiefly appearing in symptoms of dyspepsia, the bark is likely to prove an useful remedy ; but that in the cases of torpor, with firmness of tone, it is likely to be not only an useless, but even a hurtful remedy. The latter I take to be the case, in what I would strictly name Hypochondriasis. Of this, indeed, medical people have various notions, but seldom clear or well digested : and if some have asserted that they have found the bark useful in cases of hypochondriasis, I sus-

pect they have not properly distinguished between hypochondriasis and dyspepsia. The latter may be frequently attended with timidity, doubt, and despondency; but it may still be a very different disease from the proper hypochondriasis.

I have thus endeavoured to consider the use of the bark in all the variety of disease in which it may be applied, or in which it has been commonly employed; and upon the subject it remains only to say, in what manner it may be most properly exhibited: but this I think I have done pretty fully on the subject of bitters; and I have only now to say, that every thing said with regard to preparation and formula on the subject of bitters is entirely applicable to the bark.

SALIX ALBA.

THIS has been proposed as a substitute for the bark; and upon that account I have set it down here. The testimonies of STONE, CLOSSIUS, and GUNZIUS, are very strongly in its favour: and although we have not had many opportunities of employing it in intermittent fevers, the few that have been made show that it may be in some cases an effectual remedy.

The sensible qualities seem to me to be that of a pretty strong, but sufficiently agreeable, bitter, with somewhat of stypticity. These qualities persuade me that it is a valuable medicine, and to be as promising a substitute for the bark as any I have known to be offered.

The trials I have made were with the bark of the *Salix Pentandra*, taken from branches of a third of an inch diameter, and of four or five years growth. I must not, however, dismiss the subject without acknowledging that BERGIUS tells us, that several trials he had made with this bark in intermittent fevers were always without success.

* CORNUS FLORIDA.

[* The bark of this American tree is an excellent substitute for the Peruvian bark, especially as a remedy for intermittents; and accordingly I have thought proper to introduce it, in this place, to the farther notice of physicians. See my *Collections*, &c. Parts First and Second.*]

* ARSENICUM, *Arsenic.*

[* This article has no place in the original *treatise* of DR CULLEN: a circumstance the more remarkable, as the medical properties of

arsenic had solicited much of the attention of the physicians of Europe, and especially on the continent, several years before the publication of the Professor's work. Even in England, Dr FOWLER'S *Reports* appeared as early as the year 1786.

I shall not trouble my readers with the natural or chemical history of arsenic. This information may be obtained from various books, which are of easy access. My business is merely with the medical history of this most deleterious mineral; a mineral, however, under proper management, capable of being rendered one of the most invaluable medicines with which we are acquainted.

The oxide of arsenic, which some chemists have called the arsenious acid, is the principal preparation of the mineral that is employed in practice. This may either be given in substance, in the shape of FOWLER'S mineral solution, or in other fluid forms; such as Dr DARWIN'S saturated solution. In my employment of this mineral, I have chiefly confined myself to the two first mentioned preparations; and I am of opinion, that they will answer all the useful purposes of the medicine. I prefer the arsenic in substance.

It is not my intention to mention all the diseases in which arsenic has been used, or to which it is adapted. This would lead me into a discussion too extensive for our present purpose. I shall principally speak of the medicine as a remedy for intermittent fevers.

I hold it to be a fact, completely established by the experience of many physicians, that arsenic, whatever may be its mode of operation, is a medicine eminently adapted to the cure of many intermittents. The success of Dr FOWLER'S practice with the medicine is well known. And the experience of other practitioners in the same disease is equally conclusive and strong*. In the United-States, arsenic is much employed. My own experience with it, both in private and in hospital practice, has been extensive. In the management of a great variety of intermittents, occurring at all seasons of the year, but especially in the summer and autumnal months, a large proportion of them has yielded, and that in the course of a few days, to small doses of arsenic: the solution of FOWLER, given to the extent of about fifteen, twenty or thirty drops, in the course of the twenty-four hours; or to three or four sixteenths of a grain of the solid oxide, in union with opium, in the same term of time. The medicine generally produces its good effects in a few days. If it occasions a slight *nausea*, I consider this operation favourable to the recovery of the patient. Nay, it

* See DARWIN.

often happens, that in proportion to the debility induced by the medicine, the chances of recovery from intermittents are increased.

Arsenic is nearly equally adapted to the cure of remittent fevers; and may, I think, be used with more or less advantage, in most febrile diseases, such as rheumatism, dysentery, catarrh, pulmonary hectic, and even dropsy, that are complicated with an intermittent or remittent type. In intermittent rheumatism (*febris intermittens, rheumatismum simulans* of MORTON), it is an invaluable medicine. In these cases, it is, upon the whole, a less ambiguous medicine than the Peruvian bark: though I have myself prescribed the last, with good effect, in the rheumatisms of Pennsylvania. The progress of the pulmonary hectic is often essentially arrested by means of arsenic: and the medicine may, I am confident, be used with more safety, in these cases, than the bark.

Arsenic is not equally adapted to intermittents of all kinds: it will often fail in the intermittents with weak and low arterial action. It succeeds best in those of an opposite kind. Hence, and from various other circumstances, I venture to infer, that the mineral does not cure these diseases by virtue of a tonic power. Its operation must be totally different from that of the bitters, the astringents, the bitters and astringents combined, and other true tonics. But I wish, as much as possible, to avoid all speculative views of the medicines which I speak of in this work.

I might say something here of the use of arsenic in certain spasmodic diseases, such as tetanus, asthma, angina pectoris, &c.: but I must wave the consideration of this subject. In a future part of the work, I may have occasion to say something of the powers of this noble medicine in other cases.

The reader may consult Mr SHERWIN on the medical properties of the *arsenicum tartarizatum*.*]

CHAPTER III.

OF EMOLLIENTS.

THESE are medicines which diminish the force of cohesion in the particles of the solid matter of the human body, and thereby render them more lax and flexible. Their action is most evident upon the simple solid; and they may possibly also act upon the solid matter of the moving fibres: but except it may be by the heat that is frequently joined with them, they do not seem, by their chemical qualities, to act upon the nervous power. The powers which act upon this, in diminishing the contractility or tone of the moving fibres, will be considered hereafter, under the title of Sedatives.

The emollients we are to treat of here, seem to act upon the parts to which they are immediately applied, in one of two ways. The one is by being insinuated into the substance of the solid; and thereby diminishing the density of the whole of the mixt, they diminish its force of cohesion. The other is, when, by being insinuated into the interstices of dry particles, they diminish the friction that might otherwise occur, and thereby render the whole more flexible. The former seems to be the operation of water, the latter that of oil; as we shall say more particularly hereafter.

The operation of emollients is most considerable in the parts to which they are immediately applied; but as the whole of the solid matter of the body is constantly in a preternaturally extended state, and as at the same time the several parts are so connected as to form one continuous body; so the tension of the whole must in some measure depend upon the tension of every particular part. It is therefore that the relaxation of any one part must in some measure affect the whole. It is, indeed, in this way that the effect of emollients is often extended much beyond the part to which they are immediately applied.

As, however, the effect of emollients is still most considerable in the part to which they are immediately applied, it will be evident that their effect will be most considerable upon the surface of the body; and it is a question how far they can be rendered so in the internal parts. Upon this subject it may be readily imagined, that as they may be applied to the internal surface of the alimentary canal, that their effect there may be very great: and although I would not maintain that they must be none at all, yet I am disposed to think, that except in the mouth and fauces, or in the great guts,

to which they can be copiously and immediately applied, they cannot in the other parts of the alimentary canal be very considerable. The internal surface of the stomach and intestines are very constantly covered with a considerable quantity of mucus, not readily diffusible in water, and therefore likely to prevent the insinuation of water or oil into the substance of their coats.

Their effects here must also be less, as they are unassisted by any additional heat, which is often required in their action upon the external parts : and another circumstance which may prevent their action upon the alimentary canal is, that their application to any particular part can never be very durable ; as water, the chief form of emollients, must be very quickly carried on in progressive motion, or quickly withdrawn by absorption. I have known two pounds of water absorbed from the rectum in the space of an hour.

If the action of emollients in the alimentary canal be in any measure doubtful, it must be still more so with respect to the blood-vessels. Here even a large quantity is slowly introduced ; is soon very much divided ; can never be applied in large quantity to any one part, and must always be mixed with a quantity of fluid not very penetrating. At the same time, it is applied to a surface constantly covered with an exudation not readily miscible with water ; and with all this it is constantly in a rapid progressive motion, by which it must be soon carried entirely out by the several secretions and excretions.

From all these circumstances it would appear, that emollients, as watery, can hardly ever have any action in the system of blood-vessels : and therefore, to explain the action of emollients upon the system of solids, I am almost confined to consider only their action upon the external surface of the body, or in the parts immediately subjacent.

In considering the action of emollients upon the external parts, it may be a question, whether water of a lower temperature than that of the body itself can act as an emollient ?

We are of opinion, that while water is at such a temperature as to give a sensation of cold, it cannot have any emollient effect : but we know that if water of a temperature any thing above 62 in FARENHEIT'S thermometer continues to be constantly applied, it soon ceases to give the sensation of cold which it gave on its first application ; and after a short time it gives a sensation of warmth. In this condition, that is, water of any temperature above 62, that is continued to be applied till it gives a sensation of warmth, may act as an emollient.

It is however to be observed, that the greater the warmth, if within the bounds the skin will bear without pain, the greater its emollient power will be ; both because the heat will render it more penetrating, and because the heat within the bounds mentioned contributes also to the softening and relaxing the simple solids.

It likewise appears to me that water penetrates more powerfully in the state of vapour than in its liquid form ; and as, in order to be converted into vapour, it requires a considerable degree of heat ; so it is found that the human body will bear a greater degree of the heat of water, in the state of vapour, than in its liquid form : and therefore, that cloths wrung out of boiling water, if so wrung as to give only a vapour, may be more safely applied, and with more advantage, as emollients, than liquid water.

The application, however, of heat, must always be limited, so that the stimulus of the heat be noways inconsistent with the purpose of the emollient. Thus Dr WINTRINGHAM the elder has remarked, that warm fomentations applied to the pained joints at the beginning of acute rheumatism, increases the pain and aggravates the disease.

Whether emollients be applied in vapour or in a liquid form, it is found, that to give them effect it is necessary that the application be continued for some length of time ; and therefore benefit is often obtained by the emollients being applied in the form of poultice ; whereby both the moisture and heat may continue to be applied for a long time.

There is a manner of applying emollients, or warm water as such, by making it fall in drops from some height upon the part affected, and which by the French is called a *douche*. Whether in this manner the water penetrates more readily or fully into the substance of the part, I cannot positively determine ; but I can hardly think it does : and am inclined to be of opinion that the *douche* acts only by a mechanical power, exciting an oscillation in the vessels of the part, which, analogous to friction, may sometimes resolve obstructions, or excite the sense and motion in paralytic parts. I can in no other way explain the effects of pumping water upon any part.

Having thus considered the operation of emollients in general, I proceed to consider their effects on the human body more particularly.

As the cuticle is often in a dry and constricted state, the application of emollients will soften and relax this, and thereby, in some measure, take off the tension of the subjacent parts. But it appears to me, that, in many cases, the operation goes no further.

The operation of oil seems to be chiefly upon the cuticle, composed very entirely of numberless dry squamæ, and between which oil being insinuated renders them more readily moveable upon one another, and the whole, therefore, more lax and flexible.

As it may be presumed that warm water or vapour penetrates, in some measure, into the substance of the skin itself, it will therefore relax not only the cellular texture of this, but likewise the coats of the numerous blood-vessels laid in its texture. By this relaxation of the common teguments, the tension of the subjacent parts, particularly of the muscles, must be considerably diminished; and in proportion to the extent of that, the relaxation of the whole system. The effects are more particularly to be observed when parts are under a state of inflammation, as in that case the vessels are distended, and thereby irritated; so the relaxation of these vessels, by favouring the more free transmission of the fluids, may thereby diminish the irritation which had perhaps been communicated.

As the action of the heart and arteries is often increased and supported by a spasmodic constriction of the extremities of the vessels on the surface of the body; so the relaxation of that constriction, by emollients applied, may often take off the irritation of the heart and arteries.

Emollients, by relaxing external parts, may take off spasms of internal parts particularly connected with these; and thus the relaxation of the teguments of the lower belly often relieves the spasms of the intestines which take place in colic and dysentery.

Emollients applied to any one part, both by relaxation and stimulus, must determine the fluids more copiously into that part, and diminish the influx of them into others; and accordingly emollients, by relaxing the extremities of the vessels on the surface of the body, must favour perspiration and sweat, as well as at the same time take off any determination to the internal parts: Thus also pediluvia, when they do not prove stimulant to the system, must diminish the determination of the blood into the vessels of the head.

As the flexibility of the solids is increased by the more free and frequent motion of their particles upon one another; so, if the application of emollients be accompanied with much friction, the flexibility of the solids must be greatly increased by it; and particularly by its mechanical operation, the action of the blood-vessels in general, as well as the more free motion of the fluids, must be greatly promoted, and thereby obstructions may by this means be often removed.

It is further to be observed, that as the flexibility of the solids depends upon, and is maintained by, the motion of their particles upon one another; so, by long rest, that flexibility is destroyed, and a rigidity induced, which is to be recovered chiefly by the employment of emollients with friction. The motion of a joint is frequently destroyed by the rigidity of one set of its muscles, contracted by the want of motion I have mentioned; and the motion of such joints is only to be recovered by the cure of that rigidity in the manner I have just now said.

Thus far with respect to the effects of emollients on the system of blood-vessels and of the moving fibres: but it is farther to be observed, that as the warmth and humidity applied to the surface of the body, are applied to the extremities of innumerable nerves terminating in the skin, and constituting there a peculiar organ of sense; so it is probable, that this application has considerable effects upon the nervous system, both by relaxing and stimulating, and may in this way contribute greatly to many of the effects above mentioned.

We have now only to add, that the effect of emollients is hardly to be obtained but by their application long continued at one time; and we can hardly ever find the continuance of an hour less than sufficient.

PARTICULAR EMOLLIENTS.

EMOLLIENTS are applied either in a watery or in an oily form; and the emollient that deserves to be first mentioned is simple water, warmed either more or less. Whether any choice of water be very necessary, we are doubtful, as we believe that every kind of water which may be comprehended under the title of simple water, that is, water without taste or smell, must be nearly of equal power as an emollient: but if a choice can be made, the softest water may have some little advantage over the hard.

The virtues of water as an emollient may be understood from what has been said of emollients in general; for all the effects there mentioned can be obtained most certainly by the application of simple water warmed. Whether any advantage can be gained by any addition made to water, I am doubtful. It is possible, that if oil can be blended intimately with water, this might perhaps carry the oil so blended with it into the interstices of the solid parts, and thus more effectually induce a relaxation; but I know of one way only by which such a mixture can be obtained, and that is, by adding to water the milk of any of our domestic animals: and as milk im-

mediately taken from the animal that affords it, contains an oil already intimately blended with the water, so it may possibly, as common practice supposes, be an effectual emollient, either by itself or as added to water. This I presume from theory; but I have not been able to perceive the emollient powers of milk to be greater than that of simple water. In Dr BRIAN ROBINSON'S Table of the effects of different substances applied to hairs, marking the extensions produced by different fluids, the cream of cows milk is $23\frac{3}{10}$ ths; cows milk skimmed is 26; water cold is 35; water hot is 80. That table might give occasion to some remarks and reflections on the power of emollients, and I shall perhaps make some; but to consider the whole, would lead to subtle speculations, which, as I cannot find them applicable to practice, shall be passed over here.

Practitioners have commonly attempted to improve the emollient virtue of water, by employing the decoctions of several plants; but except it be those of the mucilaginous kind, which I shall consider by themselves, I cannot perceive that any of the others are employed with advantage. The oleraceous plants, as the ATRIPLEX, BETA, SPINACHIA, and CHENOPodium *bonus Henricus*, have been employed; and some others also, as the ALSINE, ACANTHUS *branca Ursina*, MELÆLOTUS, PARIETARIA, and some others. But as none of these mentioned contain any thing mucilaginous, and that, by Dr ROBINSON'S table above referred to, it appears that all saline matters joined with water render it less penetrating; so I judge the plants mentioned as emollients to be absolutely insignificant. In some lists of emollients, as in that of Mr LIEUTAUD, there are still greater inaccuracies to be found. Amongst the emollients, he inserts the radices nymphææ et lapathi, which are astringents; the flores chamamæli and sambuci, which may have their virtues, but are not emollient, except in so far as they are accompanied with warm water.

Of the vegetable substances which, joined with warm water, may be supposed to increase the emollient powers of this, are especially those that afford a mucilage, as the roots and herbs of the *Columnifera*; all of which give out more or less of a mucilaginous matter. The ALTHÆA and MALVA are those chiefly employed. Their demulcent virtue shall be considered in its proper place hereafter: and, as emollients, which gives them a place here, I judge them to be very inconsiderable, as I think they must rather impede than increase the solvent power of water. The only advantage that can be derived from them seems to be, that as warm water washes off any

unctuous matter that commonly besmears the cuticle; so, when the water is again evaporated, it leaves the cuticle more dry than it was before: and it is possible that water impregnated with mucilaginous matter, in being again evaporated, may leave some portion of the mucilaginous matter behind, and thereby obviate the dryness of the cuticle which might otherwise occur.

For impregnating water with mucilaginous matter, a great variety of farinaceous seeds have been employed; and those especially which have much oil blended with their farina, as the lintseed, have been properly preferred. This, and the others that might be employed, will come under consideration hereafter, under the title of Demulcents. And with respect to them now as emollients, I have the same observations to make as I have made just now with respect to mucilages: and I am persuaded, that the more oily nature of the farinacea will still more diminish the emollient virtue of water; but in another respect they may have some advantage. As we have said that emollients may have more durable effects, as applied in the form of poultice; so, as the farinacea are commonly employed for this purpose, the more oily kinds, as less liable to dry, will always be the best. Whether, however, the adding of oil or unguinous matter to a poultice of other farinacea, may not answer the purpose better, I leave to the surgeons to determine.

The other form of emollients is the oily; and all the mild oils of vegetables, and all the oils and fats of animals, have been employed as emollients. The operation of them in general I have mentioned above; and it is chiefly that of producing a greater flexibility in dry matters. In this way they operate especially upon the cuticle; and may thereby, in some measure, take off the tension of the subjacent parts. That the mild oils we have mentioned ever penetrate into the substance of the skin, I cannot perceive; and when they are seemingly taken in from the surface, I believe it is always by absorbing vessels. This absorption, though it certainly takes place, is certainly never in considerable quantity; and in being carried on by the absorbing vessels, cannot be supposed to have much, if any, effect in any of the parts through which these vessels pass.

As we have observed above, that friction, joined with the application of emollients, may be of service in exciting the action of the vessels, so this friction can only be applied conveniently with oil anointed on the fingers or hands employed in rubbing; and this opportunity of friction is one great advantage obtained by the employment of oils. The effects of very gentle friction, long continued, seems to be very considerable, by its exciting a constant oscillation

in the vessels of the subjacent parts; and by the oscillations excited in the nerves of the skin, these effects may be propagated to very distant parts. I know from my own experience of it, that by a friction with oil long continued upon the teguments of the lower belly, the action of the urinary passages may be strongly excited, and a copious flow of urine be produced. This practice, indeed, does not always succeed; but it has in several instances, and I have never found it do any harm.

It has been commonly supposed, that the application of oil to the skin might stop up its pores, and hinder perspiration; but, from several considerations, it appears that there is no just foundation for this: and the very general practice of the ancients, as well as of the Asiatics in modern times, is a certain proof of the contrary.

For the purpose of oily emollients, a great number of oily substances have been proposed and employed; and among these commonly proposed, I cannot find much difference. The various mild expressed oils of vegetables are all of them very nearly of the same nature; and if any distinction was to be made, it would be by choosing the most fluid in preference to the more mucilaginous: and, on this footing, I would prefer the oil of olives to that of lintseed. From the same consideration, I would prefer the vegetable oils to the animal fats; but this hardly deserves attention in practice. Among the animal fats, practitioners some time ago made a choice, and supposed that the fats of certain animals had peculiar virtues; but the supposition seems now, at least in Britain, to be very entirely abandoned; and I cannot perceive that there ever was any foundation for it. Some of them in pharmacy, may, by their consistence or colour, be better suited than others to certain formulæ: but that is now so well ascertained in common practice as to need no illustration here.

CHAPTER IV.

CORROSIVES.

THESE are otherwise called Caustics, Erodents, and Escharotics. They are all of them substances which dissolve the solid matter of the human body; and they are indicated in all those cases in which either a portion of the solid matter is to be taken away, or when the texture of it is to be destroyed, so as it may either spontaneously

fall off, or, by mechanical means, may be easily separated from the other parts. When such an indication arises, I leave my readers to learn from the principles of surgery; and also, from the same, to learn when this method is preferable to that of a mechanical excision.

The operation of caustics, whilst any living principle subsists in the part to which they are applied, is always attended with pain, and may thereby prove a considerable irritation to the whole system; but this is an effect in common to these with many other stimulants, and is not therefore to be considered here, but under the general head of stimulants, in the next article. The same thing is to be said of their use in exciting a discharge of pus; which, as it may be done by other means, is not necessary nor proper to be considered here. It only remains for us, in this place, to say what the particular corrosives are, with some remarks on their difference, for the purposes of practice.

As solvents of animal matter may be mentioned in the first place, the acids which can be obtained in a very concentrated state, such as the vitriolic and nitrous; these, therefore, may be employed as caustics: but their fluidity makes it difficult to confine their application to the parts which are only to be properly consumed, and therefore it is that they are seldom employed.

The caustic most generally employed is the fixed alkaline salt, when separated from the aerial acid which commonly accompanies it: and accordingly, when it is thus suited to the purposes of the present indication, it is said to be in its caustic state. How the common fixed alkali is brought into this state, and how it is to be managed as a caustic, are matters vulgarly known, and not necessary to be mentioned here. Dr EDWARD BARRY, in the Edinburgh Medical Essays, has proposed the employment of a caustic of acid and alkali alternately applied. The scheme is specious, but has not succeeded with us; and I believe will not at all answer except where large masses are to be consumed, and where the spreading of the acid can do no harm.

The caustic qualities of acids, though entirely destroyed by their being combined with alkalies and earths, are not so by their being combined with metals. The nitrous acid combined with silver, gives the lunar caustic very commonly employed; and the muriatic acid, in a concentrated state, joined with antimony, gives what is commonly called the butter of antimony, one of the strongest caustics known. These metallic caustics are attended with the same inconvenience as the simple acids; that is, of being ready to spread be-

yond the bounds intended for them: but this is more easily managed with respect to the lunar caustic, which can be got in a solid form, than with respect to the butter of antimony, necessarily liquid; and this gives the reason why the latter is more rarely employed.

It is here to be observed, that these corrosive matters are in different degrees of strength; and when they are not sufficient to dissolve the more solid parts, they still may be fit to dissolve those more tender fungous excrescences which arise in ulcers. Thus it happens, that alum having a considerable portion of its watery parts exhaled, and its acid thereby concentrated, is thereby rendered capable of consuming the fungous growth in ulcers. It is, however, always a weak escharotic; and we have a stronger kind in the preparations of mercury and copper. Both these preparations are noted for their cleaning foul sores, bringing them to discharge a proper pus, so necessary to their healing; and I ascribe all this to their escharotic power.

A specific power might, in certain cases, be supposed in the mercurials; but this cannot be supposed in the preparations of copper, which, however, often answer the purpose as well. In practice, the force of the latter cannot be so well measured or limited as the former; and therefore the dry red precipitate, as less liable to liquify and spread, is commonly the most convenient application. It has been common to mix this with unguinous matters; but this very much diminishes its power, and is very seldom necessary.

CHAPTER V.

OF STIMULANTS.

ACCORDING to the plan laid down in our prefixed table, we are now to consider the medicines that act more entirely upon the living solid.

The idea commonly annexed to the term Stimulant, is that of a power suited only to excite the action of moving fibres; but I am here to consider stimulants more generally, as exciting the motion of the living principle, whether producing sensation or as producing the action of moving fibres.

Very generally, indeed, the motions begin in the former: but it is not necessary, as some have supposed, that they should always do so; for there are powers which, directly applied to the moving

fibres, excite their action without any previous sensation excited, or without any intervention of the brain; which appears clearly from hence, that the motion of moving fibres can be excited so long as the living principle subsists in them, though they are entirely separated from the rest of the body, and entirely therefore removed from all sense.

The operation of stimulants, either in an extensive or more limited view, is difficult to be explained; because our knowledge of the living principle or nervous power, and of the various modifications of the different states of its mobility, is still very imperfect. Some have imagined, that the operation of stimulants might be mechanically explained by the figure of their particles; but while the Corpuscularian philosophy is at present so much deserted, we do not think it necessary to take any pains to discuss the futilities advanced on this subject: and however it may be, it seems enough to observe, that we know in general that the nervous power may be in different states of mobility, and that there are substances which, applied to the nerves, have a power of increasing or diminishing the mobility of the fluid contained in them. The former we name Stimulants, the latter Sedatives.

This then is the general idea of stimulants, That they are powers capable of increasing the mobility, and of exciting the motion of the nervous power. Here, however, it is proper to remark, that by the nervous power being acted upon by stimulants, we strictly mean not only that fluid which is readily moveable in the brain and nerves, but also that fluid which is under a peculiar modification in the moving fibres, and gives them what we name the inherent power. It is fit also to remark here, that in this manner we must distinguish between stimulant and tonic powers, which both act upon the same power, and have been commonly confounded together. Although they may mutually increase the effects of each other, they are still in their nature and operation to be considered as distinct and different, though we cannot clearly explain wherein the difference consists.

Having thus given my general idea of the operation of stimulants, I proceed to consider the various modifications of that operation, as it is determined either by the circumstances of the parts of the body to which they are immediately applied, or by the various nature of the substances that may be employed to act.

In the first place, we shall consider them as they are applied to organs of peculiar sense, which are excited by the impressions of certain matters only; or as they are applied to parts which have a

sensibility in common with the whole of the nervous system, and when their effects are modified by the state of the moving fibres in the parts adjoining.

With respect to the whole of the stimulants applied to the organs of sense, we have to remark, that the exercise of sensation is in general a stimulant power, and is a chief means of supporting the mobility of the living principle in the nervous system ; more especially in what concerns the animal functions.

It relates also to all the cases in which sensation is produced, to remark, that the effects of the stimulus seem to be in proportion to the force of the impression producing them. As a certain degree of this is on many occasions necessary to render them pleasant ; so in proportion to the pleasure arising from them, their stimulus is greater : and farther, as all strong impressions give pain ; so, in proportion to this also, they are more strongly stimulant.

From certain other circumstances beside that of force, sensations are either agreeable or disagreeable ; the former being always stimulant ; the latter being, as I judge, always sedative, or perhaps indirectly stimulant, as we shall explain hereafter.

Of particular sensations, these of light and noise have their stimulant effects in proportion to their force ; or sometimes independent of that, according to certain circumstances rendering them more agreeable.

Odours are very much on the same footing, but have often more immediate and strong effects on the sensorium ; and to explain that, it may be observed, that with respect to other parts of the system, the medical virtues of many substances seem to depend upon their odorous parts ; which seems to point out their particular activity with respect to the nervous system.

Sapid bodies do not so readily or powerfully affect the sensorium ; but the activity of sapid substances applied to other parts, often corresponds with the force of their impressions upon the tongue.

In considering the operation of substances upon the skin, it is not always easy to distinguish the effects of impressions applied to what is strictly the organ of sense, from the effects of impressions made upon that sensibility which the skin has in common with all the other parts of the nervous system.

It seems to be an operation on the nervous papillæ of the skin, when a certain gentle undulatory motion applied to the skin produces a sense of tickling, which often proves stimulant. It is also chiefly an operation not only upon the same organ, but partly also upon that of the common sensibility ; when certain substances ap-

plied to the skin produce a sense of itching, which is always stimulant, and often continues till it produces redness and other circumstances of inflammation.

These are the observations which I can make on the action of stimulants applied to organs of sense: and this in general is to be remarked, that though we should expect that impressions upon these organs should be especially and only communicated to the brain, and although, which is truly the case with all moderate impressions, exciting peculiar sensations, which for the most part act only upon the brain, and little or none at all either upon the organ itself, or upon the parts immediately adjoining to it; yet all strong impressions seem to act very often more on the neighbouring parts, than upon the brain or general system depending upon it.

The action upon the neighbouring parts seems to be especially the exciting of the action of the blood-vessels of the part immediately adjoining to the organ of sense. Thus, a strong light excites a stronger action in the numerous blood-vessels intermixed with the nerves of the retina. What happens in the ear we do not know; but strong odours inflame the internal membrane of the nose, and strong and painful impressions upon the tongue inflame the surface of it. What happens on the skin I have mentioned before; and I gave that as an example of the action of stimulants, both on parts which are not organs of peculiar sense, and on those which have only the common sensibility of the nervous system. Such are also all the internal surfaces, in which therefore we perceive only the effects of stimulants by their producing inflammation on their surfaces.

But we are now to consider the operation of stimulants upon the parts that are endued only with the sensibility that is in common to the whole of the system; and we cannot illustrate this better than by marking their action upon the skin.

When certain substances are applied to the skin, the first sensation they produce is that of heat in the part; and commonly at the same time some redness appears upon the surface, which I take to be a mark of an operation upon the blood-vessels of the skin. There is frequently, indeed, at the same time, a sense of pricking pain; yet often without that, the effect chiefly consists in an increased action of the vessels mentioned, and which accordingly proceeds to every circumstance of inflammation, as pain, tumour, blistering, suppuration, and gangrene. In many cases, some of these effects are produced in the part, without their being communicated to the rest of the system; and I consider them therefore as an immediate

operation upon the moving fibres of the vessels of the skin, without the intervention of sensation or of any action of the brain.

It is indeed true, that, in many cases, a sensation arises, and that a stimulus is communicated to the brain, and the symptoms of its increased energy as a preternatural frequency of pulse; and, in consequence of this, an increase of heat over the whole body is produced. But it is to be remarked, as often happening, that the stimulus communicated to the brain is not in proportion to the inflammation produced in the part, which we have occasion frequently to observe in those paralytic cases in which we apply inflammatory stimulants to particular parts.

These are the general effects of stimulants on the parts to which they are immediately applied: But I am now to mention what is a very important particular of the animal œconomy, which is, That many stimulants have little effect on the parts to which they are immediately applied, but excite motions in other, and sometimes very distant, parts of the body. These motions, however, have commonly a relation to the parts to which the stimulus had been immediately applied; and they are commonly such as are suited for throwing off the stimulant matter from those parts.

Such are the motions of sneezing, hawking, coughing, vomiting, and the voiding of urine and feces. In all of these, the motions are excited by an uneasy or painful impression from a matter applied to certain parts; and the motions excited are manifestly fitted for throwing off the irritating matter from these parts.

These phenomena have been commonly explained, upon the supposition of a certain consent of nerves between those of the parts irritated and of the parts acting; but no particular connection of nerves can be found that will account for the exciting of these actions, without their exciting at the same time many others; and it must be referred to an institution of nature which we cannot explain, and can only say, that the motions excited are suited to the general purpose of nature, either to resist and avert injuries from external causes threatening the animal œconomy, or to produce certain actions necessary to that œconomy. Of the latter kind are the evacuations of stool and urine; and of the former are the other motions of sneezing, hawking, coughing, and vomiting.

In illustration of this, it may be remarked, that the same actions are produced by stimuli applied to very different parts, if these actions are suited to the purpose, as we may call it, of these different parts. Thus a full inspiration and a concurring contraction of the abdominal muscles is produced by a stimulus applied to the stomach,

or by an uneasy sensation at the neck of the bladder, or by a like sensation in the intestinum rectum.

These may separately excite the full inspiration; not therefore from any particular consent of nerves, but merely from its being necessary to the purpose of nature: and accordingly it is excited, not only on these occasions, but on every other where nature intends a strong exertion of strength, to which a full inspiration is always necessary.

It is farther to be remarked, that it is the administration of nature in the business of the animal œconomy, which not only excites those motions, but also regulates the force with which they are exerted to be more or less, according as the occasional circumstances may require. Thus, a sensation that excites to an evacuation of urine, if the urinary bladder be full, and there is no resistance to the issuing of the urine, the inspiration produced will be to a very moderate degree only; but if there is a resistance to the evacuation of urine, the inspiration and other concurrent actions are excited to a greater degree and with greater force.

That the business in such cases is directed by the purpose of the œconomy, and not by the consent of nerves, appears further from hence, that it is not one set of actions, all of them constantly excited by the same stimulus, but more or fewer, according to the strength of effort that is necessary. Thus, the sensation exciting an evacuation by stool, according to the force on that occasion to be exerted, produces the action of more or fewer parts of the body. Not only a very full inspiration and a strong contraction of the abdominal muscles are produced, but a contraction, in order to a general tension, takes place in almost every muscular fibre of the body. The fists are clinched, or the hands grasp some fixed body very firmly; and even the muscles of the cheeks are often very strongly contracted.

There may seem to be some mystery in all this; but no body will be stumbled with respect to this part of the animal œconomy, who considers the ordinary operation of the will. This does not directly or consciously direct the action of any particular muscle; but willing only an end and purpose, the muscles fitted to execute or produce this end are immediately brought into action.

The actions we have mentioned are the effects of stimuli, which we suppose to be powers exciting the motion of the nervous power; and though the effects are determined by the will or propensity, we still suppose the general power of the substance acting, and are therefore what we call direct stimulants: It is now, however, to be

remarked, that there are motions excited in the body without the application of such stimulants, and by circumstances of a contrary kind; that is, merely by a sense of difficulty, of resistance, or of debility, in the exercise of functions.

Thus, sighing manifestly arises from a sense of difficulty in the transmission of the blood through the vessels of the lungs. Coughing often arises from the same sensation, without any direct stimulus applied to any particular part of them. Vomiting often arises merely from a sense of debility, as when it accompanies a syncope, from causes which cannot be supposed to operate directly upon the stomach; and the vomitings so frequently produced by narcotics seem to me to be more properly explained by a sense of the debility induced by them, than by their affording any direct stimulus. We explain in the same manner the yawning and stretching which occurs to persons coming out of sleep, and on some other occasions, when no other cause can be supposed than a sense of some difficulty in the exertion of voluntary motions.

These seem to afford unquestionable proofs of a power in the animal œconomy, to obviate and correct certain deviations from the standard of health; and both these, with the instances given above of direct stimuli producing motion suited to throw off matters applied which give pain and uneasiness, or that may prove noxious to the system, concur in showing, that there is in the animal œconomy a power to obviate and correct, in a certain degree, every thing not suited to the health of the œconomy, and which has properly enough been named the *Vis Naturæ Conservatrix et Medicatrix*.

After so many evident instances of this, we can hardly doubt of the like power taking place also in the more obscure internal parts, in many cases of disease which are spontaneously cured by the operations of nature; or, in other words, by the spontaneous powers of the animal œconomy, and particularly that the state of the circulation is often regulated so as to be excited to a stronger action, merely by the occurrence of resistance or debility. All this particularly applies to render it probable, that the effect of sedatives, exciting the action of the system, either in general, or of particular parts, may be explained entirely by their being effects of a *vis medicatrix naturæ*, obviating injuries which threaten the whole system or particular parts: and to finish this subject, nothing can better show that active powers can be excited merely by a sense of debility, than this, that a stimulus accustomed to support the activity of the system, happening to be withdrawn, the sense of debility thence arising produces various actions in the system, or in particu-

lar parts. All these means of exciting the action of the system, or of particular parts, we name *Indirect Stimulants*.

After thus mentioning the operation of stimulants as chiefly applied to external parts, we proceed to consider their application to the internal, and which is especially by their being taken into the stomach. Here they may operate, in the first place, upon the moving fibres of the stomach itself, exciting their action for the purposes of digestion; or to a higher degree, for exciting vomiting, which we shall consider hereafter under the head of Evacuations: or, in the second place, stimulants may act on the stomach as a peculiar organ of sense. Here it is surely needless to say how readily and constantly all impressions made upon the stomach are communicated to other parts of the system, and particularly to the origin of the nerves.

It is possible that impressions made upon the stomach, without the intervention of the brain, may be communicated to several parts of the system, and particularly to the surface of the body, or to parts under disease, and therefore under a state of uncommon irritability; but these are uncommon occurrences, and I cannot readily ascertain, with any clearness, the circumstances and cases in which these especially occur. I believe the most common and very general manner in which stimulants taken into the stomach operate is, by their stimulus being communicated to the brain; and that by exciting the energy of that, various effects are produced in different parts of the system.

Upon these occasions the operation may be especially distinguished, as being of different degrees of force. In some cases, it seems to amount to no more than the increasing of the mobility of the nervous power in the brain itself, and thereby rendering the exercise of the intellectual powers more free, easy, and active. Probably, at the same time, or at least with some higher degree of force, they render the derivation of the nervous fluid into the several parts of the system, especially into the nerves of the voluntary functions, more free and full; without, however, producing any uncommon increase of it in particular parts, to which a will or propensity is necessary.

Another case of stimulants applied to the stomach, is when the stimulus applied is of a still stronger kind; and, in consequence, a stronger impulse is communicated to the brain, and when consequently a stronger exertion of its energy is produced. This, however, without particular determination, may have no effect on the animal functions; but as we have said before, that the energy of

the brain is constantly exerted in supporting the activity of the vital functions of the heart and arteries ; so, any unusual increase of this exertion may increase the force and frequency of these functions. Thus the effects of certain impressions on the stomach may be to increase the force of the circulation of the blood, and especially its most general determination to the surface of the body ; whence the heat and sweating which commonly ensue. Thus the operation of stimulants in the stomach, may be distinguished by the different degrees of its force : and this, I expect, will serve as a foundation for the consideration of particular stimulants hereafter.

The operation of stimulants taken into the stomach is not always exhausted there ; for they are often carried on, very much unchanged, into the intestines ; and there also operate, in the first place, upon the fibres of the intestines analogous to the like operations upon the stomach. They increase and render more steady the action of the moving fibres ; and I have no doubt that the stimulant power from the intestines, as well as from the stomach, may be communicated to the brain, though it is probable that the stomach is endowed with more sensibility suited to this purpose.

The action of stimulants on the intestines to such a degree as to produce purging, I delay considering, as I have done that of vomiting, till I come to treat of evacuations.

As many of our stimulants are very little changed in the alimentary canal, so they are carried with their entire power into the blood-vessels ; and we are therefore to consider what may be their operation there. We judge it to be very little ; 1st, Because they are necessarily diffused in a great quantity of liquid, which must very much weaken, if not entirely destroy, their operation. 2dly, Because they are there involved in a quantity of viscid fluid ; such as we know, in all cases, to weaken the action of stimulants. And, lastly, Because we believe the internal surface of the blood-vessels to have very little sensibility, and therefore little liable to be affected by weak impressions. From all these considerations, we consider the operation of stimulants, taken in by the mouth, to be in the blood-vessels very little ; and know of no observation or experiment that leads us to think otherwise. I am of opinion, that any such effects as have been supposed can be better explained by their operation on the stomach and brain.

We still, however, know that many stimulant matters are carried into the blood-vessels, and are carried off by several excretions : and as we may justly impute their inert state in the blood-vessels to their being there extremely diffused ; so, when they are again ac-

cumulated, and as it were concentrated in the secretory organs, they may there operate in promoting the different secretions. Of this we have many instances; but I delay considering them till I shall come to treat of the evacuations they occasion.

To give a full treatise of stimulants, we should consider the powers of heat, cold, and electricity; but as not strictly belonging to the *Materia Medica*, we pass them over here.

Having now considered the operation of stimulants in general, I have only to conclude the subject with mentioning, that with regard to all of them, they are subjected to the laws of custom; and that, therefore, considered as impressions, their power by repetition is constantly diminished; but that, considered in their effects, the actions produced by the repetition may become more readily excited, and thereby the power of stimulants may seem to be increased.

PARTICULAR STIMULANTS.

WE begin by mentioning those which, with a botanical affinity, have much of a common virtue: and in the first place, therefore, the

A. VERTICILLATÆ.

THESE are a numerous order, many of which have their virtue depending upon an essential oil, largely abounding in them, as produced by nature. As, however, the effect of botanical affinity is not complete in exhibiting the same qualities in all of the same order; so, those of the *verticillatæ*, which have little or no essential oil, such as the *bugula*, *brunella*, and *lamium*, are neglected as medicines: or if there be some which, with little essential oil, are still retained in practice, it is on account of the bitter and astringent qualities which are found in many of this order. Even of those abounding in essential oil, all are not here enumerated; as, though they have the common qualities, they have them not in a higher, or perhaps not in so high a degree, as those more common in our shops. But to be still more particular, I begin with

BETONICA.

THIS, though formerly much celebrated, is now omitted in the catalogues of the British dispensatories; and, in my opinion, very justly, as it has the common qualities of the *verticillatæ* in a very slender degree: and I mention it here merely as an example of what frivolities are repeated after ancient writers, and also as an exam-

ple of very ill-grounded popular opinions which have prevailed not long ago. ANTONIUS MUSA, the physician of Augustus Cæsar, is said to have given a treatise on betony, in which he has mentioned this plant as a remedy against forty-eight different diseases; and amongst the Italians it has been considered of so great and almost universal virtue, as to introduce the maxim of *Vende la tonica e compra la Betonica*.

HEDERA TERRESTRIS.

THIS is another instance of the uncertainty of popular opinions, however generally prevailing; and the opinion of the English of the *hedera terrestris* seems to me to be no better founded than that of the Italians just now mentioned.

The sensible qualities of the *hedera terrestris* do not promise much virtue, either in its recent state or in any of its preparations; and CARTHEUSER's account of the extract I suppose to be founded on some mistake, as the same qualities do not at all appear in the extracts from a recent plant, which we have prepared with all possible care.

With respect to this plant, the accounts given of it by *materia medica* writers seem to me to be no better founded than the opinions of the vulgar. That it should be powerful in curing ulcers of the lungs, and various cases of phthisis, seems to me very improbable; and the authority of Simon Paulli, or of the others adduced on this subject, have very little or no weight with me against the consideration of the nature of such diseases, and of the general difficulty of curing them. Its use in calculous cases is not supported by any better authorities, nor with any greater probability; and I should have no fear of excess in employing it.*

Dr MEAD's particular manner of employing it, by joining it with fermenting ale, appears to me frivolous. In short, in many cases in which I have seen it employed, I have had no evidence of either its diuretic or of its pectoral effects. In common with many other of the *verticillatæ*, it may be employed as an errhine, and in that way cure a headach; but no otherways by any specific quality.

HYSOPUS.

THIS abounds with more essential oil than the foregoing, and has at the same time more of a warm bitter joined with it. It should therefore be a more active medicine; but how this activity may be

* Murray, App. H. 177.

best directed, I am quite uncertain. How the essential oils of this, and others of the verticillatæ, should be suited to operate particularly upon the vessels of the lungs, I cannot perceive. Hysop, however, has always had the reputation of being pectoral; although in many trials I have not seen its effects. Formerly the distilled water was much employed as a pectoral in this country, in the cases both of children and adults; but the efficacy of it has been so little observed by our practitioners, that it is now omitted in our dispensatory.

Its effects in resolving coagulated fluids, for reasons given above, I can hardly admit of: but as the vapour of essential oils, externally applied, may excite the action of the blood-vessels; so it is possible that hysop, as well as several other of the verticillatæ, may be usefully employed in contusions and other cases of stagnating fluids. It is possible that like applications may be usefully applied to some contusions of the eyes; but in most instances of the common ophthalmia, I have generally found any warmth applied to the eyes to be hurtful.

The vermifuge qualities of hysop are hardly established by the single instance of its effects which VAN ROSENSTEIN has given us.

LAVENDULA.

THIS contains a large portion of essential oil of a very grateful odour. It is therefore, whether externally applied or given internally, a powerful stimulant to the nervous system; and among the others of this order named Cephalics, the lavender has a very good, and perhaps the best, title to it.

It is to me probable, that it will seldom go further than exciting the energy of the brain to a fuller impulse of the nervous power into the nerves of the animal functions, and seldom into those of the vital. It may, however, be with great propriety that Professor MURRAY has dissuaded its use, where there is any danger from a stimulus applied to the sanguiferous system. It is however still probable, that lavender commonly stimulates the nervous system only, and therefore may be more safe in palsy than the warmer aromatics, especially if the lavender be not given in a spirituous menstruum, or along with heating aromatics, which, however, is commonly done in the case of the spiritus lavendulæ compositus.

It is hardly necessary to remark here, what is now so commonly known, that the verticillated plants we are treating of give out a larger proportion of essential oil, after their being dried for some time, than in their recent state; but it is not so commonly ob-

served, that most of them, in their first distillation, give out along with their essential oil a quantity of mucus or butyraceous matter, and that they may be freed from this, and much improved in their fragrance and virtues, by a second distillation with water. It is also to be remarked, that all these plants afford a larger proportion of essential oil, according as they are allowed to grow to their full maturity, and especially as they grow in light, sandy, or gravelly soils.

MARJORANA.

THIS plant also contains much essential oil of a pleasant odour. From hence it has the same cephalic and discutient qualities with lavender, and which therefore we need not repeat here. We have already observed, that many of the *verticillatæ* snuffed up the nose prove powerful errhines; and in this respect there is none more powerful than the marjorana. On this account, therefore, and on account of its agreeable odour, there is none more frequently or more properly employed than this in our sternutatories.

MENTHA SATIVA

CONTAINS much essential oil, but of an odour somewhat less agreeable than that of lavender or marjorum. It is therefore less employed as a cephalic; but it acts very powerfully on the parts to which it is immediately applied, and therefore considerably on the stomach, invigorating all its functions. It acts especially as an antispasmodic; and therefore relieves pains and cholic depending on spasm. It will also stop vomiting depending on such a cause; but there are many cases of vomiting in which it is of no service: and in these cases, anywise depending upon inflammatory irritation in the stomach itself, or in other parts of the body, it aggravates the disease, and increases the vomiting. Practitioners have thought, and I think justly, that the infusion of mint in warm water agrees better with the stomach than the distilled water, which is often somewhat empyreumatic.

The effects of mint in preventing the coagulation of milk, which have been mentioned in authors, do not appear in my experiments; and if it be found useful in resolving indurations in the breasts of nurses or of lying-in women, I ascribe it to the discutient virtue of the *verticillatæ*, which we have already mentioned on the subject of hysop.

The ancients have transmitted to us an opinion, that mint has the power of weakening the powers of venery in men, and this has

been repeated by some moderns ; but it is very inconsistent with the power at the same time ascribed to it of stimulating the uterus in females. Such an antaphrodisiac power seems improbable to me ; because I knew an instance of a man who almost every day eat many leaves of fresh mint with his bread and butter, but never found from thence any diminution of his venereal appetites ; and I have reason to believe that his report was true.

MENTHA PIPERITA.

THIS plant contains as much or more essential oil than any other species of mint, and is of a more acrid taste, with a singular feeling of a cold air, immediately succeeding the chewing or swallowing of it. There is no doubt of its answering the purposes of any other species of mint ; and the water distilled from it is manifestly more immediately antispasmodic and carminative. The same effects are readily obtained by its oil made into an *Eleo saccharum*, and diffused in water. Its qualities are, with great probability, ascribed to the camphire, which the experiments of GAUBIUS show to be largely contained in it. The rectification which we have mentioned on the subject of lavender, as proper for improving the most part of essential oils, is particularly necessary and proper for this of peppermint. What has been called the *Essence of Peppermint*, seems to me to be no other than the rectified oil dissolved in spirit of wine.

PULEGIUM.

THIS is a species of mint, and has so much the common properties of the genus, that, in my opinion, nothing but the neglect of all attempt to establish principles could have made physicians think of this as a peculiar medicine, different from the other species. It does not contain more essential oil than the *mentha sativa*, and does not discover any of the camphire that is found in the peppermint. It is upon this account that I cannot find any foundation for its peculiar virtues. It has, nevertheless, been considered as an antispasmodic, and of particular use in the chincough : but in many trials of it I have not found it of any service ; and, on the contrary, like every other heating medicine, have found it hurtful.

Another use of it as an antispasmodic has been commonly asserted ; which is, its assisting the menstrual evacuations of the female sex : This, however, I believe to be on no better foundation. At the time of menstruation, the sex are often affected with dyspeptic and spasmodic symptoms in the stomach, and I have known

these symptoms relieved by an infusion of the pulegium, or, as it is commonly called, pennyroyal tea; but the same relief was obtained more certainly by the use of the peppermint or the *mentha crispa*, though in none of them any specific power can be perceived. They have been often tried in the cases of suppressed menses without any benefit at all.

It does not appear to me to be with any discernment, when Dr HALLER tells us that the pulegium, along with steel, is an infallible emmenagogue; as it is presumed that, with the same assistance, he might have found many other plants equally powerful. It is not indeed to be doubted, that the several species of mint may, as general stimulants of the nervous system, be useful in retentions of the menses; but the account given us by Linnæus of mints producing an uterine hæmorrhagy, has probably been owing to a *fal-lacia causæ*.

ROSMARINUS.

IN this plant there is much essential oil of a very fragrant kind; and it has therefore always justly had the reputation of a cephalic, or as a medicine that gently stimulates the nervous system, but hardly so strongly as to affect the sanguiferous. It is to be remarked here, that these qualities are not to be found in the petals of the flowers, and only in their calices, or in the leaves of the plant, especially those at the extremities of the branches. It is indeed further to be remarked here, that the essential oil of the verticillated plants is commonly to be found more copiously in the calices of the flowers than in their other parts. The essential oil of rosemary arises copiously in distillation with spirit; and it is thus that the celebrated *aqua reginæ Hungariæ*, or Hungary water, is prepared. It is not made so perfect from rosemary growing in this climate, as in that growing in a more southern. It seems to me that our dispensatories have judged ill in prescribing the *spiritus rosmarini* and *spiritus lavendulæ* to be made from recent plants, as all the odorous *verticillatæ* are improved by some drying, and give out a greater proportion of essential oil.

SALVIA.

THIS has been a celebrated plant; and as it contains a quantity of essential oil, though not of the most fragrant kind, it may be allowed to have the virtues of the other plants of this order. It has been frequently employed, especially in Britain, as a tea; but it is ridiculous to allege, as some German writers have done, that it may

be employed as a tea in place of that brought from China; from which, in its qualities, it is entirely different. From particular experience I can assert, that though it has not the virtues, neither has it the noxious qualities, with respect to the stomach, which the green tea of the Chinese so frequently has. What, however, are the particular virtues of sage, I am a little uncertain. Though it were true that the Chinese put a greater value upon sage than upon their own tea, it would not give me any high opinion of its peculiar virtues. It has been observed before, that popular opinions are not always well founded; and in this, and some other instances, the Chinese do not seem to be wiser than other people.

Sage, especially in Britain, has been much employed as a sudorific, but, so far as can be perceived, with no advantage above the other aromatics of the same order. Many of these employed in infusion, and thrown in warm, in pretty large quantity, while the body is covered up very close, will all equally answer the purpose of bringing out sweat. It may however be remarked, that this method has no advantage above others that may be employed; and in some instances it has been found hurtful, by stimulating and heating too much.

If sweating is to be employed for preventing the recurrence of the paroxysms of intermittent fevers, sage or other verticillated plants may be sufficiently effectual. But while we thus take notice of the sage as a sudorific, we must observe that it has also been employed for restraining improper sweats. For this purpose SYDENHAM employed Malaga wine, but VAN SWIETEN found sage infused in wine or spirits to be a more effectual remedy. Whether the wine or spirits of VAN SWIETEN without sage would answer the purpose, as it had done with SYDENHAM, I have not experience to determine. The matter, however, is rendered doubtful, as VAN SWIETEN has found the sage useful in restraining another immoderate evacuation. The learned baron had found it useful in restraining the improper continuing of a flow of milk from the breasts of women who had been nurses, after they had weaned their child; but of this I have not any proper experience. It would seem, however, to be supported by the analogy with mint, which has been said to have the power of diminishing the secretion of milk both in women and in cows.

The power of sage in resisting putrefaction, which it has in common with mint, and other verticillated plants, may perhaps be supposed to be owing to camphire, or somewhat analogous to camphire, in the composition of their oils.

TEUCRIUM.

SEVERAL species of this genus have entered the catalogues of the materia medica: but several of them, as having their virtues depending more upon their bitter than upon their essential oil, we have mentioned above among the tonics; such as the *Teucrium Scordium*, *Teucrium Chamædrye*, and *Teucrium Chamæphytis*; and there remains only to be mentioned here among the stimulants, commonly named Cephalics, the TEUCRIUM MARUM. This contains a large portion of essential oil, of a volatile and camphorated kind. By this, its odour is more pungent than most others of the verticillated plants, and has therefore, like many others of this order, an errhine quality, and that the most powerful.

Although this plant has not performed all the wonders which LINNÆUS reports of it, it may be allowed to be amongst the most powerful cephalic and antispasmodic of the verticillated plants; and it is to be regretted that it can neither be easily cultivated in this country, nor be imported from abroad in a very perfect state.

MARRUBIUM.

THIS is a plant which affords little essential oil, and that with very little of the fragrance common to the other verticillatæ; for it is more remarkable as a bitter and somewhat acrid substance. It has the reputation of a pectoral: but in many trials, its virtues in that way have not been observed; and in several cases it has been judged hurtful. For its use in asthma and phthisis, and for its power in resolving indurations of the liver, I consider the authorities of FORRESTUS, ZACUTUS LUSITANUS, and CHOMEL, to be very insufficient; and the events they have ascribed to it seem to be very improbable.

B. UMBELLATÆ.

HERE is a set of plants, of which many with their botanical affinity have very similar virtues; but the analogy is not complete, as some of the umbellatæ have virtues very different from others of the same order. It is however alleged, that if the umbellatæ are further distinguished, according to the soil they grow in, an analogy will still hold so far, that those growing in a dry soil are stimulant and somewhat aromatic; whilst those growing in wet and marshy places are sedative and poisonous plants. This is generally true; although there are some exceptions to it. The conium maculatum, and perhaps some others of the poisonous umbellatæ,

generally grow in very dry soils; whilst the petroselinum, naturally growing in wet soils, is a salutary plant.

The analogy therefore from the soil is not complete; and without experiment is not to be entirely trusted: but as it is generally well founded, I shall here make use of it, and in this place treat only of the simply stimulant and somewhat aromatic umbellatæ, reserving the consideration of the sedative kind for their proper place in the next chapter.

AMMI.

THESE still retain a place in the London Dispensatory; and from the account of their qualities might deserve it: but as an exotic that we cannot easily have in a perfect state, it has been long neglected by us, and perhaps justly; as probably its place may be supplied by others which we can more easily obtain.

ANETHUM.

I SHOULD have remarked before, that the virtues of the umbellatæ are chiefly found in their seeds, as containing a large portion of essential oil. Their virtues are for the most part antispasmodic and carminative in the primæ viæ; and what virtues they have, when carried further into the system, are not well ascertained, as we shall observe more particularly, when we come to speak of the particular seeds or roots to which these virtues are ascribed.

The seeds of Dill have the common virtues of the order, and the waters distilled from them have been much employed in the cholics of children by the nurses of England; but it is presumed that more agreeable carminatives can be found; and accordingly it was formerly omitted in our Scottish Dispensatory. It was only brought into it again upon the recommendation of the late Sir JOHN PRINGLE, for the sake of some conformity with the English practice; but neither our physicians nor nurses have yet conformed to it.

ANISUM.

THE seeds of this plant contain a large proportion of essential oil, which gives the seeds their grateful odour. Its taste is much less acrid than the oils of the verticillated plants; some of which, therefore, are perhaps more powerfully carminative: but for the same reason, the oils of the umbellatæ, and particularly of the anise-seed, are safer, and which made into an Eleo saccharum,

the most convenient form of exhibiting it, may be given pretty largely.

The anise-seed and their oil, as well as some others of the umbellatæ, have been alleged to be useful as promoting expectoration in some diseases of the breast; but their effects have never appeared to me to be considerable.

Another effect of the anise and other seeds a-kin to them, has been alleged to be the increase of the milk of nurses; and if it be commonly true, as alleged by Mr GEOFFROY, that the odour appears in the milk, the effect is not improbable; but I have had no experience of it.

Towards the end of the sixteenth century we had a new medicine introduced, under the title of the *Anisum Stellatum*; but it has not yet obtained a place in the lists of the British Dispensatories, although it has been received by the Russian, Swedish and Danish. Though of a very different order of plants, the capsule of the seeds, in odour and taste, very exactly resemble the common anise, but are somewhat stronger. These capsules, so far as yet tried, as they have the qualities, so they are said to have the virtues, of the common anise-seeds; but as even these are not in high request, we shall hardly think of introducing an exotic for the sake of all the difference of strength and quality that may be found in it.*

CARUM.

THE seeds of this are to most persons more agreeable than those of the umbellatæ usually employed. They contain a large proportion of essential oil; and except in some peculiarity of odour, neither the seeds nor their oil differ in their virtues from those of anise.

FOENICULUM.

THIS has the same qualities as the dill, anise, and caraway, but in a weaker degree; and therefore, unless it be for its odour, which to many persons is more agreeable than that of the others, it would hardly have a place in medicine.

We make a distinction between the *feniculum dulce* and *feniculum vulgare*, which however are only varieties of the same species: but as the fennel growing in this country does not produce perfect

* The American species of anisum (*Illicium*) are fine aromatics; but their properties have not been very particularly examined. I have noted these plants in the catalogue.

seeds, we mean by the *fœniculum dulce*, seeds imported from a southern climate; we allow, however, the roots to be taken, as they most conveniently may, from the plants growing in our own gardens. To both the seeds and roots a diuretic and pectoral virtue has been ascribed; but in many trials I have never found them answer these purposes.

CORIANDRUM.

THE leaves and seeds of this plant seem to differ very much: The qualities of the former are not so well ascertained as to allow me to say any thing about them, and I am therefore to speak only of the seeds. These have the common qualities of the other carminative seeds we have been speaking of, and when well dried are generally very agreeable. One particular use of them is, that infused along with senna, they more powerfully correct the odour and taste of this, than any other aromatic that I have employed; and are, I believe, equally powerful in obviating the griping that senna is very ready to produce.

CUMINUM.

THE seeds of this contain a large proportion of essential oil, and are therefore powerful carminatives, perhaps more so than most of the others in use; but on account of their more disagreeable flavour are more rarely employed.

As I formerly observed, that the oils of the verticillated plants might be employed in fomentations for discussing indolent tumours; so it is probable that many of the umbellatæ may be employed for the same purpose, and particularly in this the cummin has been supposed useful.

PETROSELINUM.

THE seeds of this still hold a place in the London Dispensatory, and have indeed the qualities of the other carminative seeds, but not in so powerful a degree as many others, and therefore are neglected in the Scottish practice.

The roots still retain their place in our dispensatory, and are supposed to be diuretic; but in their decoctions, which I have often tried, I have not found such a virtue, and possibly because their active parts are dissipated by boiling.

The herb, as every body knows, is much used at table, and therefore must be supposed to be in general salutary; but singular ac-

counts are given of its effects by materia medica writers, and I dare not contradict them, because I know that in consequence of idiosyncrasy, the effects are very different in different persons. With professor MURRAY the odour is said to be *ingratus*; with BERGIUS it is *fragrans gratus*. To me both the odour and taste have been always very disagreeable, though now, in my old age, they are much less disagreeable than they were formerly.

PETROSELINUM MACEDONICUM.

THIS is not retained in the lists of the British dispensatories, and I know of no peculiar virtues to be ascribed to it: but of late there have been reports of its singular powers in some cases of the venereal disease, of which I have had no experience, and must therefore leave to a further time to be properly ascertained.

We have thus mentioned the umbellatæ which are for medicinal virtues chiefly employed in their seeds; and we proceed next to those which are chiefly employed in their roots; as

ANGELICA.

ALL the parts of this plant are more or less aromatic; but this quality is more considerable in the root than in any other part. It is a root gratefully aromatic; and as possessing all the qualities of the carminative seeds already mentioned, may be employed for the same purpose with these; but that it has any peculiar virtues with respect to any particular disease, I cannot perceive, nor can I trust much to the judgment of the Laplanders on this subject.

PIMPINELLA.

THIS is a plant in whose favour STAHL and his followers were very much prejudiced. In its root and seed it has the common qualities of the umbellatæ already treated of: but these qualities in the pimpinella are in no high degree; and neither its sensible qualities nor any analysis can make us think of it as a medicine of any value. Dr STAHL was valuable for his study of the phenomena of diseases; but neither he nor his followers have shown any judgment in the choice of remedies. Their system gave them a prejudice against some of the most powerful; and those they adopted were feeble and often superstitious.*

* This criticism is rather severe. The Stahlians employed many powerful remedies, and often manifested much judgment in the employment of them. Their objections to the Peruvian bark were not always unfounded; and their prejudices against some of the most popular medicines of the present day, were

GINSENG.

THIS perhaps does not belong to the *umbellatæ*;* but from the doubts that have been raised how far it differs from an umbelliferous plant, the Sion Ninsi, to which the same virtues have been ascribed, I have set it down here. A root under this name, both from China and North America, has now for many years been well known in our shops. It is a very mild aromatic, with some sweetness; but these qualities are so weak, that nothing but a popular notion among the Chinese, and the great price put upon it by them, would ever have engaged our attention to it as a medicine. We are told that the Chinese consider it as a powerful aphrodisiac; but I have long neglected the authority of popular opinions, and this is one instance that has confirmed my judgment. I have known a gentleman a little advanced in life, who chewed a quantity of this root every day for several years, but who acknowledged that he never found his venereal faculties in the least improved by it.

C. SILIQUOSÆ.

THESE are a set of medicines which, with a botanical affinity, have very exactly the same medical virtues, and are only different by the degree in which they possess the same power. They have a pungent odour, depending upon an essential oil which they give out in distillation with water, of the same odour with the entire substance; and notwithstanding the seeming volatility of it, this oil, like that of the aromatics above mentioned, sinks in water. The pungent odour of these substances has given occasion to the supposition of their containing a volatile alkali: and such indeed by a certain management can be obtained from them; but manifestly it is not in a separate state in their substance, as they are produced by nature. The distilled water of scurvy-grass does not effervesce with acids, either of the fossil or vegetable kind; does not precipitate sometimes judicious. A defence of the Stahlian mode of practice, in various diseases; and, above all, a just tribute to the memory and genius of the immortal founder of the sect, is a *desideratum* in medical history.

* Ginseng, *Panax quinquefolium* of the botanists, certainly does not belong to the order of *umbellatæ*, but to the neighbouring order of *araliæ*. There is not, I believe, any good reason to suppose, that the North-American plant is specifically different from that of Asia. The root is, unquestionably, a good, as well as pleasant, stomachic, to many constitutions: but I agree with Dr CULLEN, that the aphrodisiac power, which has been ascribed to it, is unsupported by any faithful experience.

tate earths dissolved in acids, nor produce any change in the solution of corrosive sublimate.

It is sufficiently evident that both the odour and taste of these plants depends upon the oil above mentioned, which is extracted from them by spirit of wine; and when carried over with this in distillation, affords a very volatile and acrid substance, of the odour and taste of the plant, leaving behind a mass entirely deprived of both.

The acrimony of these plants is diffused over all their parts: from the leaves it readily passes off by drying or boiling; from the roots also, if minutely broke down, it may be dissipated by the same means. In their seeds it is much longer retained; and in both the seeds and roots it is more acrid, and in greater proportion than in the other parts of their substance.

The parts of these plants which hold a large portion of active matter, if applied to the skin, soon excite a redness in it; and in consequence of a continued application, the redness which first appears arises by degrees to a very considerable inflammation, and at length to excite blisters. These continuing for some days after to discharge a quantity of serum, shows the skin still affected with an inflammation, which for several days continues to exude an almost purulent substance; and such inflammation and exudation are much later in healing than the like inflammation produced by the application of cantharides.

The same acrid substance of the siliquosæ, taken internally, gives a powerful and diffusible stimulus, which acts strongly on the nervous system; and in larger doses, or frequently repeated, it acts also on the sanguiferous: but its effects in either way are not durable, as the matter passes readily to the urinary passages; and increasing the secretion there, it is quickly and entirely discharged with the urine, and probably at the same time by insensible perspiration.

The plants of this class, when their vegetation, from any cause, ceases, readily run into putrefaction; and in this state, distilled, they give out a volatile alkali.

It is this circumstance that has given occasion to their being called Alkalescent Plants, and has given occasion to some mistakes concerning their nature and use; but we now know that their fermentation may be directed to be of the acescent kind: and there is hardly any doubt, that, with their diuretic quality, it is their acescent nature that renders them so powerful, both in obviating and curing the scurvy. Their use in this respect has been long known

and universally acknowledged; and it has been remarked as a bountiful administration of nature, that has provided an abundance of these plants, especially in those parts of the globe in which the scurvy more especially prevails.

In confirmation of our doctrine concerning the acescency of these plants, it is to be observed, that those species which do not abound in the acrid matter peculiar to the order, but which at the same time are very succulent, that such abound in a saccharine matter, which renders them considerably nourishing, and fitted to become a large part of the animal fluids. It is equally a consequence of this saccharine matter, that the same plants may be readily directed to an acetous fermentation; and when preserved in this state, they prove a very effectual means both of obviating and of curing scurvy.

These are the general properties of the siliquosæ: and the genera and species comprehended under this order have so much the same common qualities already mentioned, that it is hardly necessary to take notice of the particulars. I shall only make some remarks upon the few which are in most frequent use, and seem to be of most considerable power.

COCHLEARIA.

THIS is the plant that has been most frequently employed in the cure of scurvy, and has the reputation of being the most effectual. Its sensible qualities being as great, if not greater, than any other of this order, are sufficient vouchers of this. The entire herb has often been employed, and eaten fresh as a sallad; and it has been made into a conserve with three times its weight of sugar: but the virtues are not well preserved in this way. The most common practice is to employ the expressed juice; and this plant makes a chief part of the succi adscorbuticos both of the London and Edinburgh Dispensatories, which afford a very useful medicine.

It formerly was an ingredient in the aqua raphani composita of the Edinburgh Dispensatory, and still stands in that of the London; but the Edinburgh College being of opinion that the whole of its virtues are not extracted by distillation, they have now omitted that disagreeable preparation. Several foreign dispensatories have ordered it to be treated by distillation with spirit of wine, and have thereby obtained a volatile poignant spirit, that may prove an useful stimulus in several cases. It may possibly be improved by a combination with the volatile acid of tartar, as in the spiritus antiscorbuiticus *Drawitzii*, and in this state may be an useful stimulant in pa-

ralytic cases. It may also be employed as a diuretic, and in this way also be useful in scurvy; but its antiscorbutic virtues in this state are not to be depended upon, and are far short of the virtues of the plant in substance.

NASTURTIIUM AQUATICUM.

THIS has the common powers of the *siliquosæ* in a considerable degree; and as more succulent than many others, and to be obtained more early in the spring season, it has been the most frequently employed with the *cochlearia* to give the *succi adscorbuticos*, which have so long stood in our dispensatories. Along with these, it has been common to join the *becabungæ*; but as this has none of the qualities of the *siliquosæ*, and has no other than that of a simple vegetable juice, the Edinburgh College have left it out in the last edition of their dispensatory. It has been always the practice to join with the juices of the *siliquosæ* a quantity of a native acid juice, formerly that of the *acetosa*; and, for the use of the poor, the practice might still be continued with advantage: but the dispensatories have properly enough prescribed the juice of Seville oranges.

The addition of acids to the juices of the *plantæ siliquosæ*, shows sufficiently that the latter do not operate as alkaline or alkalescent substances; and I am persuaded that the addition of acids renders the juices more certainly effectual, by determining them more certainly to an acescent fermentation. It is hardly necessary to observe, that as the volatile parts are so readily exhaled in being exposed to the air, that the *succi adscorbuticos*, when intended to be preserved for any time, should be kept in close stopped vessels.

CARDAMINE.

THE sensible qualities of this plant, and particularly of its flowers, are so far inferior to those of several others of the *siliquosæ*, that I should not have thought of taking notice of them as subjects of the *materia medica*; but, upon the respectable authority of sir GEORGE BAKER, I think it my duty to inform my readers, that the flowers of this plant have been found to be very effectual remedies in various spasmodic affections; and for further information must refer my readers to the *Medical Transactions*, Vol. I. art. 19.

ERYSIMUM.

SEVERAL species of this genus have been taken notice of by *materia medica* writers; but I am to speak only of the *crysimum*

officinale, and of this, not for the general qualities of the siliquosæ, which it does not possess in any considerable degree, but for a particular purpose to which it has been especially applied, which is the cure of hoarseness. It is in common to almost all the siliquose plants, that in being swallowed, they stimulate the mucous glands of the fauces, and thereby excite a more copious excretion of mucus. When hoarseness therefore depends, as it often does, upon the interrupted secretion of this fluid, it is obvious that the stimulus we speak of may be useful. For this purpose, it has been common to employ the Erysimum; which, however, has been generally prescribed in an injudicious manner, along with many other things of no meaning; and the most simple form, of merely the juice of the erysimum, with an equal part of honey or sugar, is certainly the most proper.

If the erysimum in this business has any advantage over the other plants of the order, it seems to me to be its having less acrimony than others, which allows it to be more freely and frequently used. When the erysimum was not at hand, I have found that the syrup of horse-radish would supply its place; but this syrup must be made very weak, otherwise it cannot be frequently used or long continued, without rendering the fauces sore and uneasy. I have found that one dram of the root, fresh, scraped down, was enough for four ounces of boiling water, to be infused in a close vessel for two hours, and made into a syrup with double its weight of sugar. A tea-spoonful or two of this syrup, swallowed leisurely, or at least repeated two or three times, we have found often very suddenly effectual in relieving hoarseness.

BRASSICA.

THE various species of this employed in diet I have taken notice of in my First Part. The title is repeated here as a medicinal subject; and with this view it is to be observed, that the various species or varieties of this genus differ from almost all the other plants of the order, by their possessing less, at least in their leaves, of the acrimony peculiar to it. By this they are better suited to the purpose of diet; and they are especially fitted to this purpose by their greater succulency, and by their containing, as above observed, a large proportion of saccharine matter.

Though they are deficient of that acrimony that seems to give peculiar power to the siliquosæ, and as they are called Antiscorbutic Plants, the brassica has still very great powers as such; and taken in largely as aliments, they have proved an effectual cure of

the disease. This I ascribe to their acescency; and now it is well known, that if by proper art they are made to undergo an acescent fermentation, and can be preserved in that state, they are a very effectual means, both of obviating and curing scurvy. The art of preparing cabbage for this purpose, and making what is called *Saur Kraut*, is now so well known, and described in so many books, that it is not necessary for me to insert it here.

RAPHANUS RUSTICANUS.

THE root of this only is employed; and it affords one of the most acrid substances of this order, and therefore proves a powerful stimulant, whether externally or internally employed. Externally, it readily inflames the skin, and proves a rubefacient that may be employed with advantage in palsy and rheumatism; and if its application be longer continued, it brings on a blistering, with the effect I formerly mentioned.

Taken internally, I have said in what manner its stimulant power in the fauces may be managed for the cure of hoarseness. Received into the stomach, it stimulates this, and promotes digestion, and therefore is properly employed as a condiment with our animal food. If it be infused in water, and a portion of this infusion be taken with a large draught of warm water, it readily proves emetic, and may either be employed by itself to excite vomiting, or to assist the operation of other emetics.

Infused in wine, and taken into the stomach, it proves stimulant to the nervous system, and is thereby useful in palsy; and if employed in large quantity, it proves heating to the whole body: and hereby it proves often useful in chronic rheumatism, whether arising from scurvy or other causes. BERGIUS has given us a particular method of exhibiting this root, which is by cutting it down, without bruising, into very small pieces; and these, if swallowed without chewing, may be taken down in large quantity, to that of a table-spoonful: and the author alleges, that in this way, taken every morning, for a month together, this root has been extremely useful in arthritic cases; which, however, I suppose to have been of the rheumatic kind.

It would seem, that in this manner employed, analogous to the use of unbruised mustard-seed, it gives out in the stomach its subtle volatile parts, that stimulate considerably without inflaming. The matter of horse-radish, like the same matter of the other siliquose plants, carried into the blood-vessels, passes readily to the kidneys, and proves a powerful diuretic, and is therefore

useful in dropsy ; and we need not say, that in this manner, by promoting both urine and perspiration, it has been long known as one of the most powerful antiscorbutics.

SINAPI.

The seeds of this are the parts only employed ; and it has been common for the purpose of medicine to distinguish two kinds of it, the *Sinapis Nigra* and the *Sinapis Alba* ; which, though they seem to be of different species, hardly differ in their sensible qualities, and for every purpose may be indifferently used.

This seed contains a volatile part very pungent to the smell and taste. Treated by distillation with water, it gives out an essential oil which discovers the same acrimony that is found in the whole substance, and shows that the acrimony of this depends upon that. The same substance contains also a portion of mild oil, which may be obtained by expression from the powdered seed ; and when this is done, the acrid and active parts are found in the paste that remains after the expression of the mild oil.

In these seeds there is a large portion of farinaceous matter, capable of fermentation, under which the volatile oil is more evolved, and shows its activity more readily : Hence it is that the fresh powder shows little pungency, and a good deal of bitterness ; whereas, when it has been moistened with vinegar, and set by for a day, it becomes considerably more acrid, as is well known to those who prepare mustard for the use of the table. This applies also particularly to its external use. Mustard, any how moistened and applied to the skin, will become in time rubefacient and blistering ; but as prepared for the table, it is more immediately active than the fresh powder ; and therefore we have done improperly in ordering the fresh powdered mustard in our sinapisms, as the table-mustard would be much more quickly effectual.

Mustard thus applied externally has all the powers of the horseradish mentioned in the last article ; and I am much surprised that the learned Professor MURRAY should assert, that mustard stimulates the system less than the ordinary vesicatories ; that is, as I suppose, than cantharides : but to me the business seems quite otherwise. Mustard, in its powdered state, taken internally, has all the powers and effects of the other siliquosæ ; but they are here more active and powerful than in almost any other, except it may be the *raphanus rusticanus* last treated of.

A practice, so far as I can learn, first begun in this city about fifty years ago, has been since very frequent. It consists in giv-

ing the mustard-seed entire and unbruised, to the quantity of half an ounce, or as much as an ordinary table spoon will contain. This does not prove heating in the stomach; but stimulates the intestinal canal, and commonly proves laxative, or at least supports the usual daily excretion. It commonly also increases the secretion of urine; but in this I have found it frequently to fail. In giving it twice a-day, as our common practice is, I have not found it to stimulate the system or heat the body; but it must certainly have that effect if it answers in the Swedish practice, by giving it four or five times a-day to prevent the recurrence of intermittent fevers.

I trust very readily to the testimony of BERGIUS, when he tells us that he has in this way often cured vernal intermittents; and the more readily, when his candour acknowledges that it is not sufficient for curing autumnal quartans. It will be more readily understood, that the bruised seed, taken in large quantity along with some ardent spirits, may not only be more powerful for this purpose; but also, that such doses may stimulate too much; and as VAN SWIETEN informs us, may induce a violent fever.

Bergius says, that in protracted and frequently recurring intermittent fevers, he had joined powdered mustard with the Peruvian bark with a good effect. He observes, that under this management, his patients had frequently felt a heat at their stomach, but it was without any harm.

I cannot finish this subject without observing two very different opinions with respect to it. Professor MURRAY says, that mustard gives an agreeable sensation in the stomach, and gives in him a cheerfulness to the mind: "*Ita adjuvat cibi concoctionem, ventriculo sensum gratum impertit, mentique certe in memet hilaritatem haud mediocrem, forsitan ex aere fixo quod extricatur, conciliat.*" LINNÆUS gives a very contrary opinion: "*Nimius usus (says he) causatur languorem et tollit lætitiã.*" I cannot vouch for the truth of either opinion.

D. ALLIACEÆ.

THE plants to be taken notice of under this title are all of them species of the same genus; and though there are plants of other genera which have the odour peculiar to this, and may perhaps have somewhat of its qualities, they have not so much of it as to deserve being taken notice of here.

Of the species of allium, several may be treated of as of very similar virtue: but these virtues are most considerable in the Allium

Sativum of LINNÆUS ; and therefore we are to treat of this in the first place, under the title of Garlic.

ALLIUM SATIVUM.

THE whole of the plant has somewhat of the same qualities ; but it is the root only that is employed in medicine. This is of a strong pungent odour, and of a very acrid taste. These qualities depend upon a very volatile part, which is readily dissipated by drying, if the roots be bruised and the interior parts be exposed to the air, or by boiling in water. This volatile substance is at least in part an essential oil, which may be obtained by distillation in the ordinary manner ; and, like the oils of many of the siliquosæ, sinks in water. In all these respects, the alliaceæ are similar to the siliquosæ, as they are also in virtue, although still with some little difference in their chemical qualities.

The alliaceæ are not so entirely extracted by spirit of wine as the siliquosæ ; and though the former are in part extracted, they are not carried over with the spirit in distillation as the latter are. Though the qualities of the alliaceæ are not so readily dissipated by drying as those of the siliquosæ are, yet they always, by any drying, suffer some diminution of their virtue ; and by urging the drying further, it may be dissipated entirely. In my opinion, Dr LEWIS improperly proposes the dried garlic to be used in any proportion as a medicine.

The medicinal qualities of garlic are very considerable ; and I take notice of them first as they are externally applied. Garlic bruised and applied to the skin readily inflames it ; and applied for some time will raise a blister, as we have said of mustard and horse-radish : but the effects of the blistering are not so permanent nor so slow in healing from the garlic as from the siliquosæ. It may however be a question, Whether the very diffusible nature of the garlic may not in some cases give a more immediate and considerable stimulus to the whole system than the siliquous substances do ?

Garlic, taken into the stomach, seems to stimulate this organ and favour digestion, and may therefore be considered as an useful condiment of our food ; but both its odour and taste are so disagreeable to many persons, that in many cases they are inadmissible : but as in warm climates it is said to be much milder both in smell and taste, it may in these be more frequently and largely employed.

Even in its most acrid state, it is admitted into many of our sauces in small proportion. Its diffusible odour is very readily and largely communicated to the air of the stomach; and therefore affects not only the eructations, but even the ordinary exhalations, pretty constantly arising from that organ. It is thereby often disagreeable to the persons who have eaten it, and more so still to bystanders; but all this may be somewhat corrected by some volatile aromatics which have been at the same time taken in.

The stimulus of garlic taken into the stomach is readily communicated to the rest of the system, and is certainly heating and inflammatory to the whole. In all cases, therefore, in which a phlogistic diathesis, or other irritability, already prevails, large doses of it may be very hurtful. It is probable, that from instances of its improper use, some authors, imbued themselves with the strongest prejudices against it, have given us too strong assertions of its general baneful qualities; and on the other hand, many, under no such prejudices, have celebrated garlic as one of the most useful medicines.

Its stimulus is more readily and quickly diffused over the system than that of almost any other substance known. It not only affects the perspiration and secretion of urine, but seems to pervade every vessel of the system: and BENNET's account of its effects appearing so suddenly in issues, is a strong proof of this. By its stimulus being thus diffusible and powerful, it certainly may be useful in many diseases; as, wherever there is a languor of the circulation in any part, or wherever there are interrupted secretions. Accordingly, its diaphoretic and diuretic powers have been often useful in dropsy. DR SYDENHAM found some dropsies cured by garlic alone.

From what we know of some of the other species of this genus, there can be no doubt of the *allium sativum* being a remedy for the scurvy.

As taken in any manner, and even as externally applied, it so readily appears in the vapour arising from the lungs, there can be no doubt of its promoting the secretions, and therefore the exhalations, from that organ. Its use, therefore, in pituitous asthma, and even in spasmodic asthma requiring expectoration, will be readily admitted; and I am ready to allow what has been asserted, that even in its external application to the soles of the feet, it has been useful in those diseases.

The alexipharmic virtues of garlic have been much celebrated; and so far as diaphoretic and antiseptic powers can prove such,

garlic has as good pretensions as many others. Even in the plague, which is so commonly attended with a low fever, it is probable enough that it may have been useful; but the virtues which have been ascribed to it, of obviating and resisting contagion, appear to me extremely doubtful.

The stimulant powers of garlic, like that of many other substances already mentioned, may be employed for preventing the recurrence of intermittent fevers; and BERGIUS tells us, that he has seen even quartans cured by it. He gives us a particular manner of using it in the following paragraph: "Incipiendum a bulbulo unico mane et vesperi, sed quotidie unus bulbulus super addendus, usquedum 4 vel 5 bulbulos sumserit æger qualibet vice. Si febris tunc evanuit, diminuenda erit dosis, et sufficit postea sumere unicum vel etiam binos bulbulos, mane et vesperi, per plures septimanas."

The same author takes notice of a particular virtue of garlic in the cure of deafness; and I am ready to believe it, as I have myself several times found the juice of onion in such cases very useful. BERGIUS's manner of using the garlic it will be proper to give in his own words: "In surditate rheumatica sæpius levamen attulit, lanam bombycinam succo allii imbibere, illamque auri intrudere, repetitis vicibus per diem unicum. Meatus auditorius inde rubet, dolet et sensibilis fit per diem unum alterumque, tum prurit, tandemque desquamatur, redeunte sæpe auditu."

Garlic, as a medicine, is employed in different forms. Sometimes the cloves dipped in oil are swallowed entire; and in this way a number of cloves may be taken at the same time, without proving warm on the stomach, though manifestly acting on the system as diuretic and otherwise. This I take to be the administration of BERGIUS in the cure of intermittents mentioned above. For persons who cannot swallow the entire cloves, they are cut down without bruising into small pieces; and in this way a considerable quantity, if swallowed without being chewed, may be taken at once, and without proving very warm in the stomach, although it be found to be an active medicine. When the garlic cannot, in any of these ways, be taken in a somewhat entire state, it is to be bruised; and, with powders coinciding with the intention of the garlic, the whole is made into pills: but it is not a very proper formula for long keeping, as the active parts of the garlic are readily dissipated by drying. These active parts are more certainly preserved by infusing the bruised garlic in warm water, and after a due infusion making the liquor into a syrup or oxymel in the manner of the

London Dispensatory. In this form the garlic is considerably powerful; but cannot be taken in any considerable quantity, without irritating the fauces, and even the stomach: and in any quantity, in which I could introduce those forms of the medicine, I have been often disappointed of its diuretic effects.

ALLIUM SCORODO PRASUM.

THIS is the species which in its acrimony comes nearest to the *allium sativum*; but I do not know of its being used as a medicine, though it might perhaps be conveniently done, as the bulbs in the flower heads might be swallowed more easily than the cloves of the *allium sativum*.

ALLIUM CEPA.

THIS contains a very volatile part, which however flies off so readily upon the substance being cut into and exposed to the air, that it cannot be directed to any medicinal purpose. What remains when this is dissipated, has both in smell and taste a great deal of the acrimony of the garlic; but both in so much a milder degree, that though there can be no doubt of its stimulating the stomach so much as to prove an useful condiment to our food, and though it certainly passes both by perspiration and urine, and therefore may be useful, yet it does not seem possible to find in it an active remedy. Besides the acrid matter peculiar to the genus, it contains also a saccharine and mucilaginous substance; which is a nutritious matter, and may in the whole of its substance be employed as an useful antiscorbutic. All the species of *allium* have been by many writers commended as useful in nephritic and calculous cases; but they do not seem to act otherwise than as diuretics, the use of which, in nephritic and calculous cases, is in general very doubtful. It does not seem necessary to mention the use of onions externally applied in promoting suppuration; for as they are employed in a heated state, they do not seem to have more power than that of other mucilaginous poultices. The use of their juice in the cure of deafness, by a few drops put into the ear at bed-time, I have mentioned above on the subject of the *allium sativum*.

Some other species of *allium*, as the *allium porrum*, *allium ascalonicum*, *allium fistulosum*, and *allium schænoprasum*, are employed in diet, but hardly in medicine, as their qualities are in a less considerable degree than those we have already mentioned. In diet, the *allium porrum* affords a large quantity of nutritious matter, and the *ascalonicum* is conveniently employed as an agreeable condi-

ment, having much less of the odour that is disagreeable in the *allium sativum*, or even in the *cepa*.

E. CONIFERÆ.

OF this order only two genera, the *pinus* and *juniperus*, are to be taken notice of here; for though there are many other plants that belong to this as a natural order, they are many of them of very different qualities from those we are to treat of; or if some of them have somewhat of the same qualities, they have them not in such a degree as to intitle them to have a place in the *materia medica* of Europe.

PINUS.

THIS genus comprehends a great number of species very much of the same qualities; but in what different degrees I cannot exactly determine, and I do not think it necessary to attempt it; for it appears to me that the virtues of all of them depend upon the *TURPENTINE* they contain, and it is properly the virtues of this well-known substance which we are to treat of here.

This indeed again has been considered as of different species; and it may be allowed that they are different in the degree in which they possess the general qualities, but I doubt much if this difference is in any case so considerable as to affect the purposes of medicine; and I am of opinion that the Edinburgh college have done rightly in taking into the list of their *materia medica* the *terebinthina laricina*, or as it is commonly called the *Veneta*, only. And as this is the only kind that has been the subject of my observation, it is this only I am to be understood more strictly to speak of here: but I hope, that what I am to say will apply to all the other species which have been or may be in use.

Turpentine in its entire state is an acrid substance, and when applied to the skin inflames it to a considerable degree. It might perhaps by itself be an useful rubefacient, but when we would prevent its operation from going too far, it is not easy to wash it off the skin. When it was employed in the *emplastrum volatile* of the former editions of the Edinburgh Dispensatory, it proved a very powerful rubefacient, more powerful than that of the volatile alkali combined with expressed oils.

The only difficulty I have found in the employment of turpentine in this form was, that it often gave more pain than my patients would willingly bear, and that it was necessary to take it away before it had

the effects in removing the pains of the joints for which it had been applied.

From this account of the acrimony of turpentine, it will readily appear that it was, if ever, improperly applied for fresh wounds; and whatever has been said in this respect by former writers of the power of this or of other substances under the name of balsams, very much of the same nature, must have proceeded upon mistake. It is true, when wounds or ulcers, from a flaccidity of the parts, do not come to a proper suppuration, the stimulus of turpentine may be of use: but even in that case the turpentine or balsams of the same nature cannot be properly employed alone, but must be diffused and involved in some substance that may moderate their acrimony, as in the digestive so commonly employed by our surgeons.

I take it to be an improvement in modern surgery, that to fresh wounds, and even to them in their suppurating state, no applications but of the mildest kind are to be made, and that the application of terebinthinated substances are not only unnecessary but may be hurtful.

These are the observations I can make on the external use of turpentine, but its internal use has been also very frequent. Upon account of its disagreeable acrimony in the mouth and fauces, it cannot be easily taken by itself into the stomach, but must be accompanied with some other matter, as sugar, honey, or yolk of egg, so employed as to soften its acrimony, and serve to diffuse it in a liquid, or it may by means of a powder be brought into the form of pills. But however softened or exhibited, it is ready in any large quantity to be warm in the stomach, and to give that uneasiness or sickness which, as we judge, arises from substances not readily miscible with the animal fluids.

There can be no doubt of its stimulating the stomach, and communicating from thence a stimulus to the whole system; but its peculiar effects in this way I have not had occasion to discern.

As it proceeds further in the alimentary canal, it manifestly stimulates this, and proves more or less a laxative, though it can hardly be taken in, in such quantity as to prove remarkably purgative. Its power, however, of stimulating the intestines appears especially when it is employed in glysters, when to the quantity of half an ounce or an ounce it is very diligently triturated with yolk of egg, so as to be perfectly diffused and suspended in a watery liquor, and in this state injected into the rectum; we have found it to be one

of the most certain laxatives that could be employed in cholics and other cases of obstinate costiveness.

When it is carried into the blood-vessels, it there shows its power of stimulating the whole system; and as such it has been found useful in chronic rheumatism, and, like some other terebinthinate stimulants, has been found useful in preventing the gout. It shows constantly a tendency to pass off by the secretion of urine, which it imbues with a peculiar odour, and proves very generally diuretic. At the same time it cannot be doubted that it passes by perspiration; and these operations explain very well why it has so often been found useful in the scurvy.

As it may be readily admitted, that the same medicines which pass by perspiration through the skin will also pass by the exhalation from the lungs; this will in some measure explain the virtues that have been ascribed to the terebinthinate substances, which come under the title of balsams, in some diseases of the breast.

Here, however, is the place to remark, that even from a mistake, as I judge, with respect to the use of turpentine in wounds and ulcers, and more certainly from a false analogy, the use of it has been transferred to internal ulcers of all kinds. It is, however, now very generally understood, that terebinthinate medicines are not only useless but commonly very noxious in such cases. This was first pointed out by Dr Boerhave, and after him, without however his being taken notice of, has been since inculcated by Dr Fothergill. After both, the argument that may be employed is, that such internal ulcerations are so far from needing the inflammatory stimulus, by which the balsams are often useful in external ulcers, that it is a state of too much inflammation that prevents their spontaneous healing.

With respect to the internal use of turpentine, it is proper to remark, that as a diuretic, it has been commended for preventing calculous concretions in the urinary passages, and for carrying off such concretions, whilst they are in a condition to pass by the excretories; but from any thing we yet know of the lithogenesis of the human body, we cannot perceive a foundation for the first opinion; and with respect to the second, the applying such a stimulus is always in danger of being hurtful, and commonly proves so.

Another operation of turpentine in the urinary passages is that in the case of gleet. The pathology of these, however, in different cases, is not yet so well ascertained as to teach me to adapt a proper remedy to each; but there is a case in which I have found the

disease cured by inducing some degree of inflammation upon the urethra: and I am persuaded that turpentine, or what is much the same the balsam copaivæ, operates only in this manner; for I have had some instances both of turpentine and of balsam copaivæ producing a manifest inflammation in the urethra to the degree of occasioning a suppression of urine; but at the same time, when these effects went off, a gleet which had subsisted for some time before was entirely cured.

It appears to have been the analogy with gleet that has led practitioners to employ the terebinthinate medicines in the fluor albus of females; a disease difficult both with respect to theory and practice. Physicians have recommended the use of these medicines in the fluor albus, and I have frequently employed them, but seldom with success; and one hinderance of this has been, that few female stomachs can be brought to bear the quantities of the medicine that might be necessary.

[*Though it may be difficult to explain the fact, and improper to imitate the practice without great caution, there can be no doubt, that the terebinthinate medicines have sometimes been usefully exhibited, in alarming bleedings from the intestines, and other parts of the body. I have myself seen good effects from the turpentine in cases of this kind. But it is chiefly the experience of respectable British practitioners upon which I depend.*]

It is time now to observe, that the whole of the virtues of turpentine we have mentioned depend especially, if not entirely, upon an essential oil; which by distillation with water may be obtained from it in large quantity, and which is often used as a medicine in its separate state. Externally applied, this oil irritates and excites some degree of inflammation in the skin, but not so readily or so considerably as the entire turpentine. It is, however, an useful rubefacient, and seems to be as effectual as any of the aromatic oils; and if it was not for its disagreeable odour, it would be more frequently employed than these along with camphire, or otherwise.

Its stimulant power externally applied, appears sufficiently from hence, that anointed on the spine it has been found useful in intermittent fevers.

Taken into the stomach, it excites a sense of heat, and an uneasiness of the same kind as that arising from the entire turpentine, and it is equally indigestible. Carried further into the intestines, it does not discover the same laxative quality as the entire turpentine.

It passes readily into the blood-vessels, and there it is commonly determined to the urinary passages, and increases the secretion of urine; but as it cannot be easily introduced in large quantity, I have never found it a very useful diuretic, and not always a safe one, as sometimes irritating the urinary passages too much; and of which we have two remarkable instances from Dr STEEDMAN in the Edinburgh Medical Essays, Vol. II. art. 5.

It seems to be a very diffusible stimulus, and probably pervades the whole system. It seems to irritate the extremities of the vessels every where; and the use of it which the Drs PITCAIRN and CHEYNE have proposed in the sciatica, is very probable. I have never indeed found any person's stomach to bear it in the quantity they have proposed, and therefore I perhaps have been disappointed of its effects in the entire cure of the disease; but even in lesser doses, I have frequently found it an useful remedy.

[*The anthelmintic properties of turpentine are to be mentioned under the head of ANTHELMINTICS.*]

As the *pix liquida*, or tar, is a matter that, by a particular mode of burning well known, is procured from various trees of the pine kind, it falls to be mentioned here. It is properly an empyreumatic oil of turpentine, and not only retains much of the stimulant power of that, but perhaps possesses also some others acquired by the burning; so that it has been supposed to have powers analogous to those of turpentine. It is, however, a substance more disagreeable to the stomach than the turpentine or its oil; and in several trials of the *pilulæ piceæ* of the *Pharmacopœia Pauperum*, I have never found them of any special use.

A mixture of equal parts of tar and mutton-suet, or of five parts of tar to two of wax, forms an ointment which some have thought of use in certain ulcerations; but I have never found that in any case it answered better than ointments with a more moderate impregnation of turpentine: and the tar ointment applied, as some have proposed, to cancerous sores, has always appeared to me to be hurtfully irritating.

I have met with an empirical practice with respect to tar of a singular kind. A leg of mutton is laid to roast; and whilst it continues roasting, it is basted with tar instead of butter. Whilst the roasting goes on, a sharp skewer is frequently thrust into the substance of the mutton, to give occasion to the running out of a gravy; and with the mixture of tar and gravy to be found in the dripping-pan, the body is to be anointed all over for three or four nights successively; whilst for the same time the same body-linen is to

be worn. This is alleged to be a remedy in several cases of lepra; and I have had one instance of its being employed in a *Lepra ichthyosis* with great success*: but for reasons readily to be apprehended, I have not had opportunities of repeating the practice.

When treating of tar, it might be expected that I should treat of tar-water; but I refer that to another head, under which the virtues of this liquid will be more properly considered.

The virtues ascribed to tar, of obviating and correcting the contagion of the small-pox do not deserve any notice. WALLERIUS followed the practice of the vulgar in this affair, and thought it was attended with success; but he is so candid as to say, that whether the effects were to be ascribed to the use of the tar, or to other causes, he could not determine.

In the whole of the above, I have considered the properties of turpentine as in common to the whole of the turpentines afforded by the genus of pines; and I have not thought it necessary to take notice of the various species marked by materia medica writers, as proceeding from different kinds of pines, or of those from plants of other genera; as I have supposed the terebinthina *larigna* to be possessed of every virtue necessary for the purposes of medicine. In all this, however, I may perhaps have gone too far; and I must own, that some of the other turpentines are more grateful in their odour and milder in their taste; and such in particular is the *Balsamum Canadense*: but after all the attention I have been able to bestow, I have not perceived that it has any peculiar virtues, or in general more power to intitle it to the singular esteem that many seem to have conceived for it.

JUNIPERUS.

THIS is the other genus of the coniferæ we are to take notice of; and it is very properly connected with the former, both by its botanical affinity and by its similar virtues. It contains, minutely diffused through its whole substance, an essential oil very much the same with that of turpentine, only of a more agreeable odour. It is manifestly diuretic, and imbues the urine with the same violet smell that the turpentines do.

Whoever attentively considers the writers on the materia medica, will, I think, perceive, that all the virtues ascribed to the different parts of the juniper may be referred to the essential oil I have

* I have employed an ointment prepared of tar and mutton-suet, with the effect of entirely removing a most obstinate affection, apparently of a leprous kind, which was spread over the greater part of the surface of the body of a child.

mentioned : and I must observe, that I have not found it a more powerful diuretic than the oil of turpentine ; and though it be of a somewhat more agreeable odour, I have hardly found the stomach receive it in larger quantity than the other.

The part of Juniper chiefly employed in medicine is the berry ; which, especially as produced in somewhat warmer climates than ours, contains, diffused over their whole substance, particularly in their seeds, the essential oil I have mentioned in larger quantity. In the common employment of the Juniper berries, unless pains are taken, by a strong contusion, to break these seeds, the infusion is an agreeable, but a weak, impregnation ; and therefore of very little power as a medicine.

When spirit of wine is applied to these seeds, it extracts the essential oil from the husk, pulp, and bruised seeds very entirely, and carries them over with it in distillation. By this it proves a diuretic, but to my observation never a very powerful one ; and when largely used, proves more hurtful by the menstruum than useful by the diuretic quality of the impregnation. To many persons, especially after the repeated use of it, the proper odour of the juniper berries is sufficiently agreeable ; but to others it must be rendered so by the addition of some other aromatics, as in the aqua juniperi composita.

If juniper berries are treated by decoction in water, as happens to them in distillation, and the decoction is afterwards inspissated to the consistence of an extract, it gives what is commonly called the Rob Juniperi. As in the preparation of this, it is commonly directed to avoid bruising the seeds, so a little only of the essential oil is extracted ; and what is extracted is almost entirely dissipated by the boiling. I have always judged this to be an inert preparation. It is sweetish, and very slightly aromatic ; but I have never found in it the virtues which HOFFMANN and others have largely ascribed to it.

I might here mention the Sandaracha and Olibanum as products of the juniper ; but as I cannot ascribe to them any medicinal virtues, I do not think it necessary to take any notice of them.

JUNIPERUS SABINA.

THIS we have already mentioned under the title of the Fœtids, and shall say more of it under the title of Emmenagogues.

F. BALSAMICA.

AFTER the consideration of turpentine, I set down this title, be-

cause almost the whole of the substances called Balsams have the form and consistence of turpentine ; and seem to consist of this for the greater part of their substance. Accordingly, I think they are of very similar virtues ; or how far these, in the different species, are different, I find it difficult to ascertain.

BALSAMUM COPAIVÆ.

THIS is of a thinner consistence than the Venice turpentine ; and plainly for this reason, that it contains a greater proportion of essential oil, which it affords by distillation with water. Its virtues, whatever they are, depend upon this essential oil ; for when this is drawn off by distillation, the resinous substance remaining is without smell or taste. The oil separated has not been employed as a medicine ; but I dare say it may, like oil of turpentine, be employed as HOFFMANN proposes, with a double quantity of hog's-lard, in paralytic cases.

The entire balsam has been pretty much employed ; but the virtues of it, like those of the other balsams, have been very much mistaken. A certain writer has treated professedly of this balsam, but very differently from other monographers : He very candidly points out the mischievous consequences of its large use ; and as it applies to the other balsams as well as this, I judge it will be for the instruction of students, if I shall here transcribe what Dr HOPPE has said upon the subject.

After giving an account of the virtues commonly ascribed to this balsam, he gives the following paragraph.

“Hæc autem omnia in recensitis affectibus præstat sub divina benedictione Balsamum Copayva, si genuinum nulloque mangonio corruptum vel infractum, debito tempore et modo, justaque quantitate a prudenti medico et exercitato chirurgo adhibetur, largiori enim dosi, vel longiori, quam par est, minusve opportuno tempore assumtum sulphure suo balsamico et acri sensiles tunicas primarum viarum extimulat, humores nimis exagitat, et sic febres, hæmorrhagias, cephalalgias, cordis palpitationes, dolores et ardores ventris, aliaque incommoda parit. In specie pthisi et ulcere renum laborantibus abusus balsami Brasiliensis facile tussim exasperat, hæmoptoën et mictum cruentum infert, febremque lentam intendit. Nephriticis quoque frequentius et largius exhibitum dolores et inflammationes renum adauget. Dysenteria maligna et lienteria notha, quæ ex denudatione tunicæ nerveæ ventriculi ac intestinorum oritur, vexatis balsamum nostrum propinatum, vel clysmatibus additum sæpe ardores internos excitasse observavi. In omnibus

igitur alvi fluoribus, ab humorum in primis viis collectorum acrimonia natis, et cum gravi intestinorum inflammatione junctis, balsamum Copayva assumtum plus obest, quam prodest. In mictu cruento et dysuria senum, ab humorum salsedine producta, similiter nocet, quia sanguinem nimis commovet, et vias urinarias, jam dolorifice affectas, magis irritat. Nec etiam extus adhibitum balsamum Brasiliense semper et ubivis conducit, quia vulneribus et ulceribus nondum satis deterisis, seu a pure inhærente liberatis, admotum intempestive cicatricem inducit, et sic ulcera sæpe numero sinuosa infert, quæ brevi tempore recrudescunt et difficilius sanantur." Ex Dissertatione, D. FRID. WILH. HOPPE, apud Valentini Indiam literatam, p. 624.

In late times, the chief use of the balsam copaivæ has been in the case of gleet; and of this I have spoken sufficiently above on the subject of turpentine. I have been frequently disappointed of its effects, perhaps from my mistaking the nature of the case; but I believe frequently from its being taken in too small quantity, the patient's stomach often refusing to admit of a larger. I have sometimes had success with it, but have frequently found it too irritating and very hurtful. Wherever I could suspect ulceration in the urinary passages, there it was especially hurtful. With respect to its use in the fluor albus, I have nothing to add to what I said above.

As I have observed above, that turpentine, in acting upon the intestines, proves laxative; so the same has been observed, and I have myself observed it, of balsam copaivæ. Whether a certain effect of balsam copaivæ is to be imputed to this operation, I cannot determine; but must observe what I have learned from an empirical practitioner, that it gives relief in hæmorrhoidal affections; and I have frequently employed it with success: For this purpose, it is to be given from twenty to forty drops, properly mixed with powdered sugar, once or twice a-day.

BALSAMUM PERUVIANUM.

THIS is a terebinthinate substance, and procured from a tree that is a species of the terebinthus. It is of a stronger flavour, and of more acrimony, than most others; but what peculiar virtues arise from hence is not well ascertained. It was formerly much celebrated for the same virtues as the other balsams; but at present it is little used in our practice, possibly from our seldom having it in its genuine state.

The singular power in wounds of the nerves ascribed to it by

VAN SWIETEN, is not confirmed by the experience of our surgeons; who trust more to cutting through the nerve, to emollient applications, and to the obviating the effects of the irritation by the internal use of opium, than to any balsam poured into the wound.

We may readily admit of the virtue ascribed to it by SYDENHAM, of curing the colica pictonum, as its laxative qualities are analogous to what we know of turpentine and balsam copaivæ.

The warm commendations bestowed by Dr HOFFMANN upon the tincture of it in spirit of wine, I have not attempted to examine by experience; but they appear to be no other than that of a general stimulant power, which possibly we can obtain from many other substances.

BALSAMUM TOLUTANUM.

THIS, with a very agreeable flavour, is in taste the mildest of all the balsams. It has been celebrated for the same pectoral virtues as the others; and we can only say, that from its mildness, it may be the most innocent.

BENZOINUM.

THE place of this here is not the same that it holds in my catalogue; but I set it down here on my supposing a certain relation of it to the immediately foregoing balsams. The benzoin is a singular composition of an acid salt with an oily and resinous substance; but as a saline matter of the same kind is found in most of the turpentine and balsams, it may be supposed that there is an affinity between this and all the balsams we have been mentioning.

It appears to me, that the benzoin affords an analogy for explaining the composition of all these; though chemistry is yet far from being able to explain the various combinations which nature makes in vegetables. For the chemical history of benzoine, I must refer to several late writers who have treated of it; but I take no notice of them, as they have thrown no light on its use in medicine.

The flowers, which is the only preparation employed, are manifestly a saline substance of the acid kind, of considerable acrimony and stimulant power, as I have found in every trial of them I have made. It has been recommended as a pectoral; and I have employed it in some asthmatic cases without finding it of use; and in a dose of half a dram it appeared to be heating and hurtful.

STYRAX CALAMITA.

I subjoin this substance here, as it contains, though in less proportion, the same essential salt as the benzoin; and therefore may be supposed of the same nature and virtue. What these virtues are, is not at all ascertained; and it is so little employed in our practice, that I have had no opportunity of judging of them from experience.

STYRAX LIQUIDA.

THE origin of this is not well ascertained; and therefore we have no analogy for ascertaining the nature of it but from the name of *Styrax*, commonly applied to it. On account of the name, I have set it down here; and for this further reason, that the odour of it somewhat approaches to that of the *styrax calamita*. In its consistence, and by the acrimony of its taste, it greatly resembles these.

Hitherto it has been almost only employed for external use; and in that, to what particular purposes it is adapted, is not well determined: but very lately I have been informed, from an empirical practice, that, mixed with some unctuous substances in the proportion of one part of *styrax* to two of *ung. basilicon nigrum*, it has been of remarkable service in paralytic cases, and particularly in a debility of the limbs following rickets.

G. RESINOSA.

MYRRHA.

I BEGIN with this, that I may not separate substances which should be considered together.

This is a gummy resin, which has long been considered as a valuable medicine, and seems entitled to some esteem by its sensible qualities, and by the acrid matter that a chemical examination shows it to contain.

Its proper virtues, however, seem to me to have been mistaken. It manifestly stimulates the stomach, and, when taken in moderate quantity, promotes appetite and digestion; but taken in larger quantity, as in half a dram or two scruples for a dose, it raises a disagreeable sensation of heat in the stomach, and at the same time occasions a frequency of pulse and a sense of heat over the whole body. From this power, it may sometimes be useful in that flaccidity of the system which is so often connected with a retention

of the menses; but we cannot perceive that it has any peculiar power of determining to the uterine vessels, and therefore that it has not any title to be supposed, as it has usually been, an emmenagogue. By its sensible qualities, it has not even so much pretension to that as the fetid gums.

Another virtue ascribed to myrrh by several writers, and of late recommended in England, is that of a pectoral, and proposed to be employed even in phthisical and hectic cases. From my constant and frequently repeated observation of the heating qualities of myrrh, I cannot readily admit of such a measure; and upon several trials, I have found no benefit from the use of it, and often manifestly harm from it, when it was either given largely, or frequently repeated. I am pleased with the discretion of CARTHEUSER; who, though extravagant in the commendation of myrrh, has this passage: "Blandè attenuat, et imminentem fluidorum non minus quam solidorum corruptionem avertit, vel jam præsentem, *febre lenta*, tamen aut *hectica* nondum stipatam, efficacissime corrigit."

[*Myrrh has also been used as a remedy for intermittent fevers. I cannot find, however, that it has been much employed with this intention. But it has been employed, among other physicians, by Dr JOHN ARMSTRONG, the celebrated author of the *Art of preserving Health*. He gave it in large doses, and found it to answer extremely well.*]

The myrrh has been much employed externally in ulcers of various kinds, and has been much celebrated for what are called its balsamic and its antiseptic virtues. There is indeed no doubt of its possessing the virtues of the balsams; but its acrimony is perhaps greater than in any of these, and the whole of its virtues are now almost entirely deserted by the present practitioners of surgery.

If the virtues of myrrh are to be employed, they may be extracted either by water or spirit of wine; and, for most purposes, properly enough by a proof-spirit. The extracts by spirit of wine are more acrid; those by water more mild.

If its stimulant qualities are especially required, Dr STAHL is right in alleging that the quantity of myrrh in the spirituous tincture will go as far as twice that quantity of the myrrh in substance. But if the opinion of the most part of physicians be to be followed, that the myrrh is most safely employed in a milder state, the extraction by water will best answer the purpose; and it has been speciously proposed, that the myrrh in substance should be given

to be chewed in the mouth, and no part of it swallowed down but what is dissolved in the saliva.

LADANUM.

THIS stands next in my catalogue; but I think it might have been omitted altogether, as it is never now employed internally as a medicine for any purpose whatever. It is retained indeed in the shops, and enters some external compositions; but it seems to be rather for its grateful odour than for any specific virtue.

GUAIAACUM.

THIS medicine was first brought into use for the cure of the venereal disease, soon after that disease first appeared in Europe. For some time after that period, it continued to be the remedy chiefly employed; and it is impossible to reject the testimonies given then, and frequently since, of the cures performed by it alone. There are, however, also many testimonies of its inefficacy; and as soon as the use and proper administration of mercury came to be known, the efficacy of this was found to be so considerable and certain, that it soon came to be the remedy generally employed, and at the same time the guaiacum came to be as generally neglected.

Some indeed have since, particularly Dr BOERHAAVE, entertained a favourable opinion of its use in venereal cases, under a proper administration; and ASTRUC has given a particular opinion, that it is especially suited to syphilis combined with serophula. I have had no opportunity of examining this latter opinion by experiment; and with respect to its use in syphilis, I have not of late met with any instance in which the guaiacum alone was employed, nor do I know of any practitioners in Europe who now trust to it alone, or who have had success with it.

We are therefore to say no more of the use of guaiacum in the venereal disease; but it has been celebrated for many other virtues. By many the continued use of the decoction has been commended for the cure of cutaneous ailments; and in some of these it has been sometimes successful: but as I find it difficult to distinguish the various species of these, I dare not absolutely deny its power in this respect; but I can assert, that in many trials I have not perceived its efficacy in any. For the effects of gum guaiacum applied externally to cutaneous sores, see HUNTER on the Venereal Disease.

In cases of chronic rheumatism its virtues are more certainly established, and the employment of its decoction has been some-

times successful : but both because the exhibition of large quantities of it is to most persons disagreeable, and because its resinous parts, in which its virtue chiefly resides, are not well extracted by water, the use of the decoction is very much laid aside, and even the extracts which have been proposed to be made from it are hardly in use. It is the resin that spontaneously flows from it in the countries in which it is produced that is now chiefly employed in rheumatic and gouty cases.

We have this medicine imported under the title of Gum Guaiacum ; which is a substance containing a large proportion of resin, and, as some say, to three fourths of its whole substance.* Though I am persuaded that the virtues of this gum depend very entirely upon its resinous part, we can hardly think it necessary to extract this resin by itself, as, for most purposes, spirituous menstrua extract it sufficiently from the gum : and if an aqueous solution, which we judge to be often necessary, is to be employed, the gummy part favours the more ready diffusion of the resinous ; and it seems therefore best in every case to employ the entire gum. The resinous part seems to be very analogous to the nature of the balsams and turpentine above mentioned ; and therefore it may be supposed, like these, to be very diffusible in the system, and thereby to have a considerable power in stimulating the extreme vessels every where. It is indeed this which seems particularly to account for its power in chronic rheumatism.

As there can be no doubt of its passing off by the pores of the skin, it will therefore appear to be a probable remedy in some cutaneous disorders. For these and other purposes it has been administered in different forms. It has been extracted by spirit of wine ; and this strongly impregnated with it, gives the balsamum guaiacinum of the London, and the elixir guaiacinum of the Edinburgh, dispensatories. Both of them, with little addition of virtue, are flavoured by a portion of balsam of Peru. These preparations are extractions of the pure resinous part ; and whether it be with any advantage, either with respect to virtues or to more convenient exhibition, we are very doubtful.

Both colleges have also ordered the guaiacum to be extracted by the spiritus salis ammoniaci vinosus, which is a combination of spirit of wine with the caustic volatile alkali ; for though a mild

* Mr. Brande, of London, has lately shown us, that guaiacum is not, as has been generally supposed, a gum-resin, but a peculiar substance, or principle, different from all the known gums and resins.

alkali is prescribed, it is truly the caustic only that can be combined with the spirit of wine. This menstruum extracts the guaiacum very largely, and it is accordingly very much employed; but whether it gives much advantage to it seems to be uncertain. We are of opinion, that it often limits the dose that might be otherwise given: and as, in many cases, the guaiacum is too heating, so this form of it must be especially such. And as a solution of the gum in strong rum or brandy may be given more freely and safely, and if I mistake not has been given with equally good effects.

This leads me to speak of the great fame which guaiacum has lately acquired in the cure of the gout. The guaiacum had been well esteemed in England, both by MEAD and PRINGLE, for the cure of rheumatism; but its being a cure for the gout was first discovered by Mr EMERIGON of Martinico; who at first, from his own experience, asserted its power and success in delivering entirely from the pains of the gout. This he soon after communicated to Europe, and the fame of it soon spread over the whole; and since that time, there have been many in every country of Europe who have employed this remedy.

It consists of two ounces of gum guaiac infused in three pounds averdupoise of good rum; and after digesting for eight days, the tincture is poured off through paper, and the patient takes a table-spoonful of this every morning for a twelvemonth or more. The reports of the trials made, from different countries, have been very various. Many persons have boasted of its success; but there are many also who complain of being disappointed in their expectations. Several complain of their being hurt by it; and it appears that the adapting it properly to cases and constitutions is not yet well ascertained. It has been alleged by the patrons of it, that it may be given even when a fit of the gout is present; but I am certain, from several instances, that this is a very hurtful practice. For my own part, I have known several who have taken it with the effect of putting off their fits of the gout for a long time, but none in whom they did not return. In one instance, the gout, in a person liable to annual fits, had none for two years, but became, by degrees, affected with a hydrothorax, of which he died; and I suspect that several others who have taken the tincture of guaiacum have undergone the same fate: for, from the experience of the Portland powder and other remedies, I am persuaded there can hardly be found a means of preventing inflammatory fits of the gout, without inducing an atonic and dangerous state of the system.

[* Among other diseases in which guaiacum has been used with advantage, I may mention the colica pictonum, or cholic generally induced by lead. Dr JOHN FOTHERGILL, if I mistake not, first employed it in this case, in which I have myself had occasion to observe its good effects.*]

Several physicians have apprehended mischief from the use of the guaiacum in a spirituous tincture ; and I am certain that it sometimes happens. It is therefore that, in imitation of the very respectable BERGER of Copenhagen, I avoid the spirituous tincture of guaiacum, and employ almost only the diffusion of it in water. In preparing this, having first, with an equal part of hard sugar reduced the guaiacum to a fine powder, I apply some portion of the yolk of egg, or of a mucilage of gum arabic, and rubbing these together very carefully, I form an emulsion with water, or watery liquors, as may be thought proper. This preparation I give over night, in such a quantity as may open the belly once next day ; which will happen to different persons from doses containing from fifteen to thirty grains of the guaiacum. In imitation of the late Sir John Pringle, I use this preparation for some time together in chronic rheumatism ; but I never employ it for a great length of time with a view to prevent fits of the gout, as I would, for the reasons given above, think this a dangerous practice : but when disorders of the stomach, or wandering pains in other parts of the body, can be imputed to atonic or retrocedent gout, I have frequently employed it, and, as I judge, with great advantage.

SARSAPARILLA.

THIS is set down here because it so frequently accompanies the guaiacum in practice ; but if I was to consult my own experience alone, I should not give this root a place in the materia medica : for, tried in every shape, I have never found it an effectual medicine in syphilis or any other disease. Other physicians, however, have had a better opinion of it, and have communicated this to the public ; which I leave my readers to consult, and to follow their opinions if they shall think proper.

SASSAFRAS.

THIS is a wood whose sensible qualities are more considerable ; and as it contains a large portion of a very acrid essential oil, it may be presumed to have virtues ; but what these are I have not been able to ascertain. I must indeed acknowledge, that I have never employed it with any constancy, or in large quantity, in any

disease; nor do I know that such use of it has been attempted in modern practice.

It is commonly extracted by infusion only, and the long decoction of it is commonly avoided; but this practice is not very well founded, as the decoction is found impregnated with active parts. This wood is said to be diaphoretic, and I believe justly; for I have found that a watery infusion of it, taken warm and pretty largely, was very effectual in promoting sweat; but to what particular purpose this sweating was applicable, I have not been able to determine.

SANTALUM CITRINUM.

THIS still holds a place in our dispensatory lists; and, by the essential oil and resin it contains, it may certainly be an active medicine: but though Dr HOFFMAN has been a little extravagant in its praises, his authority has not been sufficient to have it retained in the present practice. It may perhaps be neglected, as we have probably in our hands many other medicines of equal virtues.

H. AROMATA.

AFTER treating of the verticillatæ and umbellatæ as stimulants, having this quality from the essential oil abounding in them, for the most part of a grateful odour, I have here put down those substances which, though not connected by any botanical affinity, have their virtues very manifestly depending upon their essential oil, generally of the most grateful odour, and from which the idea of aromatic has been chiefly taken.

These aromatics are almost all of them the produce of very warm climates, and their oils have generally the property of sinking in water. They are all of them considerably acrid and inflaming when applied to the skin; and when given internally, they stimulate the stomach so much as to show very strongly antispasmodic and carminative virtues. At the same time, they stimulate the energy of the brain so much as to affect the heart and sanguiferous system, and are therefore justly esteemed cordial. They manifestly increase the frequency of the pulse and the heat of the body, and are therefore ready to prove hurtful in all cases where these circumstances are already preternaturally increased, and especially in all cases wherein a phlogistic diathesis prevails in the system.

CINNAMOMUM.

THIS is an aromatic of the most grateful fragrance. Its oil is sufficiently acrid ; but not being in large proportion in the substance of the cinnamon as nature produces it, this may be employed more safely than most of the other aromatics.

As it is a bark, its aromatic qualities are accompanied with somewhat astringent, which may determine its being employed in certain cases rather than some of the other aromatics ; but the astringent quality is not considerable, and can never be trusted to by itself.

Its aromatic qualities are extracted by water in infusion, but more powerfully by it in distillation ; and in both ways also by a proof-spirit applied : and both the British dispensatories have now also ordered a tincture of it made with proof-spirit. In all these ways it may be agreeably employed : but we should never lose sight of its being stimulant and heating ; for even the simple distilled water, when frequently employed, has proved hurtfully irritating to the fauces.

The essential oil is only obtained by us as imported from the East Indies ; and, when obtained in its genuine state, it is one of the most agreeable and powerful aromatics we can employ.

Our college has now received into their materia medica list the **CASSIA LIGNEA**, which has all the qualities of the cinnamon, only in a much weaker degree, and at the same time with no other peculiar virtue. It differs from the cinnamon by its containing a considerable quantity of mucilaginous matter ; but we do not perceive that this can adapt it to any particular purpose.

CARYOPHYLLI.

THIS is an aromatic of a very agreeable odour, and contains a large proportion of essential oil, by which it has all the virtues we have ascribed to aromatics in general. This oil, as distilled in this country from the cloves imported, does not appear to be a very acrid matter ; but we have got imported from Holland an oil under this title of very great acrimony. It is such an acrimony as we find in the extract of cloves obtained by means of spirit of wine ; and it is therefore commonly supposed that the oil imported from abroad has its great acrimony from a quantity of the resin obtained by spirit of wine mixed with the oil. By this admixture it is certainly rendered more powerful for external use ; and how far, when

the dose is properly chosen, it is rendered unfit for internal use, I cannot well determine.

NUX MOSCHATA.

THIS is a substance abounding in oily matter, which is of two kinds; the one fixed, the other volatile, arising by distillation both with water and spirit. The fixed oily part is a butyraceous matter, without taste or smell, and therefore of no peculiar use in medicine. The volatile portion of it is of two kinds, as a part of it appears in a thin fluid oil, and another part of it disposed to congeal, puts on somewhat of the appearance of camphire, but has not however the nature of that substance.

The active parts of nutmeg may be obtained not only by distillation, but also by a simple expression of the bruised nutmeg, when a butyraceous substance is obtained, known in our shops under the title of the *Oleum macis expressum*, having much of the odour of the entire nutmeg. It is commonly imported to us from abroad, but seldom in its genuine state.

Nutmeg is an aromatic, to most persons of a grateful odour and taste; but on account of the admixture of an inert sebaceous matter, it is of a less acrid taste than several other aromatics. By its volatile parts, it is a medicine of considerable power, and has all the virtues of the other aromatics, both with respect to the alimentary canal and to the whole system.

Some writers have mentioned its hypnotic power; but Dr LEWIS, by his manner of expressing himself, does not seem to have known this from his own observation. BONTIUS, however, speaks of it as a matter of frequent occurrence in the East Indies, which had often fallen under his own observation; and in the *Ephemerides Germanicæ*, Dec. II^{da}, Annus II^{dus}, Obs. 120, we have an account of some extraordinary effects on the nervous system occasioned by the taking in a large quantity of nutmeg. I have myself had an accidental occasion of observing its soporific and stupifying power. A person by mistake took two drams or a little more of powdered nutmeg: he felt it warm in his stomach, without any uneasiness; but in about an hour after he had taken it, he was seized with a drowsiness, which gradually increased to a complete stupor and insensibility; and not long after he was found fallen from his chair, lying on the floor of his chamber in the state mentioned. Being laid a-bed, he fell asleep; but waking a little from time to time, he was quite delirious: and he thus continued alternately sleeping and delirious for several hours. By degrees, however, both these symptoms

gradually diminished, so that in about six hours from the time of taking the nutmeg he was pretty well recovered from both. Although he still complained of headach and some drowsiness, he slept naturally and quietly through the following night, and next day was quite in his ordinary health.

There is no doubt that this was entirely the effect of the nutmeg; and it is to me probable, that several other aromatics, taken in large doses, might have the same effects: from which I am of opinion, that in general the large use of them in apoplectic and paralytic cases may be very improper.

I have only to observe further with respect to nutmeg, that its active parts are not dissipated by moderate boiling. The preparation of the *nux moschata condita* does not, as in many other instances of the *Condita*, deprive the nutmeg of its virtues; while it gives us a preparation convenient for several formulæ in which the nutmeg may be employed.

MACIS.

THIS is a part of the same fruit as the nutmeg, and has therefore very much of the same qualities, only it is of a somewhat different odour and taste; and it contains an oil, or at least a part of an oil, that is more volatile, and somewhat more acrid.

PIMENTO.

THE aromatics hitherto mentioned are productions of the East Indies: the one we are now to mention is entirely from the West Indies, very much however of the same qualities as the Oriental aromatics. It is of a fragrant and agreeable odour of a peculiar kind, and seems as if it were a combination of several of those we have already mentioned. Like these it contains a large portion of essential oil that sinks in water. Its only use is as a condiment to food, and has not any peculiar virtues in medicine that I am yet acquainted with.

CARDAMOMUM.

THE species of *amomum* distinguished by the title of *Cardamomum Minus*. It is a seed of a grateful aromatic odour and taste; but not so acrid as several others. It has the common qualities of the other aromatics, depending upon an essential oil, that differs, however, from the others we have mentioned, as not sinking in water.

There is another species of the amomum, formerly kept in our shops under the title of *GRANA PARADISI*; but as being precisely of the same nature with the cardamomum minus, and of weaker quality, it is now properly omitted.

GINGIBER.

THIS root is from a plant of the same genus with the former, and like it contains an essential oil of an acrid aromatic kind: it has therefore the same qualities of antispasmodic and carminative as the other aromatics. Its odour is to me less fragrant and agreeable; but its taste is more pungent and heating. By my observation, it is equally heating to the system as the other aromatics; and why Dr LEWIS thought it not so, I cannot understand; nor do I find that the fixed nature of its active principles accounts for this, as in several aromatics, such as cloves and pepper, their fixed parts are more acrid than their volatile.

This root has much of its active parts extracted by water, and therefore it may be properly employed in infusions; and its infusion is properly enough converted into a syrup: But in doing this, it is not necessary, as both the colleges of London and Edinburgh have prescribed, to avoid boiling: for, as has been already observed, its active parts are not dissipated by boiling: and by boiling the ginger in water, a more powerful and equally agreeable syrup may be prepared at a less expence. It is on account of the same fixed nature of the active parts of ginger, that the ginger conditum is a sufficiently active preparation of it, convenient in several formulæ; but that imported from the East or West Indies is to be preferred to any preparation of it made in this country.

ZEDOARIA.

I have set down this here as of the same genus of plants with the two last mentioned; but I hardly think it deserves the place it has hitherto held in our practice. Its odour and taste are less agreeable than that of any other of the aromatics hitherto mentioned; and its bitterness is too inconsiderable to give it a place amongst the tonics. I am clear that it might safely be omitted in our lists of the materia medica. As containing a camphire, it may have virtues; but I cannot find that from thence it is applicable with advantage to any particular purpose; though I have mentioned above the extravagant commendations given of it by CARTHEUSER.

PIPER.

THIS is the aromatic which, as a condiment of our food, is much more frequently employed than any other: Its odour is less fragrant and agreeable than most of the others mentioned, and therefore perhaps less liable to pall upon us than these others, whilst its taste is more pungent and durable. It contains an essential oil, which, like that of the other aromatics, sinks in water, but is less acrid than the pepper itself: and it appears from the experiments of GAUBIUS, that the most active parts of pepper are of a very fixed nature. They may be taken out by water; and by inspissating the decoction may be got in the form of an extract of the most acrid quality. By this part, which seems to be a resinous substance, and by its essential oil, it has all the powers and virtues of the other aromatics.

NEWMANN, however, from attending only to the qualities of the essential oil, has supposed pepper less heating to the system than other aromatics; and the late learned Dr GAUBIUS has entered into the same opinion. For supporting it he appeals to his own experience; and says pointedly, that from any, and even large quantities taken in, he never found it warm on his stomach, or to increase the frequency of his pulse.

This I suspect to have been owing to habit, from his frequent use of it; for my experience has been of a contrary kind. I have all my life had a dislike to the odour and taste of pepper: which I ascribe to an instinct of my constitution; for when I have taken this spicery, though in a small quantity, it always felt warm in my stomach, and my whole body was heated by it.

It seems to me that LINNÆUS and BERGIUS judge very properly, and probably from experience, in ascribing a calefacient power to pepper: And Dr LEWIS is expressly of opinion, that pepper heats the constitution more than some other spices that are of equal pungency upon the palate.

BONTIUS properly treats as ridiculous the opinion of the Javeneſe, who consider pepper as of a cold nature. The universal use of it in India not proving remarkably hurtful, which GAUBIUS appeals to, may be considered as the effect of much habit, which the use of vegetable food has introduced: and it may be maintained, that the popular opinion of its innocence, and even of its utility, is given upon no solid ground, but merely in vindication of popular practice; which in several like instances has given occasion to such popular errors.

For the heating powers of pepper, I would require no other proof than that it is effectually employed for preventing the return of the paroxysms of intermittent fevers, by being given some time before an expected accession; and which purpose I think it can no otherwise answer, than by exciting a considerable degree of heat in the system. For its heating effects, see V. SWIETEN, Comm. in BOERH. Vol. II. p. 31.

PIPER LONGUM.

THIS is the product of the same genus as the former: It has precisely the same qualities, only in a weaker degree; and therefore should not have had the place of it, that it has had, in some of our shop-compositions, as in the tinctura aromatica both of the London and Edinburgh dispensatories, in the vinum amarum, the pulvis e bolo compositus, the species aromaticæ, and the confectio paulina of the former; in all of which the piper nigrum might have been as properly employed. Dr LEWIS judges the long pepper to be warmer than the black; but BERGIUS judges otherwise, and so do I.

CUBEBA.

THIS also is from the same genus of plants as the two kinds of pepper mentioned, and has the same qualities, but in a still weaker degree, and therefore might be left out of our list: but their odour is more fragrant and agreeable than either of the peppers: and they make a more agreeable ingredient in the vinum amarum than either the pepper or the ginger.

CAPSICUM.

THIS is given in our dispensatories under the title of Piper Indicum; and though from a very different genus of plants, it has been from its acrimony universally named a Pepper. It has the acrimony of the pepper in its taste, but without any of the odour of that, or any other aromatic that I know of. It is now very universally employed as a condiment, but has hardly yet had any place in medicinal prescription.

A particular use to which it may be applied is to be learned from the following passage and prescription in BERGIUS.

“R. Semin. piper. Ind. gr. vi. bacc. laur. ℥ij. M. f. pulvis, dividendus in tres partes æquales; quarum prima portio sumenda incipiente primo rigore, secunda postridie eadem hora; tertia vero

tertio die. Sæpissime vidi febres intermittentes protractas hocce pulvere curatas plerumque sine relapsu."

CANELLA ALBA.

THIS is a substance, both by its odour and taste, to be reckoned amongst the aromatics ; but these qualities are in a weaker degree than in most of the aromatics we have mentioned. It has no peculiar virtues, and has only been employed for improving the odour and taste of bitters ; which purpose it answers in the tinctura amara of the Edinburgh dispensatory better than the ginger proposed to be employed by the London college.

CORTEX WINTERANUS.

UNDER this title, for a long time past, the canella alba has been employed all over Europe ; and it is still in Britain only that a genuine *Winter's* bark is yet known. BERGIUS has this observation : "Plurimi auctores corticem Winteranum a canella alba distinguunt ; mihi vero alius cortex Winteranus, quam hic, ignotus est.

This is the state of matters in other countries ; but of late years our circumnavigators have brought us from the Straits of Magellan a bark, which is certainly the original *Winter's* bark, and is a substance considerably different from the canella alba. By the accounts which the late Dr FOTHERGILL has inserted in the London Med. Obs. the genuine *Winter's* bark appears to be a light and grateful aromatic bitter ; but of what particular use it may be of in medicine is not yet ascertained. Its being a preservative against the scurvy is not ascertained upon any clear foundation. For all that we know concerning it, I must refer to the London Med. Obs.

I. ACRIA.

ARUM.

THIS root is of a singular composition. As it is produced in the earth, it contains an acrid matter which is not to be extracted by spirit of wine, and is not therefore an essential oil. Though this acrid matter gives out no odour, its acrimony readily passes off in drying, and exhales under decoction in water ; but it does not rise with either water or spirit in distillation so as to give any impregnation to the distilled liquor.

Beside this acrid matter, which is in small proportion to the whole, the root consists of a farinaceous and nutritious matter : It is therefore the acrid matter only that renders it an active medicine.

The acrimony of it appears in the application of the fresh root to the skin; which, if delicate, is reddened by it, and some blistering is excited: but in this respect it is not so inflammatory as several other substances mentioned above. Taken internally, it stimulates the stomach, and excites the activity of the digestive powers when they happen to be languid; and we have this proof of its stimulating the whole system, that, like other stimulants, it has been useful in intermittent fevers.

BERGIUS gives an account of its singular virtue in curing certain headachs; and that there may be no mistake of his meaning, it seems proper to lay the whole paragraph before my readers. "Præclarum effectum identidem expertus sum ex hac radice, alcalinis, absorbentibus et aromatibus maritata, in cephalæis sympaticis pertinacissimis. Hæc species cephalææ omnes eluserat medelas, antequam in pulverem ari compositum incidebam. Scilicet sympatica ea est aprimis viis, forte ab atrabili profecta dolore capitis insane vehementi cruciantur ægri sæpe per intervalla recrudescente, absque febre, pulsu subinde nimis tardo, plerumque vero naturali. Sæpe linguæ basis ipsique dentes nigrescunt, velut apud illos qui ore tabaci fumum hauriunt. Venæsectiones hirudines, scarificationes, vesicatoria, laxantia, aquæ minerales, in hac specie cephalææ nihil efficiunt, sed sæpe augment dolorem; quod etiam accidit a propinatis salinis. Sed pulvis ari compositus nunquam non solatium attulit. In febribus intermittentibus pulveris dedi quovis bihorio e Rad. ari solid. et tart. vitriol. ā ℞ss. rhei sel. gr. v. Illi purgarunt alvum mediocriter, et subinde febrem sustulerunt, quandoque absque relapsu; sed apud sensibiliores tormenta excitarunt, quare dosis ari tunc diminuenda fuit."

JUNCKER tells us that, given with brandy, it is a very powerful sudorific; but the accuracy and judgment of that author deserve very little attention.

Formerly it has been frequently employed in the practice of England; but in this country, so far as I know, very little. In England it was especially employed in the pulvis ari compositus of the last edition of the London dispensatory, which was a very injudicious composition, and is now entirely omitted. The pulvis ari compositus of the Edinburgh dispensatory 1756 is somewhat better; but still so much loaded with other ingredients as to render it uncertain what may be the effect of the arum, what of the other ingredients; and it is in the later editions, as an officinal composition, properly omitted.

BERGIUS proposes to mix it only with an equal part of vitriolated tartar and half the quantity of rhubarb. Dr LEWIS, finding that the pungency of it may be well covered with mucilaginous and oily substances, proposes two parts of the root, two of gum arabic, and one of spermaceti, to be well rubbed together, and then made into an emulsion with any watery liquor. "In these forms (he says) I have given the fresh root from ten grains to upwards of a scruple three or four times a-day : it generally occasioned a sensation of slight warmth, first about the stomach, and afterwards in the remoter parts ; manifestly promoted perspiration, and frequently produced a plentiful sweat. Several obstinate rheumatic pains were removed by this medicine, which is therefore recommended to further trial."

BERGIUS directs this root to be gathered only when it has ripened its seeds, and the plant begins to decay : and Dr LEWIS gives, I think, the proper reason of this. He supposes that the root is of sufficient vigour for medicinal use at all periods of its growth ; but as it has hitherto been used only in a dry state, it has been generally taken up about the time of the plant's beginning to die ; as the root is then least juicy, and shrinks least in drying.

MEZEREON.

THIS plant, as one of the most acrid, though omitted in our catalogue, deserves to be taken notice of here.

It is the bark of the root of this shrub that is only employed ; the woody part of the root is quite insipid : and apothecaries deceive themselves in taking any part of the wood along with the bark. This bark contains a very acrid matter, which, applied to the skin, readily excites a blister and a considerable discharge of serum : and as by repeated applications this can be continued without any erosion of the part, it has been frequently employed in France as a perpetual issue, with all the effects of such remedies. Directions are given for the management of it by Mr Baume in the last edition of his *Elemens de Pharmacie*. They are given more fully in *Essai sur l'Usage et les Effets de l'Ecorce du Garou*, par M. Archange le Roy, Paris 1767, and they are also transcribed by BERGIUS.

The mezereon to be used internally is taken in a decoction of two drams of the root, boiled in three pounds of water into two ; and the whole of this is taken at several draughts in the course of twenty-four hours. In this proportion it proves somewhat warm on the stomach, and in larger proportion it gives a painful warmth,

with sickness, and even vomiting. It sometimes renders the pulse frequent, and heats the whole body. It has long had the reputation of curing venereal nodes which mercury had failed to do; and for its use in such cases see RUSSELL in Lond. Med. Obs. Vol. III. art. 22.

It is likewise said to cure other remains of the venereal disease, which mercury taken in large quantities had failed to do: And in one case of ulcerations in many different parts of the body, which remained after mercury had been long and largely employed, I have found them entirely cured by the use of the decoction of mezereon, for two or three weeks.

DR HOME has not only found this decoction to cure scirrhus tumours which remain after the venereal disease, and after the use of mercury, but that it healed also some scirrhus tumours from other causes. I have frequently employed it in several cutaneous affections, and sometimes with success.

PULSATILLA NIGRICANS.

THIS is one of the remedies which we owe to the benevolent industry of Baron STORCK; but he has ascribed to it so many wonderful effects, that his credit is hurt with many persons, and has made many neglect to give this remedy a frequent and fair trial. It has particularly concurred with this in Scotland, that the plant is not a native of this country, and that there has not been ready access to it: But whatever may become of the credit of Baron STORCK's experiments, I must observe that the plant is an acrid substance, and therefore capable of being active; and from the singular matter resembling camphire which water distilled from it contains, it may have peculiar powers and virtues.

I would still recommend it to the attention of my countrymen, and particularly to a repetition of trials in that disease so frequently otherwise incurable, the amaurosis. The negative experiments of BERGIUS and others are not sufficient to discourage all trials, considering that the disease may depend upon different causes; some of which may yield to remedies, though others do not.

Besides the whole of the above list, there are some other stimulants which have been formerly employed in medicine; but not discovering any peculiar qualities, they have been of late neglected: and I have therefore now taken notice only of the few that still keep a place in our dispensatory lists. In making these omissions, I cannot however fail to observe, that it is from the most acrid, and perhaps poisonous substances, that is, in those which act most pow-

erfully on the human body, that we are to expect powerful remedies; and though they are at present properly omitted in our dispensatory lists, as not proper to embarrass the apothecary, they are, however, proper objects of inquiry to all persons who would improve the practice of physic.

CHAPTER VI.

SEDANTIA.

THESE are the medicines which directly, and without evacuation, diminish the motions and powers of the human system. They are of different kinds, as they act more immediately upon the nervous or sanguiferous systems; and we are to treat of them accordingly under the titles of Narcotics or Refrigerants; the former to be first considered here.

SECT. I.

OF NARCOTICS.

THESE are the medicines which diminish the sensibility and irritability of the system, and thereby the motions and the powers of motion in it. They are commonly remarkable for inducing that cessation of sense and motion in which sleep consists; and are therefore often named *Soporific* or *Hypnotic* medicines.

As their power and operation may be extended so far as to extinguish the vital principle altogether, they form that set of substances which are properly, and such as may be strictly, called the *Poisonous*.

As the powers of sense and motion chiefly depend upon the state of the brain, so it has been commonly supposed that the medicines we treat of act primarily and especially upon that organ: but not to mention the objections that might be made to any hypothesis that has been maintained on this subject; it will be enough to remark, that as the operation of narcotics diminishes the motions and powers of motion, especially in the parts to which they are immediately applied, and that they do this in parts which are entirely removed from all connection with the brain; we must conclude, that their operation is upon a matter in common to the whole of the nervous system.

To be more explicit on this subject, we assume the hypothesis we have before maintained, that there is a subtile elastic fluid inherent in the medullary substance of the brain and nerves, upon the motions of which all sense and vital motions depend; and by which, therefore, motions are communicated from every one part to every other of the nervous system.

From many phenomena it appears, that the mobility of this fluid may be more or less at different times; and particularly that it may be affected in these respects by external bodies applied to the nerves. Such then we conceive to be the operation of narcotic medicines, that they diminish the mobility of the nervous power, and in a certain quantity can destroy that mobility altogether. This is in general the operation of narcotic sedatives; but it suffers various modifications, which, though we cannot clearly explain, we shall, in considering the particular narcotics, endeavour to go further than has been done before.

After this general idea of the operation of narcotics, it is to be remarked, that although their operation is, as we have said, first and especially on the nerves to which they are immediately applied, they are very constantly at the same time communicated to other communicating nerves, more or less, according to the number and sensibility of the nerves to which they are first applied.

The most remarkable and frequent instance of this is in the application of narcotics to the internal surface of the stomach; where both the number and peculiar sensibility of the nerves give occasion to a very extensive widely diffused operation: for it is to be further remarked, that almost every application to a particular part is communicated more or less to the origin of the nerves or common sensorium; from which, again, its operation is more or less communicated to the whole system.

From the accounts just now given, it will be obvious, that it is especially and most commonly from the operation of narcotics on the stomach, communicated to the brain, that general effects so readily appear in the whole system: and it is accordingly these effects extending from the sensorium to the whole system that have been chiefly attended to in the operation of narcotics.

But it is proper to be more particular, and therefore to observe, that the effects of our narcotics commonly and especially first appear in those functions in which the mobility of the nervous fluid admits the most readily of a change; that is, the animal functions, in the cessation of which sleep consists: and therefore it is that this is so commonly induced.

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At the same time, the effects appear also in the vital functions so far that the motions of these are weakened, and the frequency of their action rendered less; and although this, from considerations to be mentioned afterwards, may not constantly appear, there are however innumerable experiments which prove, that it is frequently, and even commonly, the effect of narcotics.

The power of narcotics in diminishing the mobility of the nervous power appears still more considerably, and without ambiguity, in the natural functions. Thus, the activity of the alimentary canal, that chief organ of the natural functions, is always diminished by narcotics any how thrown into the body.

Another effect of narcotics relative to the natural functions, is the diminution and suspension of all secretions, and of every excretion except that of sweat.

From all this it appears, that the operation of narcotics extends to every function depending upon the energy of the brain: with respect to which they show a sedative power; which, though various in its degree, and variously modified, both by the different conditions of the narcotic and by the different conditions of the body to which it is applied, yet the effects are universally and directly sedative.

There is however here a considerable difficulty occurring; as it is to be particularly remarked, that narcotics, instead of proving always sedative, or diminishing the action of the heart, they often seem to be powerfully stimulant with respect to this, and in their first operation often increase the force and frequency of its action.

How this, in consistency with our general doctrine, may be explained, is difficult to say. Some have imagined, that in the same narcotic substance there is a stimulant as well as a sedative matter: And that they have some foundation for this opinion, appears from this, that the substance of the narcotic is acrid to the taste, and when applied to the skin readily inflames it; and that in wine, or other ardent spirits commonly acting as narcotics, the stimulant matter is in large proportion, may be readily admitted.

But on the other hand, the direct stimulant power is doubtful; as in many substances the sedative power appears in masses of so very small bulk: and in that bulk the stimulant matter can hardly be in such proportion as to stimulate the heart very powerfully; as we know no other instance of a pure stimulant that in the same bulk will have that effect, even when applied to the stomach or in any other way to the body. Another consideration may be also offered here. There is no ground to suppose, that where a stimulant and

sedative power are combined in the same matter, that, as frequently happens here, the stimulant power should commonly act before the sedative.

To explain therefore the stimulant effects that often appear from the exhibition of narcotics, it seems necessary to assign some other cause than the direct stimulant power of the substance applied; and it appears to be that resistance and consequent activity, which the animal œconomy is suited to oppose to every application that has a tendency to hurt it.

This power, as we have said before, is well known in the schools of physic, under the title of the *Vis Conservatrix et Medicatrix Nature*; which, however difficult to explain, must, as a general law of the animal œconomy, be admitted as a matter of fact, as we have above, on the subject of stimulants, endeavoured to prove very fully.

We have no doubt that it might be fairly employed here, to account for the stimulant effects which so often appear upon the exhibition of narcotics, which are indeed very often evident and considerable; but they do not imply any directly stimulant power in the narcotic substance, as they can be so well accounted for by considering them as indirect stimulants, in the manner we have both here and above explained.

I will only add one other illustration on this subject. It is frequently the effect of narcotics to excite that delirium which is well known under the name of Ebriety or Drunkenness. This often appearing with the same circumstances that are ascribed to a stimulant power, has been frequently supposed to arise from a stimulus applied to the brain: And it is true that it does in some measure depend upon the stimulant operation which here takes place in the manner we have explained: but were it proper here, it might be shown by the laws of the animal œconomy, that a stimulus is commonly insufficient; and that it is only by the concurrence of a sedative power that the symptoms of ebriety, produced by the exhibition of narcotics, can be accounted for.

We conclude therefore upon the whole, that the operation of narcotics is always directly sedative. But before we proceed to illustrate this in particulars, it will be proper to take notice of a circumstance that relates to the operation of sedatives in general. With respect to them, it is to be remarked, that when sedatives thrown into the body do not prove absolutely mortal, their operation is of a certain duration only; and therefore, after a certain time,

or at least sooner or later, according to circumstances, it entirely ceases, or at least that its effects are greatly diminished.

It is in consequence of this that, when for the purposes of medicine, it is necessary that the effects of narcotics be continued. This can only be done by a repetition in due time of the sedative: and upon such occasions it is found, that the law of the œconomy, by which all impressions which do not excite to action by repetition become weaker, here takes place; and therefore that, in the repetition of narcotics, the impression, that is, the dose, must be made stronger than before. This happens very constantly in the repetition of narcotics; and to persons acquainted with the powers of custom, affords an argument, that in most instances those narcotics act by their sedative rather than by their stimulant powers.

This ceasing of the effects of narcotics is difficult to explain: and to do it, we must take notice that it is connected with a question occurring with respect to natural sleep, which is, Whether this, after it has taken place for some time, always ceases from stimuli applied? or if it ceases spontaneously upon the system being restored to the state in which it was before the causes of sleep were applied? The latter account will be adopted by those who suppose the nervous fluid to be a secretion that may be exhausted and again restored and supplied. But this is a supposition so improbable, that I believe few maintain it at present: and if so, the question returns to say, How the state of the nervous fluid, either when natural sleep has subsisted for some time, or when it has been artificially induced by narcotics, returns or is restored to its waking condition.

Although it may be difficult to explain what physical or mechanical condition the different states of sleep and waking consist in, it is highly probable that these two states do truly alternate with each other. That the state of waking does necessarily induce the state of sleep, will be readily admitted; and it is equally probable that a certain time of sleep does not only take off the state of sleep, but does also induce the condition necessary to the waking state. If this is admitted with regard to natural sleep, it will be readily allowed that the same means will also operate on the state induced by narcotics, and will therefore at length put an end to it.

These are the considerations I can offer with respect to Sedatives in general: and what might be further attempted in this way will appear more properly from what is to be said of the particular substances to be treated of under this title. And I begin with the

consideration of that sedative, which of all others has been the most employed in medicine.*

PARTICULAR NARCOTICS.

OPIUM.

THIS is procured by various means, from a species of poppy, which has properly got for its trivial name that of *Papaver Somniferum*. The botanical history of this plant, and the various means of procuring opium from it, have now been described in so many different books, that it is by no means necessary to repeat them here, or to determine by which of them the opium of our shops is particularly obtained; and I omit more readily any accounts of these, as it seems sufficiently probable, that though they may give substances of different degrees of purity and power, they do not give a medicine of different qualities: and we shall now proceed to consider that quality as it is found in the opium common in our shops.

In the first place, we shall consider its operation and effects as in general with respect to the animal œconomy; and afterwards consider how these effects are varied and modified by the circumstances of particular diseases in which they are employed.

The general effects of opium are very much the same with those mentioned already as in common to narcotics; and indeed these were chiefly taken from the example of opium, though a more particular consideration may still be proper here.

The general effect of narcotics, and perhaps every particular effect that has been taken notice of, we suppose to depend on the power of these substances in diminishing the mobility, and in a certain manner suspending the motion, of the nervous fluid.

This we prosecute therefore more particularly with respect to opium; and the operation of this that seems first to be taken notice of, is its power of inducing sleep.

This is a state of the animal œconomy which spontaneously occurs in man, and perhaps in all other animals in their natural and healthy state, once in the course of every diurnal revolution of the sun.

* On the subject of the operation of narcotics, and other poisonous articles, I beg leave to refer the reader to the late publication of the respectable Mr BRODIE, in the Transactions of the Royal Society; which has been reprinted in many other periodical publications, both in Europe and in the United-States.

In man, in whom only we are particularly concerned, it is variously modified ; but in its most natural and complete state it consists in a total cessation of the exercise of all sensation and thought, and consequently of all intellectual operation ; and at the same time therefore of all exercise of volition, and of the motions of the system depending upon this.

As we take it here for granted, that all exercise of sense and voluntary motion depend upon the motion of the nervous fluid to and from the brain, we conclude that sleep consists in a suspension of these motions. The causes of this suspension have been variously assigned ; but it does not appear necessary to consider these several opinions here, as we suppose it to be demonstrated elsewhere, that it depends upon the nature of the nervous fluid itself, disposed to the alternate states of torpor and mobility.

What is the physical or mechanical condition of the nervous fluid in these different states, we do not pretend to explain ; but it seems to be enough for our present purpose to say, that opium produces the same state that occurs in natural sleep. As in this, therefore, the motions from the extremities of the nerves to the sensorium cease, we can readily understand how opium, producing this state, can produce a cessation of all sense of pain or other irritation arising from any part of the system.

At the same time, as in sleep the exercise of will and every motion from the brain to the other parts of the system entirely cease ; so opium can suspend every motion from the brain into the voluntary organs, whether the motions in these appear in the form of convulsion or spasm.

But not only do these powers of opium appear in the animal functions ; but in so far as the other motions of the system depend, as I presume they do, on the constant energy of the brain, opium certainly diminishes the force of this, and thereby diminishes, and to a certain degree suspends, all the vital and natural functions.

To prosecute the analogy of natural sleep with that induced by opium, it is proper to observe, that natural sleep occurs more or less readily as the causes producing it have been greater or less ; and chiefly therefore according to the labours of the preceding day : but more certainly if those irritations, commonly arising from the exercise of the functions, or from external impressions, are more completely absent ; and particularly those of the former kind, arising from interrupted digestion, from the earnestness of mental occupations, and from the increased action of the sanguiferous system.

Making allowance for these circumstances, the occurrence of sleep is very much under the government of a periodical revolution which the system is subjected to: and under the influence of this, it may occur at its usual period, though the labours of the preceding day may have been much less than usual; and it will only be prevented by some of the irritations just now mentioned, or others prevailing in the system.

When sleep occurs in spite of the circumstances that have a tendency to prevent it, it will be broken by those irritations, that is, by the causes of watching frequently intervening; or if these do not proceed so far as to excite watching, they may render the sleep incomplete, by producing only a partial interruption of thought: and as this exercise of thought, when it is partial only, must be irregular, so it must produce that incoherent and inconsistent thinking which we call dreaming.

According to the degree of the causes, dreams may be mild, and perhaps agreeable; or, according to the violence of their causes, they may be more turbulent, and with more emotion produced. It appears that, even from moderate causes, they are different, and prove either cheerful or gloomy according to the tone of mind prevailing in the person affected; but why, from violent causes, they are generally of the frightful kind, I cannot explain.

Such are the different states of natural sleep: and when it is over the effects of it are also different, while there is either a sense of ease from all the irritations which the system was affected with before, and when the sleep is said to be refreshing, or there remains some of those irritations that had disturbed their sleep, and therefore give a desire of its continuance.

Whether, without any such irritations, the state of sleep does not give a disposition to its continuance, I leave my speculating readers to consider: But, however they may determine, it will not affect the proposition I maintained above, that the state of sleep induces the state fit for watching; since it is evident that a state of sleep subsisting for some time induces a state of the system more ready to be affected by stimuli of all kinds.

Analogous to these different states of natural sleep, and of its consequences, are the states induced by opium. If the system is tolerably free from irritation, opium induces a sleep which would not have spontaneously occurred. Even though some irritations should prevail, if these be moderate, opium, by diminishing sensibility, may induce sleep, and will do it more or less according to the dose employed. In some cases, though the power of the dose

employed may not be sufficient to induce sleep, it may be able to take off, or at least to diminish, the causes of restlessness which had prevailed, and thereby give a tranquillity that, subsisting for some time, is often found equal to the refreshment of sleep.

There are, however, cases in which the irritations of the system are too strong to be overcome by the force of any moderate dose of opium; and in such cases no sleep is produced, and at the same time the conflict arising between the stimulant irritations and the sedative power of opium, gives a farther irritation to the system which is often very hurtful to it. Such however is the force of the sedative power of opium in inducing sleep, that if the dose be large it will overcome very strong irritations; and it is to be remarked, that the conflict just now mentioned often arises from the dose of opium being too small, and when a larger would have prevailed over the irritations more entirely.

The management of this, which is often a difficult matter in practice, must be directed by the nature of the irritations prevailing. It appears, that when the irritations are primarily and especially applied to the brain, and not at all to the sanguiferous system, the force of opium may be employed very freely, and to any extent, and in a large dose will always either take off the irritation entirely, or at least for some time suspend its operation; and from thence it appears, that in purely nervous cases, opium may be employed in very large doses with great safety.

But I have observed above, that narcotics, and particularly opium, in its first operation, often irritates the sanguiferous system, and excites the force of the circulation. And, however we may dispute about the causes of this, the fact is certain, and that this in a certain degree gives opium the powers of a cordial and exhilarant. On this occasion, it is to be observed, that though the action of the stimulant should not entirely prevent the sedative power, it often puts it off for some time, to give what we may call the intermediate state of ebriety; which, according to the balance between the stimulant and sedative power, may appear more or less, or may subsist for a longer or shorter time, and may therefore more particularly explain the operation of opium in different persons and cases.

The consideration of the stimulant power of opium will particularly explain why, in persons whom the stimulant power is considerable, the effects of a moderate dose of opium, instead of inducing sleep, may, by the increased action of the heart, appear to prevent it; and this probably may also be a frequent cause of opium's not

inducing sleep. It will also be obvious, that in any case when the irritations already prevailing in the system, and preventing sleep, depend upon an increased action of the heart and arteries, the addition of the stimulus of opium, more ready to take place in such cases, must certainly prevent sleep, with all the bad consequences of the conflict above mentioned. In many cases, however, the sedative power does prevail, and at length induces sleep; the state of which sleep and its effects may be understood from what is said above.

If the sedative power of opium prevails not only over the general energy of the brain, but also over its exertion in increasing the action of the heart, the effects upon the whole may perhaps be salutary; but if the irritation of the heart either continues after the action of the opium has ceased, or be then, from that very action, more easily renewed, the effects may certainly be pernicious.

It appears clearly, that the stimulant and sedative powers of opium operate at one and the same time; and in no instance more remarkably than in that of opium proving powerfully sudorific. The increased action of the heart, however excited, has a tendency to produce sweating: but every body knows that it is difficult to produce sweating by the power of medicines purely stimulant, and at all times opium has been found to be the most effectual of all sudorifics. This by some may be ascribed entirely to its stimulant power; but it is highly probable that the sedative power, concurring at the same time, by relaxing the extreme vessels, renders the sweating a more certain effect, and more considerable in its degree.

Are not the sweatings which often occur in natural sleep, and particularly the colliquative sweat in hectic, analogous to this, as depending upon an irritation and weakness of the extreme vessels concurring together?

Before I finish the operation of opium in general, it is proper for me to consider what changes it may produce in the state of the fluids. It has been very commonly imagined that opium rarefies the blood; but I can find no foundation for this. In many instances it produces its effects on the nervous system while it is yet in the stomach, and before it can be supposed to have reached the mass of blood, and often before it appears to increase the action of the heart. But even supposing some portion of it to be introduced into the blood-vessels, whilst it is not alleged that it acts as a ferment, we trust to the general principle, that no kind of matter applied in

small proportion can have any considerable effect upon the mixture of a much larger mass.

By an argument therefore *à priori*, I conclude that opium does not rarefy the blood. It is, however, alleged as a fact that it does so; but we maintain that the symptoms which are supposed to be in proof of this may be owing only, or entirely, to the increased action of the heart and arteries, which will often give such appearance without any change in the state of the blood. And if it be further alleged, that after the use of opiates the vessels are found in a more turgid state, we are ready to admit the fact, but are disposed to impute this to the slower motion of the blood, in that case produced by the weaker action of the extreme vessels giving occasion to the accumulation of it in the larger; and that this will appear especially in the vessels of the head, and in the system of the *vena portarum*; in both of which the blood is more liable to stagnate in every case of languid circulation.

With respect to the fluidity of the blood in consequence of the frequent use of opium and other narcotics, we may admit the fact;* but we suppose it to be in consequence of a state of the circulation rather than of the effect of mixture: The experiments adduced in proof of the latter opinion being made on blood drawn out of the vessels, and with such a proportion of mixture as cannot by any means be applied to them while they are in circulation, and therefore that such experiments do not afford any conclusion.

Having now considered the effects of opium upon the human system more generally, I proceed, in the next place, to consider how these general effects are suited to the circumstances of particular diseases: And first, of its employment in continued fevers.

The nature of continued fevers was, in former times, little understood by physicians; and I flatter myself that I have somewhat advanced the state of our knowledge on this subject, though I must allow that there are several circumstances of continued fevers not yet sufficiently explained and understood. For the general doctrine, so far as I have been able to deliver it, I must refer the reader to my other writings, and must confine myself here to those parts of the doctrine which relate to the use of opium in continued fevers.

To this purpose we are disposed to think, that almost all our continued fevers arise from contagion, or from certain corruptions

* I greatly doubt, if there be the smallest foundation for the notion, that narcotics render the blood more fluid.

of human effluvia proving such ; and it is highly probable that those contagions, or matters similar to them, act as sedative powers, and, applied to the human body, produce a debility, which both induces the fever and subsists through the whole course of it, proving the circumstance from which the danger of the fever chiefly arises. In this view of the matter, opium, as a stimulant to the heart and arteries, may be considered as a principal remedy in fevers ; and as such we are disposed, with the most part of our present practitioners, to consider it : But that it is universally such, and in every circumstance of fever proper, we are very far from thinking.

In very many of the fevers of this climate, there appears in the beginning of them to be more or less of an inflammatory diathesis in the system ; and during this state I hold, and have often seen, the use of opium to be extremely hurtful. It does not then either induce sleep or relieve pain, but aggravates the inflammatory symptoms, and often determines to particular inflammations, which prove afterwards fatal.

In different fevers this inflammatory state is in different degrees, and of different duration. In some cases of the most powerful contagions, it may appear very little, and such cases may very possibly admit the early use of opium ; but in most of the cases in which cold so frequently concurs in the production of the fever, we suppose that such inflammatory state commonly subsists for the first week of the disease ; and therefore, for that space of time, we hold opium to be a dangerous, and at least an ambiguous remedy.

As the disease advances, the inflammatory state generally disappears in the second week, and the symptoms of debility become more evident. In this condition opium may be employed, and more or less as the symptoms of debility and irritation are more distinctly apparent ; but even in this second stage, it is an ambiguous remedy ; and if it increases delirium, and does not readily induce sleep, it may be very hurtful, and is therefore to be employed with great caution.

In this advanced state of fevers, there is a circumstance which occurs that we are assured of as a fact, though we cannot well explain it. The cause of fevers gives an irritation to the brain, which is not of the inflammatory kind, but produces convulsive motions of the limbs to a considerable degree ; and to this irritation it is that we impute the subsultus tendinum so much taken notice of as occurring in the advanced state of fevers.

The same irritation also frequently produces a delirium ; which, as not of the phrenetic and inflammatory kind, we name the Mania-

cal. To remove these effects of irritation I find opium to be a sovereign remedy; and it may not only be employed freely, but must commonly be given in large doses, and these also repeated every eight hours, unless sleep and a remission of the convulsive motions and delirium shall allow of longer intervals. For some time, however, in the advanced stages of fever, though these symptoms, by the use of opium, may be much abated, they are liable to recur, unless they are obviated by the repetition of the opiate.

There is still another circumstance in the advanced stage of fevers that on this occasion requires to be taken notice of. Though the most part of our fevers arising from contagion may have little general inflammatory diathesis accompanying them, and be on the contrary attended with much debility, there occurs, however, from causes not easily assigned, some topical inflammation of the brain, which has frequently appeared upon dissection, after fevers of the most nervous or putrid kind. These topical inflammations, and the delirium depending upon them, do not admit of opium, and all their symptoms are much aggravated by it. The existence, however, of such topical inflammation, is not always easily ascertained; and some suffusion of the eyes is not always a certain proof of it: but we can give no better directions for the management of this matter, than those given by Sir John Pringle with respect to the use of wine in the jail fever.

These are the remarks I have to offer on the use of opium in continued fevers. Many are more fond of a more free use of it than had been common before, and have believed that this was introduced by a certain noted teacher and author; but I assert, that I myself was the first who freely and largely employed opium in fevers, under certain restrictions indeed, which, neglected by other practitioners, have occasioned much mischief.

In the cure of intermittent fevers, opium, or some of those compositions of which it was the chief ingredient, were very much employed by the ancients; but since the use of Peruvian bark has been introduced, opium has been less employed, and only by persons who were prejudiced against the bark. Mr BERYAT of the Academy of Sciences, without knowing any thing of what had been done before, has endeavoured to recommend the use of opium; but without showing any understanding of the nature of the disease, or of the remedy he proposes to be employed. He has been therefore, so far as I know, little followed by any practitioners since that time.

To judge properly of its use, we must attend to the nature of the disease, which I hope is better understood now than it was before. It appears to me clearly, that the recurrences of the paroxysms of intermittent fevers depend upon the recurrence of a state of debility, and that this is to be prevented either by the use of tonics or stimulants, which may excite the action of the heart and arteries, and support that excitement till the period of accession is over.

For this purpose, various means of exciting fever and sweat have been employed; and there is perhaps no medicine that can be more effectually employed for that purpose than opium. It appears that Dr BOERHAAVE's sudoriferum antipyreticum rarofallens derived its chief virtue from the two grains of opium which it contained, and which determined it to act as a sudorific. Opium alone has been employed, by being given an hour or two before the time of accession, and has prevented the return of a fit without exciting sweat, and merely as a stimulus and antispasmodic; but the consequences of this, as marked by Baron STORCK and others, have been sometimes bad: and it seems that the safe and more certain practice will be, to direct opium to operate by sweating.

We need hardly say here, that almost every practitioner has found it useful to join opium to Peruvian bark, or other tonics, in the cure of intermittents. Not only in correcting the purgative quality of the bark, or other tonics which sometimes take place, but even where no such purgative quality is to be apprehended, we are certain that a certain quantity of opium, joined with the bark, makes it sit easier upon the stomach than with certain persons it would otherwise do; and that a portion of it, joined with two or three doses of the bark, which are given immediately before the time of accession, enables it, in less quantity than it would otherwise do, to prevent the return of paroxysms.

A particular use of the bark in intermittents has not long ago been proposed and practised by Dr LIND of Haslar, which is the giving opium in the time of the hot stage of the paroxysms. As I have had no experience of this practice, I cannot either recommend it, or offer the suspicions I have of its being improper.

We proceed, in the next place, to consider the use of opium in inflammatory diseases, in which the practitioners of almost all ages have declared it to be hurtful; and we should be much surprised if any person engaged in practice for any length of time had not found it frequently to be so. The reason of it is also obvious; for, if inflammatory diseases consist in an increased action of the heart and arteries with a phlogistic diathesis, which causes and supports

this increased action, it is highly probable that every stimulus applied to the system must do the same, and thereby aggravate the disease ; but opium, on many occasions, as we have said already, is a stimulant power ; and whoever denies this, as some in writing have done, appears to deny and misrepresent facts admitted by every body else. For my part, I conclude with the utmost confidence, that opium, in general, is hurtful in all inflammatory diseases, and disposed to increase the phlogistic diathesis of the system ; and as all practitioners are agreed that blood-letting affords the most effectual means for the cure of that diathesis, so we are persuaded of the propriety of Dr Young's general rule, that opium is improper in all those cases in which blood-letting is necessary.

But I must allow, as he does, that there may be exceptions, or circumstances in certain inflammatory diseases, that may admit, or perhaps require the use of opium. Such are those cases in which the inflammatory state arises from irritation in a particular part, producing spasm and supervening inflammation. Thus, in cases of jaundice, I have found a biliary stone, in passing the biliary ducts, give such an irritation as to produce a considerable degree of inflammatory state in the system ; and though I have found it necessary, for moderating this, to employ blood-letting, yet, as I considered the passage of the stone to be chiefly interrupted by a spasmodic constriction of the ducts, I have employed opium for taking off this with great advantage.

Similar circumstances have frequently occurred in the case of urinary calculi passing the ureters, in which I have found it necessary to employ opium and blood-letting at the same time.

In like manner, as opium is useful in moderating excretions, so, where the irritation occasions an increase of these excretions, which is attended with affections which irritate the whole system, opium becomes especially useful. Hence it becomes so generally useful in catarrhal affections, and the cough attending them ; and probably it is this analogy that has brought the use of opium to be frequently employed in pneumonic inflammations. It is possible that there may be cases of such inflammations, wherein the opium may be more useful in taking off the cough, than hurtful by aggravating the inflammatory state of the system : but I have hardly met with such cases ; and even in the recent state of catarrhs from cold, I have found the early use of opium manifestly hurtful : and in cases of pneumonic inflammation I have always found it to be very much so, if exhibited before the violence of the disease had been moderated by repeated blood-lettings.

When that indeed has been done, I have found the opium very useful in quieting the cough; and I have hardly ever found it hurtful by stopping expectoration. It may suspend this for some hours; but if the glands of the bronchia have been duly relaxed by bleeding and blistering, the expectoration after the use of opiates always returns with more advantage than before. The mucus which had issued before had been poured out from the follicles in an acrid state; but, by being made to stagnate, it becomes milder, and is discharged in what the ancients called a Concocted State, with more relief to the lungs.

Although we are well persuaded that opium, when it does not procure sweat, is always hurtful in inflammatory diseases; yet I am ready to admit, that when it is directed to procure sweat, it may be so managed as to take off the inflammatory disposition of the system, and thereby to cure the most part of inflammatory affections. This we certainly learn from the present practice in acute rheumatism, which is often cured by a sweat excited by DOVER'S powder. We consider the disease to be purely of the inflammatory kind, and attended with every mark of inflammatory disposition; and therefore, when opium, in this disease, is given for the purpose only of relieving pain and giving sleep, we have found it constantly hurtful; but we have always found, that sweating with DOVER'S powder was the most effectual means of taking off the whole of the disease.

Before dismissing the consideration of the use of opium in inflammatory diseases, I must observe that there is a certain state of these in which I judge it to be not only admissible, but often very useful. This is in the suppurating state of inflammation; and, as soon as a determination to this has taken place, we suppose the phlogistic diathesis of the system to be very much taken off, and therefore that the pain of suppuration may be safely relieved by opium, as we are at the same time persuaded that opium promotes the process of suppuration.

The next set of diseases in which I am to take notice of the use of opium, are the Exanthemata: and I begin with observing, that as, in the whole of these it may be supposed there is an acrimony diffused over the whole system, and giving some irritation to it; so we are of opinion, that opium, by moderating this irritation, may in general be useful, and that therefore it is often more admissible than their other circumstances might seem to allow.

But, to be more particular, the use of opium in the small-pox has, since the time of SYDENHAM, been very much spoken of. In the

inflammatory state of the eruptive fever, I have always found opium to be hurtful; but as soon as the disease has taken a determination to suppuration, I have always found it employed with advantage. As I had occasion to practise in this disease long before the practice of inoculation became common in this country, I always found the practice of SYDENHAM, in giving an opiate once or twice a-day, to be extremely useful, especially when, at the same time, much costiveness was prevented by the use of laxative glysters. Since the practice of inoculation became more common, and that by the several means employed few pustules are produced, I hold the employment of opiates to be unnecessary and superfluous; but when it happens, even after inoculation, that a numerous set of pustules are produced on the face, I still hold the employment of opiates to be extremely proper: and when, either in consequence of common infection or of inoculation, a confluent small-pox is produced, which is always attended with a low and putrid fever, I hold opium to be one of the most effectual means of supporting the vigour of the system, and of producing as much of a kindly suppuration as the nature of the disease will admit of. In short, I hold opium to be a very useful medicine in various circumstances of the small-pox; but I would not assert its absolute utility to be so great as the late Dr de HAEN, from his enmity to inoculation, has been led to maintain.

The affinity that was so long supposed to take place between the small-pox and measles, formerly led practitioners to transfer the practice found useful in the one to that of the other; and I suspect that even Dr SYDENHAM was under this influence in recommending so strongly as he has done the use of opiates in the measles.

The measles, however, is purely, and often strongly, an inflammatory disease, with a strong tendency to pneumonic inflammation; and I believe that the most part of practitioners find blood-letting to be the most certain means of obviating the fatal consequences of this disease. In many cases therefore of measles, before bleeding had been duly employed, I have found opium to be not only ineffectual, but manifestly hurtful. It is true, indeed, that the measles are very constantly attended with a cough, for which the only certain remedy is opium: and as this symptom is not only severe, but may be supposed to aggravate the disease, the practitioner has a strong temptation to employ opium; and I am of opinion that it may be employed more freely than the inflammatory nature of the disease might seem to admit of. I would however have practitioners, from what I have said above on the use of opium in pneu-

monic inflammation, and now on the present subject, be as much as possible reserved in the use of opium in the measles, till the violence of the inflammatory state be taken off by bleeding and other anti-phlogistic measures.

With respect to the use of opium in other exanthemata, I have little to say. When the simple scarlatina, and even the scarlatina anginosa, is purely inflammatory, without any tendency to a putrid state, I judge opium to be an unnecessary remedy; and when the scarlatina anginosa is of the putrid kind, I am persuaded that opium may be pernicious.

The next order of diseases to be taken notice of in which opium may be employed, is that of hæmorrhagies. From the manifest power of opium in restraining evacuations, an analogy has transferred the use of it to hæmorrhagies, and both materia medica and practical writers have commended its use in such cases; but we are persuaded that there is much fallacy in the testimonies that have been given of its good effects. We are well persuaded, that every active hæmorrhagy is accompanied with a phlogistic diathesis of the system; of which we have just now said enough to show, that in such cases opium is generally hurtful, and I have had several occasions in active hæmorrhagies to observe its being so. If opium therefore is ever admissible or useful in such cases, it must be in those in which the hæmorrhagy is occasioned and supported by a particular irritation. Thus, in a hæmoptysis, where the blood comes up without coughing, or when the cough attending it only arises in consequence of blood being poured out into the bronchia, as in cases of hæmoptysis from external violence, opium is of no service and often does harm. But there are cases in which the hæmoptysis is occasioned by coughing, and appears only in consequence of the returns of coughing: in which cases opium may, and has been of service.

In the mænorrhagia which happens to women who are not pregnant, I have not found opium of service: but in the cases of abortion and of child-bearing, the hæmorrhagy very often depends upon spasmodic affections; in quieting of which opium may be highly useful.

There is no disease in which opium has been more frequently employed, or found more useful, than in catarrhal affections. These very often depend upon an undue balance of the system, that is, upon a languid perspiration, necessarily producing a more copious determination to the lungs; and this, as pouring out a mucus, is attended with much coughing. In many persons this is habitual, or

is readily renewed upon every slight application of cold; and in such cases and persons opium is a sovereign remedy. Whenever, therefore, there is little fever and much coughing, it may be employed very freely, that is, in doses which have sedative effects without heating the system. The peculiar delicacy and irritability which occurred in Dr G. YOUNG, does not allow of his experience being admitted in forming any general rules.

The remarks I have now made relate especially to habitual catarrhs; but there is a catarrh arising occasionally only from a strong application of cold, almost always attended with a phlogistic diathesis of the system, and probably with a more or less inflammatory state of the mucous glands of the bronchia. Such a disease is to be cured by blood-letting, and an antiphlogistic regimen; and the early use of opium, by confirming the inflammatory state, has proved very hurtful. What I have said above upon the management of the cough in cases of pneumonic inflammation, is entirely applicable here, and should correct an abuse that has been too common and very mischievous.

Another profluvium in which opium has been much employed, is the dysentery; the nature of which, till very lately, has been very little understood. If I am right in the pathology I have elsewhere endeavoured to establish, it will be obvious, that if the present practice of the frequent use of gentle laxatives be the most effectual measure, it will be equally evident that opiates must be commonly hurtful; and notwithstanding the urgency of pain, it is at best a very precarious remedy, and to be avoided as much as possible. This, however, seems now to be so well understood by our practitioners, that there is no occasion for my insisting longer on it here.*

I have now considered the use of opium in all those cases in which it is most nice and difficult, that is, in all the various diseases of the febrile kind; and with respect to others, our work will be more easy.

* There are few eminent practitioners of medicine in the United-States, who will read the above without some degree of surprise. In the management of the dysenteries of this portion of the world (and it is evident, from the writings of BONTIUS, RICHTER, and many other physicians in Asia and in Europe, that the same observation equally applies to those countries), opium is not only not a "precarious," but even an indispensable remedy. Its astringent operation is much less considerable than has been imagined: and it is a fact, that sometimes no medicine more effectually procures stercoraceous stools than opium. I readily subscribe, however, to the propriety of exhibiting laxatives in the management of most dysenteries.

In the comatose diseases, it is obvious that opium can hardly in any case be admissible. In some cases of palsy, attended with convulsive motions, I have known it employed, and with success, in relieving these motions, but manifestly, at the same time, aggravating the primary disease.

In dyspepsia and hypochondriasis, there often happens pains and spasmodic symptoms, which may be, and for the most part are, relieved by opium. It is accordingly often employed, and it is not easily withheld from such patients; but I have always found the frequent use of opiates in these diseases extremely pernicious.

It is by preserving the mobility of the energy of the brain, especially in spasmodic affections of an idiopathic kind, that opium has discovered its great powers. In the most violent and obstinate disease of this kind, the tetanus, opium, though often insufficient, has, however, been the most effectual remedy; and it appears that, whatever other remedies have been proposed and alleged to be useful, hardly any of them have been so but when opium was at the same time employed. But I say no more on this subject, as I expect the enquiries that the Société Royale of Paris are now engaged in will give us some more light on this subject: and I must also refer to the works of that learned Society for our best instruction on the use of opium in the hydrophobia.

In various convulsive affections of the limbs, not accompanied with any stupor, and therefore not to be considered as epileptic, we have frequently found opium of service; but it is not always so: And as I cannot always in different cases assign the causes, or distinguish them by different circumstances; so I cannot determine the cases in which it is especially proper.

There is a case which I think may be distinguished from all others, which is generally known under the title of Chorea Sti. Viti. Neither the pathology or practice in this disease is well agreed on among physicians; and we cannot enter into the discussion here; but can say, from a good deal of experience, that opiates have been very generally useful in the cure of it.

On this subject of convulsive diseases, the great question with regard to the use of opium has occurred with respect to epilepsy; and it has been variously determined by different authors. The pathology of the disease is in many respects obscure; but we can clearly enough perceive that it arises from different conditions of the system; and so far as we can discern and distinguish

these, we may make some attempts towards ascertaining in what cases of epilepsy opium may be hurtful, and in which it may be useful.

To this purpose, we can observe that it may be produced by large hæmorrhagies, or other causes of great debility: but as I have hardly ever met with cases of this kind, I cannot say how far opium may be useful in them.

Much more frequently do we meet with epilepsy connected with a plethoric state of the system: and in all such cases I am of opinion with the most part of practitioners, that opium is extremely hurtful. So far does a plethoric state appear to me to dispose to this disease, that I am of opinion with Dr CHEYNE, that epilepsies have been more frequently cured by a low diet than by any other means. It is here to be observed, that epileptic fits very frequently occur from an occasional turgescence of the blood in the vessels of the brain: and from frequent trials, I know that opium will not prevent such fits, but if exhibited will bring them on with more violence.

They are the epilepsies arising from irritation applied to the nervous system in which opium promises to be useful; and when the return of such fits are anywise periodical, or nearly so, opium given a little before the times of accession, has been often useful in preventing the recurrence. In many instances, however, the returns of epilepsy are irregular; and in such cases, the frequent use of opium, either by producing an occasional turgescence of the blood, or by increasing the mobility of the system, is often very hurtful.

As instances of epilepsy depending upon irritation applied to the nervous system, I consider all those depending upon an *aura epileptica* to be such: and in several cases of this kind, where the times of accession could be foreseen, and even when the symptoms announcing it had come on, I have found opium an effectual remedy.

The late Dr de HAEN has given us what seems to be a singular case of epilepsy, as occurring only in the time of sleep, and when the recurrence of the fits was prevented by avoiding sleep: But at the same time this very disease was cured by the use of opium. This, as I have said, may seem singular; but it is not so much so as might at first sight appear: for perhaps the greatest number of the cases of epilepsy occur during the night, and during sleep. In several such cases I have now frequently found an opiate, given at bed-time, prevent their return.

[*Opium has been much praised, by many writers, as a remedy for tetanus; and, I believe, there is no disease of the human system in which this article has been more liberally, indeed extensively, administered. I have no doubt that opium has really been found useful in tetanus: but I have not myself found it equal to the cure of the disease; and eminent authors record many instances of its failure.*]

I have thus treated of the use of opium in the spasmodic affections of the animal functions, and of those of the vital; I have to mention only those of the heart in palpitation, and those of the lungs in asthma and chincough.

Palpitation is generally a symptomatic affection; and so far as it depends upon spasmodic affections, if the primary disease admits of opium, the symptom of palpitation may be cured by it also.

In the case of asthma, when the disease depends, as it often does, upon occasional turgescence of the blood in the lungs, opium can hardly be employed with safety; but when it depends upon other irritations, and is purely of the spasmodic kind, opium may be employed both to prevent and to moderate fits with great advantage. Even when the disease is of the catarrhal kind, if it be fit to employ opium to relieve the catarrh, it may likewise be employed to relieve the asthma depending upon it. But I must conclude by remarking, that in both the spasmodic and catarrhal asthma, I have frequently employed opium in moderating the disease; but have never found it to prove an entire cure of it.

[*There is another disease, not unallied both to palpitation and to asthma, in which opium has, unquestionably, been used with some benefit. I mean the affection called angina pectoris, asthma convulsivum, &c. See the learned Dr HEBERDEN'S Commentaries, p. 369.*]

With respect to the chincough, we have to observe, that in the first stage of it, and especially when that is attended with fever and difficulty of breathing, opium has always appeared to me very hurtful; but when the disease has subsisted for some time, and is in what I call its second stage, and when the fits come most frequently in the night-time, I have found opium of great use; and as I judge, it has often contributed to put an end to the disease.

In the spasmodic affections affecting the natural functions, opium may have much employment. In the pyrosis, frequent in this country under the name of the Water-brash, and frequent in most countries of Europe, as a transitory illness, has been little taken notice

of by physicians ; but it is a painful disorder, and a relief from it is often demanded. We have found nothing that gives that relief excepting opium ; but this relieves only the present fit, and contributes nothing to preventing returns of it.

In cholic, the employment of opium is not exactly agreed on. It will pretty certainly relieve the pain for some time ; but if the cholic has been brought on, or is attended by costiveness, it will certainly confirm the disease and interrupt the operation of the purgatives, which are absolutely necessary to the cure of it. Opium, however, is certainly suited to the cure of every spasmodic affection ; and if it can be employed so as not to interfere with the operation of purgatives, it may as an antispasmodic even favour the operation of these, and contribute to the cure of certain cases of cholic. For this purpose, some practitioners have exhibited the opium and the purgative at the same time ; but this has been seldom found to answer, and it has always appeared better, in the urgency of pain, to exhibit the opiate by itself ; and in four, five, or six hours after, when the power of it was somewhat diminished, to exhibit the purgative. In this manner of managing, it is commonly necessary to employ a purgative of a powerful kind, and one that commonly operates soon after its exhibition ; and these considerations will, on the one hand, exclude the employment of aloetics, and, on the other, recommend the *oleum ricini*.

In affections of the alimentary canal, of a nature contrary to that of cholic, that is, where the action of the canal is preternaturally increased, as in vomiting, cholera, and diarrhœa, opium is a more undoubted remedy.

Vomiting is commonly a symptomatic affection, from very various causes ; and in many cases cannot be cured by opium : but the distinction of these cases cannot be entered into here ; and I have only to observe, that there are more cases of it than is commonly imagined to be relieved by opium properly employed.

It is common with practitioners to exhibit the opium by the mouth ; and it is often in such cases immediately rejected again by vomiting, without having any effect in relieving the disease ; which must always render the practitioner uncertain to what quantity it may be necessary to repeat the opiate. In all such cases, when the vomiting is not immediately stopped by the opiate given, and this is rejected by vomiting, it is extremely improper to repeat it in the same manner ; and a much surer measure is to throw the opium, joined with a small bulk of a mild liquid, into the anus ;

and when thus thrown in, in sufficient quantity, it will as certainly stop the vomiting as if it had been thrown into the stomach itself.

In cholera, the employment of opium, as directed by SYDENHAM is so well understood that we need not say any thing of it here: and I go on to speak of its use in diarrhœa, in which it has not been so frequent as we judge it ought to be.

As diarrhœa seems always to depend upon an increased action of the intestines, so, except in a few singular instances in which opium proved purgative, we have found it very universally to have the power of diminishing, and for some time suspending, the action of the intestines; and therefore very universally of use in the diarrhœa. This indeed may sometimes be a symptomatic affection, and therefore not to be entirely cured by opiates; and sometimes the disease may depend upon an acrimony which must be evacuated in order to the entire cure of the disease. But still in most cases it seems to be safely employed: for as its operation is not very durable, it will not long interfere with the use of other remedies that may be thought necessary; and it seldom happens that the temporary suspension of the diarrhœa is of any bad consequence. In many cases we have found purgatives to be very hurtful, and the disease to be more quickly cured by the continued use of opium alone.

There is no disease in which opium has been more frequently spoken of as a remedy than in hysteric affections; but there is nothing I find more difficult to treat of in a scientific manner.

The term Hysteria I would willingly confine to the affection which I have described under that title in my First Lines; but most writers are disposed to extend the meaning of it much farther, and to every unusual feeling, or irregular motion, that seems to arise from a mobility of the nervous system. To give any due limits to this idea of hysteric, I find beyond the reach of my skill, and shall not attempt it here: and with respect to my present subject, can only say, that in hysteria, as I would define it, and as generally affecting plethoric habits, and depending upon an occasional turgescence of the genital system, I hold opium to be an improper, and commonly a hurtful, remedy.

But, on the other hand, in all those cases of unusual feeling and irregular motions, not depending upon a plethoric state, but manifestly upon a mobility of the nervous system, opium is a very certain remedy. Whenever therefore these symptoms are in excess, it may be employed, though it be difficult to set the proper limits

to its use. There are cases in which its tonic and antispasmodic powers must be frequently repeated; but it is to be remarked, that wherever that necessity does not manifestly occur, the frequent use of it increases the mobility of the system, and creates a seeming necessity that readily induces a habit, which again, constantly indulged, has a tendency to destroy the system altogether.

In the rabies canina, and in the most violent state of it, the hydrophobia, opium has been employed; but the experiments reported have not been so many as to fix our judgment on this subject: and for what may be said upon it, I must refer my readers to the labours of the learned and industrious Société Royal of Paris, who have taken much pains, and employed the most proper means for ascertaining the practice in this disease.*

In mania the employment of opium is nice and difficult. In the appendix to WEPFER's *Historiæ Apoplecticorum*, we have an account of mania being cured by large doses of opium; and it may be true: but there is no such account of those cases as might serve to specify their peculiar character, so as to enable us to imitate the practice, whilst we know pretty certainly that there are other cases which do not admit of the same.

In several cases of mania we have employed opium, and in some have found it useful in moderating the violence of the disease; but in other cases we have found it manifestly hurtful: and we have not had so many opportunities of treating the disease as to allow us to distinguish clearly the cases in which it may be proper. We suppose there are many cases of the disease depending upon an organic affection of the brain, in which no benefit is to be expected from opium; but there are certainly many other cases in which, from their transitory nature, we cannot suppose any such organic affection, and in which therefore opium may be admissible and useful.

If we may suppose that such cases depend upon occasional causes of excitement without inflammation, we should judge opium to be a promising remedy; but probably it must be given in larger doses

* In my employment of opium in two or three cases of hydrophobia, I never could distinctly observe, that the medicine was of any service: and I have exhibited it in large doses. I am aware, however, that other physicians have given a favourable testimony concerning the powers of opium in this most unmanageable of all diseases. I wish it were prudent to rely upon such testimony. At all events, I will not believe, that the medicine has been of essential use, in the trifling doses in which it was used by LANER and others.

than we commonly exhibit, and possibly in such large doses as **BERNARD HUET** actually employed. In some trials we have found it moderate the disease, and induce sleep; but I have never pushed it so far as to obtain an entire cure, because I suspected that in many cases the disease approached so much to a phrenitis as to render the large use of opium very dangerous. We cannot indeed treat this subject with so much precision as were to be wished; but other practitioners having more opportunities of practice, by considering what I have said both here and above on the subject of delirium in fevers, may settle this matter more exactly.

There is now but one other disease in which the use of opium is to be mentioned; and with respect to which our opinion will be expected: this is the venereal disease, in which of late opium has been very much employed, and with various success. We do not think it necessary to give an account of the different facts reported, and of the different opinions entertained, on this subject, as they are to be found in many books which are in every body's hands; and all that seems to be incumbent on me is to say what I have learned from my own experience, and from that of my fellow-practitioners in Scotland. From this we have not learned that opium has been alone a remedy for the venereal disease; and any experiments that we know to have been made, lead us to conclude, that it is never alone sufficient for that purpose. But from almost every experiment made, we are well assured of its being of very great use in almost every circumstance of the disease. It moderates and alleviates every symptom; and in many of them it will do this without the assistance of other remedies.

We are well persuaded that it will almost in every case favour and expedite the effects of mercury, either in removing symptoms, or in entirely curing the disease. We have only further to remark, that the opium in this case seems to operate by obviating the effects of the general acrimony in the system; and this supposition explains both why large doses of the opium are necessary, and why persons bear these large doses in this disease better than in many other cases.*

* It is hardly necessary to offer any comment on the preceding judicious passages. The question with respect to opium, as a means of curing the venereal disease, is nearly at rest. Opium, of itself, is by no means equal to the cure of this disease: but it is, on many occasions, an useful, and often an indispensable, auxiliary. It has been said by **MICHAELIS** and others, that opium sometimes induces a ptyalism. This is, certainly, possible, since other narcotics,

The effects of opium hitherto mentioned are for the most part such as appear in consequence of its being given by the mouth; but we have also had occasion to say, that it may be introduced by the anus into the intestines: And it is proper to remark, that not only in the case of vomiting, but also in many others, it may be introduced in this way into the intestines, and in this way produce all the effects that have been mentioned of its being thrown into the stomach. In some persons there is a peculiar irritability of the stomach with respect to opium, and from whence several disorders arise, which are avoided by its being thrown into the rectum.

Some practitioners are of opinion, that some effects of opium upon the nervous system in general, as headach and vomiting, which often appear in the morning after a dose of opium had been thrown into the stomach over night, are not so ready to appear after its being thrown into the rectum; but this seems to depend upon the dose in the latter case being weaker, either from the quantity employed, or from the lesser sensibility of the rectum. This leads to observe, that the sensibility of the rectum is so much less than that of the stomach, that it is commonly necessary, when applied to the former, to employ at least double the quantity of what would have been sufficient for the latter.

In the application of opium to the rectum, it is necessary to introduce it in a liquid form, to avoid giving along with it any thing that may in the least prove irritating to the rectum; and therefore a solution in water is the most convenient to be employed in this way. This is farther to be observed, that we are sometimes disappointed in this practice by the opiate glyster's being rejected soon after it has been given. Hence it is as improper to throw it into the rectum in some cases of diarrhœa and tenesmus, as we said above it was improper in the case of vomiting to throw it into the stomach: but even though neither diarrhœa nor tenesmus be present, opiate glysters are sometimes rejected soon after they have been given. This

such as cicuta, hyoscyamus, stramonium, do unquestionably occasionally induce this discharge of the salivary glands. But the salivant effect of opium must, I judge, be extremely rare, since in my employment of the medicine, in various diseases, for many years, I have never observed a single instance of salivation induced by opium. Neither have I any reason to believe, that the ptyalism induced by other medicines (mercury excepted) will essentially contribute to the cure of the venereal. I will only further observe on this head, that the mercurial ptyalism is often more effectually restrained by means of opium, or by DOVER'S Powder, than by any other means with which I am acquainted.

may perhaps be owing to a peculiar irritability of the rectum in certain persons ; but we have found it commonly owing to too great a bulk of liquid being thrown into it ; and therefore I advise that opiate glysters be never made of more bulk than that of three, or at most four, ounces of liquid, and this, as we have said, of a very mild kind. I find that three drams of gum arabic, dissolved in three ounces of water, makes a proper and ready preparation for that purpose.

We must now add, that opium may be employed not only by being thrown into the stomach or into the rectum, but may also by being applied to the skin. In this case, as opium acts always first, as I have said above, upon the parts to which it is immediately applied, so it may be often applied to the external parts with some advantage ; and, by diminishing the sensibility of these parts, it may relieve the pain that happens to affect them. We find also, that opium operates not only on the parts to which it is immediately applied, but that, without being communicated to the sensorium, it operates to a certain extent on the nerves of the parts adjoining to that which it is more immediately applied to, in diminishing their sensibility, and thereby in relieving their pains. Thus a plaster of opium applied to the temple has often relieved the toothach. In other cases, when it is applied to the skin, whether it penetrates by inorganic pores to the viscera of the abdomen, or if it only acts on the teguments, and particularly on the muscles consenting with the viscera, we would not confidently determine ; but we have certainly found the external application relieve the pains and spasms of the stomach and intestines.

The external application has been made under different forms, and I believe it may have effects either in the form of plaster or poultice ; but we are very certain that its effects are most considerable when applied in a liquid form. In this form it may be employed as dissolved in water, wine, or spirit ; but we presume that it will always be most effectual when dissolved in rectified spirit. This certainly most powerfully extracts the volatile part of opium, upon which its powers especially depend ; and this same volatile part may be presumed to be the most readily penetrating, and therefore the most fit for external use.*

* There is by no means an unanimous agreement among physicians concerning the effects of opium, when externally applied to the body ; some uniting in sentiment with Dr CULLEN, while others positively deny that the medicine, when thus applied, exerts any effects upon the nervous, the arterial, or visceral

After thus endeavouring to assign the various powers and virtues of opium, we must, in the next place, say somewhat of its pharmaceutical treatment and exhibition. The former has been very various, and very little upon scientific grounds. We know of no means that can be employed in operating upon the opium alone, that can improve its virtues. The volatile and active parts of it may be extracted from the other parts of its substance by rectified spirit of wine; but the tincture and extract made by this menstruum has the same powers and virtues as the entire opium, and only differs by being brought into a smaller bulk. It is at the same time found, that these preparations are more offensive to the stomach than the entire opium, and are therefore very little employed. The other menstrua, as proof-spirit, wine, and water, that may be employed in extracting opium, do it all of them on much the same footing, extracting both the gummy and resinous parts; so that the several tinctures do not differ but in proportion to the quantities employed. In all of them the qualities are the same as those of the entire opium, with a very little difference from the solid or liquid form; the former, in certain cases of irritability in the stomach, being readier to sit upon it than the latter.

As opium may do ill as well as good, physicians have thought of correcting its bad qualities; but as they are not separable from its good, the business of correction has been to no purpose. From the notion of the ancients with respect to its coldness, the correction has been attempted, by the joining with it aromatic and heating medicines, which was very anciently practised, and has in some measure been continued to the present time. Some practitioners are of opinion, that the addition of aromatics renders opium more agreeable to the stomach: and we dare not assert that this does not, in some cases, take place; but we have hardly ever observed it, and we are very certain that the saffron and aromatics which are added to our thebaic tinctures, in the quantity they are employed, can neither do good nor ill. Both the colleges of London and Edinburgh have now omitted all additions to the tincture of

systems. If my own observations have not unaccountably deceived me, I must say, that the effects of opium applied to the skin, especially in the shape of fluid laudanum, and the laudanum-poultice, are on many occasions, very considerable, and obvious. It is probable, however, that too much has sometimes been ascribed to the influence of the external application: and I must suppose, that there is some fallacy in the observations of the respectable BERGIUS, on the subject. As to the reports of certain Italian physicians, such as Doctors CHIARUGI and CHIARENTI, I deem them worthy of no attention.

opium, but both of them have retained the elixir paregoricum; which, either in the choice or proportion of its ingredients, I cannot perceive to have any other meaning than that of giving a variety of formula. Other attempts to correct opium have been equally fruitless; and the correction supposed to be obtained has amounted to no more than a weakening of its power, without producing any change in its qualities. Some means of weakening its power may be readily found, particularly such practices as give occasion to the dissipation of its most volatile parts. Such is the making of the extractum thebaicum of the London College, in consequence of a solution in water; and in the bringing this into the form of an extract, so much heat is employed as occasions the dissipation mentioned: but here I maintain there is no change in the qualities of the opium, and the only change effected consists in the weakening of its power; so that two grains of this is necessary to produce the effects of one grain of the crude opium of the same quality that was employed in the preparation. Another means of weakening the powers of opium, is the application of acids, and we have found this very effectual: but it does not change the qualities; for, when given in a sufficient dose, it has all the same effects as the crude opium.

We know but one kind of addition that can be made to opium with the effect of modifying its operation; and this is the addition of emetics and neutral salts, which is done in making DOVER'S powder. In this ipecacuanha has been constantly employed; and it has been supposed that it has a specific power of diminishing the power of opium, as in that powder larger doses of opium can be employed than would be proper in the use of opium alone. This opinion, however, of the power of ipecacuanha with respect to opium, we cannot admit of, as we suppose that the large doses of opium which are given in DOVER'S powder become safe, only because, by the other ingredients, it is directed to sweat. This we take to be the effect of ipecacuanha; not by any specific, but by its emetic power, for we can obtain the same effect by antimonial emetics; for by these, as well as by ipecacuanha, we can be allowed to employ larger doses of opium than we could of opium alone.

It certainly belongs to a treatise on the virtues of opium, to explain and ascertain the virtues of DOVER'S powder; and I have mentioned some of them above, when speaking of the use of it in intermittent fevers, in rheumatism, and in dysentery; and I leave the farther use of it to be learned by an analogy from those

cases. We have only to add, that wherever the DOVER'S powder is to be employed, the effects and benefits of it will depend very much upon a proper administration, which we have very often observed to be neglected or mistaken; and therefore we subjoin here what I have learned from much experience to be the most proper management of it.

The powder is to be given in the morning, when the ordinary sleep or the time of it is over. Sleeping is not incompatible with, but is commonly not favourable to, sweating.

For security against cold, the patient is to be laid in woollen, that is, in a flannel shirt and in blankets, the bed-linen being entirely removed.

The powder will be taken most properly by being made into a bolus with a little syrup, and swallowed in a wafer, that the taste of it may not occasion any squeamishness.

The covering on the body may be only what the person has been used to sleep in; but commonly it will be convenient to make some addition over the whole body, and always some considerable addition upon the feet and legs.

As the powder is ready to be thrown up by vomiting, no drink should be taken into the stomach till some sweat breaks out.

When the sweat begins to break out, the person may then take frequently, but at first in small portions, some warm liquid, such as thin gruel, weak sage, or bohea tea; and of such drinks he should take frequently during the course of the sweating.

When the sweat has broken out, if it does not extend freely to the legs and feet, some additional covering should be laid over these parts, or to lay boiled bricks or bottles filled with warm water to the soles of his feet; for it is always proper to render the sweating thus universal.

As the sweat should be carried on with as little heat and uneasiness to the person as possible, if he finds himself very warm and restless, the additional covering that was put upon the body, and even a part of that put upon the feet and legs, may be gradually removed.

If the person bears the sweating easily, it is of much consequence to continue it for some length of time, and always, if possible, for twelve hours: then it will be allowable to let it cease, by drying the body very well with warm towels, and shifting the body into dry flannels and blankets, and allowing him afterwards to put out his hands, and perhaps his arms, from under the bed-clothes; but he should continue in flannel and blankets till next morning.

During the sweating, instead of the drinks above mentioned, he may take frequently a weak soup, as chicken broth, or what we call beef-tea; and at his ordinary time of meals, he may take some dry toast with these broths; or if the sweat does not proceed freely, and it is at the same time not attended with much warmth, he may, instead of the drinks mentioned, take frequently weak negus, or white-wine whey.

In the morning after this sweating, the person may come out of bed, and put on his linen, and other parts of his ordinary dress, but should keep his chamber, or at least within doors, for the whole day after; and even for a day or two after that, he should be very careful in avoiding his being exposed to cold.

By this administration I have found the DOVER'S powder a highly useful remedy.

With respect to the exhibition of opium, we have sometimes found a small dose of it answer the purpose; as, in the gradual use of opium and of wine, the stimulant power is first exerted, so small doses are ready to prove stimulant rather than sedative: but for obtaining the latter effect, it is commonly necessary to give a full dose. This at a medium, for adults, is at least one grain: And I am a little surprised at BERGIUS putting the mean dose at half a grain, and at TRALLE'S telling us that he never goes beyond a grain. Both such accounts show me, that they do not use opium freely either in Sweden or Silesia. We find it often safe and proper to give more than a grain; and whenever there is any irritation in the system to be overcome, it is commonly necessary to go still farther. In all cases it may be proper to begin with moderate doses; but where these do not answer the purpose, they must be repeated and increased till the desired effect is obtained: and we very often find that they may be increased with safety to a very high degree. In a case of the gout in the stomach, I have by degrees gone to the dose of ten grains twice a-day; and when the disease was overcome, the dose of opium was gradually diminished, till in the course of two or three weeks it was none at all; and in all this no harm appeared to be done to the system. We frequently find, that when a strong irritation is to be overcome, very large doses may be given without procuring sleep, or showing any of those deleterious effects that in other cases appear from much smaller quantities given. All this appears from the practice now well known in tetanus, mania, small-pox, gout, and syphilis.

In the use of opium, it is to be constantly observed, that in the case of irritation, when large and repeated doses are necessary,

that even the effects of such doses do not long continue; and therefore, that the repetitions must be made at no long intervals. We have frequently observed in such cases, that the effects of opium do not continue longer than eight hours; and that, after such an interval, if the disease has not yielded to former exhibitions, a repetition becomes necessary. It is hardly requisite to repeat here what we have said above of narcotics in general, that opium is subjected to that law of custom by which the force of impressions in which the body is passive becomes weaker by repetition; and that, when frequent repetitions are requisite, it is always necessary to increase the dose.

[*The preceding account of opium is, in many respects, extremely valuable. But I would not be understood to subscribe to all the author's speculations and opinions concerning the nature and operation of this article.

The *primary* operation of opium is, unquestionably, that of a stimulant. I think that few facts in medicine are better established than this. It is established by the direct observations of many of the most eminent practitioners and theorists of the two last centuries: by the observations of SYDENHAM, BERGER, BOERHAAVE, TRALLES, HALLER, DARWIN, and BROWN. Dr CRUMP's experiments have thrown considerable additional light upon the subject; and to these experiments I cheerfully refer my young readers, for specific information. But while I thus subscribe to the opinion of the writers whom I have mentioned, that opium is a cordial medicine, I cannot adopt the dogma of some of them, that this narcotic is the most powerful and diffusible of all the known stimulants. The stimulant power of Belladonna (not to mention many other articles, even from the vegetable kingdom) is much greater than that of opium. It must be confessed, moreover, that the primary or stimulant operation of opium, when given in moderate doses, is often very inconsiderable, and of short duration. Hence it is, that so many practitioners have adopted the idea, that opium is a *direct* sedative. And hence, too, we often prescribe opium in affections truly of an inflammatory nature, without our perceiving any inconvenience from the primary effect of the medicine.

Upon the whole, I am of opinion, that in throwing opium, and several of the succeeding articles, which are to be mentioned, into

the class of *SEDANTIA*, Dr Cullen has done less injury to medicine, or at least to young and inexperienced practitioners, than many other physicians, who have placed this article at the head of their class of *STIMULANTIA*, or *INCITANTIA*.*]

CICUTA.

THERE are many instances of the fallacy of experience in matters of the *materia medica*; but there is no instance in which it appears more strongly than in the history of our present subject. Since Dr *STORCK* recommended it from his own experience as a most effectual remedy in many diseases, it has been employed by many practitioners in every part of Europe; and taking in the whole of the reports we have had, I am still at a loss to say what are truly the powers and virtues of this plant. I am disposed to think that the worthy Baron *STORCK*, from a partiality to his own discovery, and from much false information given in complaisance and adulation to the rank he holds, has represented the virtues of hemlock as much greater than ever they were, or ever will be found to be; and many are the instances in which practitioners of the greatest candour and discernment have found this medicine to fall much short of the promises which Baron *STORCK* had given of it. For experiments directly contradictory to those of Baron *STORCK*, we would not adduce the testimonies of a declared enemy, and of a man of the most difficult access to all new opinions and remedies, the late Dr de *HAEN*: But we have no reason to reject the testimony of persons not suspected of partiality; and, in the particular case of cancers, we have the experiments of *PETRUS AF. BIERKEN*, as reported by *BERGIUS*, which assert, that the *cicuta* not only fails in the cure of cancers, but that it aggravates the disease, and hastens on the fatal event of it. In the other instances seemingly contradicting the assertions of Baron *STORCK*, we consider many of them as merely instances of failure of what Baron *STORCK* had led to expect; but such negatives do not allow them to afford any conclusion. I know from my own observation, that many of the trials had been unfairly made. Sometimes the proper plant had not been employed, and frequently that it had been improperly prepared. I have frequently found the extract, both as prepared at Vienna and here at home, a perfectly inert substance, and producing no sensible effects on the body, though given in very large quantities. The nicety of Dr *MORRIS*, in distinguishing the extracts of different places, seems to depend upon the general fallacy attending this preparation. What this is owing to we cannot clearly deter-

mine; but such is the uncertainty of extracts of the cicuta, that the practitioners of this country have very universally deserted the use of that preparation; and when they think of employing this plant, they always employ it in powder. This indeed is commonly more to be depended upon than the extract; but the powder also, from improper drying or keeping, is liable to uncertainty, and we have frequently found it in a perfectly inert state.

In illustration of all this I give a particular history: A lady labouring under a cancer in the breast was advised to use the cicuta; and she accordingly got a quantity of it in powder, and weighed out the doses of it for herself. She began with a small dose; and feeling no sensible effects from that, she went on increasing the dose till she had taken a dram for a dose. By the time she had come to this size of dose, she had taken the whole of the parcel she had got from the apothecary, and therefore sent to him for a fresh parcel of the powder. She had, however, been advised, that when she was to pass from one parcel to another, she should suspect some inequality in the different parcels; and therefore, though she had taken a former parcel in a very large dose, she should begin any fresh parcel with a small dose only. Upon this occasion, therefore, she was resolved to follow this advice; and as she had taken sixty grains of the former, she would take twenty only of the new parcel: but such was the inequality of the two parcels, that she was nearly killed by the twenty grains she had then taken. In ten or fifteen minutes after she had taken the dose, she was affected with sickness, tremor, giddiness, delirium, and convulsions. Happily for her the sickness proceeded to a vomiting, with which part of the powder was thrown up; but the vomiting continued, and probably till the whole was thrown out: and notwithstanding this, the delirium, and even the convulsions, continued for some hours after. These symptoms, however, gradually abating, a sleep at length came on; and after some hours she waked, free from all the former symptoms. This shows sufficiently the unequal state of the hemlock in powder. The same powder in the quantity of five or six grains only occasioned some tremor and giddiness, when the former parcel taken to sixty grains had no sensible effects at all. I hold it as a rule, that when hemlock, either in the form of powder or extract, has no sensible effects when taken to twenty grains for a dose, the medicine may be supposed to be imperfect; and that, if it is to be continued, another parcel of it should be employed.

From what has been said, it will sufficiently appear, that the many failures that have been reported of hemlock do not afford any

proof of its being useless as a medicine; and, as it has manifestly strong powers in affecting the human system, I conclude, that, like all other substances possessed of such powers, it may be a very efficacious medicine. This, we believe, will be allowed; but it may still be a question, in what diseases and cases of them it may be of peculiar efficacy? Here I am at a loss, from my own experience or that of others, to answer this question. We have known it useful in resolving and discussing schirrosities of different kinds, and particularly those of a scrophulous nature. We have also known it useful in healing ulcers which had come upon schirrous tumours, and which continued to be surrounded with such schirrosity; and in some ulcers certainly that approached to the nature of cancer. Even in cases that might certainly be considered as truly cancerous, I am so far from being of the opinion of BIERKEN of its rather aggravating the disease, that I have found it in several cases to relieve the pains, and mend the quality of the matter proceeding from the sore, and even to make a considerable approach towards healing it; though I must own that I never was concerned in a cancerous case in which the cure of the sore was completed.

This medicine has been by many reported as useful in syphilis; and one of the most competent judges on this subject, Mr JOHN HUNTER, has found it to be so. I myself have employed it in some cases with advantage, but in several others I have not found any benefit from its use. The ancients were of opinion that it diminished the venereal appetite; but BERGIUS thinks it has a contrary effect, and mentions a case in which it had restored the power of venery when it had been lost: but so far as my observation goes, there is no foundation for either the one or the other opinion.

I have said above, that it often fails from its being exhibited in an inert state, and that it can only succeed when it shows some sensible effects on the system: but candour obliges me to acknowledge, that in many cases where it did show sensible effects, it failed in curing a disease, though similar to those in which it had succeeded; and I am yet at a loss to ascertain the cases to which it is most certainly adapted.

With respect to the pharmaceutic treatment of hemlock, there are different opinions concerning the proper time of gathering the plant. We have been in use here to gather it before the flowers, and even almost before the flower-bearing stalks appear: and from some experiments we have been led to judge, that at this period of its growth the virtues of the hemlock are the strongest. Dr FOTHERGILL was of opinion that these virtues were stronger at a more advanced period, when the flowers were falling off, and the

seeds beginning to be formed; and if we understand BERGIUS rightly, he seems to be for allowing the growth to proceed still farther, and till the seeds are ready to fall off. We must leave it to farther experience to determine this matter more exactly, though I believe it is of little consequence which ever of the practices be followed.

We have for the most part employed the leaves of the plant; but a physician, lately of this place, was strongly persuaded that the seeds, treated by decoction, and brought into the form of an extract, gave a preparation more powerful than that made of the leaves, and therefore gave occasion for such an extract to be introduced into our dispensatory: but this property of the seeds I have not had confirmed by my own observations, and must think it succeeded no better with the other fellows of the college, as we do not find that such a preparation continues to be made.

We have observed above, that both the extract and the powder are liable to be in an imperfect state; and we have not attempted to assign the causes of this, but must earnestly recommend it to the apothecary to find out those causes, that they may be avoided: and to engage his attention to this matter, we must repeat what has been said above, that unless the hemlock produces sensible effects on the nervous system, it cannot be a remedy in any disease; and we are disposed to add, that those effects must be pretty strong, in order to render the hemlock an efficacious medicine. The practitioner indeed should take care, by bringing on these effects by degrees, to avoid its becoming a poison; but it is to be suspected, that by bringing on the effects too slowly the medicine fails in many cases; and by its being gradually habituated to the system, that it has less effect than it might otherwise have had.

BARON STORCK is very fond of representing the hemlock as a very innocent medicine: and we have known it taken for a very great length of time without any bad effects; but I am certain it may prove a poison, and that it is only by its being slowly habituated to the system that it proves, as every other vegetable poison may be, sufficiently innocent.

In mentioning the administration, we must remark, that it is often applied externally with advantage, and particularly in the form of poultice; but in the form of plaster, in which it has been often employed, it seems to be of very little effect. In the form of poultice it has been useful in resolving some indurations, especially those of the scrophulous kind; but in the indolent scirrhusities in the breasts of women it is seldom of any service: and we have found

the frequent application of hemlock poultices do much harm, by bringing these tumours sooner to an open cancer.

CICUTA VIROSA.

THE root of this plant is well known to be a strong poison both to men and brute animals, with the exception of the goats and swine of Norway, who are not hurt by it. Its deleterious powers in man are so considerable, that they have prevented its being employed as an internal medicine; though with me this is not a sufficient reason for our not attempting a trial of this and some other of the umbelliferous poisons.

If it be true that both the roots and leaves become much milder by drying, we might probably find an intermediate state between the fresh and the dry, with which our trials of this might be made with more safety. The roots of the cicuta have been much recommended as an external remedy in many cases; but as these recommendations have proceeded upon the alleged experience of a barbarous people, we cannot pay much regard to them.

BELLADONNA.

THIS is a medicine that has been very long known for its narcotic and deleterious powers; and from these powers it is sufficiently probable that it might be an efficacious medicine. Its berries and leaves are the parts which have been chiefly employed: The former being taken unwittingly by children, have often shown their poisonous quality; but this does not hinder us from believing that GESNER employed them safely as a soporiferous and anodyne medicine; and we have often resolved to imitate his practice, but have always been by certain accidents diverted from it.

It is the leaves that have of late been especially employed as a medicine; and they have been employed in powder, in infusion, and in extract from a watery infusion. The latter I have often found, like that of the hemlock, to be an inert substance; but the powder and infusion of the leaves are more certainly active. They have both been especially employed in the cure of cancers; and there are many instances of their utility reported by persons of good credit: but at the same time there are as many reports of its having been employed without success; and the latter reports are sometimes from persons who had upon other occasions employed it with advantage.

The same variety of event has occurred to myself. I have had a cancer of the lip entirely cured by it; a scirrhus in a woman's

breast, of such a kind as frequently proceeds to a cancer, I have found entirely discussed by the use of it; a sore a little below the eye, which had put on a cancerous appearance, was much mended by the internal use of the belladonna: but the patient having learned somewhat of the poisonous nature of the medicine, refused to continue the use of it, upon which the sore again spread and was painful; but upon a return to the use of the belladonna, was again mended to a considerable degree: when the same fears again returning, the use of it was again laid aside, and with the same consequence of the sore's becoming worse. Of these alternate states, connected with the alternate use of, and abstinence from, the belladonna, there were several of these alternations which fell under my own observation; but the patient being removed to a great distance, I do not know how long these changes took place: but in the mean time, I was very well convinced of the power and virtues of the medicine in certain cases. At the same time, I must own, that in several cases, both of scirrhus and of open sores, it has not answered my expectations.

I have only further to add, that the infusion of the belladonna is ready to bring on a dryness and considerable stricture of the pharynx and adjoining parts of the œsophagus. In one instance of a person using it at a distance and without any communication with me, when taking the infusion, with the effect of nearly healing up a cancer of the lip, he had this dryness and stricture come on to a great degree, and was suddenly killed by a very copious throwing up of blood, seemingly, as I was informed, proceeding from the fauces.

[* Belladonna, as well as cicuta, has, on respectable authority, been recommended as an important medicine in pertussis. But I have not employed either of these articles in this refractory disease.*]

HYOSCYAMUS.

THIS is a plant which has long been well known for its narcotic and deleterious qualities; and many instances are reported of its fatal effects in man and other animals: but notwithstanding its deleterious powers, it has been employed as a medicine both in ancient and modern times. The roots, the seeds, and the leaves, have all been upon occasion employed; but till very lately it was especially the seeds which were much commended for restraining hæmorrhagies of all kinds, and particularly by the excellent Mr BOYLE. The credit, however, of this excellent person, in reporting the virtues of medicines, for reasons I have given before, does not

stand high with us. We have not tried the seeds, but have employed the extract of the leaves very often. This, like other narcotic substances, will sometimes moderate and restrain hæmorrhagies; but for the reasons we gave before on the subject of opium, we are persuaded, that, except where the hæmorrhagy manifestly depends upon a particular irritation, henbane, and all other narcotics, may be very hurtful.

The seeds for a long time past have not been employed in the practice of Britain, nor were the leaves or any preparation of them thought of till lately, that the Baron STORCK endeavoured to introduce the extract of the leaves. As usual with him, he gives us many cases of different diseases in which this extract had been useful; but so far as we have learned, his credit has not been supported by other practitioners.

With respect to its effects in mania, melancholia, and epilepsy, the experiments of GREDING, reported in LUDWIG'S *Adversaria*, are very contradictory to those of Baron STORCK. In epilepsy, and various convulsive affections, for which Baron STORCK particularly recommends the extract of the henbane, we have very frequently employed it; but have never found it of any great virtue, nor of more than what we have found in opium. We have indeed found the hyoscyamus to be often an agreeable anodyne and soporiferous medicine; and we have frequently found it such in persons who, from particular circumstances, did not agree with opium, and particularly because it was less binding to the belly than opium. We judge, however, that it is more ready in full doses to give delirium than opium is; and therefore we have found it in many cases to give turbulent and unrefreshing sleep: and notwithstanding its laxative qualities, for which we had employed it, we have been obliged to lay it aside.

Baron STORCK and some other practitioners have found the extract of henbane useful in small doses; and in a few instances I have found the same: But though I always begin with the small dose of a grain or two, yet in the extracts prepared in this country, we have seldom found the soporiferous or anodyne effects appear till we had proceeded to doses of eight or ten grains; and we have often found it necessary to go further, to fifteen, and even to twenty grains. We have often employed such large doses with advantage; and where they had been brought on by degrees, without any bad effects. We must however remark here, that it is almost only when the extract of henbane is employed in large doses that its laxative effects are very remarkable.

[* Hyoscyamus, in a prescription rather complex, has of late been warmly recommended as an important remedy, in some cases of asthma.—See BREE on asthma.*]

NICOTIANA.

THIS is a well-known drug, of a narcotic quality, which it discovers in all persons, even in small quantity, when first applied to them. I have known a small quantity of it, snuffed up the nose, produce giddiness, stupor and vomiting; and when applied in different ways, in larger quantity, there are many instances of its more violent effects, even of its proving a mortal poison. In all these instances it operates in the manner of other narcotics: But along with its narcotic qualities it possesses also a strongly stimulant power, perhaps with respect to the whole system, but especially with respect to the stomach and intestines; so as readily, even in no great doses, to prove emetic and purgative.

By this combination of qualities, all the effects of tobacco may be explained; but I shall begin with considering its effects as they appear in the use of it as an article of living.

As such it has been employed by snuffing, smoking, and chewing; practices which, as having been for two hundred years past common to all Europe, need not be described here. Like other narcotics, the use of it may be introduced by degrees; so that its peculiar effects, even from large quantities employed, may not, or may hardly at all appear: but this does not at all contradict the account I have given of its quality with respect to persons unaccustomed to it, and even of its tendency to show its power in those much accustomed to it: for even in these, the power of habit has its limits; so that in persons going but a little beyond the dose to which they have been accustomed, very violent effects are sometimes produced.

On this subject it is to be remarked, that the power of habit is often unequal; so that in persons accustomed to the use of tobacco, a lesser quantity than what they had been accustomed to, will often have stronger effects than had before commonly appeared. I knew a lady who had been for more than twenty years accustomed to take snuff, and that at every time of day; but she came at length to observe, that snuffing a good deal before dinner took away her appetite: and she came at length to find, that a single pinch, taken any time before dinner, took away almost entirely her appetite for that meal. When, however, she abstained entirely from snuff before dinner, her appetite continued as usual; and after dinner, for

the rest of the day, she took snuff pretty freely without any inconvenience.

This is an instance of the inequality of the power of habit in exerting its effects: but in what cases this may take place, we cannot determine, and must now go on in marking its usual and ordinary powers. When snuff, that is, tobacco in powder, is first applied to the nose, it proves a stimulus, and excites sneezing; but by repetition that effect entirely ceases.

When snuff is first employed, if it be not both in small quantity and be not thrown out immediately by sneezing, it occasions some giddiness and confusion of head; but by repetition these effects cease to be produced, and no other effect of it appears in the accustomed, when not taken beyond the accustomed quantity. But even in the accustomed, when it is taken beyond the usual quantity, it produces somewhat of the same giddiness and confusion of head that it did when first employed; and in several cases, these effects in the accustomed, depending on a larger dose, are not only more considerable, as they act on the sensorium, but as they appear also in other parts of the system, particularly in the stomach, occasioning a loss of appetite, and other symptoms of a weakened tone in that organ.

With respect to this, it is to be observed, that persons who take a great deal of snuff, though they seem, from the power of habit, to escape its narcotic effects; yet as they are often liable to go to excess in the quantity taken, so they are still in danger from these effects operating in an insensible manner; and I have observed several instances of their being affected in the same manner as persons are from the long continued use of other narcotics, such as wine and opium; that is, by a loss of memory, by a fatuity, and other symptoms of the weakened or senile state of the nervous system, induced before the usual period.

Among other effects of excess in snuffing, I have found all the symptoms of dyspepsia produced by it, and particularly pains of the stomach, occurring every day. The dependence of these upon the use of snuff became very evident from hence, that upon an accidental interruption of snuffing for some days, these pains did not occur; but upon a return to snuffing, the pains also recurred; and this alternation of pains of the stomach and of snuffing having occurred again, the snuff was entirely laid aside, and the pains did not occur for many months after, nor, so far as I know, for the rest of life.

A special effect of snuffing is, its exciting a considerable dis-

charge of mucus from the nose ; and there have been several instances of headaches, toothachs, and ophthalmias, relieved by this means : and this is to be particularly remarked, that when this discharge of mucus is considerable, the ceasing or suppression of it by abstaining from snuff, is ready to occasion the very disorders of headach, toothach, and ophthalmia, which it had formerly relieved.

Another effect of snuffing to be taken notice of is, that as a part of the snuff is often carried back into the fauces, so a part of this is often carried down into the stomach, and then more certainly produces the dyspeptic symptoms mentioned. These are the considerations that relate to snuffing ; and some of them will readily apply to the other modes of using this drug.

Smoking, when first practised, shows very strongly the narcotic, vomiting, and even purging powers of tobacco, and it is very often useful as an anodyne ; but by repetition these effects disappear, or only show themselves when the quantity smoked is beyond what habit had before admitted of ; and even in persons much accustomed to it, may be carried so far as to prove a mortal poison. From much smoking all the same effects may arise which we said might arise from excess in snuffing.

With respect to the evacuation of mucus which is produced by snuffing, there are analogous effects produced by smoking, which commonly stimulates the mucous follicles of the mouth and fauces, and particularly the excretories of the salivary glands. By the evacuation from both sources, with the concurrence of the narcotic power, the toothach is often greatly relieved by it ; but we have not found the smoking relieve headaches and ophthalmias so much as snuffing often does. Sometimes smoking dries the mouth and fauces, and occasions a demand for drink ; but, as commonly the stimulus it applies to the mucous follicles and salivary glands draws forth their liquids, it occasions on the other hand a frequent spitting.

So far as this is of the proper saliva, it occasions a waste of that liquid so necessary in the business of digestion ; and both by this waste and by the narcotic power at the same time applied, the tone of the stomach is often weakened, and every kind of dyspeptic symptoms are produced. Though in smoking a great part of the smoke is again blown out of the mouth, still a part of it must necessarily pass into the lungs ; and its narcotic power applied there often relieves spasmodic asthma ; and by its stimulant power it

there also sometimes promotes expectoration, and proves useful in the catarrhal or pituitous difficulty of breathing.

Smoking has been frequently mentioned as a means of guarding men against contagion. In the case of the plague, the testimony of DIMERBROEK is very strong; but RIVINUS and others give us many facts which contradict this: and CHENOT gives a remarkable instance of its inutility. We cannot indeed suppose that tobacco contains an antidote of any contagion, or that in general it has any antiseptic power; and therefore we cannot allow that it has any special use in this case: but it is very probable that this and other narcotics, by diminishing sensibility, may render men less liable to contagion; and by rendering the mind less active and anxious, it may also render men less liable to fear, which has so often the power of exciting the activity of contagion. The antiloiamic powers of tobacco are therefore on the same footing with those of wine, brandy, and opium.

The third mode of using tobacco is that of chewing it, when it shows its narcotic qualities as strongly as in any other way of applying it; though the nauseous taste of it commonly prevents its being carried far in the first practice. When the practice, however, is continued, as it is very difficult to avoid some part of it dissolved in the saliva from going down into the stomach; so this, with the nausea excited by the taste, makes vomiting more readily occasioned by this than the other modes of applying it. They are the strong, and even disagreeable impressions repeated, that give the most durable and tenacious habits; and therefore the chewing of tobacco is apt to become one of these: and it is therefore in this way that it is ready to be carried to the greatest excess, and to show all the effects of the frequent and large use of narcotics. As it commonly produces a considerable evacuation from the mouth and fauces, so it is the most powerful in relieving the rheumatic affection of toothach. This practice is also the occasion of the greatest waste of saliva; and the effects of this in weakening digestion, and perhaps from thence especially, its noted effect of producing emaciation may appear.

These are the effects of the different modes of employing tobacco, when it comes to be of habitual use and an article of living. These effects depend especially upon its narcotic power, and certain circumstances accidentally attending its application to the nose and mouth; but as we have observed before, that beside its narcotic, it possesses also a stimulant power, particularly with respect to the alimentary canal: by this it is frequently employed as a medicine

for exciting either vomiting or purging, which it does, as it happens to be more immediately applied to the stomach or to the intestines.

An infusion of from half a dram to a dram of the dried leaves, or of these as they are commonly prepared for chewing, for an hour or two, in four ounces of boiling-water, affords an emetic which has been employed by some practitioners, but more commonly by the vulgar only. As it has no peculiar qualities as an emetic, and its operation is commonly attended with severe sickness, it has not been, nor is it likely ever to come into common practice with physicians.

It is more commonly employed as a purgative in glysters; and, as generally very effectual, it is employed in all cases of more obstinate costiveness; and its powers have been celebrated by many authors. I have known it to be in frequent use with some practitioners; and it is indeed a very effectual medicine, but attended with this inconvenience, that when the dose happens to be in any excess, it occasions severe sickness at stomach; and I have known it frequently occasion vomiting.

It is well known, that in cases of obstinate costiveness, in ileus and incarcerated hernia, the smoke of burning tobacco has been thrown into the anus with great advantage. The smoke operates here by the same qualities that are in the infusions of it above mentioned; but as the smoke reaches much further into the intestines than injections can commonly do, it is thereby applied to a larger surface, and may therefore be a more powerful medicine than the infusions. In several instances, however, I have been disappointed of its effects, and have been obliged to have recourse to other means.

The infusion of tobacco, when it is carried into the blood-vessels, has sometimes shown its stimulant powers exerted in the kidneys; and very lately we have had it recommended to us as a powerful diuretic of great service in dropsy. Upon the faith of these recommendations we have now employed this remedy in various cases of dropsy, but with very little success. From the small doses, that are proper to begin with, we have hardly observed any diuretic effects; and though from larger doses they have in some measure appeared, we have seldom found them considerable: and when, to obtain these in a greater degree, we have gone on increasing the doses, we have been constantly restrained by the severe sickness at stomach, and even vomiting, which they occasioned: so that we

have not yet learned the administration of this remedy so as to render it a certain or convenient remedy in any cases of dropsy.

The same circumstances have occurred to several other practitioners of this city and neighbourhood; and of late the trials of it have been very generally omitted, owing perhaps to our practitioners being directed at the same time to the use of the digitalis, with which they have had some more success.

From some experiments we are certain that tobacco contains a quantity of volatile parts that may be dissipated by long boiling in water; and that by such a practice its emetic, purgative, and narcotic qualities may be greatly diminished; and we are of opinion that the preparation in extract, as prescribed in the Wirtemberg dispensatory, is upon a good foundation, and may be employed in pectoral cases with more advantage and safety than the simple infusion or decoction made by a short boiling only.

When we were restrained in employing the infusion of tobacco as a diuretic, as mentioned, we expected to succeed better with the decoction; and I have found, that by long boiling this might be given in much larger doses than the infusion: but we still found it retaining so much of the emetic quality, that we could not employ it as a diuretic without being interrupted in its use by the same emetic quality that had interrupted the use of the infusion.

Besides the internal uses of tobacco mentioned, I must now remark, that it has likewise been commended for its virtues as externally employed. I have known the infusion employed with advantage as a lotion for some obstinate ulcers: but the many instances of its being absorbed, and proving thereby a violent poison, dissuade from such a practice; especially as there are other medicines, of as much efficacy, that may be employed with much more safety. BERGIUS recommends it to be employed as a fomentation in the paraphymosis; but we have had no opportunity of employing it.

DIGITALIS.

[* ON account of its close affinity to tobacco, in a botanical point of view; and from the great resemblance of the medical properties of the two articles to each other, this would be the proper place† to treat of some of the uses of digitalis; as of its use in cases pulmonary consumption, mania epilepsy, in carcerated hernia, &c. But we introduce the whole of what we have to offer concerning the properties of this *lurida* under the head of DIURETICA.*]

† I follow this order in my public lectures.

STRAMONIUM.

THIS is a powerful narcotic substance, and many instances are given of its proving a fatal poison. The seeds have been especially remarkable in this way, but the leaves are possessed of the same quality.

Neither of them have been employed as medicines till the Baron STORCK, among the other poisonous plants, thought of trying this. He made the expressed juice of the plant into an extract, and employed this in some cases of mania, epilepsy, and some other convulsive affections, and, as he reports, with some advantage; but he has been more reserved in his trials with this, and more temperate in recommending it, than with respect to most of the others he has practised with. Some other writers, however, have employed it, and recommended it; but they are chiefly the experiments of GREYING which properly ascertain its powers and virtues.

This industrious physician employed it in a great number of maniacal cases; and, beginning with small doses, he proceeded to very large ones, but could not, in any of the cases he employed it in, obtain a cure. It is remarkable, that in his experiments he employed two different preparations of the extract of the stramonium; the one he got from Vienna by the favour of Baron STORCK, the other from Leipsic by the favour of Professor LUDWIG. The latter he found to be much more powerful than the former; and, with respect to this, he puts the question, Whether the difference was to be ascribed to the difference of the soil in which the plants grew, or to any other cause? I consider it as a mark of the fallacy of extracts, and mention it here as a proof of that.

Dr GREYING employed the same extracts in a great number of epileptic cases, and in cases of epilepsy joined with mania; but, except in one single instance, he made no cure: and the great number of cases in which it failed, lead me to judge it to be a medicine seldom suited to the cure of those diseases. There are indeed cases of both diseases reported by persons of good credit, in which the stramonium succeeded: but I do not admit this as a proof of any peculiar power in the stramonium, as there are many instances of other narcotics having the same effect. I have no doubt that narcotics may be a remedy in certain cases of mania and epilepsy; but I have not, and I doubt if any other person has, learned to distinguish the cases to which such remedies are properly adapted. It is therefore that we find the other narcotics, as well as the stramonium, to fail in the same hands in which they had in other cases

seemed to succeed. It is this consideration that has occasioned my neglecting the use of the stramonium, and therefore prevented me from speaking more precisely from my own experience on this subject.

[* Stramonium is an article of great powers and value. In the practice of the United-States, the extract and seed of the plant have, in many cases, afforded essential relief in epilepsy. Some such cases have fallen under my own notice. In mania, I have found the good effects of the medicine more constant: and I have even the satisfaction of asserting, that by means of this narcotic I have cured several cases of mania and melancholia. As I am compelled to be of opinion, that the practice in maniacal affections, must be often necessarily empirical, I shall not venture in this place, to offer my (occasional) opinion concerning the forms or varieties of mania to which this medicine is adapted. I will only observe, that I have seldom found it of use in manias of great arterial excitement.

The extract and seed of stramonium are well suited to many cases of rheumatism, especially syphilitic rheumatism, and have been employed, with advantage, in ulcerous affections attended with high irritation. Even in cancer they have afforded essential relief.*]

LAURO-CERASUS.

THIS is a sedative of the most powerful kind, but hitherto little employed as a medicine; but I enter upon the consideration of it here, as the matter it contains, which renders it so powerful, is also present in several substances which have been frequently employed as medicines, and whose properties therefore may be best illustrated by treating first of the Lauro-cerasus.

Since the year 1733, when the first account of the poisonous quality of the lauro-cerasus was published, many experiments have been made, which all concur in showing, that the distilled water from this plant is one of the most powerful poisons that we are acquainted with; and these experiments have now been published in so many books, that it seems quite unnecessary to repeat them here.

The operation of this poison has been very various, according to the dose in which it has been employed, and to the size, perhaps the constitution, of the animal to which it has been applied; but in a certain dose it has universally proved a fatal poison. In many cases it has very immediately induced death, without any previous

disorder; and if, in other cases, it has excited convulsions, tetanus, palsy, and several evacuations, it does not seem owing to any peculiar property of this poison, but to the moderate dose of it, which, during its gradual operation, allows a various reaction of the system. We have a fine illustration of this in LANGRISH'S experiments, in which, p. 67, he tells us that one ounce of laurel-water will occasion more violent and stronger convulsions than five or six ounces will do. For this he gives a theory which I do not understand; and I think it needs no other than that the larger dose proves more immediately fatal.

The tendency of the lauro-cerasus is plainly to destroy the mobility of the nervous power, and thereby the vital principle; and, when employed in sufficient quantity, it does this very suddenly in every animal to which it has been applied, without exciting inflammation in the part to which it had been more immediately applied, and without producing any sensible change on the state of the fluids. If it seems to some persons to coagulate, and to others to render the fluids more thin, we have not taken any pains to ascertain either of these facts, because there is no proof of its acting directly upon the fluids; and therefore, any changes which happen to appear in these must be imputed to a change in the action of the vessels, which we know has a great power in changing the state of the fluids. We must own, however, that to explain the effects of the lauro-cerasus in this respect, we know yet too little of the changes which the fluids are capable of undergoing by the various action of the vessels.

With respect to the sedative power of the lauro-cerasus, it may be remarked, that its operation upon the nervous system is different from that of opium and other narcotic powers, which, in their first operation, commonly induce sleep, and which I do not find to have been ever observed as the effect of the lauro-cerasus. May it be supposed that the animal and vital functions depend so much upon a different condition of the nervous system, that one kind of poison may act upon one of these functions more readily than upon the other, while another kind of poison may act more directly upon that other set of functions, and less upon the former. If there is any foundation for this supposition, we might say that the narcotic poisons act first upon the animal functions, though their power may at length be extended also to the vital; and that the lauro-cerasus, and other poisons analogous to this, act more immediately upon the vital functions, without showing any intermediate affection of the animal. If such a speculation may be indulged, we would al-

lege that the poison of the mad dog seems to operate more immediately upon the natural functions than upon either the vital or animal. But whether such speculations are to be indulged, or what application they are capable of, we must leave to future philosophers to judge.

The active matter of the lauro-cerasus lies in its most volatile parts, and is therefore readily carried over with water or spirit in distillation, and may be still rendered more active by cohobation, and especially if, without any addition of water, it is distilled in *balneo mariæ*. In distillation with water, it gives out an essential oil, which, either taken by itself, or diffused, as it may readily be, in the distilled water, shows that it contains some of the most active parts of the plant.

By these operations for obtaining the more volatile parts of the lauro-cerasus, a singularly powerful poison is obtained; but the same power is also to be found in the entire substance of the plant, with this difference only, that this, to show the same degree of power, must be employed in much larger doses than the other. This explains very well why a portion of the plant, often employed as an article of diet, had not before discovered its poisonous quality: And this leads me to remark, that even since its poisonous qualities have been discovered, it has been proposed to be employed as a medicine, either by employing the volatile parts in small doses, or the substance of the whole plant in larger. That a matter of such power in changing the state of the animal œconomy should, in certain circumstances, prove a medicine, we can have no doubt; but we have not yet learned to what circumstances of disease it is peculiarly adapted. Its power of rendering the blood more fluid is not certainly or universally proved; and though it were, as, by the reflection we made above, the change that appears is more probably depending upon the state of the vessels than any direct action upon the fluids; so we hold this state of matters to be too mysterious to admit of any application in medicine. We must remark further, that all judgment made from the state of the blood drawn out of the veins to that of its state in the blood-vessels, is extremely fallacious, unless a nice and strict attention is given to the circumstances of the extravasation, and which we have not found to be commonly bestowed.

There is a circumstance commonly taken notice of in favour of a fluidity being induced by the lauro-cerasus, which is, that the blood in several places is found to have passed from the red vessels into the serous; but as this seems to have happened only after frequent and strong convulsions, it is with more probability imputed

to an increased action in the arteries, which has often this effect of pushing red blood into the serous vessels than to the increased fluidity of the mass: and it is in the same manner that we would account for the fullness of the veins and the emptiness of the arteries, which have been found to be the effects of the lauro-cerasus. To confirm these opinions with regard to the fluidity of the blood, and the application of it to medicine, it is only necessary to add, that when the lauro-cerasus is given in such a manner as instantly to kill, without occasioning almost any other disorder, there is not any mark of change in the state of the blood to be perceived; and upon that occasion, that the death is owing to an operation upon the blood, I believe there is no other physiologist in Europe, except the Abbe Fontana, who can imagine.

I have made these observations to prevent any rash application of the lauro-cerasus, from the supposition of its producing a fluidity of the blood: and I find no proof of its having been applied, upon that supposition, to any good purpose; and particularly that it has been of use in cases of phthisis pulmonalis, or that it has been of use in resolving obstructions of the liver, seems to be concluded upon too few experiments.

Although we do not find the benefit of its internal use in resolving obstructions well ascertained, we are somewhat disposed to believe, that its external use may be useful in resolving certain schirrosities. Even this power, however, is not sufficiently ascertained, though we shall hereafter mention some analogies that seem to support it. By another analogy also, I find a virtue ascribed to the lauro-cerasus rendered very probable. Dr BROWNE LANGRISH tells us, that the lauro-cerasus in his neighbourhood was frequently employed in the cure of agues. He unhappily omits the dose, manner of administration, or peculiar circumstances of the disease;* but the experiments of BERGIUS with bitter almonds sufficiently confirm the general power of such bitters in the cure of intermittents.

We do not find room to say any more on the medicinal virtues of the lauro-cerasus; but, from its general power, they are certainly probable, and will, hereafter, in the hands of a future STORCK, be

* Dr LANGRISH's words are these:—"I have lately been told that the powder of dried laurel-leaves is much used in my neighbourhood, as a certain cure for an ague, by giving as much of it as will lie on a shilling, in a glass of white-wine, two hours before the fit, and repeating it three times. It is held in great esteem among the poorer sort of people, and is said to have good success." Physical experiments upon brutes; &c. p. 122. London: 1746.

ascertained. To encourage such inquiry, we must remark, that the lauro-cerasus has hardly in any experiment shown any tendency to produce topical inflammation; and in many experiments on brutes, though the employment of the lauro-cerasus has been carried so far as to produce various and violent disorders of the system, yet upon withdrawing the exhibition of it, the animal has soon after recovered a seemingly entire state of health. These may give encouragement to some trials; but I hope it will never be forgot, that a matter which has so strong a tendency to extinguish the vital principle is to be employed with the utmost caution.

[*The chemical analysis of the lauro-cerasus has lately solicited much attention. The leaves are found to contain, in considerable quantity, the prussic acid: and it is the opinion of respectable writers, that this acid is essential to the constitution of the narcotic and deleterious principle of this plant.*]

Here, immediately after the lauro-cerasus, it seems proper to mention some articles of the materia medica which contain the same kernel bitter, and which can be extracted from them in such a manner as to show the same deleterious power; but as they contain it in a less concentrated and weaker state, they are therefore more readily to be admitted as articles of the materia medica.

The first we shall take notice of is the

CERASA NIGRA.

THE kernels in the stones of these fruits do certainly contain a like matter with the lauro-cerasus; and by a certain management a very powerful poison can be obtained from them, but certainly they do not contain it in the same proportion: and it is a question with me if the distilled water, as formerly extracted from black cherries and their bruised kernels, contains it in such a quantity as to engage the colleges both of London and Edinburgh to reject an agreeable water from their dispensatories. If the kernels are bruised only so far as necessary to the breaking of the stones, and at the same time that a good deal more water is added than the weight of the cherries, and that less than the whole of this is drawn off, I am persuaded that such a water will be very safe, and particularly in the quantities employed in our juleps. I shall not indeed advise the tampering with such a matter in the case of infants; but surely that a matter, under a certain preparation, and in a certain dose, being a poison, will not, in the present age, be an objection to its being employed in other circumstances as a medicine.

I might here take notice of the flowers and leaves of the peach tree, all of which contain the kernel bitter; but after what I have said of the black cherry, and am to say of the bitter almond, I do not think it necessary to speak of substances which I have not been acquainted with in practice.

AMYGDALÆ AMARÆ.

THESE have been long known to be a poison with respect to many brute animals; and there are some instances alleged of their being such to men. We at present understand this, from observing that they contain the same peculiar bitter that is found in the lauro-cerasus, and in the other kernels mentioned above. It is alleged that they are not so powerful with respect to men as they are to other animals; and they have, in a certain quantity, been often admitted both in diet and medicine. Their medicinal qualities, however, are, as I have said before, not well ascertained; but there is one virtue, which is, their being a remedy in inter-mittent fevers, that is well established on the authority of the learned BERGIUS.

His manner of administration is the following: He takes two drams of soluble tartar and an ounce and half of honey. These he diffuses in a pound of water; and with this water he makes an emulsion with one ounce of bitter almonds, to be strained in the ordinary manner. Of this emulsion he gives, during the intermission, a pound or two every day, and says that, by this remedy, the recurrence of fits is prevented. He acknowledges, indeed, that certain fevers have resisted this remedy, and obliged him to have recourse to the bark; but even then, with the decoction of the bark, he mixes the bitter emulsion. And he says also, that he had seen inter-mittent fevers frequently recurring, and which had entirely resisted the bark, at length entirely cured by the bitter emulsion alone. I have had so little opportunity in this country of practising upon inter-mittent fevers, or upon any but those which readily yield to the bark, that I have never had occasion to imitate the practice of BERGIUS; but if I were to have the opportunity, I should certainly proceed with some caution in exhibiting such quantities of the bitter almond.

The ancients had an opinion, that bitter almonds taken before drinking wine would prevent this from causing ebriety; but JOHN BAUHIN, from experiments made on purpose, denies them to have this power.

CAMPHIRE.

THIS is a substance, whether chemically or medicinally considered, of a very peculiar nature.

The chemists have subjected it to many experiments, and given us many particulars with respect to its chemical history; but I do not find that they have clearly ascertained its composition, and I cannot indeed perceive that their experiments have any influence in the consideration of it as a medicine. They have given us some instruction in the pharmaceutic treatment proper for its most convenient exhibition; but they have not given us any preparation of it, that either increases or diminishes its powers with respect to the human body. I hold it therefore unnecessary here to enter into its chemical history.

This substance, as we have it in our shops, and employ it in medicine, is obtained from a tree now sufficiently known to our botanists, and distinguished by the trivial name of *Laurus Camphora*.* What we employ is chiefly the growth of Japan, though there are several other trees in the East Indies which afford the same substance. But as I do not know that the camphire obtained from these other trees is ever brought into Europe for the purpose of medicine, or, if they are, that they differ in the least from that which we commonly employ, I do not think it necessary for me to prosecute the natural history of it further; nor is it anywise proper for me to speak of the manner in which this substance is obtained from the trees affording it; of the different states in which it is found and transmitted to Europe; or of the several operations by which it is brought into that form in which we have it in our shops.

These are particulars that may be of some curiosity with respect to chemistry and trade; but there is certainly no foreign drug so little liable to any variation or adulteration, or that comes into our hands so steadily and uniformly of the same appearance and qualities, and therefore requiring less of our acquaintance with its previous history.

With a view to its medicinal history, it may be proper to remark, that since we became acquainted with this peculiar substance from the East Indies, the chemists have supposed, that a substance

* It has of late been doubted, whether the genuine camphire be really the produce of the *laurus camphora*, or indeed of any other species of the genus *laurus*.

precisely of the same kind was to be found in many European plants. In many instances they have supposed this without any clear proof; but they have certainly, in several instances, demonstrated its existence in the clearest manner. It does not however seem necessary to enter into any enumeration of those plants; because, even in the instances in which the presence of camphire is most clearly demonstrated, it is even in these in such small proportion, that it has not given any modification of their ordinary virtues, or that these substances have been employed, or can be employed, as a medicine, for the purposes which camphire, in its separate state, is or may be employed.

After setting aside so many particulars that might have entered into a treatise of camphire, it is time for me now to come to my proper business, which is the consideration of camphire as a medicine. This I find to be a difficult task, as I must encounter the various and contradictory opinions that have been maintained with respect to it.

The opposition of opinions appears strongly from hence, that the controversy has been commonly brought into the single question, Whether camphire be a heating or a cooling medicine with respect to the human body? or, as I would put it in other words, Whether it is a stimulant or a sedative power? The question has been often attempted to be determined by frivolous and ill-founded theories, both on one side and the other; but these shall be here entirely neglected, as we judge the question must be absolutely determined by experiments made upon the human body, assisted however by some analogy, wherever it can be safely drawn from experiments on brutes.

To this purpose we remark, in the first place, that camphire taken into the mouth is of an acrid taste; and though, by its evaporation, it excites a sense of cold air, what remains is a sense of heat in the mouth and fauces: and when taken down into the stomach, it often gives some pain and uneasiness, which we impute to the operation of its acrimony upon the upper orifice of that organ. These may be considered as marks of its heating quality; and the same are more strongly marked by its application to any ulcerated part, which it always evidently irritates and inflames.

These are indeed marks of a stimulant power; but hardly any thing corresponding to these appears upon its being thrown into the stomach of man or brute animals. It appears that in the stomach of animals it operates there by a small portion of its effluvia; for when a mass of any bulk has been thrown in, though it has

produced considerable effects upon the body, neither the bulk nor weight of what had been thrown in are found to be sensibly diminished: and in such cases it cannot be doubted that the operation has been entirely upon the nerves of the stomach, and by these on the rest of the system. This operation seems to me to be entirely that of a sedative power; and we take its being of that kind on the stomach itself, which occasions the indigestion of the food which has been constantly observed to follow its exhibition in any large quantity.

The sedative effects, however, are still more evident and considerable in the sensorium. The death of so many animals, suddenly occasioned by it, in the experiments of MENGHIN, can be explained in no other way but by the power of this substance, like that of other poisons, in destroying the mobility of the nervous power, and thereby extinguishing the vital principle. It is in illustration of this that it so often operates by first inducing stupor and sleep; and the other symptoms of delirium, furor, and convulsions, can all be probably explained as we have done with respect to other poisons, by the struggle that occurs between the force of the sedative power and the reaction of the system.

But before we go further, it is proper to enquire what are its effects on the sanguiferous system. And here at least we can assert that it shows in the first instance no stimulant power. I regret, that in the account of the experiments on brutes that we have met with, there is no mention of the state of their pulse; but I think we have enough of experiments on men to ascertain this matter. The experiments of HOFFMAN assure us, that the pulse was not rendered more frequent, or the skin warmer, by twenty grains and upwards of camphire being taken into the stomach. The experiments of GRIFFIN and ALEXANDER rather show that the frequency of the pulse was diminished by large doses of camphire. To these we may add the experiments of BERGER, WERLHOFF, LASSONE, HOME, and especially those of COLLIN.

The last, in giving some hundred instances of the exhibition of camphire in large doses, even to the quantity of half an ounce in the course of one day, has not in any one instance taken notice of the frequency of the pulse, or of the heat of the body being increased by it. In the case in which half an ounce of camphire had been exhibited, the patient was examined by the Baron VAN SWIETEN, and some other physicians, who could not miss to have taken notice of its heating the body, if any such effect had appeared. I myself have frequently given twenty grains of camphire, without ever find-

ing the frequency of the pulse increased by it, and sometimes manifestly diminished.

I once had a maniacal patient, a young woman between twenty-five and thirty years of age, whom I was resolved to try the cure of by camphire; and beginning by five grains for a dose, and increasing it by the same quantity every evening, I brought it at length to a dose of thirty grains; and that dose, in imitation of Dr KINNIER, I repeated for four nights together: During all this I never found the frequency of the pulse increased; and when the larger doses were employed, the pulse was frequently brought to be ten strokes fewer in a minute than it had been before. At the same time, so little change was made in the state of the mania, that I was resolved to give up the trial; but the apothecary, by a gross error in BADDAM's abridgement of the Philosophical Transactions, was led to think that I had mistaken Dr KINNIER's practice, and had not carried the dose of camphire so far as he had done. Proceeding upon this supposition, he presumed to give forty grains of camphire for the next night's dose. In about half an hour after this had been exhibited, I was sent for to see my patient; who, after beating upon her breast, as if she had felt some uneasiness there, had fallen down seemingly in a faint. She appeared to me quite insensible, with her pulse very weak and hardly to be felt, and her breathing hardly to be observed, with a paleness and coldness over her whole body. I judged her to be dying; but by holding some spirits of hartshorn to her nose, and chafing her extremities with warm flannels, she was so far recovered as to swallow a little warm milk, and afterwards a little warm wine; and by these measures continued for two or three hours, her pulse and the heat of her body were a good deal recovered, and she had the appearance of being in a sleep, in which she was allowed to continue till morning, when she came out of it by degrees, with her pulse very much in its natural state. At the same time the mania was also in the same state as before, and continued to be so for some months afterwards, when I ceased to enquire after her.

DR HOFFMAN gives us the history of a person who, by mistake, took at one draught two scruples of camphire, which occasioned violent disorder; but the operation was at first like that in the case above mentioned, a weakness and paleness of the whole body, which evidently showed a sedative operation.

From so many experiments directly in point, I shall be surprised if any body shall deny the sedative and assert the stimulant power of camphire; and when I find QUARIN giving the following account:

“*Vidi enim* (he says) *in multis, quibus camphora majori dosi exhibita fuit, pulsum celerrimum, faciem ruberrimam, oculos torvos, inflammatos, convulsiones et phrenitidem lethalem secutam fuisse;*” I, who in a hundred instances of the exhibition of camphire, both in smaller and larger doses, never saw such effects produced, must think that either he or I had our senses strangely biassed by preconceived opinions of the stimulant or sedative power of camphire. I am, however, the more disposed to trust to my own senses, because I have frequently had my fellow-practitioners concurring with me in the same perceptions.

But it is time for me to remark, that all observers are liable to some uncertainty and ambiguity in these matters. I am well persuaded, that in the case of all poisons which do not immediately and entirely extinguish the powers of life, there is a reaction of the system which has a tendency to resist and to overcome the power of the poison; and that this reaction operates in various ways, sometimes in exciting the action of the heart and arteries, producing fever; sometimes in exciting the energy of the brain, and producing convulsions; and probably in other ways which we do not clearly perceive or can explain. But it is enough that such a power exists, and that its effects are often so mixed with those of the poison, as to render it difficult, in most cases, to determine what are the effects of the one or of the other, and has certainly occasioned many phenomena to be imputed to the direct action of the poison, which are, however, purely the effects of the reaction above mentioned.

We do not, however, venture upon assigning these effects more particularly, as I perceive that they are greatly diversified, according to a variety of circumstances; as, *1st*, the power and activity of the poison; *2d*, the quantity of it, and as it has been more or less suddenly introduced; *3d*, the size of the animal to which it is applied; *4th*, the constitution of the animal, as more or less powerful in reaction; and *5th*, according to the time which has been allowed for the operation of these circumstances. This will perhaps remove some of those difficulties which might otherwise have occurred.

It particularly might be alleged in favour of the stimulant power of camphire, that in the animals which have been killed by large doses of it, many of the viscera have been found in a very inflamed state; but I cannot allow this to have been the direct effects of the camphire: for there are no instances of this inflamed state appearing in the animals killed soon after the taking in of the poison.

The suddenness of the death, in many cases, occasioned by a direct

action on the nervous system, allows of no supposition of previous inflammation; and the sudden recoveries which have sometimes happened after very large doses, assure us that in such cases no inflammation had been formed in any part of the body. It seems therefore certain, that inflammation is not the direct operation of this substance, and that the inflammation sometimes found, as above mentioned, must be imputed to that agitation of the system produced by the conflict that had subsisted for some time between the powers of the poison and of the reaction.

It is true that camphire shows a stimulant power in parts of great sensibility, as in the mouth, in the upper orifice of the stomach, and in ulcers where the nerves are laid bare; but there is no proof of its taking place in any other part of the system: and how little it is disposed to operate in this manner, we may judge from hence, that, rubbed upon the skin in the most concentrated state, it produces no redness or other mark of inflammatory action there; and we shall have occasion to observe below, that it has a special power in taking off the inflammatory state of the subjacent parts.

I have thus endeavoured to ascertain the operation of camphire in general upon the human body, and have especially endeavoured to correct the most common opinion, that of its calefacient power; which I think has on many occasions perverted the practice.*

Having thus ascertained the general operation, we are next to enquire what are the diseases to which it is more especially adapted. And in doing this, we find it difficult to repeat after practical writers, both on account of their different opinions with respect to the general operation, and with respect to the pathology of the diseases in which they employ this medicine, as these different opinions very much affect their reports on this subject.

It has been much employed in fevers of all kinds, particularly in nervous fevers attended with delirium and much watchfulness; and in such I have frequently employed it with advantage. Some time ago, I have often seen it employed by my fellow-practitioners in such cases: and that the good effects of it did not always appear, I imputed to its being used only in small quantities. Since we came into the free use of wine and opium, camphire has been little em-

* I have employed camphire in not a few cases of disease; and have satisfied myself, that it is truly a stimulant medicine. This is also the opinion of many eminent practitioners, among whom I may mention WHYTT, the second MONRO, and HEBERDEN.—The stimulant power of this article upon vegetables has been satisfactorily proved. See Transactions of the American Philosophical Society, vol. iv.

ployed in the practice of this country. The use of it, however, has been very fully established by some of the most eminent physicians on the continent: Among these I reckon the late learned and experienced WERLHOFF, who often employed it in many inflammatory diseases with great benefit, and plainly gives us his opinion in favour of its refrigerant power.

The use of this medicine has been especially remarkable in putrid fevers, of which indeed we have not many instances in this country: but from the very remarkable antiseptic powers which it discovers in experiments out of the body, it is very probable that when thrown into the body in large quantities, so that at least its more subtile parts may be diffused over the whole system, it may be expected to produce considerable antiseptic effects. Its power in resisting and curing gangrene in the experiments of COLLIN, are very remarkable; but whether that power be owing to its antiseptic virtue alone, or to its operation at the same time on the nervous system, I would not rashly determine.

Both from its use in low, or what are called Malignant Fevers, and from its antiseptic powers, it is highly probable that it has been of great service in the confluent small-pox. It is also likely that it may be of service in favouring the eruption of exanthemata, and of bringing them back to the skin, when from any cause they had suddenly receded, though I have no particular experience of this.

These are the cases of acute diseases in which camphire has been useful; and its use in many chronic cases is equally well authenticated. Whenever diseases depend upon a mobility of the nervous power, and an irregularity of its motions, it may be expected that such a powerful sedative should be of service. Accordingly, many practitioners have reported its virtues in hysteric and hypochondriac cases; and I myself have had frequent experience of it.

In spasmodic and convulsive affections it has also been of service; and even in epilepsy it has been useful. I have not indeed known an epilepsy entirely cured by camphire alone; but I have had several instances of a paroxysm which was expected in the course of a night, prevented by a dose of camphire exhibited at bed-time; and even this when the camphire was given alone: but it has been especially useful when given with a dose of cuprum ammoniacum, of white vitriol, or of the flowers of zinc.

Since the report of Dr KINNIER, in the Philosophical Transactions, Vol. XXXV. camphire has been often employed in cases of mania; and I have given above an account of a trial which I had

made of it. In that case, however, it was not successful; nor in several other trials has it been more so with me or other practitioners in this country.

We have had here lately, in a patient under the care of Mr Latta, surgeon, a notable example of the use of camphire in a maniacal case, which I think it proper to take notice of here.

A young man of sixteen, seemingly of a sound constitution, without any previous cause that could be assigned or suspected, was affected with a loquacity very unusual with him. It continued for some weeks, but at the same time with some confusion of head gradually increasing to somewhat of delirium; and these symptoms for some weeks went on gradually increasing till the patient became quite maniacal, and so unmanageable as required his being tied down to the bed. In this state, bleeding, blistering, vomiting and purging, and every other remedy that could be thought proper, were employed with great assiduity, without any effect however in moderating the disease. It was then thought proper to try camphire. He got it at first in doses of five grains three times a-day; and this dose was repeated every day, and increased by two grains till it came to be above sixty grains, given three times every day. Whilst the doses were not more than two scruples, they seemed to have no effects either good or bad; but as the doses were farther increased, they came by degrees to give more sleep, and in the intervals of that to render the symptoms of the mania more moderate. And before the doses came to be so large as I have mentioned, his sleep came to be more and more, and his senses came to be in the ordinary state of health; and, with very little interruption, from an accident which we could account for, a very perfect state of health has continued ever since, which is now for seven months.

This shows clearly enough the power of camphire in mania; and I have only to add, that though in several other instances it has not made a cure, it has not in any instance of a moderate dose, that is, not exceeding half a dram, occasioned any disorder in the system; and in several cases it has induced sleep, and rendered the mind for some time more quiet.

I observe that De BERGER has been more successful; and perhaps the reason of our failure has been our not attending to his admonition. In his letter to WERLHOFF on the subject of camphire, he has the following passage: "*Multoties hoc remedio in mea praxi utor, præcipue in inflammationibus internis, magno cum successu, et demiror tam multos medicos ab usu ejus interno abhorrere.*"

Non diu est, quod præmissis præmittendis maniacum eo sanitati penitus restitui. In eo vero momentum præcipuum situm est, ut sufficiente dosi et diu satis exhibeatur."

This is particularly confirmed by a case given by JOERDENS in the *Commercium Norimbergense*. In several other writers there are accounts of maniacal and melancholic cases cured by the use of camphire; but many of the practitioners who report such cures acknowledge, that in many cases it had disappointed their expectations. Whether these failures have been owing to the not employing at the same time nitre, vinegar, and some other remedies which are supposed to contribute much to the virtues of camphire, we would not determine; but we are clear that mania is a disease of considerable diversity with respect to its causes, and that there are certain cases of it only to which camphire is properly adapted. In cases of an organic affection of the brain, it is hardly to be supposed that camphire or any other remedy can be of use.*

I have mentioned above, that several practitioners have employed camphire in the most acute inflammatory diseases; and therefore we are not surprised to find that it has been given also internally in cases of acute rheumatism; and it is said to have been with advantage. We have no experience of it, because we have found another method of cure generally successful; but I take this occasion to mention its external use, as often of great service in removing the rheumatic pains of the joints or muscles. This we have often experienced, and have no doubt of camphire having a peculiar power in taking off the inflammatory state in cases both of rheumatism and gout. In the case of rheumatism it is a matter of common experience: in the case of gout it is more rare; but I have had the following particular example of it. A gentleman had brought from the East Indies an oil of camphire, a native substance, which seemed, by its smell and taste, to be no other than camphire in that form, and which I perceive to be mentioned by naturalists as a native substance, produced by several trees in the East Indies. This the person possessed of recommended to all his acquaintances as an infallible remedy for gout and rheumatism; and a gentleman who had often laboured under the gout, and then felt the pains of it unusually severe, was persuaded to apply it. He had then the gout exceedingly painful in the ball of the great toe and instep of one foot. On this part he rubbed a quantity of the oil of camphire;

* I have certainly employed camphire with advantage in some cases of mania. In one case, which occurred under my care in the Pennsylvania Hospital, it effected a complete cure.

and in about half an hour or a little more he was entirely freed from the pain he had before. In less, however, than an hour after, he had a pain and inflammation come upon the same part of the other foot. As the pain here became pretty severe, he again employed the oil of camphire, and with the same effect of soon relieving the pain very entirely. The consequence of this was also the same; for in less than an hour the pain and inflammation returned to the foot that had been first affected: and here again our patient, obstinate in persisting in the trial of his remedy, again applied the oil, and he had the same success as before in relieving the part affected, and with the same effect also of occasioning a translation. But here the translation being made to the knee, the patient abstained from any farther application of the oil, and suffered the pain of the knee to remain for a day or two, and till it went off by some swelling and desquamation in the usual manner.

This history shows sufficiently the power of camphire in relieving the inflammatory spasm and pain of the part chiefly affected; but at the same time that it has no effect on the diathesis of the system, and that, when that subsists, as camphire is ready to occasion a translation, it will always be employed in gouty cases with great danger. In cases of acute rheumatism, we have had occasion to remark, that a strong solution of camphire in oil would relieve the pain of the joint for the time chiefly affected; but it was very often with the translation of it to another joint soon after; and we have therefore long ago ceased from employing such an application in all cases when an acute rheumatism was very general and strong in the system.

It may be supposed that it is analogous to this power of camphire in taking off an inflammatory state, that this medicine has been often found so useful in relieving toothach; and I have no doubt that camphire operates by the power mentioned in relieving toothach; but it is also by exciting a copious flow of saliva and mucus from the internal surface of the mouth, that water somewhat impregnated with camphire, employed to wash the mouth, has been frequently of service in relieving the disease.

However it may be with respect to toothach, we have no doubt that the antiphlogistic nature of camphire may be of use in curing ophthalmia: and this gives a good ground for the many attempts that have been made to introduce camphire into the medicines intended to be employed externally in the cure of ophthalmia.

We have now mentioned many of the virtues of camphire as em-

ployed by itself, and must now mention some instances of its peculiar utility when combined with other medicines.

When combined with drastic purgatives, it is said to moderate their acrimony, and thereby their violent operation. We have not indeed perceived this, and perhaps never tried it in a proper manner; but in the mean time, the respectable authority of Mr LASONNE the father satisfies me that it is well founded.

Another opinion that has been very general is, that camphire has the power of correcting the acrimony of cantharides. In opposition to this, we would not quote the facts given by Dr HEBERDEN of two several instances in which camphire seemed to occasion strangury; for I must conclude these facts to have been very accidental occurrences, as I have employed camphire fifty times, even in large doses, without my ever observing its having any effect upon the urinary passages. Mr LASONNE the father has observed, as I have done frequently, that camphire, though given very largely, never discovers its smell in the urine, whilst it frequently does it in the perspiration and sweat.

It was formerly a frequent practice in this country to anoint a blistering plaster that was to be applied to the back, or other part, with camphorated oil, and this with a view of preventing strangury from the cantharides. The practice however has been long ago laid aside, because it was perceived that, in most persons, if the plaster was allowed to continue applied for above twelve hours, and while at the same time it was omitted to give the patient a large quantity of drink, a strangury would come on notwithstanding the unction of camphorated oil, and even the exhibition of a quantity of camphire internally. The practitioners of this country have lost their faith in the power of camphire in correcting the acrimony of cantharides; and for preventing the strangury that might otherwise arise, they trust entirely to a large exhibition of Arabic emulsion, and to the plaster's not being allowed to lie on too long.

Another virtue ascribed to camphire in combination, is its moderating the action of mercury; and if the saline preparations of mercury are triturated with a portion of camphire, this abstracts a part of the acid that had been united with the mercury, and therefore renders the preparation more mild than before, and at the same time does not deprive entirely the preparation of much of its deobstruent virtue. This we have had experience of in that very acrid preparation of mercury the turbeth mineral, and also in the mercurius dulcis or calomel, which, by being triturated with camphire, becomes less purgative, and less ready to excite salivation. How

far this mitigation of the preparations of mercury leaves them equally powerful as before in the cure of syphilis, I cannot certainly determine ; but am of opinion that it does not, if they be employed in the same quantities as they would have been before.

This mitigation of the saline preparations of mercury, by a combination with camphire, will be readily admitted ; but many practitioners go farther, and allege that mercury, in every condition, united with camphire, becomes a more mild substance, less irritating to the system, while it is equally powerful in curing the diseases to which it is otherwise adapted. I must admit the experience of the practitioners of France in this matter, but those of this country know nothing of it ; and I can assert, that in many trials, a quantity of camphire added to our common mercurial ointment neither prevented the unction, in the usual quantity, from exciting salivation, nor rendered the symptoms of it more mild than usual.

A peculiar combination of camphire, said to have considerable effects, is that with opium. The employment of opium is in many persons attended with some inconvenience and disorder, as I have observed above ; and every practitioner knows it to be alleged by some respectable persons, that camphire joined with it prevents these disorders. It may be so, but I have not found it in my experiments. I have found large doses of camphire dispose to sleep, but commonly with that same confusion of head and turbulent dreams which sometimes arise from the use of opium ; and I have not found that a small quantity of camphire has any effects in increasing the power of opium, or of rendering the operation of it different from what it would have been if employed alone. But against the respectable authorities of LASONNE and HALLE, I must suspect that my experiments have not been made properly or often enough.

There is still another instance of the improvement of a medicine by a combination with camphire. Mr LASONNE assures us, that camphire joined with the Peruvian bark gives it more energy and force, whether it be to be employed for the purpose of curing fever or gangrene ; and I believe this to be well founded.

After thus treating of the virtues of camphire, we must speak of its dose and exhibition. It will appear clearly from what is said above, that it may be given in doses of very different quantities ; and it appears to me from many trials, that doses of a few grains, repeated only after long intervals, have hardly any effect at all ; and that, to obtain sensible effects from it, it must either be given in

large doses, not under that of twenty grains, or, if given in smaller doses, these must be repeated frequently after short intervals. The latter practice is preferred by some eminent practitioners. To what length in either way we may proceed, I have not experience enough to determine with any precision. From the effects of two scruples given in one dose in the case narrated above, and in another quoted from Dr HOFFMAN, it would appear that such doses are violent and dangerous; but from some other experiments, it appears that larger doses have been sometimes given with impunity: and when it is given in divided doses, it appears from COLLIN'S experiments, that it may be given to the quantity of a dram, or two drams in the course of a day; and in one of his experiments it was given to the quantity of half an ounce: and the same will appear from the history which I have given above. It is probable that from large doses only, considerable effects are to be expected; and as, from many experiments, it appears that the effects of camphire are not very durable in the body, it will be obvious that the repeated and long continued use of it may be necessary to the cure of several diseases.

With respect to the exhibition of this medicine, it is, in the first place, necessary that it should be always very minutely divided, as we know it is not readily dissolved in the stomach; and while it remains there, it will float on the surface of the other contents, and in that way be applied to the upper orifice of the stomach, and give occasion to some pain there. It ought therefore to be minutely divided before it be given; and this may be done by rubbing it first in a mortar with any dry powder, such as nitre or hard sugar: but to make certain of a minute division, it is proper at the same time to add a few drops of rectified spirit of wine, or of other such spirituous menstruum as the spiritus vitrioli dulcis, or liquor anodynus mineralis of HOFFMAN.

It may also be divided by rubbing it with the mucilage of gum arabic; but this will also be more perfectly executed if the camphire is previously dissolved by a little spirit of wine or expressed oil. By its being diffused in the mucilage of gum arabic, it may be again diffused in any watery fluid for more convenient exhibition; but it is to be observed, that camphire diffused in a watery fluid is ready to exhale from it, or arise to its surface, and to render the exhibition more disagreeable. When, therefore, any large quantity of water in which camphire is diffused is to be prepared at once, it is proper to employ some means for entangling the camphire. Sugar alone does not seem to be sufficient for the purpose; and it

is more effectually done by triturating the camphire with mucilage alone, or with a portion of sweet almonds, and diffusing it again by means of mucilage into an emulsion.

It has been thought that the virtues may be increased by exhibiting along with it a portion of nitre; but in many trials I have not been sensible of the benefit derived from the nitre, which, in any quantity that can be conveniently employed, has little effect on the system. It is with more probability alleged, that vinegar exhibited with camphire is of service. Vinegar certainly gives the best means of correcting the taste of camphire, and seems even to render it less disagreeable to the stomach; and we may allow that both by its refrigerant and antiseptic powers, it may contribute somewhat to the virtues of the camphire.

THEA.

THIS is so universally an article of diet, that it deserves to be considered very fully. Being so much however an article of diet, it may be supposed that we should have treated of it in our first part; but as we cannot find it to afford any alimentary matter, and as its qualities give it the character of a medicine, we have reserved it for this place.

With respect to it as a subject of natural history, or as an object of commerce, having had no good opportunity of being properly informed, I must abstain from these discussions here, and must refer my readers to the information of the industrious Dr LETTSOME, who I believe has given it more fully and accurately than any other.

With respect to its qualities as a medicine, that is, its power of changing the state of the human body, we might suppose it ascertained by the experience of its daily use; but from the universality of this use in very different conditions of the plant, and in every possible condition of the persons employing it, the conclusions drawn from its effects must be very precarious and ambiguous, and we must attempt by other means to ascertain its qualities with more certainty.

To this purpose it appears, from the accurate Dr SMITH's experiments *De Actione Musculari*, No 36, that an infusion of green tea has the effect of destroying the sensibility of the nerves, and the irritability of the muscles; and from the experiments of Dr LETTSOME, it appears that green tea gives out in distillation an odorous water, which is powerfully narcotic.

That the recent plant contains such an odorous narcotic power,

we might presume from the necessity which the Chinese find of drying it with much heat before it can be brought into use; and that, even after such preparation, they must abstain from the use of it for a year or more, that is, till its volatile parts are still farther dissipated: and it is said, that unless they use this precaution, the tea in a more recent state manifestly shows strong narcotic powers. Even in this country, the more odorous teas often show their sedative powers in weakening the nerves of the stomach, and indeed of the whole system.

From these considerations we conclude very firmly, that tea is to be considered as a narcotic and sedative substance; and that it is especially such in its most odorous state, and therefore less in the bohea than in the green tea, and the most so in the more odorous, or what are called the finer kinds of the latter.

Its effects, however, seem to be very different in different persons; and hence the different, and even contradictory accounts that are reported of these effects. But if we consider the difference of constitution, which occasions some difference of the operation of the same medicine in different persons, and of which we have a remarkable proof in the operation of opium, we shall not be surprised at the different operations of tea.

If to this we add the fallacy arising from the condition of the tea employed, which is often so inert as to have no effects at all; and if we still add to this the power of habit, which can destroy the powers of the most powerful substances, we shall not allow the various and even contradictory reports of its effects to alter our judgment, with respect to its ordinary and more general qualities in affecting the human body.

These, from the experiments above mentioned, and from the observations which I have made in the course of fifty years, in all sorts of persons, I am convinced that the qualities of tea are narcotic and sedative.

It has been often alleged, that some of the bad effects imputed to tea are truly owing to the large quantity of warm water which commonly accompanies it; and it is possible that some bad effects may arise from this cause: but from attentive observation I can assert, that wherever any considerable effects appear, they are in nine of every ten persons entirely from the qualities of the tea; and that any like effects of warm water do not appear in one of a hundred who take in this very largely.

But while we thus endeavour to establish the poisonous nature of tea, we do not at the same time deny that it may sometimes show

useful qualities. It is very possible, that in certain persons, taken in moderate quantity, it may, like other narcotics in a moderate dose, prove exhilarating, or, like these, have some effect in taking off irritability, or in quieting some irregularities of the nervous system.

As its bad effects have been often imputed to the warm water that accompanies it, so we have no doubt that some of its good effects may also be ascribed to the same cause, and particularly its being so often grateful after a full meal.

CROCUS.

THE natural history and preparation of this medicine is so commonly known, and delivered in so many books, that it is now necessary to repeat any part of it here.

Chemically considered, it appears to be a very peculiar substance. It may be extracted by either spirituous or watery menstruums, by wine or by vinegar; and each of these menstruums take out the whole of its odorous, sapid, or colouring parts. The tincture in spirit of wine does not become milky by the addition of water, and the tincture in water is not rendered turbid by the addition of spirit of wine. Its odorous part rises in distillation, both with water and spirit; and it is alleged, that in the former case a portion of essential oil appears; but neither the quantity nor quality of this is well ascertained.

Although the odorous part of saffron arises in distillation with either menstruum, yet a great portion of fixed matter is obtained in the extracts; but the extract from water is very much changed from the nature of the entire saffron. That made with spirit of wine retains the sensible qualities of the saffron more entirely; but as there has been some dissipation of the odorous and volatile parts, we can hardly suppose that the concentrated tincture, or extract of Dr BOERHAAVE, can contain the whole of the medicinal substance of the entire saffron.

It seemed proper to give thus, as well as I could, the chemical history of this famous drug; but must remark, that from this chemical history we learn nothing towards pointing out or explaining its medicinal powers, nor indeed more from these than may be learned from its sensible qualities.

By these, being of some acrimony both in smell and in taste, it would seem that saffron might be very active with respect to the human body; but I have not been more puzzled upon any occasion than in ascertaining the medicinal qualities of this substance. The

writers on the materia medica have constantly spoken of it as a very active medicine; but their reports of its effects are in some instances manifestly extravagant, though repeated by Dr BOERHAAVE himself; and very frequent experiments in practice do not at all support the opinions that have been commonly entertained of it. I have given it in large doses, without its showing any sensible effects; hardly in any degree increasing the frequency of the pulse; and as anodyne or antispasmodic, I have hardly observed its operation.

It has been especially famous for its supposed emmenagogue powers; and in one or two instances I have had some reason to believe in its power of this kind: but in many other instances, though repeatedly employed in large doses, it has entirely disappointed my expectations.

The common accounts of its producing hilarity are strongly contradicted by the account of Bergius, whose words are, "Nobilis matrona semper in tristitiam illapsa est ingentem, postquam pulveres crocatis ei propinaveram." And his words before, "Vidi hystericas quasdam a propinato croco valde emotas," are more pointed in favour of its power than any thing I have otherwise learned. I have employed it in every shape, in substance, in tincture, and in BOERHAAVE's extract, and in larger doses than authors have ever proposed; but still I have not discovered in it any considerable power or virtue.

It does not appear that the London College had much faith in it, as they have omitted to give us any tincture of it. They have indeed retained it in the tinctura aloes composita, and in the pilulæ ex aloe cum myrrha, and in larger proportion than the Edinburgh College do; but I must observe that I have frequently prepared these compositions without any saffron at all, and at the same time could not discern any diminution of their virtues. But in thus disparaging the virtues of saffron, I must acknowledge, that by a little attention, I have found the saffron of our shops to be often in a very imperfect condition, and therefore, that my experiments may have been sometimes affected by this.

NYPHÆA.

I REGRET this standing in my catalogue, as it is now omitted in both the British dispensatories, and justly, as it has no virtue in its flowers; and though the roots have some astringency and bitterness, they have not so much as to deserve any place in our practice, when we have so many substances more powerful for the purposes for which these might be employed.

WINE AND ALCOHOL.

IN the catalogue of narcotic sedative medicines I have set down *wine* and *alcohol*; because it seems necessary to give them a particular consideration here.

Wine I have formerly considered as a drink, and have there said all that seemed necessary with respect to its preparation; and from the various causes of this we have endeavoured to explain its various conditions, particularly the different matters of which it may consist; and, as depending upon these, the various sensible qualities that may appear in the different wines that are employed in our diet.

In all this, which it seems unnecessary to repeat here, I have supposed, that what constitutes a wine is its containing a portion of alcohol; but the effects of this in diet I took little notice of, and mentioned only the effects that might arise from the other matters which might accompany it in the different wines appearing upon our tables.

It is, however, as containing alcohol that wines are to be considered as medicines; and the considering them as such we have reserved for this place, in which I have put them as narcotic sedatives.

That alcohol is such, can hardly be doubted; as, when only diluted with water so much that it can be swallowed, it shows the inebriating, intoxicating, and narcotic effects of other sedatives. When taken in small quantity, and much diluted, it does not indeed immediately show its sedative power; but, on the contrary, it may appear as a stimulant, cordial, and exhilarating liquor. As these operations, however, are in common to it with opium and other narcotics, they do not contradict our opinion of its proper sedative nature.

As in wine the alcohol is never in large proportion to the water at the same time present; and as in wine the alcohol is also blended with matters which diminish the force of it; wine can be, and is commonly, employed as a stimulant, cordial, and exhilarating liquor, more conveniently than alcohol could be in any other way.

This explains why wine has been most commonly considered as a stimulant; but it is equally well known, that when taken to a certain quantity, it exerts all the sedative powers of alcohol or opium: and its medicinal qualities, according to the quantities in which it is employed, may be either stimulant or sedative.

Whenever, without fever, there is any langour or debility in the system, wine can be employed in moderate quantity with great advantage; as in most persons it is not only grateful to the palate, but also to the stomach: in which, if its acescent effects can be at the same time avoided, its cordial powers are immediately perceived, as from the stomach they are readily communicated to the whole of the system.

These are the virtues of wine employed in moderate quantities: And it is to be remarked by the way, that by its particular operation on the stomach it excites the action of this, and thereby promotes appetite and digestion: and passing further into the intestines, it does not so readily as other narcotics suspend the action of these, and induce costiveness; but, on the contrary, by the mixture of its acescent parts with the bile, promotes the action of the intestines, and the evacuation by stool.

It may be further observed, that carried into the blood vessels, by the alcohol it contains it promotes perspiration; and by the water and saline matters at the same time introduced, it certainly passes to the kidneys, and promotes the secretion of urine.

Wine may produce all these effects, though taken in no large quantities; and they may be referred entirely to its stimulant powers or acescent qualities, which are in so far very commonly salutary.

It is difficult however to set the limits between its stimulant and sedative powers; and if the quantity of it be gradually increased, the latter gradually come on, and concurring with the former, produce at first a degree of delirium or ebriety, which is generally of the cheerful kind, and which occupying the mind, excludes all thoughts of care or anxiety: but the same sedative power carried on still further, renders the delirium more considerable, and gives that irregularity and confusion of thought which is the state of intoxication; and at length the sedative power entirely prevailing, the animal functions, both of sense and motion, are gradually weakened, and the person falls asleep.

After thus detailing the several operations of both the stimulant and sedative power of wine upon men in health, I proceed to mention their effects in the various circumstances of disease.

In the first place, it will be obvious, that when the system is under any irritation increasing the action of the heart and arteries, the stimulant power of wine, even in the most moderate degree, must be hurtful: and as there is hardly any irritation more considerable or

more permanent than inflammation subsisting in any part of the body; so in all pyrexia produced by inflammation, wine must be particularly pernicious.

We are also persuaded that all active hæmorrhagies are attended with an inflammatory diathesis; and therefore it will equally appear that wine is improper in such cases.

But we proceed no further on this subject of the use of wine in diseases, as it may be governed upon the same principles we have laid down above with respect to opium; with this difference, however, that if the sedative powers of either are to be sought for, they are to be obtained more easily and certainly by opium than by wine; but where the stimulant powers of either are separately, or as combined with the sedative to be employed, the management may be more easy and accurate with wine than with opium.

One question only on this subject remains to be considered, and that is, Whether alcohol, under any state of dilution, can be properly employed in place of wine and opium? We are of opinion, that in many cases it may; but that it will be always more difficult to separate the stimulant powers of alcohol from its sedative quality. In those cases, however, in which the stimulant powers are especially required, as in the case of resisting gangrene, the diluted alcohol may be employed as properly as wine; and therefore in the case of poor persons the former may be more convenient than wine.

CHAPTER VII.

REFRIGERANTS.

THESE are medicines supposed, as their title implies, to diminish the heat of the living body.

In many trials made on purpose, it has not appeared to me that the supposed refrigerants diminish that temperature of the body which is the ordinary temperature of it in health; and therefore I am disposed to define the refrigerants to be such medicines as diminish the temperature of the body when preternaturally increased. It is especially upon such occasions that their power is supposed and employed by physicians: and as the heat of the body, whether from internal or external causes, is never increased beyond its ordinary degree, but with an increased action of the sanguiferous system; so the refrigerants, as they diminish this increased action, are justly put under the general title of Sedantia; but being substances of quality and operation very different from those sedantia we have already considered, they are here to be treated of separately.

In what manner they produce their effects is not well ascertained; and whether they act by diminishing the temperature of the body, as cold bodies, or those of a temperature lower than that of the body itself do, or if they operate only by removing the cause of heat, has been a question.

The former opinion has been frequently supposed, and that from a particular consideration. As the neutral salts, which are the refrigerants chiefly employed, do, upon being dissolved in water, generate a considerable degree of cold; so it has been supposed that they may in like manner generate cold in our bodies, and therefore produce their effects as by an actual cold applied. See BROCKLESBY'S Observations, p. 122.

This conclusion, however, will readily appear to be mistaken, when it is considered that the cooling power of these neutral salts in water appears only during the time of their solution. When taken indeed undissolved, they may, as in BROCKLESBY'S and ALEXANDER'S experiments, generate cold in the stomach, and from thence have particular effects; but as after solution they produce no permanent cold; so, when taken in a dissolved state, as they

commonly are, their refrigerant powers cannot be ascribed to any actual cold applied.

The conclusion drawn from their solution in water further appears to be very erroneous, from this; that acids, which are as powerfully refrigerant in the human body as the neutrals, do however, upon being mixed with water, always generate heat; and even the neutral salts, when any how deprived of the water necessary to their crystalline state, do, upon that water's being restored to them, always generate heat. It is not therefore any thing in the nature of the saline matter that has a power of generating heat or cold in water or other bodies, but that the appearance of such a power depends entirely upon the circumstances of solution or mixture, and appears no longer than these circumstances subsist.

It is not therefore by an actual cold applied that our refrigerants diminish the heat of the living body; although in what other manner they do it may be difficult to explain.

We are, however, here to venture upon a conjecture, which it is hoped may be founded; but whether it shall be or not, we throw it out as a conjecture only.

For this purpose I am disposed to admit of a doctrine delivered by the late ingenious TURBERVILLE NEEDHAM, which seems to me to have been too little attended to in the physiology and pathology of the human body. We do not charge ourselves with supporting the whole of Mr NEEDHAM's theories, or the applications of them which are opposed by SPALLANZANI; we only assume from him what we think he has demonstrated in fact, that there is every where in nature an expansive force and a resisting power; and that particularly under a certain degree of heat, the expansive power appears in all the parts of organized bodies, in consequence of which they show a singular vegetating power; while at the same time, in other bodies, there is a power resisting and preventing the action of this vegetating power, and at least of diminishing its force. See *Nouvelles Observations Microscopiques* 1750, p. 229, 230.

This resisting power he actually found in those saline bodies which we commonly suppose to be refrigerant powers with respect to the living body; and we hope that this doctrine may be applied to our purpose in the following manner. As heat is the great support of expansive force, so we suppose that every increase of heat is no other than an increase of the expansive force in the heated parts; and from this we conceive it may be understood how resisting powers may diminish any preternatural expansive force and heat in our bodies.

We thus endeavour to account for the refrigerant power of saline bodies ; and the doctrine seems to be illustrated and further confirmed by this, that besides organized bodies, there seems to be an expansive force in all bodies disposed to any fermentation. This seems always to begin by an expansion of air from a fixed to an elastic state ; and it is very certain in fact, that by the contiguity of a sufficient quantity of saline substances, that is of resisting power, the beginning of every fermentation is prevented. Such resisting powers have been often taken notice of as antiseptic ; but there is hardly any doubt that the more general term of Antizymic may be fairly applied to them.

It may be proper to remark here, as not unheeded by us, that many other substances besides the saline may perhaps come under the list of Antizymics : but whether they are ever also refrigerant with respect to the human body, or why they are not, we cannot here presume to determine.

When we have gone thus far in the theory of refrigerants, we judge it to be incumbent upon us to acknowledge that there are some difficulties which occur upon this subject, and which it is proper to lay before our readers.

The operation of refrigerant powers, though we have supposed it different, seems in some respects to be analogous to the operation of actual cold applied. This not only changes the temperature of bodies, but in a certain degree proves a resisting and antizymic power. Its operation upon the body is attended with this peculiar circumstance, that when applied in a moderate degree, and with no long continuance, it always increases the heat of the part to which it is applied ; and from the redness which it at the same time produces, it is pretty certain that both effects are produced by its increasing the action of the blood-vessels in the parts. Its effects as a stimulant are upon no occasion more remarkable than when any substance is taken into the stomach, of such a temperature as to feel cold there ; it commonly produces a sense of heat on the surface of the body, and a disposition to sweat to be easily promoted, if at the same time the cold of the external air is by coverings avoided.

Quite analogous to this is the action of our refrigerants when taken into the stomach ; for though we have denied their producing any actual cold there, they always produce a determination to the surface of the body, and a disposition to sweat ; which from the analogy mentioned, we are ready to ascribe to a refrigerant power, or, if the expression may be allowed, to a potential cold which they

can produce. How this is to be reconciled to the refrigerant power which they are supposed to exert with respect to the whole system, is not to be easily explained.

To our present purpose, however, it may perhaps be enough to say, that the stimulant operation of actual cold, which sometimes occurs, will not be sufficient to make us deny its power when longer continued, or frequently repeated, of diminishing the temperature of the body; so the stimulant power which our refrigerants frequently exert in the stomach will not be sufficient to make us doubt of their refrigerant power with respect to the whole system, which the experience of all ages has very certainly established.

Before going further it may be proper to observe, that the substances we suppose to be refrigerant are such as act, not only by the potential cold we have alleged them to be endowed with, but at the same time by other operations that may be supposed to contribute to their general effects of diminishing the action of the sanguiferous system. These operations are, their being laxative in the intestines, and diuretic in the kidneys; and we are disposed to judge their relaxing a febrile spasm on the surface of the body to be another means of their concurring to their general effect.

Whatever therefore may become of our theory, or however difficult it may be to overcome the doubts above mentioned, the state of facts, from the experience we have asserted, may, we judge, be sufficient ground for our proceeding now to consider the qualities and effects of the several refrigerants enumerated in our catalogue.

PARTICULAR REFRIGERANTS.

At the head of the list of refrigerants, I have set down Acids; and although these might come under some other of our general titles, I shall here consider all their several powers and virtues, or nearly the whole of their medicinal history.

It might be expected that I should here, in the first place, enumerate all the several substances which may be, and generally are, comprehended under the general title; but this I find would be a difficult, and we hope it is an unnecessary work. The chemists of late have been discovering a great number of different species of acids that were not known before; and it is probable that their inquiries are not yet finished; but in the mean time, it appears, that although it was very proper for the purposes of chemistry to mark and ascertain the diversity of acids, yet as few of the whole number have been employed as medicines, and that we are at least uncer-

tain how far several of them may be employed as such, it does not seem necessary for us to take notice of any but those which we know to have been employed in the practice of physic.

In doing this, we shall in the first place mention the medicinal qualities which we suppose to be in common to all the species of acid employed in physic; and shall afterwards consider how far these qualities may be anywise different in the particular species.

Upon this plan, the quality first to be mentioned is that of their refrigerant power. This we suppose to be established by the experience of all ages; and practitioners still constantly employ them in every case in which the heat of the body is preternaturally increased; and although there may be some of the other qualities of acids which may not be suited to the constitution of certain persons, yet as to this quality there are hardly any exceptions in the cases of fevers, inflammations, and hæmorrhagies.

These effects, however, are not very evident to our senses, nor are easily subjected to experiment; because they cannot be remarkable in consequence of any one exhibition; and the effects are only found in consequence of frequent repetitions. It is proper, therefore, that we should confirm it by other observations.

One is, that any preternatural heat arising is accompanied with thirst; which especially directs to the choice of acid: and as instincts may be commonly supposed to be suited to the purpose of the animal œconomy, so this desire of acid is presumed to be a proof that these are suited to moderate the heat that is the cause of thirst.

Another consideration may be, that acids especially abound in warm climates and warm seasons; and therefore, that nature has made this provision of what is suited to moderate the heat of the human body, arising in such climates and seasons.

To all this I would add the antizymic power of acids, as this opposes the expansive force of heated blood: and as we have reason to suppose that the blood is more readily heated as it is more disposed to putrescency, so the well known antiseptic power of acids is particularly suited to temper that increased heat; and therefore, after all these considerations, there can be no doubt that acids are particularly suited to act as refrigerants in the human body.

Another quality of acids in general is their astringent power, which we have taken notice of and explained above. This power however appears only in weak or diluted acids; for in a more concentrated state they prove corrosive, as we have also observed above.

Indeed we conceive that it is especially when their corrosive power is weakened, though still approaching to it, that another quality appears; which is, that they become painful and pretty powerfully stimulant, in so far that they are useful in some cases of palsy.

It is however to be remarked, that it is very doubtful if their stimulant power can always be in this way explained; for it sometimes appears in the operation of the weaker or more diluted acids. Thus acids may quench thirst by their refrigerant power; but it is probable also that they, by their stimulating the excretories of the mouth and fauces, pour out their fluids more copiously. I mention this stimulus of the mouth and fauces here, to introduce another consideration to be next taken notice of; and which is, that the same stimulus applied to the stomach excites appetite, and, by increasing the tone of the stomach, promotes digestion.

After mentioning so much of the power and virtues of acids in general, there remains a question, What are their effects when carried into the blood-vessels, and there mixed with the mass of blood? As to this I would assert, that the concentrated fossil acids cannot be carried into the mass of blood but in such a diluted state as must destroy entirely their coagulating power, and therefore that their effects in that way cannot be supposed or apprehended.

This necessarily leads to the question, In what state are the fossil acids when mixed with the mass of blood? In answer to this we observe, but for what reasons we cannot explain, that they do not enter into the composition of the animal fluid, as we have alleged and maintained above on the subject of acid as an alimentary matter. And here we have only to observe, that as they do not enter into the animal mixed, they make a part of the serosity; and therefore, in passing with that by the excretions, they may show their stimulant power. At the same time, as a part of the serosity, they may, in passing by the skin, show there some diaphoretic effects, or, in passing by the lungs, show some irritation there; but it is probable that they pass chiefly by the urinary passages, and therefore show their diuretic powers more readily than in any other way.

These are the effects of acids in general; and we now proceed to consider how far these effects are anywise varied in the different species.

VITRIOLIC ACID.

THIS is the acid that we can have in the most concentrated state, and therefore the most fit to be employed as a caustic, or, when pro-

perly diffused, as a stimulant. For the latter purpose it is commonly diffused in some unguinous substance, as the hog's lard; but it may be more properly diffused in a more liquid oil, as in this it may be more equally diffused than in the thicker matter. When it is to be employed for internal use, it must be largely diluted with water; and the dispensatories have ordered seven or eight parts of water to be added to one of the concentrated acid. The proportion of water is not a matter of much nicety; but it is proper for the sake of prescribers that it should be fixed, which, however, cannot be done without determining the specific gravity of the concentrated acid, which neither of the colleges have done.

The diluted acid is seldom employed in any precise dose, but mixed with water, or with tinctures or infusions, in such quantity as the patient's palate will easily bear. This however is a very inaccurate practice, as it generally occasions the dose of the acid to be too small. In my opinion, it would be better to fix the quantity of acid, and leave it to be diluted to what the patient's palate may require.

It has been long a common practice of mixing this acid with a quantity of spirit of wine, and in the mixture infusing some aromatics; but this is also a very inaccurate practice, as neither the specific gravity of the rectified spirit, nor of the vitriolic acid, are anywise determined. I would however take no pains to rectify this preparation, as I could never find the addition of the aromatic to improve the medicine; and while the practitioner is always left uncertain with respect to the quantity of acid employed, I have almost always found that this aromatic elixir was less agreeable than the simple acid.

The simple acid properly diluted, and sweetened perhaps with a little sugar, is generally grateful to the palate, and is of service in quenching thirst. When it is carried down into the stomach, it is useful in curing the nausea which arises from any putrid matters there; and either by this means, or by its stimulus applied to the stomach, it excites appetite, and consequently promotes digestion*.

I have never found that, in any quantity, the vitriolic acid mixed with the bile proved laxative, as the vegetable acids so readily do. What may be its effects in the blood-vessels we have said enough when treating of the effects of acids in general. What are the vir-

* In my public lectures, I treat of the principal properties of this article under the head of *TONICS*, and I am of opinion that it is, on many occasions, one of the most important articles of this class that we can employ.

tues of this acid in giving the æther vitriolicus, we reserve to be spoken of on the subject of antispasmodics.

NITROUS ACID.

THIS acid, from its being so commonly employed in chemical operations under the title of *Aquafortis*, has probably, from the opinion of its corrosive nature, prevented physicians from employing it as a medicine. This however was a mistake; for this acid, properly diluted, may be very safely employed, and has all the powers and virtues of acids in general. Though the instances are few, there is one in *BOERHAAVE's Nitrum Nitratum*, in which the acid is in greater proportion than is necessary to saturate the alkali; and I have frequently employed it as a grateful and cooling medicine.

There is another instance in which the acid of nitre is also employed, and that is in the *spiritus nitri dulcis*. If this was properly prepared, it should contain no acid; but this is not commonly the case, and the vulgar practitioners commonly employ it as a diuretic medicine, which it cannot be but by the quantity of acid it contains, and which therefore shows this acid to be frequently and safely employed; but it is hardly necessary to observe, that in this way it can never with any accuracy be employed.

The employment of the nitrous acid, as producing æther, shall be considered in another place.

MURIATIC OR MARINE ACID.

IN the last century *GLAUBER* took great pains to introduce the use of this acid, ascribing many virtues to it both in diet and medicine; but in both he was extravagant and incorrect, and therefore he has not been much followed. It happened, however, that physicians employed it a good deal in the diseases of the stomach; and many have been of opinion, that in restoring the tone of the stomach, it operates more powerfully than the vitriolic: but as the latter can be more easily brought to a standard than the other, it has entirely thrown this other out of our practice. Although the London college, in the last edition of their *Dispensatory*, have omitted both the simple spirit of salt and the *spiritus salis dulcis*, yet the Edinburgh college have retained both: and wherever the latter is employed, I consider it as an employment of the acid; for, in the ordinary preparation of it, the qualities of the acid are never entirely destroyed.

But the most remarkable instance of the employment of this

acid was in the *tinctura aperitiva moebii*, which Dr HOFFMAN informs us was, in the course of the last century, much employed and celebrated for its virtues. Dr HOFFMAN informs us that it consisted of a solution of common salt supersaturated with its acid. I have frequently employed it by making a solution of half an ounce of good bay salt in four ounces of water, adding to this two drams of a well-rectified spirit of salt; and this given in a tea spoonful or two in a glass of water I have found useful in improving appetite, and frequently in stopping vomiting.

VEGETABLE ACIDS.

THESE I am to consider as of three kinds; the native, the distilled, and the fermented.

The native acids are chiefly those found in the fruits of plants, sometimes however also in the leaves and roots. They are in different degrees of acidity, and different by the texture of the fruit in which they are lodged; and still more considerably by the various matter adhering to them, both in the fruits and in the juices expressed from these.

The effects of these different conditions in the use of them as aliments I have endeavoured to explain when treating of them above: but, as medicines, I do not find that I can apply any distinction of them. Although they may be distinguished in a chemical view, I do not find that I can apply such distinctions to the purposes of medicine; and that, with a view to this, I must consider them in general, and merely as acids. In considering them therefore as medicines, I must observe, in the first place, their refrigerant power; and that, especially upon account of the quantity in which they may be given, they are the most effectual of any we can employ. As we have said above, that they enter into the composition of the animal fluid, and thereby diminish the putrescent tendency of this, they therefore, as I judge, obviate the heat that might otherwise arise; and it is in proof of all this that they are the most ready and certain cure of scurvy.

The same acids are never in such a concentrated state as to show any caustic or even stimulant powers; but they show readily the stimulant power which is in the weaker or much diluted acids, so far as they excite appetite and promote digestion: and probably it is by the same power that they excite the urinary excretion.

All these powers are to be ascribed to the pure acid that is in this native acid of vegetables; but it is now to be remarked, that in all of them, even the most purely acid, there is present a quanti-

ty of fermentable matter : and if this happens to be in large proportion, or even in small proportion, and thrown into stomachs of an acescent disposition, the acid undergoes a fermentation, which is attended with flatulency, a more powerful acidity, and all the other symptoms which we term Dyspeptic. This does not however much affect their refrigerant power, or do much harm to the system, except in those cases of gout and calculus renalis, in which the taking down the tone of the stomach may be very hurtful. It seems to be in consequence of this acescent disposition of the stomach that a more copious acidity, and perhaps of a peculiar kind, united with the bile, forms a laxative which may occasion more or less of diarrhœa, and the cholick pains which so frequently accompany the operation of laxatives.

DISTILLED ACID OF VEGETABLES .

ALL vegetables except mushrooms, if these be truly such, when treated by distillation without addition, give out, in the first part of the distillation, a quantity of acid, and continue to give out more during the whole of the distillation. This acid is somewhat different according as it is drawn from different vegetables : but that difference has not been ascertained ; and we know them even in chemistry, and more certainly in medicine, only by the common quality of acid.

This acid has been but little employed as a medicine, and has hardly been remarkable but by its late use in the form of tar-water. In making tar, it is exhaled from vegetables whilst they are burnt, in the same manner as in the distillation above mentioned ; and accordingly, in the making of tar, an acid water is found in considerable quantity in the same ditches that are prepared for receiving the tar during the burning of the wood. In the countries where tar is prepared, particularly in North America, this acid was accidentally employed as a medicine. It was found to prove very useful ; and the benevolent and worthy Bishop BERKELEY being informed of this, was desirous of rendering such a medicine very generally known. But as the water collected, as we have said, during the burning of the wood, could not properly or conveniently be obtained in Britain, he perceived that a quantity of the acid remained in the tar as it was imported, and perceived that it might be extracted from it by infusion in water. It is such an infusion that gives the celebrated tar-water which has been so often used since.

It was at first by many persons celebrated as a very valuable me-

dicine; and from my own observation and experience, I know it in many cases to be such. But, as happens in all such cases, the commendations of it by the patrons and favourers of it were very often extravagant and ill founded; and though the persons who disparaged it had some foundation for their opinions, yet they also told many falsehoods concerning it.

Although it would have been difficult, at that time, to balance between these opposite accounts; yet, in the course of sixty years, the matter has found its own balance. The excessive admiration of it has entirely ceased, and the most part of practitioners, from causes we could assign, have neglected the use of it; but there are still many judicious persons who believe in and employ its virtues. In many instances this preparation has appeared to strengthen the tone of the stomach, to excite appetite, promote digestion, and to cure all the symptoms of dyspepsia. At the same time it manifestly promotes the excretions, particularly that of urine; and the same may be presumed to happen in that of others. From all these operations it will be obvious, that in many disorders of the system this medicine may be highly useful.

It may be however, and has been a question, upon what, in the composition of tar-water, these qualities depend: and I have no doubt in asserting that it is entirely upon the acid produced in the manner above mentioned. Mr REID, the author of a dissertation on this subject, has rendered this sufficiently probable, from the accounts of GLAUBER and BOERHAAVE with respect to the virtues of such an acid, and from the opinion of the bishop of CLOYNE in preferring the Norway tar to that of New England, as the acid part is not taken from the former so entirely as it is from the latter; and he also properly supports it by this, that any other parts of the tar-water which may be found in it, unless carefully separated, are commonly very hurtful.

Upon the first introduction of tar-water, some physicians were of opinion, that it derived part of its virtue from some oily matter in its composition; but it would not be difficult to show, that this, in many respects, is very improbable, and that, upon the contrary, the presence of these oils, as Mr Reid has particularly pointed out, is frequently pernicious. But, to supersede all controversy on this subject, I can assert from much experience, that the tar-water, as it abounds in acid, and is more free from all oily matters, is the most effectual medicine: and I have this clear proof of it, that when, instead of extracting the acid by infusing the tar in water, I procured it by distillation from solid fir or other woods; and, by

taking only the first part of the distillation, I obtained the acid as free as possible from all oily matter. I found that by employing this acid as a medicine, properly diluted with water, every virtue appeared that was ever found in any tar-water. In this practice I found a particular advantage, as I could, by a proper rectification and concentration, bring the acid into a small bulk; which being readily portable, is, on occasion of journeys, or other circumstances, rendered very convenient. But it is very necessary to observe here, that this acid, to be rendered a very useful remedy, must be always largely diluted with water; and how much the water may favour its operation in every respect will be sufficiently obvious.

FERMENTED ACID OF VEGETABLES.

THIS is the well-known liquor named VINEGAR, the preparation of which needs not be given here. As it is found in our houses and shops it is in different conditions, the causes and circumstances of which are not well ascertained; and we can only judge of its purity by the sharpness of its acid taste, and its being free from all others.

As this acid is prepared by fermentation, it is always in a diluted state; and, both for the purpose of medicine and of pharmacy, it has been desired to be obtained in a more concentrated condition. The purposes and the execution of this are various; but the most ordinary practice has been by distillation, which seems to me not to be the most proper; for the distillation cannot be practised without the acids becoming empyreumatic, which always renders it a disagreeable medicine; and at the same time, by the ordinary practice, the acid is hardly or not at all rendered stronger than it might have been by a proper fermentation. The directions of the London College I could never follow with any exactness; and I have always found, that before the aqueous part be drawn off, an empyreuma is communicated to the whole liquor.

The Edinburgh directions may be exactly executed; but the empyreuma is made very strong, and at the same time the distilled acid, as I have said, is hardly stronger than it is in good vinegar; and I know of no advantage that this distilled acid has over the other.

If a concentrated vinegar is much to be desired, there are two other ways of obtaining it. The one is by freezing, which has now been frequently practised in the northern countries of Europe; and

the management of it is prescribed in many books of chemistry, that I believe are almost in every body's hands.

The other means is by a distillation from any neutral containing this acid, by the addition of a strong vitriolic acid. This gives a very volatile acid, which by its volatility may be applied to several purposes ; and by its being in a concentrated state it may be, by a proper dilution, applied to every purpose of medicine that the fermented acid of vegetables is fit for.

It is true that this distilled acid wants some substances which are joined with it in the vinegar prepared by fermentation ; and Dr BOERHAAVE insinuates that some virtues may be derived from these. I have not however truly perceived them ; but allow, that if there are any such advantages to be desired, they may be more certainly obtained by employing the vinegar concentrated by freezing.

After these remarks upon the different management of this acid, I proceed to consider its virtues. It is certainly a refrigerant power, which we conclude both from experience and from its antiseptic powers ; and it has this advantage over the fossil acids, that it can be thrown in, in much larger quantity, and with more effect, as it enters into the composition of the animal fluid. It is grateful to the palate and stomach, and certainly stimulates the latter so far as to excite appetite. By the same stimulant power it acts upon the mucous excretories of the mouth and fauces ; and at the same time it seems to act as an astringent on the blood-vessels of these parts, and proves useful in the inflammatory affections of them. When it is carried in large quantity into the blood-vessels, a portion of it passes off by the excretions, and proves manifestly diuretic. It is celebrated also for its diaphoretic and even sudorific virtues ; and these are commonly ascribed to its power of dissolving the fluids. But this, upon the general principles which will be explained hereafter, we must deny ; and if it ever has appeared to have this effect, we must impute it to its refrigerant powers in the stomach, and its gently stimulant powers in the whole system, assisted by a sudorific regimen.

A singular power has been ascribed to this acid, and that is, in preventing and curing obesity, justly I believe in both cases ; and I hope that I have above explained the theory of it. We have alleged that the oily matters taken into the body do not remain in their oily form, but are, in the first place, incorporated with the proper animal fluid, and are afterwards separated by a peculiar secretion, and deposited in the adipose membrane. This union of oil with the animal fluid we ascribe to the acid taken in as a part of our food ; and

it will be obvious, that according to the quantity of this, the oil will be more intimately united and fitted to pass off by the excretions, and leave less therefore to be deposited in the adipose membrane. But farther, as we have alleged above that the oil already deposited in the adipose membrane is again consumed by every acrimony prevalent in the blood, so a superabundance of vinegar in that mass may have a share in this consumption.

This is all pretty well ascertained by observations upon the large use of vinegar; but lately a new fact has been presented to us.

A gentleman disposed to obesity found, that by his abstaining from wine, which I take to be the same as abstaining from the fermented acid of vegetables, he lost his fat very considerably; but returning again to the use of wine, his obesity soon also returned, and was again removed by the same means as before. I shall not attempt the theory of this till we shall be farther informed of such cases, and more exactly with respect to the circumstances of them.

ACID OF MILK.

THERE is perhaps another species of vegetable acid to be taken notice of, and that is the acid which so often, and in certain circumstances, so constantly appears in the milk of all phytivorous animals. As, in the milk of the same animals, a quantity of sugar is constantly present, we may suppose it to be no other than a fermented acid of sugar; but some difficulty occurs on this subject, as the fermentation which produces an acid in milk, takes place more suddenly than we could expect it to happen in any solution of sugar, and, as was observed above, continues for a long time to increase the acidity produced. We are therefore persuaded there is something peculiar in the fermentation which produces the acid of milk; but what this peculiarity consists in, or what effects it has on the nature of the acid produced, we cannot discover. It may perhaps deserve particular consideration, both in chemistry and medicine, but we have not yet learned what application in either way may be made of it; and in the mean time can only say, that the acid of milk, both in the good effects it can produce, and the noxious qualities it may, upon occasion, discover, are the same we have pointed out as arising from the native or fermented acid of vegetables.

A vegetable acid prepared by fermentation might still be mentioned, which is that of tartar; but I think it will be more properly considered under the next title of Neutral Salts, or afterwards under the title of Laxatives.

We have now mentioned most of the acids that are well known in the practice of physic ; but I must own that there are many others which have been sometimes employed, and may I believe deserve to be inquired after, but I own that I find the facts too few to determine the matter clearly, and at least that I am too little acquainted with these facts to be able to speak positively on the subject.

Of the large list that might be mentioned, the only one that I am disposed to take notice of is the

ACID OF BORAX.

THIS was the invention of the celebrated HOMBERG ; and, as he imagined it to be possessed of strongly sedative powers, he gave it the name of the SEDATIVE SALT. Upon such an authority it was introduced into practice ; and such is the favour for a new medicine, and such are the excuses so readily found for its failure, that it soon came to be much employed in France : and Mr GEOFFROY having found a cheaper method of preparing it, the government ordered, at their expence, that it should be furnished to all the medicine chests of the army and navy.

This certainly gave an easy opportunity of trying its virtues ; but we have hardly ever had any favourable reports of these from France, or from any other country of Europe : and it appears that the practice with it has ceased every where ; and long ago Mons. de la Mettrie has, in disparagement of our art, observed, *Que le sel sedatif n'est pas aussi sedatif qu'autre foi.* To all this I could add my own experience, which has shown me, that even in large doses this salt has no effect on the human body.*

NEUTRAL SALTS.

THE next set of refrigerants in my list are the neutral salts ; and these, with acids, are certainly the refrigerant remedies we chiefly depend upon in practice. The refrigerant power seems to be in common to every neutral, so far as we have yet tried them, except those neutrals composed of the muriatic acid and fossil alkali, and perhaps some other acids which carry into the composition of neutrals some other matters of an acrid kind : but these are not well

* It is really difficult to conceive, that the acid of borax "has no effect on the human body." I have heard of its having been prescribed, with marked advantage, in some cases of pulmonary consumption, in Philadelphia. I have never analyzed this medicine except in a single case of disease. This was a case of phthisis. The patient refused to persist in the use of the medicine, from a full persuasion that it had uniformly proved inconveniently laxative.—October 22, 1812.

ascertained; and we take it for granted that it is of the nature of a neutral salt, composed of an acid and alkali, with the exception mentioned, to give a refrigerant substance.

This power in these salts is a matter of common experience, and may be presumed from their antizymic and antiseptic powers; but in what proportion it is in the several species, is not exactly ascertained, though Dr SMITH, in his experiments, has done somewhat to this purpose. In the Doctor's experiments it appears, that, except in common salt, some sedative power in every one takes place. In these, indeed, composed of the fossil alkali, some stimulant power appears upon their first application; but soon after this, their sedative power becomes manifest by their destroying the irritability of the part. After all, however, I cannot apply these experiments so as to explain the respective powers of these salts as they appear in the practice of physic. It appears here, that all of them which show a sedative power in Dr SMITH's experiments, when thrown into the stomach, produce a disposition to sweat, which we refer entirely, as we have explained above, to their refrigerant power in the stomach; and in what proportion this is I find it difficult to ascertain. The prejudices of practitioners at present are in favour of the neutral formed of the native acid of vegetables with the fixed vegetable alkali; and while this is the most agreeable, I have no objection to its being the most commonly employed in practice: But I make these observations to show country practitioners, that when they happen to be in want of lemon juice, they may employ any other acid except the muriatic to form neutrals that may answer the same intentions; and a very little chemistry will teach them every thing else that may be here necessary. In the time of our last wars upon the continent, our practitioners frequently employed the vitriolic acid, and which was indeed employed in making the original anti-emetic draught of RIVERIUS.

With regard to particular neutrals, I have a few observations only to make. I have said just now, that the vitriolated tartar may be employed as a refrigerant; and as it is thereby diaphoretic, it is employed in the composition of DOVER's powder.

The sal mirabile is almost only employed as a purgative; but that it has refrigerant powers, appears from the intestines being left, after the operation of this purgative, in a lax and flatulent condition.

What is named the secret Sal-ammoniac is little employed in practice; but there is no doubt that it is nearly of the same nature with the common ammoniac.

Nitre has been commonly esteemed as the most powerful refrigerant; and from Dr SMITH's experiments, as well as from those of Mr ALEXANDER, it appears to be so. But as all refrigerants produce a determination to the surface of the body, and thereby increase the force of the circulation; so, after this operation, they prove directly stimulant to the stomach and alimentary canal: and in this way nitre is as remarkable as any other; and it is therefore, in large doses, very often uneasy and painful to the stomach. When it is therefore necessary to continue its operation as a sudorific, it is at the same time necessary to give it in divided doses, and at proper intervals.

I do not doubt but the practice of Dr BROCKLESBY may be often successful; but I could never find it convenient to imitate it, as I could hardly, or at least seldom, find a stomach that would bear half the quantity of nitre that he seems to have employed; and in most cases I have been limited in the doses of nitre that I could exhibit. I believe that the employment of nitre, as recently dissolved, will be a more powerful refrigerant than when the solution of it is entirely finished; but I am of opinion that the practice has no advantages to compensate the trouble that otherwise attends it.

I have so seldom employed the cubic nitre that I know little of its qualities and powers.

Of the peculiar power of neutral salts formed of the muriatic acid, I have had occasion already to remark, that by Dr SMITH's experiments, common salt composed of the muriatic acid and fossil alkali is the neutral which, applied to the nerves or other irritable parts, shows a strongly stimulant power, and is therefore to be thrown out of our list of refrigerants. Its stimulant power seems in part to be owing to the fossil alkali in its composition; for this alkali, joined with the nitrous or vegetable acids, do also, in the first application to the nerves, in Dr SMITH's experiments, show somewhat of a stimulant power, which however soon passes away, and they afterwards prove manifestly sedative. These neutrals, therefore, consisting of the fixed vegetable or volatile alkali, though formed by the muriatic acid, may be taken into our list of refrigerants; and their common employment as sudorifics, for preventing the recurrence of intermittent fevers, is only to be explained upon this ground.

The use of the common ammoniac has been otherwise frequent in practice; but what are its peculiarly useful powers, I dare not determine. Its resolving powers, by attenuating or dissolving the fluids, I do not admit of; but that, like other saline matters, in pass-

ing by the excretions, they are suited to promote these, may be readily allowed.

In being joined with the Peruvian bark, as has been frequently practised, the ammoniac may be of some use as a diaphoretic; but I have not perceived it, and doubt if, in obviating the consequences apprehended from the use of the bark, it can be of any service.

The ammoniacal salts have been often used externally for the discussion of tumours; and they may possibly give a moderate stimulus to the vessels on the surface; but that they enter the pores, and attenuate viscid fluids, we must very much doubt of.

The neutrals composed of vegetable acids must be different according to the species of this acid employed; but they are all in general refrigerant and diaphoretic, and we know them only in that light. The one most frequently employed is that composed of the native acid and the fixed vegetable alkali, commonly known under the name of the Saline Mixture. The acid commonly employed is the juice of lemons; but that only because a quantity of acid juice is most easily obtained from that fruit. I have frequently employed the expressed juice from several other fruits, which the country practitioner should know in the case of the want of lemons; and I have frequently employed the juice of apples with equal advantage.

It is hardly necessary that the alkaline salt of worm-wood, so frequently employed before, be now used, as the purer the alkali the medicine is the better.

This neutral salt, formed and given in due quantity, is, for what I can perceive, equally refrigerant and sudorific as any other, and has this particular advantage, that it is, or can be, easily rendered more agreeable than any other. In my opinion it is commonly given in too small doses, and at too great intervals; and though given in large doses, it is not ready, as nitre is, to give uneasiness to the stomach. It is often named the Antiemetic Mixture, and properly, as it is often useful in stopping vomiting, especially that which arises in febrile disorders, and particularly at the beginning of the paroxysms of intermittent fevers. When given in quantity, its diuretic and purgative qualities appear as in the other neutrals.

It has been of late a favourite practice to give the saline mixture during the act of effervescence; and besides the advantages of introducing a quantity of ærial acid, I am persuaded that the detachment of that acid in the stomach renders the whole of the mixture more refrigerant.

The distilled acid of vegetables has not been employed in forming neutrals that I know of.

The fermented acid, or vinegar joined with the fixed vegetable alkali, has certainly the powers and virtues of the saline mixture; but while the neutral formed of vinegar has no advantages over that formed of the native acid, the quantity of vinegar necessary to saturate the alkali gives a bulky inconvenient dose. Whether any advantage may be gained by employing it in its concentrated states, I have not tried, because I doubt much if any peculiar advantage was to be obtained from them.

Both the native and fermented acids have been applied to the volatile alkali to form ammoniacal salts, and I have frequently tried this with the native acid; but I never found that the ammoniacal salt had any advantage over that formed of the fixed alkali.

The application of vinegar to the volatile alkali, which gives the liquor named Spiritus Mindereri, has long been famous in the practice of this country: but if any thing is to be regarded in the quantity of the dose employed, this in the doses commonly given must be a very weak neutral; and as I have never seen any benefit from it, this, with the disagreeableness of the empyreumatic taste of the medicine, has made me omit it in practice altogether. I have known four ounces of it taken at once, and soon after four ounces more, without any sensible effect.

This, upon the notion of its being an ammoniacal salt, has been employed externally; but after what we have said on the external use of the common ammoniac, it will readily appear that the weakness of impregnation in the spiritus mindereri must render it much less effectual. It is very possible indeed, that by employing a concentrated vegetable acid, we may obtain an ammoniacal neutral, of much more force than the spiritus mindereri; and if any one expects any particular benefit from such a combination, he must endeavour to obtain it: but from what we have said on the combination of the native acid with the volatile alkali, I cannot expect much benefit from any combination of the same alkali with the fermented acid in any of its states.

After the Neutral Salts, strictly so called, I have set down the Sales Terrestres, and believe that these may all be considered as refrigerants; but I cannot perceive any of them to be more powerful than the proper neutrals. Accordingly, they are little employed in practice; and if they have ever been, this in my opinion must have been upon some false apprehensions both in chemistry and medicine.

Of the combination of acids with metallic substances, they are generally acrid and stimulant; and there are none of them that can be considered as sedative or refrigerant excepting the *Sal Plumbi* or *Saccharum Saturni*; of which however I have said enough already on the subject of lead, enumerated among the astringents.

CHAPTER VIII.

ANTISPASMODICA.

THIS is the most difficult subject that has occurred to me; and I find nothing to relieve this difficulty in any of the writers who have gone before me. All of them consider it as an obscure subject, and so mysterious as hardly to be attempted. This indeed is in a great measure just; but it ought to be attempted: and we hope some light may be thrown upon it, by considering the diseases or morbid affections, for the cure of which the medicines named Antispasmodics have been chiefly employed.

These in our Nosology, in the third order of the second class of the Neuroses, are, as fully as I could, enumerated under the title of Spasmi: and though there is some difficulty of admitting that title in its most proper and strict sense, yet I could not well avoid it; and I have obviated all ambiguity by the character given of *Motus Abnormes*. Here also, though it may not be strictly proper, I must employ the term of Spasmodic Affections for the whole of the diseases I am here to consider.

In the whole of these, the state of contraction makes always the chief circumstance; and I begin with observing, that in every contraction a nervous power has a part. I own that in some phenomena the inherent power only may be concerned; but these are few and inconsiderable: for even in the involuntary motions, and especially when these are exerted in an irregular manner, it is pretty evident that there is always a concurrence of a nervous power; and in the whole of my discussions, such concurrence is always to be kept in view.

On this subject, therefore, the first consideration to be offered is, that the nervous power is always derived from the brain, or that it consists in a motion beginning in the brain, and propagated from thence into the moving fibres, in which a contraction is to be produced. The power by which this motion is propagated we name

the Energy of the Brain; and we therefore consider every modification of the motions produced as modifications of that energy.

With respect to these, it seems to be a law of the œconomy, that the energy of the brain is alternately excited and collapsed, or that every contraction produced is alternated with a relaxation; and the motus abnormes, or as we name them Spasmodic Affections, seem always to consist in the irregularity of the alternation mentioned, as they appear in spasm or convulsion.

Before going further, it is proper to remark, that these affections take place in one set of functions more than in another. Thus tetanus and epilepsy affect the animal, hysteria the natural, while palpitation and syncope affect almost only the vital functions. There is indeed in all violent cases some preternatural phenomena, in which all the several functions are in some measure affected; but whoever considers the diseases just now mentioned, will perceive that the affection is chiefly and especially in one set of functions only. A conclusion to be drawn from this is, that the energy of the brain is exerted differently, and often separately, with respect to the several functions, distinguished by physiologists into animal, natural, and vital. This is a state of the œconomy which has been little attended to, but is very manifest in the business of sleep and watching, and in the diseases above mentioned. See *First Lines*, from MCCLXII to MCCLXV.

It is now further to be remarked with respect to the whole, that though the phenomena appear in particular parts, that is in the organs concerned in the exercise of the several functions, the whole of them must depend upon an affection and peculiar state of the energy of the brain. It is possible indeed, that certain motions may take place in particular parts, independent of any change in the state of the brain; but the instances of these are few and inconsiderable, and probably they cannot subsist without the brain's being brought into that state that might have induced them.

But however all this may be, it is confidently presumed that spasmodic affections are often primarily, and always chiefly, affections of the brain. This may clearly enough appear from what has been said in general, establishing all motions as necessarily depending upon the energy of the brain; but as the proposition is of consequence, it may be proper to add some more particular proofs of it here.

One is, that spasmodic affections often arise from applications to particular parts of the body; but for the most part, the effects produced in other parts cannot be accounted for, but by supposing the

intervention of the brain. Such is the case of odours and some other impressions, whose producing spasmodic affections cannot be explained otherwise, or by any consent of nerves.

The intervention of the brain is more especially proved by this, that in many cases, the effects of applications can be prevented by interrupting the communication of the parts affected with the brain, by cutting through or compressing the nerves which form that communication.

But farther, that the state of the brain has a very special concern in spasmodic affections, the strongest and clearest proof is this, that all these affections, and all the different modes of them, can be produced by passions of the mind; which we maintain to be causes operating always first, and chiefly in the brain.

Having thus established, that spasmodic affections depend very entirely upon the state of the energy of the brain, we proceed to consider what that state may be in different cases; and we judge of them, in the first place, as they produce Spasm, strictly so called, or convulsion: and though our total ignorance of the mechanism that takes place here, will not allow us to go far in explaining it, we shall make some observations, which we hope may be useful.

In spasm there appears to be a preternatural force exerted in the energy of the brain, as appears both in the degree and duration of the contraction produced; but with a view to the general law above mentioned, it is proper to remark, that even here some alternate contraction and relaxation takes place, as I have pointed out in the *First Lines*, MCCLXI.

In convulsion, which always consists in manifestly alternate contraction and relaxation, it appears, that from other causes than the will, the contractions are performed with more force and velocity than usual; but at the same time, as they are still such as admit of an alternate relaxation, the disease consists in an alternation's being produced more quickly than is natural. This hurried alternation we suppose to depend upon a certain state in the general energy of the brain, which may be determined by causes to be mentioned hereafter, to affect one set of functions more than another, and to produce there the spasmodic affections which these functions are liable to.

This perhaps may not appear very clear, and may be considered as hypothetical; but we suppose it may be illustrated by some further considerations. The alternation of contraction and relaxation in the animal functions is commonly regulated by the will, and therefore seems to admit some difference in the quickness of the

alternation and repetition; but it is probable that that difference has its limits set to it by the animal œconomy, or at least by habit; so that if at any time it is hurried beyond the usual measure, some confusion and disorder is occasioned with the effect on the general energy mentioned above.

This seems well illustrated by surprise, or impressions unforeseen and unexpected, breaking in upon the order and velocity of the train of ideas then going on in the mind; and this we know will frequently bring on every form of spasmodic affection. Our doctrine seems also to be farther illustrated by the case of stammering; when a diffidence and hesitation, interrupting or hurrying the succession of syllables or words, throws the face, and sometimes the whole body, into convulsions; which may always be avoided, by giving a measure regulating the velocity in the succession proposed, as is done by the persons attempting it in the manner of a song.

From the whole that has been just now said, we think it will appear, that convulsions may be brought on by whatever hurries the velocity of the alternations which take place in the energy of the brain.

It will illustrate the whole to observe, that as spasmodic affections thus depend upon a change in the manner and order of the motions taking place in the brain, they will occur more or less readily as that manner and order is more or less readily changed, which happens to be different in different persons. That this disposition to admit more or less readily of a change in the state, and whole of the motions depending upon the brain, is different in different persons, has been often taken notice of; and it has been as universally observed, that in persons of very great mobility in this respect, spasmodic affections are most readily excited, and do most frequently arise; which seems to confirm very much the doctrine we have delivered.

To complete our pathology as well as we can, we are next to consider what it is that determines spasmodic affections to affect one set of functions more than another. It may, in the first place, be a mobility in the energy of the brain, greater with respect to one set of functions than to another; and therefore it is that the passions of the mind, which may produce any of the spasmodic affections, do however produce them in one set of functions rather than in another.

It is possible, therefore, that the affections produced may depend entirely upon the state of the brain; but it seems also probable, that

the affections produced often depend upon a conformation and state of the organs concerned in the functions to be affected, determining the energy of the brain to be directed to those parts. Thus certain organical affections of the heart itself, or great vessels connected with it, are found to give occasion to the spasmodic affections of palpitation and syncope.

It is probable that a certain state of the lungs gives occasion to asthma; as we can so often observe, that applications made to the lungs themselves, and not to the brain, bring on the disease.

It is equally probable that a certain state of the alimentary canal, induced by a state of the ovaria, determines to the production of hysteria.

It is not easy to determine what particular state of the organs of voluntary motion should give occasion to the spasmodic affections of these; but it is probable, that as the energy of the brain is chiefly exercised in these motions, and with such a variety that we may suppose them to acquire a considerable mobility, which, joined with the constitutional condition of the same, may dispose them to be affected by any considerable change of the manner and order of the motions of the brain, and therefore to produce epilepsy, or the chief spasmodic affection of the animal functions: And that any general affection of the energy of the brain is ready to produce this, we conclude from its being one of the most frequent of spasmodic affections, and certainly more frequent than those of syncope, asthma, or hysteria.

The scope and purpose of all that we have now said, is to establish this general proposition, That spasmodic affections, whether they arise primarily in the brain, or in particular parts, do consist chiefly, and always in part, in an affection and particular state of the energy of the brain; and the operation of antispasmodic medicines must consist in their correcting this morbid or preternatural state in the energy of the brain, by their correcting either the state of preternatural excitement or collapse, or by obviating the too sudden alternation of these states.

Before, however, proceeding to a more particular consideration of these indications, and of the remedies suited to them, which are strictly to be named Antispasmodics, I must observe, that there are remedies, though not strictly such, which are however suited to cure spasmodic affections, and therefore may occasion some confusion in the use of terms.

The first of these I would take notice of are the remedies suited to obviate the predisponent cause of spasmodic affections. We

have said above, that a certain mobility of the whole system gives strongly this predisposition, and therefore, that tonics may be fitted to obviate this; and when the disease depends upon mobility alone, these may be entirely the remedies of it: but we have seldom found them to prove truly such, both because it is difficult to render the operation of tonics sufficiently durable, or because, when either the disease depends upon the state of particular parts which tonics do not change, or when it depends upon a plethoric state of the system which tonics have rather a tendency to aggravate, tonics cannot be the proper remedies. The last circumstance happens often to take place in the cases of hysteria and epilepsy.

Another means of obviating spasmodic affections, is by avoiding the exciting causes. We have said above, as well as in our First Lines of the Practice of Physic, that an occasional turgescence in the blood-vessels of the brain is one of the most frequent causes exciting epilepsy, and perhaps some other spasmodic affections; but it will be obvious, that such exciting cause must be avoided by employing refrigerants, which cannot be considered as antispasmodics.

A third case in which the proper antispasmodics may be often superfluous and useless, perhaps hurtful, is, when the disease does not primarily depend upon a state of the brain, but arises from a peculiar constitution of certain parts, which is communicated to the brain. In such cases it will be evident, that the affection of the brain cannot be corrected till the primary disease is cured; and instances of this kind I have given above, as occurring with respect to particular functions.

Here I shall remark only with regard to one of those instances, as it is the best illustration of the general doctrine, and will give me an opportunity of making a particular remark with respect to it.

The instance I speak of is in the case of palpitation, syncope, and of other irregular motions of the heart. Every practitioner knows, that these disorders commonly depend upon an organic affection of the heart, or of the great vessels immediately connected with it, as aneurism, polypus, or ossifications, which are commonly considered as incurable diseases. Dissections have indeed so commonly discovered such causes, that practitioners are very ready to despair of curing such diseases, and desert all attempts towards it; but I think it may be for the instruction of practitioners to give the following case:—

A gentleman pretty well advanced in life was frequently attacked with palpitations of his heart, which by degrees increased both in frequency and violence, and thus continued for two or three years. As the patient was a man of the profession, he was visited by many physicians; who were very unanimously of opinion, that the disease depended upon an organic affection of the heart, as we have just now said, and considered it as absolutely incurable. The disease, however, after some years, gradually abated, both in its frequency and violence, and at length ceased altogether; and since that time, for the space of seven or eight years, the gentleman has remained in perfect health, without the slightest symptom of his former complaint.*

Besides this, I have had some other instances of palpitation, both violent and lasting, for some length of time; and these especially, with the instance above mentioned, persuade me that spasmodic affections, though sometimes both violent and durable, are not however always depending upon organic and incurable affections of particular parts, but may very often depend entirely on an affection of the brain alone.

Having now mentioned several remedies which cannot be strictly considered as antispasmodics, and having mentioned, though with less accuracy, the cases in which the proper antispasmodics may be useless or superfluous; I proceed to consider those which are more strictly intitled to the appellation.

I consider them as to be referred to two heads; the one of Sedatives, and the other of what I would still more strictly name Antispasmodics, and which I would judge to be of a quality and operation different from those others.

With respect to the first, it may seem surprising that opium should not have entered into my catalogue of antispasmodics, whilst every practitioner considers it as the chief remedy in the most part of spasmodic affections. Their opinion is certainly just and true; but the consideration of its operation being often different from that of the proper antispasmodics, I overlooked the matter in composing my catalogue.

* Palpitation from gout (*Palpitatio arthritica*) is a common affection, which I have often experienced in my own person, and which I have had occasion to observe in others. In some instances, the palpitation, though violent and of long continuance, has almost instantaneously subsided, on the coming on of an attack (sometimes extremely light) of gout in the foot. The learned Sauvages has related a most impressive case of *palpitatio arthritica*. *Nosologia methodica*, &c. tom. i. p. 564.

But it is now incumbent on me to observe, that as spasmodic affections are so often begun by an increased excitement of the energy of the brain; so, opium being the most powerful means of diminishing this excitement, it must very often be the most certain and ready means of both obviating and curing spasmodic affections; but at the same time we must remark, that it often fails to answer either purpose. If the increased excitement arises from an irritation applied to a particular part of the body, to the removal of which opium cannot contribute, the disease may continue to recur, although the largest doses of opium have been employed. Thus it happens in tetanus, from wounds whose communications with the brain cannot be intercepted, that opium often fails to prove a cure.

Another case in which opium may fail, is where the excitement of the brain arises from a plethoric state of the sanguiferous system, and upon an occasional turgescence in the blood-vessels of the brain. In these cases, opium is so far from proving a remedy, that it often is a means of aggravating the disease; and this will explain why it so often fails and does harm in cases of epilepsy and hysteria.

It is hardly necessary to observe here, but as the excitement and collapse of the brain do mutually produce one another, so the spasmodic affections do always consist in some increased excitement, yet this may be begun by a state of collapse; and therefore that stimulants, such as the volatile alkaline salts, or certain highly odoriferous substances of a grateful kind, may obviate the coming on of spasmodic affections.

The other set of antispasmodics, and which I hold to be properly and strictly such, appear to me to be of two kinds; one of them consisting of a set of substances of a disagreeable odour, and therefore commonly named Fœtids, both from vegetable and animal substances. The operation of these I take to be in this way; that as all disagreeable sensations are sedative, or means of weakening the energy of the brain, so I conceive that our fœtid medicines, by obviating or moderating the increased excitement which begins spasmodic affections, may be the remedies of these.

The other kind of antispasmodics appear to me to consist of a highly volatile oil, and which, by its volatility, acquires a singular power with regard to the nervous fluid of animals. These have manifestly the power of obviating or moderating that excitement which begins spasmodic affections, and are thereby the remedies of such. But I conceive them to have also another power, which, though I cannot explain, seems to be manifestly that of giving a

tone and steadiness to the energy of the brain, so as to prevent those sudden alternations of excitement and collapse in which so many convulsive disorders consist. This may not be quite clear to my readers, and I offer it as a conjecture only to be farther examined by speculative physicians. Whilst the nature of the nervous power and its several motions are still so imperfectly known, it seems to be allowable, with a proper reserve in the application, to enter into some speculations and conjectures.

PARTICULAR ANTISPASMODICS.

AMBRA-GRISEA.

THIS is a medicine so little employed in our practice, that it is omitted in the list of both colleges; but it still retains a place in all the foreign dispensaries, and by its strong odour it promises to be an active medicine. I am however so little acquainted with it, that I must refer entirely for information on this subject to Dr LEWIS, who has given its natural and chemical history, as likewise the various formulæ in which it has been employed as a medicine.

SUCCINUM.

THIS, in its entire state, has been often employed as a medicine; but as it discovers, in that state, no active parts, and is entirely insoluble in our fluids, it must be, as it has always appeared to me to be, an absolutely inert substance: and though still perhaps employed by midwives and empirical practitioners, I believe it to be now entirely neglected by British physicians.

Much pains has been taken to obtain tinctures containing the more active parts of amber; but I have never found that any impregnations of these tinctures were considerable enough to give an active and useful medicine, and the attempt has been entirely deserted in Britain. The authors of the Pharmacopœia Genevensis have made an imperfect attempt in employing a large proportion of rectified spirit of wine; and the Danish and Swedish Dispensaries have done somewhat better in employing the liquor anodynus mineralis, or the spiritus æthereus vitriolatus: and by these menstruums, indeed, some solution and extractions are made of the amber; but in these solutions I could never discover any virtues but what might be imputed to the ætherial spirits.

The only active powers that can be obtained from amber are to be found in its distilled oil and salt. The latter we have very seldom genuine, and therefore I cannot positively determine its virtues;

but when genuine and well purified they do not promise to be powerful, as I believe they differ little from vegetable acids: and the liquor cornu cervi succinatus so much spoken of by foreign writers, I have never found to be of any efficacy, or a better medicine, than the spirit of hartshorn rendered neutral by any vegetable acid.

The distilled oil of amber is a more powerful medicine, but not in the state in which it is obtained by a first distillation; and now accordingly, in all the dispensatories it is ordered to be rectified by after distillations. This rectification, however, is variously ordered. The London college have ordered the distillation of it to be repeated three times; but unless they had ordered, that in every distillation a less and less proportion of the whole was to be drawn off, the operation may be inaccurate and very imperfect. The Edinburgh and Swedish dispensatories have done better, in ordering the rectification to be made by the addition of water in the proportion of six parts of water to one of oil; and the Edinburgh college have at the same time judiciously ordered that two thirds of the water only should be drawn off at each distillation. This indeed will give a great improvement to the oil; but I have hardly thought it enough to give it the greatest possible purity it is capable of. I have employed several distillations with water, and have always found, that by repeated distillation the oil became of more fluidity and volatility, acquired a more agreeable odour, and proved a more powerful medicine.

It is here to be particularly observed, that all very volatile oils become medicines which have been constantly reputed to be powerful antispasmodics; and however their operation may be explained, I put the rectified oil of amber into this set of medicines, which I have found, in many cases of epilepsy, hysteria, and other spasmodic affections, to be useful. The oil of amber may be given in doses from ten to thirty drops.

It is only when amenorrhœa can be considered as part of a spasmodic affection that the oleum succini shows any emmenagogue powers.

PETROLEUM.

UNDER this title I mean to comprehend all the fossil oils that are found in the earth; and I believe I might comprehend, in the same class, the whole of the bituminous fossils, as the asphaltum or bitumen judaicum, and pit-coal.

I believe it to be agreed among both naturalists and chemists, that the inflammable part of all these fossils is that fluid, volatile,

and very inflammable oil that is named Naphtha, which is found in its separate state in some places of the earth, or upon the surface of waters into which it has been washed out from their sides or bottoms. The production of it is not accounted for; but it is pretty certainly a fossil matter that is generated in the earth; and by the admixture of various matters it must meet with there, it puts on various forms, from that of a finer oil to a grosser, and through all the different degrees of a grosser and thicker, till it becomes quite of a solid consistence.

It is not necessary for me to prosecute the natural or chemical history of these substances here, since it is enough for the purpose of medicine for me to observe, that while they are in a separate, and in any degree in an oily or liquid state, the oil retains an acrimony that renders it stimulant, and so much antispasmodic, as to have been useful in several spasmodic affections. How far the petroleum is improved as a medicine, by having dissolved a portion of flowers of sulphur, I have not had experience enough to determine. The petroleum, in many of its different states, may be a medicine as I have said; but it is always, in every form in which it can be exhibited, a very disagreeable remedy, and I have never found its powers to be so considerable as to compensate that incon-venience. The only use of the whole bituminous fossils that I can find worth attending to, is this, that in distillation they afford a volatile oil of the nature of that of amber; and which, by the rectification proposed for that, may be brought to the same degree of purity and virtue, and perhaps, in some cases, at a less expence.

FROM VEGETABLES.

FETID PLANTS.

ARTEMISIA.

THIS, as a fetid and antispasmodic, seems to be the weakest of the whole set, and justly omitted in the London list; and, though retained in the Edinburgh, is not known in our practice.

This plant has led the learned Professor MURRAY to give us a valuable compilation on the subject of Moxa; but this does not seem to me to belong to this place, as it seems to be a general and not a particular remedy.

The other plant of the class of Syngenesia which has entered my list, is the

MATRICARIA.

This is a plant of more active parts than the former, and may deserve to be more employed than it has been ; but it is not retained in either catalogue of the British colleges, and I have seldom had such opportunity of seeing it employed as to enable me to determine precisely concerning its virtues.

CUMINUM.

THE general virtues of this as a carminative and antispasmodic I have given already ; but a somewhat more disagreeable odour attending this than the other carminative seeds, has led me to insert it again here ; and I esteem it to be the most antispasmodic of the whole set.

I have, in my list of fetids, inserted the pulegium, but very improperly ; and I have said enough to explain my opinion of its powers when I treated of it as one of the verticillated plants.

ATRIPLEX FOETIDA.

WHAT genus this properly belongs to I have pointed out in my catalogue.

It is a plant of a remarkable fetor, and may be presumed, from that, to be a powerful antispasmodic. Although it is not admitted into the list of the London college, it has been frequently employed in this country with advantage ; not however so frequently as might be expected, as it is a plant, in its fresh state, not always ready at hand, and in its dry state it loses all its sensible qualities. It can only be employed therefore in its recent state, and the most convenient formula is that of a conserve ; and as it is not always easy to reconcile our patients to it even in that state, it is not employed so often as I would wish.

RUTA.

THE first thing to be observed with respect to this plant, is, that the herb and seeds give out essential oils in different quantities, and, as I judge, of different qualities ; but as it is not marked in what different state of the plant the distillations or extractions have been made, this has produced, in my opinion, the different reports that have been given of the products obtained from this plant, and has also occasioned some different reports of its virtues. The analysis therefore is to be submitted to a more accurate examination ; but, in the mean time, from its sensible qualities, and my ex-

perience of its use, I have no doubt in asserting its antispasmodic powers, as employed in its distilled water, in its conserve, or in its extract. The distilled water is to be taken from the plant before it has put forth its flowers, and may be much improved by a cohobation. The conserve, if made as formerly proposed, with three parts of sugar, is a weak and inconvenient formula; but if prepared with an equal part of sugar only, and made in small quantities, so that the plant may be still taken in its recent state, it is an useful antispasmodic. The extract is certainly an useful medicine, and has the approbation of both our colleges. It is possible that it may exert some emmenagogue virtues, though I have not been so successful in employing them as I could wish.

Some other virtues ascribed to Rue I judge to be in common to many other plants, and therefore take no farther notice of them here. One virtue particularly ascribed to it, that of resisting contagion, or of expelling it when taken in, I hold to be absolutely without foundation; and I hope the reasons for this opinion have been, upon several occasions, already explained.*

SABINA.

THIS is a plant which, of all others, gives out the greatest proportion of essential oil; and as this oil retains the peculiar odour and taste of the plant, the medicinal virtues of the whole plant may be fairly ascribed to it; but it is a very acrid and heating substance, and I have been often, upon account of these qualities, prevented from employing it in the quantity perhaps necessary to render it emmenagogue. I must own, however, that it shows a more powerful determination to the uterus than any other plant I have employed; but I have been frequently disappointed in this, and its heating qualities always require a great deal of caution.

Of its anthelmintic qualities, or of its powers in healing carious bones, or foul ulcers, I have had no experience.

GUMMI FETIDA.

ASAFOETIDA.

I have put this at the head of the list as the most powerful of the whole, and when it is in a tolerably recent and genuine state, it is a most valuable medicine. This depends upon the force of its

* For some account of the good effects of rue in cases of the bites of poisonous serpents, see Transactions of the American Philosophical Society, vol. 3. p. 104.

odour, and upon that odour's being of a very diffusible kind, and, which I believe therefore penetrates the nerves more readily than any other vegetable odour. All this explains its being a powerful and suddenly operating antispasmodic. Accordingly I have found it to be the most powerful in all hysteric cases; and when the presence of an hysteric paroxysm prevented medicines being taken by the mouth, I have found it, given in glyster, to be very effectual. When taken into the stomach it is particularly useful in relieving those spasmodic complaints which so frequently attend dyspepsia; and as it has manifestly a laxative power, it is well suited to relieve the flatulent cholics of hysteric and hypochondriac persons.

It is in some measure suited to relieve the spasmodic asthma; but as the spasm in these cases is of an obstinate kind, I have seldom found the asafœtida of much service in asthmatic paroxysms.

As all the fetid gums seem to be determined to the lungs, and to promote expectoration; so I have found the asafœtida the most powerful for this purpose, and more powerful than the ammoniac so frequently employed.

[*Asafœtida, both when exhibited by the mouth and in the shape of enema, has often been found useful in the case of cyanche trachealis.*]

The asafœtida has been at all times considered as an anthelmintic, and I have no doubt of its being such; but I have seldom found it effectual; which, however, I impute to our not having it in so recent and diffusible a state as were to be wished.

The fetid gums have always been commended as emmenagogues; and certainly the asafœtida should have the best pretensions to this power; but whether it be owing to the imperfect state in which we too frequently have this medicine, or to somewhat in the nature of the amenorrhœa, I would not positively determine: but this is certain, that I have very seldom succeeded in employing the asafœtida as an emmenagogue.

[*I doubt whether asafœtida be deserving of the praises which some late writers have bestowed upon it, as a remedy in the case of caries of the bones.*]

The asafœtida is employed in various forms, as it may be given in its solid form, or may be extracted by either watery or spirituous menstruums, and especially as its virtues rise in distillation with those of the latter kind.

In a solid form it seldom acts as a powerful antispasmodic; and therefore, excepting where it is to be joined with aloes or other medicines, I seldom employ it in this state.

When it is to be employed as an antispasmodic, and especially where a sudden operation is required, the form of tincture or volatile spirit are the most proper. As the frequent repetition of the same antispasmodic is ready to weaken its powers, so some variety of formulæ, and of combination with other antispasmodics, may be necessary. Of the tinctures, I take the tinctura fuliginis to be the least useful; and in my opinion it is properly omitted by the London College.

For the purposes just now mentioned, I hold the spiritus volatilis fœtidus of the Edinburgh College, or the spiritus ammoniæ fœtidus of the London, when they can be conveniently given in large doses, to be the most powerful formulæ; but much of all this must be left to the discretion of practitioners.

AMMONIACUM.

OF all these enumerated among the fetid gums, the ammoniac has the least of the fetid odour; and therefore I consider its antispasmodic powers as the least considerable. It is, however, an acrid and heating substance, which, determined to the lungs, may prove an expectorant; which is the virtue commonly ascribed to it; but I have seldom found its power very remarkable; and in common practice I have frequently found the mischief arising from its heating qualities greater than the benefit obtained by its expectorant powers.

The ammoniacum has been commonly commended for its power, externally applied, in resolving indurated tumours; but the theory of this is very doubtful, and I have not any clear proof from experience of its having any such power.

GALBANUM.

THIS is indeed a fetid gum, and should have the virtues of such; but it is neither of a strong odour nor of diffusible quality, and therefore its virtues are not considerable. By itself it is of little power, but is properly retained in practice, as affording the variety so requisite in the use of antispasmodics. The London College in my opinion have properly given a gum pill without the asafœtida, which is so often disagreeable to particular persons. Though the Edinburgh College have perhaps given a more effectual medicine, they have missed the advantage of the variety mentioned.

The galbanum has been commended for favouring the suppuration of inflammatory tumours; but its powers in this way have ne-

ver appeared to be considerable : and our surgeons have found that they can execute this business more certainly and speedily by the frequent repetition of emollient poultices.

OPOPANAX.

THIS is the least disagreeable of the fetid gums, and therefore of the least virtue. In its separate state it is little employed ; and properly, as its particular virtues are not ascertained. It is however properly retained in practice, as it affords the variety just now mentioned.

SAGAPENUM.

THIS is the most active and powerful of the three last mentioned gums, and has a stronger and more diffusible odour than any of them : It has therefore a better title to be retained in practice, and comes the nearest to the powers of the asafœtida ; but it is not so suddenly operative, and is hardly to be otherwise employed than as affording a variety.

With regard to the last mentioned gums, I have not taken notice of the various means of extracting them, as they cannot be much improved in their activity by their being treated either by tincture or distillation.

TACAMAHACA.

THE common tacamahaca of our shops should not have had a place here, not being employed as an internal medicine ; and as an external I cannot perceive its virtues. There is however a medicine under the title of *Tacamahaca in Shells*, which from the accounts of materia medica writers, seems to have more active power. It was therefore allowable to point it out to students of materia medica as an object of enquiry ; but it is yet so little in use, that I myself have had no opportunities of being acquainted with it.

RADICES GRAVEOLENTES.

PÆONIA.

THIS was very anciently, and has been always since, an article of the materia medica. In our History we had occasion to give a stricture on the subject with regard to GALEN, which does neither credit to him nor to the virtue of the medicine. Since that time, its fate and reputation have been various ; while some comment

its virtues, and others declare their disappointment in employing it.

Its sensible qualities, in its recent state, promise some virtues; but these qualities are very inconsiderable, and at the same time very transitory; so that in the powdered root, the form in which it is most frequently employed, I can hardly perceive them to be any at all. In the frequent employment of them, I could never perceive any effect, either in epilepsy or other spasmodic affections. To conclude the subject, it is enough to observe, that both the Edinburgh and London Colleges have now omitted it in their lists of the materia medica.

VALERIANA SYLVESTRIS.

THIS is a root of more virtue and deserved reputation. It has been almost at all times in esteem, but particularly since the time of FABIVS COLUMNA. It has been since much taken notice of and employed in practice, frequently with success, but frequently also, particularly in my own practice, without any effect at all. The latter circumstance, however, I impute to this, that the best remedies may often fail in a disease which depends upon a diversity of causes; and partly to this, that the valerian is frequently employed in an improper condition. In the condition we have it, in different shops and at different times, I have found the sensible qualities of it to be very different; and I am persuaded, that unless it is taken up at a proper season, and properly preserved, it is often a very inert substance.

I do not conclude from its singular power with respect to cats, that it must have peculiar powers with respect to the animal œconomy; but I consider its more or less activity with respect to cats, which is different at different times, to be a test of its active powers in general.

Its antispasmodic powers in general are very well established, and I trust to many of the reports that have been given of its efficacy; and if it has sometimes failed, I have just now accounted for it, adding only this, that it seems to me, in almost all cases, that it should be given in larger doses than is commonly done. On this footing, I have frequently found it useful in epileptic, hysteric, and other spasmodic affections. It seems to be most useful when given in substance; and in large doses I have never found much benefit from the infusion in water.

[*In that violent affection of the head called hemicrania, which often appears in the shape of an intermittent, practitioners have

recommended valerian as a powerful remedy : and I have myself found it such, especially when I have combined with the valerian, a portion of Peruvian bark.*]

The London College have attempted a tincture strongly impregnated ; and I have attempted one still stronger, by taking the root in double the quantity, and straining the tincture by a strong expression : and this I have found, in persons who cannot bear a large dose of the menstruum, is a powerful remedy, and suddenly operating. The volatile tincture prescribed by both colleges, is often, as suddenly operating, an effectual remedy, and gives an excellent variety of antispasmodic formulæ ; but whatever may be the efficacy of the valerian, the menstruum here has certainly a share in it.

I readily believe in the anthelmintic power of the valerian, but have hardly had an opportunity of perceiving its effects.

FULIGO LIGNI.

IF this had not been retained in the list of the Edinburgh college, I should not have given it a place here ; and I judge it to be very properly omitted in that of the London. It is a heterogeneous mass that has not yet been with any accuracy analysed, at least so as to ascertain its proper application in medicine ; and this is especially uncertain, as on different occasions it is of different kinds.

It has been retained in the Edinburgh dispensatory merely, if I mistake not, by the habit that Scottish practitioners have been in of prescribing the tinctura fuliginis as a variety of the antispasmodic formulæ ; but it is now much neglected by them : and although we cannot deny that the soot may contribute somewhat to the intention of the medicine, yet the tincture has never shown to me any power that might not be ascribed very entirely to the asafœtida it contains.

OLEA ESSENTIALIA.

ALTHOUGH these, for the most part, have been treated of before under the title of Stimulantia, I could not miss to give them a place here, because, as I observed above, they often exert an antispasmodic power. Their effects in this way are commonly most remarkable in the alimentary canal, and especially where the spasm may be supposed to arise from some loss of tone in some portion of the muscular fibres, and when therefore a stimulus, exciting a motion in the other parts of the canal, may be the effectual remedy.

The antispasmodic power of essential oils is very much confined

to these parts, and excepting in a very few particulars, do not show their power with respect to the whole system; or, if they do, it is probably only where the more general or particular affections depend upon a state of the stomach which may be corrected by the operation of antispasmodics applied to it.

It is very generally the effect of essential oils to be stimulating and heating to the system; and therefore, when any degree of phlogistic diathesis prevails in the system, the use of these essential oils is to be avoided. Even in some cases of spasmodic affections of the alimentary canal, though some suspicion of phlogistic diathesis remain, the antispasmodic power of essential oils may seem to be necessary; but in such cases it is at least desirable to employ the essential oils of the least inflammatory kind. To this purpose, I am of opinion that the least inflammatory are those of the umbelliferous seeds; that next to these are the oils of the verticillated plants; and that the most inflammatory of all are those of the aromatics strictly so called. But all this I leave to be farther examined, and more accurately determined, as the various qualities of the essential oils have not yet been examined with so much nicety as seems to be proper; and to this purpose a particular observation here occurs to me.

Camphire is in many respects to be considered as an essential oil; but its operation upon the human body seems to be very different from that of most others. It is a powerful antispasmodic with respect to the whole system, without being readily heating to it, as I think I have demonstrated above: and I repeat the observation here for the sake of remarking, that several of the essential oils approach to the nature of camphire, and contain manifestly a portion of it in their composition. It may be therefore supposed, that such camphorated oils may be more powerfully antispasmodic, and at the same time less heating. Such I take to be the case with the peppermint; but whether there are any others containing so large a proportion of camphire as to give them the same qualities with this, and different from the most part of the other essential oils, I have not been able to determine.

ÆTHER.

THIS is entirely an artificial substance, formed by a combination of alcohol with a concentrated acid. For a long time we were acquainted with it as formed with the vitriolic acid only; but we have since learned, that not only the other fossil acids of nitre and sea-salt, but that also the vegetable acid, may be managed so as to form

an æther, or an oil of great volatility. Although we are only very well acquainted with the vitriolic æther, all of these formed of the other acids seem to be endued with the same antispasmodic power; and how far this is anywise different in the different species, is not yet properly ascertained. They are employed in all spasmodic affections, whether of the whole system or of the alimentary canal; and the suddenness with which they are diffused gives them great advantages. They are irritating and heating to the parts to which they are immediately applied, in which they resemble camphire; but resemble this also in not being heating to the whole system. They resemble that also in another respect, in being antispasmodic in the case of inflammatory spasm; and thus, by an application commonly known, they cure headach, toothach, and some rheumatic affections. Æther seems also to be endowed with some anodyne virtue; and this, ascribed to the liquor anodynus mineralis HOFFMANNI, or what I take to be the same thing, the spiritus vitrioli dulcis, seems to me to be tolerably well founded.

The only other observation I have to make with respect to æther is, that the vitriolic most commonly employed is ready to have some portion of the sulphureous acid adhering to it; and that, in proportion to such adherence, the virtues of it are greatly impaired. To obtain, therefore, a powerful medicine, it is necessary that great pains be taken to render the æther free from all adherence of the sulphureous acid.

OLEA EMPYREUMATICA.

THE empyreumatic oil most noted for its antispasmodic virtues is very constantly taken from the empyreumatic oil of animals; and it is therefore, in its rectified state, named the Oleum Animale. I think it however proper to inform my chemical reader, that an oil of the same volatility and antispasmodic power, as I know from my own experience, may be obtained from the empyreumatic oil of vegetables, when treated in the same manner as proposed for that of animals; and it is therefore that, in my catalogue, I chose to give the general title of Empyreumatic.

I do not however allege, that any particular advantage is to be got by working upon the vegetable oil; and therefore I go on to speak of this subject as it is commonly obtained from animal oils.

The preparation of this oil was formerly, and as particularly delivered by Dr HOFFMAN, a very troublesome work; but succeeding chemists have found, that the purpose of the whole may be obtained with less labour and as much success. I shall enter

no farther into the history of these labours, and of the various methods proposed, but to remark, that the directions given in the last edition of the London dispensatory, for the reasons given above, on the subject of the oleum succini, do not seem to me sufficient; and the directions given in the last edition of the Edinburgh Pharmacopœia, seem to be more perfect and complete. The directions given there for the preserving of this oil in its perfect state, are particularly proper and necessary.

As we said above, what I believe every body apprehends, that it is very difficult to explain the operation of antispasmodics in general, I find the difficulty increases as we go farther in the consideration of particulars. Here I have occasion to take notice of a very particular circumstance in this business. We find that a very volatile oil in the several æthers, and a very volatile oil procured by the management above mentioned, from either the fossil, animal, or vegetable kingdoms, do all prove powerful antispasmodics; so it appears to me that their power is very much in proportion to the volatility to which they are carried: for it is well known, that when their volatility, and with that their antispasmodic power, is carried to the utmost, they are again readily changed by the contact of the air; and by this their colour, odour, and volatility, are much diminished, and with these changes their antispasmodic power is also greatly impaired. Here then is a singular connection between the volatility of oil and our nervous power; but how the former acts upon the latter we do not at all perceive: and particularly, how the former, by the loss of its volatility, is brought into a state less suited to the cure of spasmodic affections, we cannot clearly discern.

We have said above, that these affections depend upon a state of mobility in the energy of the brain; and we would now make another step in alleging, that our volatile oils give, for a certain time, a steadiness to the energy of the brain, without destroying its mobility, in the same manner as narcotics do.

But after these conjectures, I must pass from the subject, till we shall, by farther observation and reflection, learn more of the nature of the nervous power than we do at present. In the mean time I must remark, that the speculations I have entered into have taught me somewhat in practice; for in some instances, when I could know exactly the period of an epileptic accession, I could, by giving a full dose of animal oil, prevent such an accession. *Sed manum de tabula.*

EX ANIMALIBUS.

MOSCHUS.

THE production of this in an animal body we do not pretend to account for; as we do not in the least presume, in many other instances, to account for the various and peculiar productions of the animal œconomy.

The natural history of the animal producing this peculiar substance I must leave to others, as it is of no consequence to our purpose to determine, whether it be of the goat or of the hart kind.*

I would wish to enter into its chemical history; but the chemists have not gone far on this subject. It is a remarkably odoriferous substance; and this seems to depend upon what may be called an essential oil, as it arises with distillation in water. If this may be taken as a proof of the great volatility of this oil, it may be comprehended under the head of those which have their antispasmodic powers depending upon their great volatility. This, with regard to musk, must be left to farther speculation and experiment; and I must now go on in considering it as a medicinal substance in its entire state.

This I consider as entirely depending upon its being a very odoriferous matter, which in all cases seems to be powerful in acting upon the nerves of the human body. As, however, we do not yet know any certain means of extracting its odoriferous parts; so the first thing to be remarked with respect to its medicinal qualities is, that it is more effectual given in substance than under any preparation that has been attempted. In substance it is to be given in large doses, from ten to thirty grains; and even when these large doses are found to be effectual, they must be repeated after no long intervals till the disease is entirely overcome.

While I am mentioning the doses of musk, it is proper to remark, that these will depend upon the quality of it, which is at different times in very different condition. Whether this is owing, as has been alleged, to a more imperfect condition in the original musk, or to an adulteration frequently practised upon it, I cannot certainly determine; but certainly such differences do occur, and I have therefore very often found it to be an ineffectual medicine. I judge of it always by the strength of its odour, and in proportion to this

* The animal which furnishes us with the genuine musk of commerce, is neither a species of goat nor of hart, but an animal belonging to a very distinct genus of the order *pecora*, or *ruminantia*: the *moschus moschiferus* of Linnaeus.

only to be an effectual remedy. I was once called to a patient in the night-time, under violent headach and delirium arising from gout, for which I ordered fifteen grains of musk, but without giving my patient any relief. In the morning, however, the disease continuing the same, as I had learned where some good and genuine musk was to be had, I ordered a like dose of this, and thereby obtained the immediate relief of my patient. From many such instances of the difference of musk, I must inculcate upon all practitioners, that genuine musk is a very powerful medicine, and that they should not doubt of its efficacy on any occasion, without their being certain that the failure was not owing to the imperfect state of the drug. I must add, that the imperfect state of musk is not compensated by a larger dose.

With such precaution in the choice of it, I maintain that musk is one of the most powerful antispasmodics that we are acquainted with. I have found it, with Dr WALL, to be a powerful remedy in many convulsive and spasmodic affections, and in some of a very peculiar kind. I had once a gentleman affected with a spasm of the pharynx, preventing deglutition and almost respiration. This, when other remedies had failed, was relieved by the use of musk, which often showed its power; for the disease continued to recur at times for some years after, and was only obviated or relieved by the use of the musk.

[* Musk has been employed in tetanus: and a remarkable case of the efficacy of the medicine, in this disease, is related by Dr OWEN, an English physician. What HILLARY has said of the powers of this substance, in the same disease, as it occurs in hot climates, is known to every physician. A patient of mine, affected with a spasmodic affection of the muscles of one side of the face, and of the jaws, was essentially relieved, on various occasions, by musk.*]

Some time ago the musk had the reputation of curing the bite of a mad dog. Dr. JOHNSTON has given us two facts that are very much in favour of its power: and I have been informed of an instance in this country of some large doses of musk having proved a cure after symptoms of hydrophobia had come on; but we have had no more instances of the same kind, and I leave its powers of this kind entirely to the judgment of the Societ  Royale de Paris.

In another disease I can vouch for the powers of musk, and that is in several circumstances of the gout. The case given by Mr PRINGLE, in the Physical and Literary Essays, Vol. II. art. 12. are very much in favour of its virtues: and, in several instances of the gout attacking the stomach, I have found it relieved by large doses

of musk. I gave above an instance of headach and delirium, arising from the gout, being cured by it ; and in the same person I had repeated instances of its power. This person being frequently affected with the gout, was liable to have it retrocedent, and affecting the stomach, the lungs, and particularly the head, in the manner above mentioned ; and in many of these instances it was very suddenly relieved by large doses of musk, or by these at least repeated after short intervals ; though at length the great irregularities of this patient brought the disease into a state that resisted all remedies.

Musk has been employed by some in continued fevers ; and I have had some experience of its use. It seems to be adapted to these cases of convulsive disorder which I have said above are to be cured by opiates ; and indeed the success I have generally had with these has prevented my having further experience of the musk.

CASTOREUM.

THIS also is an animal production, the natural history of which the public are well acquainted with. It is a pretty strongly odoriferous substance, of the disagreeable kind ; and to this we ascribe its medicinal powers. It is certainly on many occasions a powerful antispasmodic, and has been useful almost in every case requiring such remedies, especially when given in substance, and in large doses, from ten to thirty grains. It has been supposed by some to have somewhat of a narcotic power ; but I have never perceived this excepting where such effects might be imputed to its removing the spasmodic affections which interrupted sleep. Its medicinal virtues are best extracted by a rectified spirit, as it is probable that this extracts most powerfully the odoriferous oil, upon which the medicinal quality probably depends.

The Edinburgh College are of this opinion ; but the London College prefer a proof-spirit. The latter may give a medicine to be employed more conveniently in a larger dose than the former ; but neither of them, in my opinion, can admit of doses of much efficacy. Either of them may give a medicine to be suddenly diffused, and therefore of use in spasmodic affections : but if that is the intention of the practitioner, it will be most certainly obtained by employing the compound tincture of castor, as prescribed by the Edinburgh College.

SALES ALKALINI VOLATILES.

THESE should have been put above, under the head of Stimulantia: for their stimulant is their most remarkable power; and this they show in every dose wherever the energy of the brain is weakened, and in consequence the action of the heart is languid, or requires to be accelerated. In such cases this stimulus is among the safest, as it is always transitory; and when their acrimony can be covered, so as to pass the mouth and fauces without irritation there, they may be given in large doses from ten to twenty grains.

It is not necessary to observe, that these volatile alkaline salts were formerly drawn from various animal substances, and supposed in consequence to have peculiar virtues; but now the chemists have learned, that from whatever substances they may be extracted, they may be brought to such a degree of purity as renders them hardly different from one another. They are still however prepared in two different ways; the one of which is from sal ammoniac, which gives the ammonia of the London Dispensatory, or the sal ammoniacus volatilis and spiritus salis ammoniaci of the Edinburgh.

These are certainly the purest forms of the volatile alkali, the most free from any adhering animal substances; but while the trade continues of preparing a volatile alkali from the bones or other solid parts of animals, there will come into our shops a salt and spirit that can hardly ever be so pure from some empyreumatic animal substance adhering: and it is a question with me, Whether such an adherence may not give some peculiar quality to the salt and spirit? I believe it does so, and may render it more antispasmodic. This indeed cannot go far in any doses of the salt or spirits given to adults; but it may go much further, as employed in the spasmodic affections of infants.

The liquid volatile alkali is commonly employed in its mild state; but by a distillation of the sal ammoniac with quick-lime, the alkali obtained may be in its caustic state. In this state it may be readily joined with spirit of wine, and gives the spiritus salis ammoniaci dulcis of the Edinburgh Dispensatory, or the spiritus salis ammoniaci vinosus of the London. The combination affords an excellent menstruum for dissolving the several fetid substances employed as antispasmodics, and renders them more suddenly diffusible, and perhaps of more effect, in all spasmodic affections.

The caustic volatile alkali is seldom employed by itself; but if its acrimony be covered while it passes the mouth and fauces, it may be employed with great safety. Its chief use, however, is when employed externally; and when smelled at the nose, gives a more powerful stimulus than the mild alkali can do. Its acrimony is so considerable, that when applied to the skin, it readily irritates, and even inflames it; and may be so managed as to prove an useful stimulant and rubefacient in many cases. But this requires its being blended with a mild expressed oil, in such proportion as to prevent its inflaming too much; and in this state it may be employed with great advantage, and particularly in paralytic cases, with more advantage than the acids we mentioned before for that purpose.

Practitioners are now well acquainted with the use of this combination, under the name of the Volatile Oil, and find it useful in relieving all pains arising from rheumatism, when the skin is not already affected with redness; and it is even useful in relieving pains of the flatulent kind. This combination, to be very useful, requires to be made of one dram of good caustic alkali to an ounce of the oil; and it may even go frequently with advantage to double that quantity. Let apothecaries observe, that if the alkali does not entirely and intimately unite with the oil, and remain constantly united with it, it is a mark that the alkali was not sufficiently caustic.

Of the Action of Medicines upon the Fluids.

HAVING now considered and explained, as well as we can, the action of medicines upon both the simple and living solid, I am next to consider the action of medicines upon the fluids of the human body.

The subject has occupied a great part of the writings on the materia medica; but, in my opinion, with no advantage. The doctrines have been often drawn from mistaken facts; from an imperfect view of things; and commonly explained upon mistaken principles. Whether I shall be able to correct and improve the doctrine, I dare not determine; but it seems necessary to attempt it; and I shall do it as far as I am able.

The principles I am to employ are perhaps very well understood by some chemical philosophers; but they are still far from being understood by the most part of physicians in any country of Europe, and particularly very imperfectly understood by writers on the materia medica. It seems therefore necessary to lay down the

principles I am now to proceed upon ; allowing them to be corrected and improved hereafter by abler philosophers.

The leading principle to be employed is this, that the qualities of bodies, as they appear to us, are especially changed by separation or combination ; that is, by the separation of mixts into their constituent parts, which in their separate state have qualities different from those which appeared in the mixt ; or by the combination of two or more separate bodies, into a mixt or compound, which has qualities different from those which appeared in the separate parts.

All this is in general obvious ; but in order to explain the latter case, we must now observe, that nature has established between the small parts of bodies an Attraction, as it is called, or a disposition in a certain contiguity, to run into an union with one another, and to remain firmly united together.

This disposition or this attraction does not however take place between all kinds of bodies, as there are many which have no such relation ; and of two bodies which have each of them an attraction to a third, the force of this is stronger with respect to this third body in the one than in the other, which is called an Elective Attraction. It is by this especially that the separation of the constituent parts of mixts is obtained ; as when to a mixt body another is applied which has a stronger attraction to one of its constituent parts than they have to one another, the part having the strongest attraction towards the body added passes to that, and leaves the other with which it was formerly joined by itself ; and thus the constituent parts of a mixt may be separated from one another, whilst a new combination is at the same time formed.

To explain the separation of mixed bodies, it is further necessary to remark, that the constituent parts of mixts may be separated from one another by the action of heat or fire ; and taking this into the account, we have all the several means of changing the qualities of bodies by separation and combination.

In this view of the matter it will appear, that, beside the action of fire, the only other power in nature by which the qualities of bodies are changed is the relation of attraction which nature has established between different bodies. What that relation depends upon, we have not, so far as I know, in any measure perceived. The smallest ultimate parts of bodies we have not, in any case that I know of, had a sight of, so as to show us any properties or conditions that might account for their several attractions, or their repugnance to it, which we call their Repulsion. The suppositions

of the Corpuscularian philosophy, have been gratuitously assumed, and might perhaps be shown, with respect to particular bodies, to have been universally false.

The late discoveries, showing acids to appear often in the form of an air, should, I think, disturb the notions of the Corpuscularians. In short, the Corpuscularian doctrines have never explained to me any one phenomenon of nature; and it appears to be full time for us to give up our assuming them in our explanation of the qualities of bodies.

Some changes in the qualities of aggregates may be obtained by a mechanical division; but mechanical division divides aggregates only into their integrant parts: and I know no instance of such division separating the constituent parts of any mixt that takes place in the ultimate or smallest parts of the aggregate. If mechanical division seems to change the cohesion of aggregates, I maintain it to be always by some relation of attraction operating by solution or mixture.

It must in the next place be observed, that where bodies are to be changed by the combination of two different bodies, a certain proportion of the one to the other is always necessary to make any considerable change in the qualities of the new mixt; and if the portion of the one is very small with respect to the other, though this may be equally diffused over the whole, yet the changes in the former qualities of the larger portion may be very inconsiderable, or hardly assignable. When, therefore, a quantity of matter, small with respect to the whole of the fluids of the human body, is introduced into it, no considerable change can be made in the larger mass; and this is a doctrine we shall have frequent occasion to employ.

It is however to be remarked here, that whenever it appears that a portion of matter, small with respect to the whole of the human body to which it is added, has very considerable effects in changing the state of it, that this must be either by the matter's acting primarily on the nervous system, which may be moved by very small quantities of matter, or that it must be by the matter's acting as a ferment; which, by acting successively on the several parts, may at length make a considerable change in the whole mass.

Having thus laid down my general principles, I proceed to treat of the several medicines acting upon the fluids, under the several titles to which I have referred them in my catalogue. I might, as is usually done, and as I have done in my general table, mention

them as *Alterantia* and *Immutantia*, or as *Evacuantia*; but as I have no proper doctrine to deliver under the general head of *Alterantia*, I proceed to consider the particular state of alternation, as the several conditions of it are explained in my general table, and in the detail of my catalogue.

CHAPTER IX.

DILUENTIA.

THE fluidity of the blood may be increased in two ways; that is, either by increasing the proportion of fluid in it, or, by diminishing the cohesion of the other parts. It is the first for which we employ strictly the term and title of *Diluentia*; and the second we are to consider in the next chapter, under the title of *Attenuantia*.

With respect to the first, it is well known that the ordinary fluidity of the blood is owing to water, which in great proportion is constantly present in it; and that the chief, and perhaps only, means of increasing its fluidity, will be by increasing the proportion of water in it. We take it for granted that the blood, in the state in which it is in living bodies, will always readily admit of a further proportion of water to be uniformly diffused in it, and thereby to increase the fluidity of the whole; and we cannot indeed discover that any other fluid can have this effect, but in proportion to the water which such fluid contains. Water therefore is the proper, perhaps the only proper, diluent; and its effects as such I am now to consider more particularly.

AQUA.

THIS I formerly considered as a drink, and am now to consider as a medicine; and in this light some have justly considered it as very universal. We formerly mentioned the several qualities of water necessary to render it fit for a drink; and it seems to be enough to say now, that the same qualities precisely are what render it fit to be employed as a diluent; and as such I proceed to consider its operations.

Nature having appointed water to be universally the drink of the whole animal creation, it is therefore in man the proper object of thirst; and its first operation is to quench this appetite, and thereby remove a very uneasy sensation, which is often a considerable

irritation of the whole system. It does this, not only by its coolness and simple fluidity, but also by its diluent power in dissolving the viscid matters of the internal mouth and fauces.

When water is carried down into the stomach, it has there, according to its temperature and quantity, a very various operation. The effects of the former I have mentioned several times; to be therefore no further taken notice of here: and they are the effects of its diluent power only which I am now to consider.

As the most part of mankind take drink along with their solid food, there can be little doubt that a certain portion of diluent drink, and particularly water, favours the solution and digestion of our solid food, and also contributes to the more speedy evacuation of the stomach. The quantity necessary for this is very different in different persons, and must be suited to the feelings of every individual; but with this observation, that a larger proportion than necessary, by increasing the distension of the stomach, is ready to take off what appetite might otherwise remain; and it is commonly proper only, after the digestion is over, to throw in a quantity of water to finish that business more completely, and to promote the entire evacuation of the stomach.

Not only for the assistance of digestion our diluent is necessary, but is also otherwise to the state of the stomach itself. As the mucous glands of this organ throw out a large quantity of a heavy viscid fluid, which, remaining in the stomach, gives an uneasy sense of weight, and impairs the appetite; so, in this morbid state, a quantity of water, by diluting and favouring the absorption and evacuation of this mucus, may often be the most certain remedy.

It will be obvious, that in consequence of these operations, many and various disorders of the stomach, and of the whole system, may be removed by water taken into the stomach.

When water is carried into the intestinal canal, it will, by mixing with the bile, diminish the acrimony of this, and obviate irritations that might otherwise have thence arisen. By diluting the contents of the intestines, it will certainly promote the more entire solution of these, and, even by its bulk, favour their progress. But it is to be remarked here, that as water is intended to be copiously absorbed here, so the effects we have just now mentioned will always be less and less as the alimentary mass goes farther on, and will thereby allow it to come to a thicker consistence; which will perhaps explain why the drinking of water so commonly contributes to a costive habit. At the same time it is to be remarked,

that a large quantity of water, pretty quickly thrown into the intestines, may, by its bulk, increase their action, and thereby prove laxative; and I have known many instances of water operating in this way proving an useful remedy, by clearing out the whole of the contents, whether natural or morbid, which might be stagnant there. The common people, who commonly take in every thing that is under the name of a mineral water in very large quantities, often obtain much benefit from waters of no sensible impregnation, or at least of any such impregnation, as would have no effect, if it was not from the bulk of water which accompanies it.

When any unusual quantity of water enters the lacteals or other absorbents, it must contribute to increase the fluidity of their contents, and to expedite their motions; and considering how much obstructions in the conglobate glands are to be apprehended, the increasing the fluidity of the liquor passing them may often be a means of obviating these obstructions, or removing them when formed.

The water entering the blood-vessels by the thoracic duct must, in proportion, increase the fluidity of the whole mass, and is certainly the means by which its fluidity is commonly preserved.

It is true, that even an unusual quantity of water entering the blood-vessels, enters so slowly, that it can hardly, before it be again withdrawn, increase the bulk of the whole, or give any unusual distension; but the size of the vessels is commonly so exactly adjusted to the quantity of these, that I am persuaded any unusual increase in the quantity of fluid, though very small, may give some degree of distension, and in some measure invigorate the system.

This, however, in healthy bodies, or such as are without any obstruction of the excretions, cannot long subsist; for I hold it to be true, that any unusual increase of the quantity of water in the blood will immediately pass off by one or other of the excretions: and this passing off very immediately and largely by the excretions, we are now to consider as a principal effect of water taken in.

When an unusual quantity of water has been thrown in, and passes off largely by urine, as it commonly passes off almost without colour, taste, or smell, it may be supposed that it carries little of the saline matter of the blood along with it. This however cannot be supposed to be entirely the case; but that water, in this way, in some measure diminishing the saline matters formerly present, may thereby obviate and contribute to the cure of several diseases; and further, although in this way its operation should not be considerable,

there is another effect of it to be taken notice of, which is, that the exciting and increasing the action of the secretory and excretory vessels must always be of considerable use to the system.

One other remark is to be made.—Although it is probable that, by the constitution of the œconomy, any unusual quantity of water be determined to pass off by the excretions, rather than by the internal exhalants, this can hardly be supposed to be so entirely the case, but that some portion of the abundant water will also pass by the internal exhalants, and thereby, in some measure, dilute the ordinary halitus and the lymph that is absorbed from it. By this means the diluted lymph will pass along its vessels, and be fitter to obviate stagnations that might otherwise occur there. And whether, in this way, the large use of water may not contribute to the cure of scrophula, I leave my intelligent readers to determine.

From this detail of the operation of water, when joined with the effects of its temperature, explained elsewhere, it will readily appear that the abundant use of it, with very few exceptions, may be considered as a very general means both of preserving health and of curing diseases.

After AQUA in my catalogue, I have set down the *aquosa blanda*; by which I mean all those fluids whose parts are chiefly water, without the addition of other matters that may either diminish the diluent qualities of it, or give it peculiar properties: and with these conditions I hold, that all aqueous liquors may have all the powers and properties I have ascribed to simple water.

CHAPTER X.

ATTENUANTIA.

THESE are medicines supposed to increase the fluidity of the mass of blood, and that without increasing the proportion of the water in it, but by an operation upon the other parts of the mass.

The employment of this class of medicines seems to me to have proceeded upon the supposition that the preternatural spissitude of the fluids is owing to the small parts of them uniting together, and thereby forming grosser and more impervious masses.

This state of the fluids is supposed to be corrected either by mechanical or chemical means. The first, it is supposed, may be done by a matter attenuating or diminishing the size of the preternaturally grosser particles, or by a matter which divides and sepa-

rates the parts of these ; and these last are named *Incidentia*, a term frequently occurring in writers on the *materia medica*. On the subject of these operations of attenuating and inciting, I would in the first place observe, that the supposition of the cause of the preternatural spissitude of the fluids is upon a mistaken foundation; and I am disposed to maintain, that there is no evidence of its ever taking place. *Secondly*, Though the supposition was better founded, I maintain, agreeable to the principles above laid down, that no such mechanical operation can here take place. But, without entering farther into the question, I choose to quote the following passage from the learned GAUBIUS. Although he was bred in the corpuscularian school of BOERHAAVE, and has himself, in other parts of his work, admitted much of that doctrine, he had certainly entertained some doubts of its truth and propriety; and with respect to one particular of it, has given us the following passage. In the 300th paragraph of his pathology, he has the following words: “ An et naturæ humanæ facultatis inest, moleculas, acres detritis aut intropressis angulis in sphaerulas tornando blanditiem creandi? Non satis constat speciosam ideam æqualiter in fluidam solidamque acrimoniam quadrare. Credibilis profecto mixtione chemica (298) magis quam mechanica rotundatione id opus perfici.”

I dare say the opinion of the mechanical operation of the attenuantia and incidentia will be deserted by every body; and we have therefore only to consider how their effects may be accounted for in a chemical way. Here however we meet with much difficulty. The change that happens in consequence of the exhibition of these medicines, if any at all, cannot be rendered evident in fact; and the theory of any supposed operation is not to be readily explained. What can change the state of the gluten is not well known; and we do not know of any matters applied to it out of the body that can dissolve it, except a caustic alkali, which cannot be applied to it as it flows in the vessels. Saline matters as applied to it, when it is drawn out of the vessels, do prevent its usual concretion, but these have no effect upon its consistence; for, on a quantity of water being added, the gluten separates from the rest of the mass, and shows the same qualities which it would have done upon any other occasion. I must say the same thing of the red globules, that we do not know of any substances which, in the body or out of it, can change the state of these; and therefore that we do not know of any substances which can change the consistence of the blood with respect to its principal parts, which we might suppose

to be the most ready to form preternatural concretions. If, therefore, any such take place, it must be in the serosity; but whether ever any such concretions take place there, is not ascertained as a fact: and the supposition is not suitable to what we know of the serosity, which is always a saline fluid, possessed of a solvent power with respect to the other parts of the mass of blood.

But however all this may be, if we can suppose that there may be concretions, or a disposition to concreate, there may be room for attenuating medicines; and I have set down a list of medicines supposed to be of that kind.

Of these, the first I have set down is water, which perhaps need not have been repeated here; but I mention it to say, it is probable that this not only increases the proportion of water which is always separate from the animal fluid, but that a portion of it may insinuate itself into this, and be a means therefore of diminishing the force of cohesion in it.

The next in my list are the

ALKALINA,

SUPPOSED to be powerful attenuants; but this does not appear to me to be on just grounds. It was originally supposed that they operated by their septic powers; but the experiments of Sir JOHN PRINGLE have entirely exploded this opinion: and as to their otherwise solvent powers, I have already observed, that with respect to the gluten they are none at all: and if they act at all as attenuants, they must act merely by increasing the saline state of the serosity, and therefore in the same manner as the matters I am next to mention do.

SALES NEUTRI.

THESE have been universally supposed to be attenuant, but on no certain foundation that I can discern. They may, as I have said already, be employed in preventing the usual concretion of extravasated blood; but in no experiment do they show any power in dissolving or moderating the cohesion of the gluten. I have allowed that the saline state of the serosity has a chief share in preserving the fluidity of the whole mass; and when the saline matter is in large proportion present, it may give an unusual fluidity to the whole: but I cannot perceive that any such quantity of neutral salts that are commonly employed as medicines can have such an effect. An ounce of nitre, thrown in *par refrises*, in the course of twenty-four hours, while a portion of it is at the same time constantly

passing off by the excretions, cannot possibly be ever accumulated in such quantity as to have any effect as a solvent. In the same manner I reason with respect to the other neutrals; and I proceed to consider the next article of

SAPONES.

BOERHAAVE was much disposed to extend the idea annexed to this term, seeming to suppose that every combination of saline and oily matters might be considered as a soap. As such a combination however takes place in almost every natural production, whether vegetable or animal, it is obvious, that as the qualities and proportions of the ingredients of such mixts must be considerably diversified, the chemical qualities and effects of them upon other bodies must also be so; and therefore the language of saponaceous must in chemistry be loose and inaccurate; and the use of it in medicine must be in the same condition. As incapable of precision, it should not be employed so promiscuously and commonly as it has been done.

For the purpose of the materia medica we must aim at more precision; and I am here to consider only what comes most commonly and strictly under the appellation of *Soaft*, which is a combination of fixt alkali with an expressed oil. The preparation of this has been so frequently described, and is so well known, that it need not be delivered here: and with a view to its chemical or medicinal qualities, it is enough to say, that it consists in such an exact and mutual saturation of the two ingredients with each other, that a new mixt is formed in which the qualities of the constituent parts very entirely disappear. The alkali loses the acrimony which it had in its separate state, and the oil now becomes readily miscible with water, which it was not at all before; and the perfect state of these properties is the mark of the preparation's being accurate and exact.

The medical consideration of this substance first to be entered into is, that soap is ready to be decomposed by any acid, however weak: and this circumstance in the quality of soap is of great weight in our judging of its effects in the human body. As in our opinion the human stomach, in its healthy state, is never without some acid present in it, so it is probable that any moderate quantity of soap taken into the stomach is always decomposed by the acid of this cavity applied to the alkali of the soap; and this goes so far, that when acidity to a morbid degree prevails in the stomach, there is not a more powerful corrector can be applied to it than soap;

and it is often a more convenient remedy than common absorbents or simple alkalines.

When soap is thus decomposed, what effect either the neutral formed from it or the oil separated from it, may have in the stomach, hardly deserves any attention; and what are the effects of its correcting the acidity of the stomach shall be considered hereafter.

Upon the supposition that soap is not decomposed in the stomach, or that such a quantity is thrown in as cannot be entirely decomposed there, it may be an object of enquiry to determine what are its effects in different parts of the system. As under a certain management soap may dissolve the most part of vegetable or animal concretions, a specious foundation has been laid for supposing its attenuant power with respect to the human fluids; and very possibly it may be of use in resolving the viscidities that may be supposed to occur in the alimentary canal; though, considering the diluted state in which it must be applied, its operation cannot be very powerful; and this will apply more strongly with respect to its effects, as it proceeds farther in the system.

In the intestines it has been supposed to be a laxative; but except when taken in very large quantity, I cannot perceive its operation. When it does happen, it must be owing to the common salt that is employed in its preparation, and which in part adheres to it: for when this is separated, the soap becomes a perfectly mild substance, not likely to give an irritation to parts of the greatest sensibility.

It has therefore been a frivolous practice to employ soap as a laxative in glisters. It may perhaps be of some use in softening hardened fæces; but as a stimulus it can act only by its common salt; and a quantity of this may always be added with less trouble than the addition of the soap.

When soap is carried into the blood-vessels, it may be supposed to have some attenuant power; but I must hold this to be very doubtful, and it can never be considerable. When we consider that it cannot be thrown in, in any large quantity, and that only in some length of time; and when taken in, as it is much divided and diffused over the whole mass of blood; we cannot suppose it to be in any part of this mass in such quantity or concentration as could have any effect in resolving viscid concretions even out of the body; and therefore we must hold the so-much talked of power of soap, in resolving obstructions, to be very insignificant.

While it has been supposed that soap may be of use in resolv

ing obstructions of the liver, it has been a consequence of that supposition, to judge that it may be useful in jaundice ; and as useful in that case, it has been universally recommended by materia medica writers. I imagine it however to be upon a slight foundation. The arguments I have employed against the resolving powers of soap lead me to think that it cannot resolve biliary concretions, which it does not do even out of the body ; and in persons frequently liable to such concretions, I have known the soap employed without any effect. When a jaundice is actually produced by a biliary concretion falling down into the biliary ducts, that soap can do any thing towards dissolving or pushing on that concretion, is not in the least probable. It is therefore that it has been unreasonably recommended in jaundice : but I have frequently employed it ; and by its correcting the acidity of the stomach, and in some measure obviating the argillaceous consistence of the fœces, I have found it useful.

I must not dismiss the consideration of the internal use of soap without acknowledging that it has often appeared to be useful to the system ; but it has only appeared to me to be so in calculous and gouty cases, which I ascribe entirely to its correcting the acidity of the stomach ; the explanation of which has been already hinted, and will be more fully considered in the sequel.

Nothing has been more frequent than the commendation of soap for external use ; and as it is commonly employed, it seems to be well founded. We spoke above of the great benefit of friction employed by means of oil ; and as soap also affords a convenient medium, so the friction employed with this is often a powerful means of resolving various obstructions on the surface of the body, and at the same time of the subjacent parts. At the same time, as it is convenient enough for admitting the antispasmodic power of camphire, and the stimulant and rubefacient power of essential oils, we may readily perceive that soap very properly forms the basis of some powerful external remedies.

DULCIA.

IN entering upon the consideration of sugar, which I have before represented as an alimentary matter, it naturally occurs to us to remark, that a choice of diet should be the most obvious and certain means of giving the proper consistence, or the other necessary qualities, to the mass of blood. This appears to be just ; but the application of it is not so easy as might be imagined. The blood of the phytivorous animal hardly differs from that of the

carnivorous ; or, at least, the difference has not been clearly ascertained. What we are more certain of is, that men live upon very different aliments, and at the same time produce blood of no apparent diversity. This also is perhaps not exactly true ; but I maintain that physicians have not yet learned to mark the different states of the blood in men of ordinary health. This will readily appear from the accounts that have been given of it. See Halleri *Elementa*, lib. v. sec. 2. art. 8. and consider what we have said above, *Introduct.* chap. I. art. 2. From all which it will appear, that we are not in a condition to determine the effect of aliments upon the state of the blood. It is probable that they give some difference ; but it is at the same time probable that the different state of the blood depends more upon certain differences in the general œconomy than upon the diversity of aliment.

I proceed therefore to consider what may be the effect of sugar, and of saccharine matters, when taken into the body in large quantities. I hope, that when treating of aliments in general, I sufficiently proved that these matters enter largely into the composition of the proper animal fluid, and make a part of the nourishment of the body ; and from the facts adduced, it is highly probable that they may be taken in with perfect safety in very large quantities : and in proof of this many extraordinary facts are adduced. What limits may be set to this, is with me very uncertain ; but we shall allow that there may be limits in this respect, and that whenever it happens that more sugar is taken in than can enter into the composition of the animal fluid, it must remain in its separate state, and may then be considered as a medicine that may have particular effects on the whole of the fluids.

Upon this subject it has been commonly supposed that sugar is an attenuant ; that is, increases the fluidity of the whole mass, and may obviate and resolve concretions that might or do actually happen in our fluids. It may be so, but there is no proof that I know of given of the fact ; and there are no experiments made out of the body that support the opinion. Its antiseptic powers fully established are against those of its being an attenuant. What effects it may have when very largely introduced, or when generated in unusual quantity in the singular case of diabetes, I dare not determine.*

* Late observations have sufficiently established a very important fact, unknown to Dr CULLEN, that sugar is an improper article of diet in diabetes, evidently increasing the quantity of saccharine matter in the urine, and thereby increasing all the chances of a fatal termination of this formidable disease. The diuretic quality of sugar has been rendered probable by the observations of

The noxious qualities that have been sometimes ascribed to it are neither clearly proved nor ascertained; and the experiments of the late ingenious and industrious Dr STARK do not appear to me to be anywise complete or conclusive.

It remains therefore still to say what are the medicinal qualities of sugar, when present in any unusual quantity in the mass of blood. It appears to me that they are no other than that of a mild saline substance, that will readily pass off by the excretions, and probably expedite and promote these; and this is the only medicinal virtue I can ascribe to it.

On the qualities of sugar, it was hardly necessary to observe, that in certain stomachs it may be disposed to an acescent fermentation; and when from the state and circumstances of the stomach this happens to be in excess, sugar may have all the effects of other acescents.

When sugar is carried unchanged into the intestinal canal, it seems to stimulate these, and prove laxative; and the use of it in glysters is in proof of this: but when taken in by the mouth, its laxative effects hardly appear, except when it is taken in large quantity; and when indeed the laxative quality of sugar appears to be considerable. I am of opinion that it is most commonly from its having been brought from the stomach into the intestines in an acid state, and when therefore, like other acids, being mixed with the bile, it may like those others induce a diarrhœa.

MEL.

THIS is so exactly and entirely a sugar, that I am at a loss to find in it any qualities or virtues different from those of sugar. It may commonly have somewhat more viscid adhering to it; but what effect this has upon its qualities I cannot perceive: and whatever they are, they may be taken away by clarifying with white of egg.*

Dr PEMBERTON: and this circumstance is of itself a sufficient objection to the employment of saccharine articles in diabetes, in which the kidneys are already too much stimulated into inordinate and irregular action.

* Chemistry has pointed out essential differences in the composition of honey and sugar. And, if I mistake not, there is attached to the generality of the honies, which are used as aliments or medicines, certain properties which the present state of chemistry is unable to detect: properties, however, which may render honey, on many occasions, more medicinal, or in other words, better adapted to the relief of morbid symptoms, than sugar. What these properties are we do not always know. But we are certain, that there often ad-

Recent honey has a matter in it which in certain persons readily excites an acescent fermentation and spasms of the stomach, which are called Colics. What is the peculiar matter here present we cannot discern; but it seems to be volatile, as it is readily dissipated by boiling. The effects of the recent honey we speak of do not take place in every person, and in those only of a peculiar idiosyncrasy; and to such persons honey should not be given without having been boiled.

As I have said that the medicinal qualities of honey are not different from those of sugar, there is no foundation for what might have been necessary in ancient times; that is, for making honey the basis of syrups. The London College still continue the practice; but for what purpose in medicine I cannot conceive. In my opinion, the Edinburgh College have properly laid it aside, for several reasons. Our country apothecaries would not always take the trouble of clarifying their coarse honey; and fine honey is almost always dearer in this country than sugar.

I have said that I do not know any difference of medicinal quality in sugar and in honey: but I am not positive in this; for I have had some reports of benefit obtained by certain asthmatics from the large use of honey: and if it be possible that honey is in any measure disposed to go by the exhalents of the lungs, there may be a foundation for this; but it is not yet ascertained that sugar taken in the same quantity would not have had the same effect. In some of the instances reported as above, the honey was taken to the quantity of several ounces every day.

GLYCYRRHIZA.

THIS is a well known root, which affords a large proportion of saccharine matter; and when that is extracted by itself, it does not differ from common sugar, and therefore does not differ from it in any of its medicinal qualities.

This is particular with respect to it, that besides its sweet substance, it contains a bitterish disagreeable matter, which, however, is only extracted by long boiling; and this therefore directs, that to obtain the sweet and avoid the bitter, the liquorice should always be treated by slight and short boiling. This practice is now commonly established; and I mention it only to take notice of what

heres to honey, a narcotic or deleterious power, very similar to that of the plants from which such honey has been obtained. See a "Memoir concerning the poisonous and injurious honey of North-America," in the 5th volume of the Transactions of the American Philosophical Society.

has been much observed, which is, that while all other sweets excite thirst, liquorice takes it off, and was therefore anciently named *Αδύπνον*. To explain this, I observe, that in the sweet of liquorice, separate from the root, I do not find that it quenches thirst more than other sweets; and I take the mistaken notion to have arisen from this, that if a piece of the root is chewed till the whole of the sweetness is extracted, that further chewing brings out the acrid and bitterish matter, which stimulates the mouth and fauces so as to produce an excretion of fluid, and thereby takes off the thirst which the sweetness had produced.

I have only further to repeat, that as the sweet of liquorice is no other than that of sugar, so we can ascribe no other medicinal qualities to it. It is alleged that it has some mucilaginous matter joined with its sweetness, by which it may be a more powerful demulcent than sugar; but this we shall have occasion to consider further under the article of Demulcents.

FRUCTUS DULCES SICCATÆ.

I THOUGHT it proper to mention these here among the dulcia; and I think properly enough, as they contain a large proportion of sugar, and have every property of this. I do not however allow them to have any more attenuating powers than sugar itself; but some of them seem to have more of a mucilaginous matter mixed with their sugar, and may therefore have a more demulcent quality, as we shall say by and by.

CHAPTER XI.

INSPISSANTIA.

IF it had not been in complaisance to the common system, and to give a seeming consistency to my own, I should not have inserted this title; for I do not know the application of it in the practice of physic. If the general consistence of the mass of blood is to be increased, I do not know any other means of doing it than by diet and exercise: for I do not know of any medicine that can give a more dense consistence to the animal fluids, or a greater proportion of the denser fluids to the whole.

I have set down here two substances which may increase the cohesion of the parts; but I think they cannot be introduced so as to

have any such effect: and I have set them down here merely to obviate a mistake that might arise with thoughtless chemists, who might imagine that every portion of these fluids might have some tendency to coagulate or thicken the mass of blood. It is however certain, that neither acids nor alcohol, except in their very concentrated state, can have any such effect; and it is equally certain that they cannot possibly be introduced by the mouth, without suffering such a dilution as must entirely destroy their coagulating powers.

They have, I believe, been hardly thought of as inspissants; and the purpose of inspissation has been commonly proposed to be executed by introducing substances of a thicker consistence than usual; and which, if they could remain in the body in that condition, might perhaps answer the purpose: but we are clearly of opinion that all of them, before they can be introduced into the blood-vessels, must be reduced to the same state of fluidity that our fluids ordinarily have; and therefore, that the purpose of inspissating cannot by these be obtained.*

CHAPTER XII.

DEMULCENTIA.

THESE are medicines suited to obviate and prevent the action of acrid or stimulant matters; and that, not by correcting or changing their acrimony, but merely by involving it in a mild and viscid matter, which prevents it from acting upon the sensible parts of our bodies. We have mentioned before the use of oil for this purpose, in covering both acids and alkalies; and even the vitriolic acid may be in a great measure covered by being mixed with a mucilage of gum Arabic.

These effects of demulcents are sufficiently evident with respect to the external parts; and it may be presumed that the same may happen with respect to the internal, so far and so long as the acrid continues mixed with the demulcent. But here the difficulty occurs, to suppose that the demulcent matter retains its mild and inviscating quality, after it has been taken into the body. To cover acrimony it is necessary that the demulcent should be of a considerable degree of viscosity; and when it is such as can be diluted with wa-

* In my lectures, I do not give place to the two classes of *ATTENUANTIA* and *INSPISSANTIA*; and I find myself compelled to omit several of the succeeding classes.

ter, a considerable dilution greatly diminishes its power, and renders it almost none at all. But the most part of demulcents cannot be long in the stomach, or in passing through the intestines and other passages into the blood-vessels, without suffering a dilution that must take off its viscosity altogether.

And it is further probable, that demulcents being commonly of a nutritious kind, they must, by the power of the gastric liquor, and perhaps by a fermentation they undergo in the stomach, be rendered of the same fluidity with the other aqueous fluids of the body. All this reasoning I can employ with respect to the demulcents; such as the mucilages and sweets which are of an aqueous nature, to afford this conclusion, that such demulcents can have no effect as such in the mass of blood, or in passing by the various excretions.

With respect to the oily demulcents, the matter is not so obvious; but considering what we have said above of the diffusion, and even mixture of oil in our fluids, it will be probable that no quantity of it can be commonly present in the mass of blood, so as to act as a demulcent, or in their oily state to pass off by the excretions.

We have indeed alleged above, that oil is a matter fitted to inviscate the vegetable acid taken into the body; but by that very mixture the form of the oil is changed, and loses its fitness to be an inviscating matter. There is indeed another argument that might be employed in favour of the inviscating, and if you will, demulcent, nature of oil. It has been observed, and we have pointed it out above, that when an acrimony, in consequence of certain diseases, prevails in the mass of blood, an absorption of the oil which has been formerly laid up in the adipose membrane takes place; and it is with great probability supposed, that in this nature intends that the absorbed oil should cover the prevailing acrimony; and this supposition presumes that the oil is fitted for this purpose. All this is probable; but that it will apply to show that oil taken in by the mouth will act as a demulcent, is to me very doubtful. In the other case of absorption, there may be circumstances, both in the nature of the acrimony prevailing, and in the state of the oil absorbed, which we do not know with any exactness.

To conclude the subject of the demulcent power of oil, I must observe, that the oil commonly present in the blood, or even copiously introduced, is not a demulcent with respect to some acrimonies taken into the body. The vitriolic acid passes copiously by the skin in its acid state when it cures the itch; and the muriatic acid is found ready to irritate issues and open ulcers: and we might give other instances of acrid matters passing by various se-

cretions in their acrid state, notwithstanding that a great deal of oil is at the same time taken in.

From these considerations it seems probable, that the operation of demulcents in covering acrimony in the mass of blood must be very inconsiderable; and therefore, that they do not allay coughing by covering that acrimony, which, exhaling from the lungs, and applied to the glottis, excites that uneasy motion. But it is certain, that the taking in of demulcents often allays coughing, and suspends the repetition of it for some time; and this, without having recourse to their operation in the mass of blood, may be accounted for in another way. As coughing is ordinarily excited by a halitus or vapour of some acrimony, arising from the lungs, and irritating the very sensible parts of the glottis and its neighbourhood; so by besmearing these parts with a demulcent matter, we may often avoid the irritation we speak of, and therefore the frequency of coughing. Accordingly, medicines perfectly mild and free from acrimony, but of considerable viscosity, being swallowed leisurely, so that they may adhere to the fauces, answer these purposes.

After these general considerations, I shall offer a few remarks upon the particulars that have been employed; leaving it to the practitioner to employ them or not as he shall judge proper.

ASPERI FOLIÆ.

SYMPHITUM.

SOME other of the asperifoliæ contain a portion of mucilaginous matter; but it is not in common to the whole of the order, and I have set down only two that have been chiefly in use.

The root of the symphitum gives out a large proportion of a mild mucilaginous juice, and perhaps in larger proportion than almost any other root; and therefore, while mucilaginous matters are retained in our lists, I do not perceive why both the British colleges have entirely omitted the symphitum. It may be of service, as alleged, in diarrhœas and dysenteries; but that it has ever been of use in hæmoptysis, for the reasons given above, I cannot admit.

CYNOGLOSSUM.

THE root of this affords so little mucilage, that it is not to be taken notice of on this account; but it has been formerly considered as having somewhat of a narcotic quality, and its sensible

qualities might lead to a belief of it; but trials made on purpose to examine this have not at all confirmed it.

MUCILAGINOSA.

THESE are the medicines especially trusted to in practice as demulcents; and I have set down the chief of them, which are the most pure and simple mucilages which nature affords.

GUMMI ARABICUM.

To this I have subjoined the *gummi cerasi*, to show, that where it can be had in tolerable purity, it may be employed for every purpose of the foreign gum Arabic.

The gum Arabic is the mucilage most universally employed, because it can be introduced in the most concentrated state, and therefore easily in the largest quantity; and its demulcent qualities are supposed to be very considerable. They are supposed to reach the bronchiæ, and thereby to correct the acrimony that occasions coughing, and especially supposed to reach the urinary passages, and there to cover any acrimony prevailing in the urine. This is a doctrine so universally prevailing among physicians, and so generally followed in practice, that I had great difficulty in trusting my own judgment in admitting any doubts concerning it; but after much reflection, the reasons employed still prevail with me, and persuade me, that even gum Arabic, as an internal demulcent, can be of no service beyond the alimentary canal. Besides the general reasoning above with respect to this gum, the one taken from the quantity thrown in is of much weight with me. In common practice, hardly more than a few ounces are given in one day; and what that can give of a mucilaginous quality to many pounds of serosity, I leave my intelligent reader to judge. Still however it may not be thought enough to reason *à priori*, and I should say what experience has actually taught. What others may have observed I cannot determine; but, for myself, I can assert, that, in innumerable trials, I have never observed the effects of gum Arabic in the mass of blood, or in the excretions derived from it. The most frequent occasion for its use is in the ardor urinæ; and in that I have been often disappointed, and have often found, that two pounds of water, or watery liquors, added to the drink, would be of more service than four ounces of gum Arabic taken in without such addition.

TRAGACANTHA.

AFTER what I have now said on the subject of gum Arabic, I need not say that the tragacanth, though more powerful as a mucilage, cannot be of any greater use as a demulcent.

After these gums I have set down the *Amylum*, as, with a little water, it forms a considerable portion of mucilage; and in this state it may be of use in the great guts in the case of dysentery, but its demulcent powers cannot be considerable; and even in the cases of dysentery might be better obtained, and with less trouble, from other substances.

ICTHYOCOLLA.

AFTER the vegetable, I have here subjoined the animal mucilages, the most powerful of which is the ichthyocola. This may afford an useful medicine in the alimentary canal; but that it goes farther I cannot admit of: and all the arguments I have employed above against the power of demulcents, will, in my opinion, apply equally here.

With respect to this article, and to the one that follows the *gelatina ex rebus animalibus*, I would add, that there is another argument against their retaining their mucilaginous quality in the blood-vessels and excretions, which is, that as animal substances, from the nature of the animal œconomy, they must be constantly approaching to a putrescent state, and in proportion to this, have their mucilaginous qualities destroyed.

OLEOSA BLANDA.

How far these can in any case prove demulcents, I cannot positively determine; but, in my introduction to this chapter, I have considered the matter as fully as I can, and need not repeat any thing here.

CHAPTER XIII.

ANTACIDA.

THAT there is almost perpetually in the human stomach a quantity of acid of the nature of the vegetable acid from which it is derived, cannot, in my opinion, be doubted; and that it is very often copiously present there, every body knows. From these appearances, it might be suspected that a quantity of the same acid might pass unchanged into the mass of blood, and be often present there. Dr BOERHAAVE, in writing his Aphorisms, seems to have been of this opinion, and mentions the supposed effects of an acid prevailing in the mass of blood. But afterwards, on reflecting on the general tendency of the human œconomy to a putrescent state, he seems, in his chemistry, to have deserted his former opinion; and the supposition of an acid in the mass of blood has been deserted by all his followers, and indeed by every physician since. The medicines, therefore, comprehended under the title of this chapter, have been considered as adapted only to the correction of acidity in the alimentary canal.

Some years ago I should have been of this opinion, but some late discoveries have given me better instruction. By the analysis of the urinary calculus by SCHEELE and BERGMAN, we are taught that this concretion is formed by an acid; and BOERHAAVE'S experiments show, that a matter fit to form such a concretion is constantly present in the most healthy urine, and ready to form such a concretion whenever a matter fit to favour its accretion is presented to it. All this shows, that the acid often copiously taken in is not entirely destroyed in the course of the circulation, but subsists, and is carried to the remotest passages. All this may make some changes in our physiology of the fluids: but I am not ready to prosecute this here, and can only at present make some application to the pathology of the urinary calculus, and even this I cannot carry far. I cannot say what are the means of determining the different quantities of calculous matter at different times present in the urine; what are the various circumstances that determine its concretions; and particularly, what are the causes of the uneasiness and pains that arise from calculi formed: I find all this to be extremely difficult; and I shall not attempt to solve these, and perhaps some other problems that might arise.

I must be satisfied now with what seems to be enough for my purpose ; which is, to observe what experience has shown, that antacid and alkaline substances are what have given the most certain relief in the most part of calculous cases.

This has been long ago known; and physicians have very often gone into the opinion, that the relief obtained in such cases was by the medicines dissolving the concretions that had been formed in the kidneys or bladder; and it is not yet absolutely determined whether they ever do or not. I am indeed of opinion that they do not; but it is by no means necessary to determine the question, as we allow it to be proper to employ them wherever they conveniently can be. In the mean time, it is enough for me to remark, that it is now sufficiently certain, that alkalines do not always dissolve the stones in the urinary passages; but, in many cases, without dissolving the calculi, they certainly relieve the pain and uneasiness which the presence of the calculus occasions; and therefore, upon every supposition, their employment is proper: and I proceed to what may be said of the administration of

PARTICULAR ANTACIDS.

I HAVE set down a pretty long list; but it is not necessary to take much notice of each of the particulars. The

LAPIDES CALCARIÆ,

CRETA, and the several TESTACEA, are much of the same nature, and are especially fitted for correcting the acidities of the primæ viæ, and for that purpose may be used in large quantities; and some have imagined, that by being joined with the acid of the stomach, they may become astringent: but I have not observed this; and if it does ever happen, I believe it is a rare occurrence. They sometimes seem to be of service in diarrhœa; but this I impute not to their astringent quality, but merely to their correcting acidity, which, by being mixed with the bile, had occasioned the disease.

[*Another important property of some of these calcarizæ deserves to be particularly noticed here: I mean the property which they possess of relieving, in a remarkable manner, the inordinate and ever dangerous vomitings which often occur in the more malignant fevers of certain climates; such as the bilious, remitting, and yellow fever, of the United-States, of the West-Indies, &c. In many instances of such vomitings, lime-water, (aqua calcis,) combined with

milk, is a most effectual remedy. Even the black vomiting, which is very generally a mortal occurrence in yellow fever, has sometimes yielded to the preparation just mentioned.*]

The CORALLIUM and CORALLINA are alkaline and absorbent; but the present practice neglect them as unnecessary.

The CORNU CERVI USTUM is still retained in the list of the London dispensatory; but as it is the weakest of all the absorbents, and has not, so far as I know, any peculiar virtues, I think it might have been omitted as it is by the Edinburgh college.

MAGNESIA.

THIS may be employed as an absorbent, as it does not differ in its chemical qualities from the others mentioned;* but in its medical, it differs from all the others, as, when joined with a vegetable acid, and such as it commonly meets with in the human stomach, it proves a laxative, operating much in the same manner, though not so strongly, as the magnesia glauber salt.

The ANTACIDS hitherto mentioned are chiefly employed for correcting the acidities of the stomach, and have not been commonly employed in the cases of calculi as mentioned above, though, upon our theory, they might be, and sometimes have been, with advantage. It would appear that they cannot be conveniently employed in such quantity as to absorb so much acid as seems necessary to give so entire relief in calculous cases as is to be wished. It has therefore been found necessary to have recourse to the alkaline salts; and such I consider the impregnation of LIME-WATER to be. This we have known in several instances, when taken in large quantity, to be sufficient for the purpose; and with respect to it, I have only to remark, that from many trials, the lime-water made from common lime-stone is equally effectual, and generally more agreeable, than that made from a lime prepared from any of the testacea.

As there may be imperfections in preparing lime-water, and as it is frequently inconvenient to give it in sufficient quantity, so practitioners have of late years depended upon the use of the proper alkaline salts; and as I am persuaded that these, from several considerations, are most effectual in their caustic state, so I have frequently observed the good effects of it in that state, as it has been commonly exhibited in what has been called ШИТТИК's medicine. This how-

* The Author could not have meant to assert, that the *chemical* natures of magnesia and lime are not different. He was intimately acquainted with the fine discovery of his illustrious friend Dr. BLACK.

ever has frequently failed; and I impute its failure either to its not being properly administered, or to its not being given in sufficient quantity.

In order to relieve the uneasiness arising from calculi, I know, from much experience that it is necessary that the alkaline remedy should be exhibited in considerable quantity, and very constantly. But for this purpose, on account of its acrimony, it is not easy to exhibit the pure alkali, unless some measure is contrived for covering it in the mouth and fauces. Such a measure might be supposed to be the employing soap; and I have accordingly found it, in some cases, employed with great advantage. But there are several inconveniences that prevent the employment of it in large quantity; and though there might be means of obviating these, I do not enquire after them, as we have found another means of answering our purpose that is commonly very effectual. This is done by saturating a pure fixed alkali with the *aerial acid*. This covers the acrimony, and any thing disagreeable in the alkali; which therefore can be taken down into the stomach in large quantity: and as this acid is readily separated by the acids so constantly present in the stomach, it allows it to have all the effect in correcting the acidities of the stomach that can be wished for, and has now been found by frequent experience to relieve all the uneasiness arising from calculi more certainly and more completely than any other remedy formerly tried. The apparatus and measures necessary in making this preparation are now so commonly known, that I do not think it necessary to insert them here.*

* See the Chapter on ANTILITHICS.

CHAPTER XIV.

ANTALKALINA.

HAD it not been to give some appearance of system, and from my complaisance to Dr BOERHAAVE, who treats *de Morbis ex Alkali spontaneo*, I should not have admitted of this chapter; for I am well persuaded, that no alkaline salt, in its separate state, ever exists in the blood-vessels of the living human body. The doctrine of BOERHAAVE, which I have just mentioned, is, in almost every part of it, incorrect and erroneous, and leads to no occasion for the use of antalkalines; and the only occurrence that can require them is a very rare one, that of a pure alkali being thrown in by mistake or accident into the stomach; and the means of taking off its irritation by acids is sufficiently obvious: only this farther is to be remarked, that as the alkali, in any noxious quantity, cannot have been introduced without hurting the mouth, fauces, and œsophagus, so it is always necessary, in such cases, along with the acids, to employ the large use of diluents and demulcents.

CHAPTER XV.

ANTISEPTICA.

THAT there is, in the animal œconomy, a constant tendency to putrescency and putrefaction, is now admitted by every physician. The complete putrefaction cannot, in any considerable portion of the body, take place without extinguishing life; and therefore a competent putrefaction is not a disease of a living body that can be an object of practice. It is the tendency to it which, in any considerable degree, produces various morbid disorders, and requires the utmost skill of our art to prevent. By what steps this tendency proceeds, and in what different degrees it may appear, we do not clearly understand; and therefore, to this tendency, in all its several degrees, I have given the general name of Putrescency; and the medicines suited to moderate and correct this I name Antiseptics, and have endeavoured to enumerate them in this chapter.

The list is taken from experiments made out of the body; and even there they show their power to be in various degree, and ma-

nifestly to be more or less suited to application in the living body. But before proceeding to consider that, I must observe, that the state of putrescency in the living body seems to be in different conditions, and requiring therefore different remedies. The one I call the Acute, the other the Chronic, Putrescency. The first attends febrile disorders of various kinds; and, if I mistake not, appears upon occasion in fevers of every kind. The chemical condition of the fluids in this putrescency I do not pretend to determine with any clearness. But, in my First Lines, on the subject of the Prognostic in Fevers, I have endeavoured to mark the various symptoms by which what I judge the putrescent state of the fluids may be ascertained, and to remedy which our antiseptic remedies are to be applied.

The other species of putrescency, which I have called the Chronic, is, as I judge, what appears in scurvy; and although the nature and chemical state of the fluids in this disease are not well ascertained, yet I think it enough that, as the symptoms of the disease are well known, and for the most part characteristically determined, I may speak of it as an object of the application of antiseptic remedies, which are often employed in the cure of it with advantage. Of these, in particular, as enumerated in my catalogue, I would now proceed to speak; but must first make a remark that must in some measure correct the general system.

I have said that one state of putrescency is that which especially accompanies febrile disorders; but I believe that the same state may occur without having any fever joined with it. We have seen several instances in which numerous petechiæ have appeared on the surface of the body, without any fever appearing at the same time: but as with these petechiæ there occurs a fetid breath and spongy bleeding gums, these with the petechiæ have been considered as marks of a putrescent state of the fluids.

I have known one instance which seems applicable to our present consideration: This was a woman who lived very constantly upon vegetable aliment, and had not been exposed, so far as could be judged, to any febrile or putrid contagion, was, without feeling any other disorder, affected with numerous petechiæ over the whole surface of her body. After these had continued for some days, without any symptom of fever, she was affected with swelled and bleeding gums, with fetid breath and much thirst; and in the course of a week or two more, almost every symptom of a putrid fever came on, and in a few days proved fatal.

Such cases, with the petechial cases above mentioned, seem to

show that the human fluids, without fever, and without the causes of scurvy having been applied, may run into a putrescent state; and whether this case may be considered as a peculiar state of putrescency, I dare not determine, but am much disposed to think it not much different from the others; and that, indeed, though different by its causes, it is much the same with the febrile putrescency.*

Having thus ascertained these different states as well as I can, I proceed to give some remarks on

PARTICULAR ANTISEPTICS.

SALES ACIDI.

THESE are universally antiseptic, and may be employed in all cases of putrescency. The fossil acids have not been employed in scurvy with any advantage; and the reason is obvious, as that disease requires a change in the animal fluid, which we have shown above does not admit of an union with these fossil acids. It is therefore that in this disease the vegetable acids, as capable of such union, are more universally proper, and are accordingly employed with certain success. In the febrile putrescency, a fossil acid, particularly the vitriolic, has been very generally employed; and whether from its concentrated state it has any advantage, I cannot determine: but as it does not unite with the animal fluid, and is even limited in the quantity in which it can be exhibited, I am persuaded that the vegetable acid, both by the union it can form with the animal fluid, and by the large quantity in which it may be given, will be the most effectual.

Whether as antiseptics there is any difference between the native acid of vegetables, and the fermented acid in vinegar, may be a question. I am disposed to think, that in cases of febrile putrescency, the latter may be generally useful, and perhaps more fit than the former; but in cases of scorbutic putrescency, I am pretty certain that the native acid, for reasons already given, will be always the most useful: but the former, as approaching more to an alimentary matter, must be fitter in the case of scurvy.

SALES ALKALINI.

TUM FIXI TUM VOLATILIS.

EXPERIMENTS out of the body show that these alkalines are truly antiseptic powers; but at the same time it is equally well known

* See the Editor's notes to the chapter of *CONDIMENTS*, in the first volume.

that they are constantly imbued with such an acrimony, that they cannot by themselves be introduced into the body without acting more by their stimulant than by their antiseptic powers. The volatile alkali may sometimes be an useful remedy in putrid fevers; but it cannot, as some have imagined, be given more freely on account of its antiseptic powers, as it can never be given largely enough to have any effect by these qualities.

SALES NEUTRI VEL TERRESTRES.

THESE saline matters, by experiments out of the body, are manifestly antiseptic; but how far applicable in cases of morbid putrescency we are very doubtful. As, in my opinion, scurvy consists in a preternaturally saline state of the blood, so I would judge that every addition of saline matter must be in some measure hurtful, and therefore that they are not anywise admissible in this disease.

In the case of febrile putrescency, no such objection lies against their use; and they are commonly employed in fevers, both for their refrigerant and antiseptic powers. The former purpose is often obtained by their operation on the stomach; but that their refrigerant power renders them antiseptic is very doubtful: But however that may be, I am persuaded that in any quantity in which they can be taken into the body, their antiseptic powers in the blood-vessels can never be considerable. An ounce of nitre exhibited in divided doses in the course of twenty-four hours, can have little effect on a fermentation going on in the whole mass of blood, or in the serosity, consisting at least of fifteen pounds of fluid.

PLANTARUM PARTES ACIDÆ.

THIS need not have been inserted after the general title of *Acida*; but it was not amiss to point out, that the native acid of vegetables is the antiseptic that can be employed in the largest quantity; and for a reason given above, is, I believe, adapted to every species of scurvy.

OLERA ACESCENTIA.

As these can be introduced largely as an aliment, they are found to be the most powerful and effectual antiseptics that can be employed in scurvy.

As I am persuaded that the most certain means of obviating scurvy is by filling the blood-vessels with acescent matter, so I long ago gave my opinion, that SUGAR and HONEY much employed in

diet might be a means of preventing the disease ; and my opinion on this subject gave the first hint to Dr MACBRIDE for his proposing the employment of malt. I am not indeed certain that sugar, in its purely saline state, will so readily enter into the composition of the animal fluid as a farinaceous matter, which, besides sugar, contains a quantity of other alimentary substance ; but I still maintain, that the infusion of malt, which has been found to be so salutary, has its virtues chiefly depending upon the sugar it contains.

PLANTÆ SILIQUOSÆ ET ALLIACEÆ.

WHY I put these together will be obvious from what is said of them above. Both these orders of plants, by experiments out of the body, show an antiseptic power, and may be supposed to have more or less of the same when taken into the blood ; and even upon that footing have their use in scurvy : but their antiseptic powers are not considerable ; and I am of opinion, that in any quantities in which they can be taken in, except it be in such quantity as can be employed as alimentary, and be at the same time directed to an acedent fermentation, they cannot be considered as powerful antiseptics ; and I hold the most acrid substances of the orders mentioned to be especially useful in scurvy, by their promoting the excretions of putrescent matter by perspiration and urine.

ASTRINGENTIA.

IN experiments out of the body, these are found to be powerful antiseptics ; but I do not find that they can be taken into the body in such quantity as to be internally of much service. They have been frequently employed in the case of scurvy ; but their effects have never appeared to be considerable : and I am of opinion that they should not occupy the place of more powerful remedies.

AMARA.

I HAVE to say much the same thing of these as I have said of the astringentia ; and they have never been found very useful in obviating or preventing scurvy. In cases, however, of a febrile putrescency, commonly attended with a considerable debility, they may possibly, by their tonic powers, have their use.

I am led to this in considering the Peruvian bark, which I comprehend under the title of Amara. This bark is well known to practitioners to be highly useful in all cases of febrile putrescency, when it is employed in sufficient quantity. Whether however its

effects are to be ascribed to its tonic, or to peculiar antiseptic powers, I cannot certainly determine; but I am disposed to think that the former opinion is the best founded; which, however, need not prevent practitioners, either in the case of fever or scurvy, from employing its antiseptic power as far as they may think proper.

The benefit received from it in scurvy has never been remarkable; and I should say the same thing of it that I said above of astringents, that it should never occupy the place of more effectual remedies.

Whether, in cases of fever, any other tonic medicine might be employed in place of the bark, does not seem yet to be determined by proper experiments; but it certainly deserves to be considered, when upon occasion the bark may be wanting.

AROMATICIS,

AND their essential oils, are set down here, as being certainly, in experiments out of the body, antiseptic; but I am of opinion that they cannot, upon account of their stimulant and heating power, be admitted as medicines in any cases of putrescency, except that in certain cases of gangrene they may be externally employed.

CAMPHORA.

THE various and singular power of this we have taken notice of above; but there are none of its powers more remarkable than its antiseptic; and though for its use in this way it can hardly be given in large quantity, I am clearly of opinion, that in all cases of putrid fever, where it can be on any account admitted, it ought always, with a view to its antiseptic power, be employed as largely as possible. In cases of external putrescency its use has often been most beneficial.

GUMMI RESINÆ.

I HAVE set down these in the list of antiseptics, as they prove manifestly such in experiments out of the body; but there is the same objection to their internal use as I made with respect to the aromatics. Their stimulant cannot be compensated by their antiseptic powers.

Their external use I leave to be judged of by the surgeons; but I believe it has been more frequently employed than it ought to have been.

The other articles of the catalogue of antiseptics, that is, *Crocus*, *Contrageryva*, *Valerian*, and *Opium*, are all set down here upon the

same footing as the last article of Gummi Resinæ; and that is, from their being found in experiments out of the body to be in some measure antiseptic; but none of them are so considerably or powerfully such as to promise being of much use in cases of morbid putrescency.

VINUM ET LIQUORES FERMENTATI.

AFTER what I have said above of the use of acids and acescents, I need hardly have inserted this article; but it cannot be amiss to repeat, that the plentiful use of weak fermented liquors of all kinds are most certain means both of obviating and curing scurvy.

I have here set down ALCOHOL, as certainly one of the most powerful antiseptics known: but as we cannot easily divest it of its stimulant power, it is very doubtful if it ever can be employed as an antiseptic in cases of morbid putrescency.

There are, however, cases of putrescency attended with very great debility; and whether in such cases the alcohol properly diluted can be employed in place of wine and bark, may be doubtful; but in cases where either of these are wanting, or cannot be easily obtained, I am persuaded that the diluted alcohol may be usefully employed.

EVACUANTIA.

HAVING now considered the several medicines which are supposed to change the state and condition of the fluids, I proceed to consider those which excite and promote the evacuation of them.

In this I do not find it necessary to consider evacuations in general, and therefore these made by blood-letting, blistering, or other such; and am only to consider these evacuations which are produced by exciting and promoting those which nature has instituted.

With respect to these I might observe, that the evacuation may be produced in two ways; that is, either by medicines which change the state of the fluids, so as to fit and dispose them to pass off more copiously by certain secretions, or by medicines which internally or externally are applied to excretories, from which we propose to excite a more copious excretion. These different measures, however, we do not propose to consider here, as we think it will be more properly done when we are to consider the several particular evacuations to be treated of. We proceed then to consider the particular evacuations and evacuants, arranging them as they occur *a capite ad calcem*; that is, considering first those made from the superior

parts, and afterwards those from the inferior. This arrangement has no particular advantages; but no better offers itself at present.

I begin therefore with the Errhines.

CHAPTER XVI.

ERRHINA.

THESE are medicines which procure a discharge from the nose, sometimes of a mucous, and sometimes of a thinner fluid; but which in both cases we suppose to proceed from the mucous follicles of the Schneiderian membrane upon the internal surface of the nose, and of the cavities adjoining to it.

This evacuation is sometimes procured without any sneezing, but frequently attended with it. This however implies no difference, but merely that of stronger or weaker stimulus in the medicine employed. The sneezing that occurs may have particular effects by the concussion it occasions; but it does not vary the evacuation induced by the medicine, excepting that with sneezing there is commonly a larger evacuation produced.

This evacuation often goes no further than to restore the natural evacuation when it had been interrupted; but it commonly goes further, and increases the evacuation beyond its usual measure; and that not only for some time after the medicine has been applied, but also for some following days.

This evacuation not only empties, but also produces, a larger excretion from the mucous follicles of the Schneiderian membrane: but, agreeable to the laws of the circulation, this must produce an afflux of fluids from the neighbouring vessels, and in some measure empty these. By this it often relieves rheumatic congestions in the neighbouring muscles, and particularly those in which the toothach often consists.

But not only the more nearly adjoining muscles are thus relieved, but the effects may extend further to the whole of the branches of the external carotid; and we have known instances of headachs, pains of the ear, and ophthalmias, cured or relieved by the use of errhines. How far their effects may extend, cannot be exactly determined; but it is probable that they may operate more or less on the whole vessels of the head, as even a branch of the internal carotid passes into the nose: and independent of this, it is not improbable that our errhines may have been of use in preventing apo-

plexy and palsy; which at least is to be attended to so far, that whenever any approach to these diseases is suspected, the drying up of the mucous discharge should be attended to, and, if possible, restored.

These are the effects of an increased discharge from the nose: and we are to say next how they are to be obtained, which is to be done by stimulants applied to the internal surface of the nose; and I have set down a list of such as may be employed. These differ only by the degree of acrimony they possess; and I have endeavoured to arrange them accordingly: but I could not possibly do this with much accuracy.

BETA.

THIS is of no great power, but I have set it down; as from the time of Galen to the present it has been marked by many writers as an useful errhine: but in my trials, the juice snuffed up the nose gave no large or durable evacuation.

BETONICA. MARJORANA.

THESE by themselves have not much power as errhines; and I believe the power they have is in common to them with many others of the verticillated plants; and they seem to be only useful, by diffusing and giving an agreeable odour to the other errhines.

* HEDERA TERRESTRIS.

[* CONCERNING the errhine property of this plant, see page 104. I do not deem it necessary to say any thing further concerning it.*]

ASARUM.

THIS is to be considered hereafter as an emetic and purgative, and here only as an errhine, in the list of which it has been long reckoned; and I truly find it to be one of the most useful and convenient. In large doses it is very powerful, and sometimes too violent; but in more moderate doses, not exceeding a few grains, and repeated for several evenings together, it may be employed to procure a pretty large watery discharge from the nose; and which sometimes continues for several days together. By this it has the general effects of errhines above mentioned, and particularly has proved very useful in toothach and ophthalmias.

It is properly the basis of the pulvis sternutatorius of our colleges; but I judge the London college have added too large a proportion of the cephalic plants, which renders the dose of the chief

ingredient, the asarum, by much more bulky than convenient; and that the Edinburgh college have given a composition much more convenient for a proper exhibition. I find that three grains of asarum is a proper dose; and that four grains of the whole powder makes a convenient snuff.

NICOTIANA.

THIS, as commonly prepared for persons who amuse themselves by snuffing, I find may, with people unaccustomed with it, be conveniently enough employed as an errhine. It will be of different force with different persons; but in a moderate dose it is never violent with any. Repeated once a-day, it may, like the asarum, continue a discharge for some time; but repetition is ready to diminish its power, and render it useless. I observed above, that even in people accustomed to snuffing, it has different effects in producing more or less of a discharge from the nose: and from my own experience, I am led to repeat here, that whenever the discharge has been considerable, the laying aside snuffing, and therefore suspending that discharge, may have very bad effects.

* HELENIUM AUTUMNALE.

[* THE florets of the disk, or interior portion of the flower, of this common North-American plant, reduced to powder, furnish us with a powerful, safe, and valuable errhine, which ought to be employed by practitioners, and may even supercede the use of several other articles of the class.*]

EUPHORBIIUM.

HERE I enter upon the mention of the more acrid errhines, and I believe the euphorbium is one that is the most so: but before mentioning the precautions necessary in the use of it, and several others that might be added, I must observe that the more acrid errhines, even in moderate doses, are ready to inflame the internal surface of the nose, and often to a considerable degree; and this is often communicated not only to the immediately adjoining parts, but to the whole branches of the external carotid, so that the whole of the teguments of the head are affected with considerable swelling. These effects, by being at the same time attended with hæmorrhagy from the nose, and violent sneezings, may have very mischievous effects; and it is very seldom that they ever answer any purpose of medicine. It is therefore my opinion, that they should never be employed in doses that may have the consequences

mentioned. Whether they are ever to be employed in lesser doses I am doubtful. I have seen some instances of megrims, ophthalmias, and particularly toothachs, cured by the violent operation of errhines; but I never thought it safe to imitate the practice.

It is possible that, employed in very moderate doses, they may increase the power, and render more permanent the effects of the asarum or of tobacco; and I have sometimes thought that they answered this purpose: but it is the white hellebore only that I have employed to the quantity of one grain to half a dram of the sneezing powder. I have sometimes tried the euphorbium, but it it is liable to be violent even in very small quantities.

There is one sternutatory sometimes employed by the vulgar of this country, and that is the succus radice iridis nostratis; but as the juice is snuffed up the nose, the dose of it cannot be well measured; and I have frequently found the effects of it very violent.

[* To the preceding list of errhines, it would be an easy task to add several others, even from the vegetable kingdom. But it is not necessary to do this; and I shall content myself with noticing one other article, and that from the mineral kingdom.*]

* TURPETHUM MINERALE.

[* THIS, which is afterwards to be spoken of among the Emetics, may be very advantageously employed as an errhine, peculiarly fitted to procure a fluid discharge from the nose. It may be employed uncombined with any thing else than a portion of white sugar; but it is more generally and conveniently administered in union with the powder of asarum, or with common snuff. Certain British practitioners have spoken very highly of this mercurial snuff, as a remedy in affections of the eyes and ears. On such authority, I have employed it in cases of epilepsy, gutta serena, &c. And although I cannot boast of having made any cures of these affections by the medicine, I can confidently recommend it to others as a remedy entitled to their attention. It may be worth adding in this place, that in at least two cases that have come under my care, a considerable salivation, accompanied with all the ordinary phenomena of the common mercurial salivation, was induced by the topical application of the mercurial powder to the nares.*]

CHAPTER XVII.

SIALAGOGA.

FOR the sake of comprehending the last article, I have thought it necessary to employ the general title, while with respect to the others I could not distinguish them as acting more upon the mucous follicles than upon the salivary glands. It answers our purpose very well to distinguish the sialagoga, as applied externally to the excretories from which the evacuation is to be produced, or as they are applied internally, and operating as supposed on the state of the fluids to be poured out.

The medicines externally applied, are, for obvious reasons, named Masticatories. They have frequently, and properly enough, been called Apophlegmatizonta; but I did not employ the term, because it comprehends, without distinction, both the errhines and external sialagogues.

The latter, which I am to speak of now, are certain acrid substances, which, applied to the internal surface of the mouth, stimulate the excretories of saliva and mucus opening there; or as nature has ordered that upon any acrid matter being applied to the sensible parts of the tongue, or internal surface of the mouth, that a quantity of saliva and mucus should be poured out to wash it off, or to obviate its effects; so by this, as well as by an application to the excretories, an evacuation is produced, and commonly a much larger than can be produced by any application of errhines.

This evacuation, however, operates in a manner very analogous to that of the errhines. By their emptying the salivary glands and mucous follicles, they produce an afflux of fluids from all the neighbouring vessels, and which is upon occasion extended, as we alleged the evacuation of errhines to be, to the whole branches of the external carotid. By this it will be readily understood that our masticatories may relieve rheumatic congestions, not only in the neighbouring parts, as in the case of toothach, but also congestions or inflammatory disposition in any part of the system of the external carotid.

The means that may be employed for the purpose are many; and indeed every one that can prove acrid or heating to the tongue or internal surface of the mouth. I have set down a list marking the angolicea as mild and agreeable; the imperatoria, as one

more acrid, or as more acrid still, the pyrethrum, which therefore is commonly employed. I need not prosecute the pointing out and considering others; and have only to mention, that I have found none more effectual, though not marked in my list, than a bit of fresh horse-radish root held in the mouth, and chewed a little there.

These are the external sialagogues; and I must next treat of the internal, of which the only* example is the celebrated

HYDRARGYRUS.

THIS I shall often speak of under the appellations of Quicksilver and Mercury; but these terms are now so commonly employed and understood, that I am in no danger of being mistaken. I shall treat of this medicine as fully as I can, as it is one of the most useful and universal medicines known; and it has indeed, on that account, been the subject of much discussion and writing: but as I judge much of this to be superfluous, I am to endeavour to bring the matter into the most concise and simple view possible.

Quicksilver in its native, and as we commonly speak, its running state, is, I am persuaded, a perfectly inert substance with respect to the human body. About sixty years ago, upon the authority of Dr DOVER, the author of the *Ancient Physician's Legacy*, crude quicksilver was brought into frequent, and even into fashionable use; and I knew many instances in which it was employed very largely, and for a long time: but upon the most fair and strict

* This is not exactly true. On the contrary, it is now certain, from the observations of many writers, as well as from my own, that there are not a few articles of the materia medica, which, when taken into the stomach, do occasionally induce a salivation, more or less considerable. The salivant effect of arsenic I have several times observed: and the same effect has been noticed by European practitioners. Certain preparations of copper and lead have induced the same discharge. I have, in a former part of this work, hinted at the salivant effects of certain narcotics, see page 189. Of these, if I mistake not, *cicuta* is the most constant in its operation. *Polygala senega* and squill have often salivated: *ipecacuanha* sometimes. I might mention several other vegetable sialagogues.—The flesh of certain animals, especially species belonging to the two classes of *pisces* and *amphibia*, or *reptilia*, seems, under certain circumstances of their food, to be pretty constantly endued with the power of promoting the salivary discharge, and of occasioning swelled gums, &c.—I have omitted to mention, in a more proper place, the reputed sialogogue quality of the nitrous acid. This was, at one time, said to be a pretty constant effect of the medicine. But in my trials with that article, I have not observed it; and I believe I may assert, that it has seldom been observed by my fellow practitioners, some of whom have carried the dose of this medicine to a great extent.

examination that I could make, it never had any sensible effects, or cured any one disease.

Since that time it has hardly ever been employed in practice, except upon the supposition that by its weight it may overcome some strictures or obstructions in the intestinal canal. But the theory of this has been mistaken; and I have never known, in several instances of its employment, nor have I heard of, any instances of its success in practice.

To render quicksilver therefore active with respect to the human body, some changes in its chemical state, or some additions to its substance, are found to be necessary. What are the various means of rendering it thus active, I shall endeavour to ascertain hereafter: But as I am disposed to judge that the effects of it, in all its active states, however various, are always very much or nearly the same, I shall begin first with considering these.

Universally, mercury in its active state seems to be a stimulus to every sensible and moving fibre of the body to which it is immediately applied; and in consequence, it is particularly a stimulus to every excretory of the system to which it is externally or internally applied. Besides its noted effects upon the excretories of the saliva, it seems to operate upon the whole of those of the alimentary canal. It proves often diuretic; and I have particular proofs of its reaching and acting upon the organs of perspiration.

Although it may sometimes operate more upon certain excretions than upon others, it may be presumed, that when any tolerable quantity is thrown into the body, it is in part distributed over the whole; and therefore its medicinal effect is, that it is the most universal aperient and deobstruent known: and to how many cases of disease this operation may be applicable, will be sufficiently obvious.

But before going further, I would allege, that the effects we mention of its producing evacuations depend entirely upon the stimulus given to the excretories, and not at all to any change produced in the state of the fluids. This indeed is not the common opinion, but I am disposed to maintain my own; as upon many occasions of mercury thrown into the body very largely, I have found no difference in the appearance of the state of the blood drawn out of the veins. From the stimulus given by mercury to the whole system, I have always found the blood putting on the same appearance that it does in inflammatory diseases;* and particularly, I have not observ-

* Dr CULLEN here distinctly hints at the stimulant effect of mercury upon the sanguiferous system: but he ought, perhaps, to have more specifically

ed any circumstance that implies any diminution of its ordinary consistence.

It has been the common opinion that mercury does diminish the consistence of the blood, and very much increases its fluidity; but no evidence or proof of this as a fact, that I know of, has been produced: and I believe it has been taken up upon mistaken facts, and supported by a theory which seems to me to be without foundation. This theory, however, has been so common and so universal, that I judge it necessary for me to show it to be false; and I do it upon the following considerations.

Besides the general objections that I have made above to the doctrine of the attenuantia and incidentia, the particular application of mercury to the purpose seems to be very ill founded. It has been supposed that the specific gravity of the particles of mercury might give it more than usual force in dividing the coherent portions of our fluids: But if it is attended to, that as the particles of all bodies, by being divided, have their surfaces so much enlarged, in proportion to their quantity of matter, that the resistance to their passage through other fluids is so much increased, that the heaviest of bodies, gold, can be so divided as to be suspended in water; and though we cannot precisely determine how much the particles of mercury may be divided in its different preparations, yet it may be confidently presumed, that in all of them they are so much divided as to take off entirely the effect of their gravity.

I know that a grain of corrosive sublimate may be divided in eight ounces of water, so that a portion of it may be rendered sensible in every drop of that water. There is therefore no probability of mercury acting upon the fluids by its specific gravity. Whether, however, by its chemical qualities, it may not have effects on the state of our fluids, I cannot be so positive in maintaining; and must candidly own that its effects in the scurvy seem to point out

noticed the fever which mercurial medicines always induce, when they occasion a salivation of some continuance; and in many instances, when they do not induce any discharge whatever, by the salivary glands. This fever, which has been aptly enough denominated *febris salivatoria*, and *morbis mercurialis*, is certainly a peculiar one, the phenomena of which have of late, much engaged the attention of physicians. This mercurial fever sometimes runs so high, that mortal hemorrhagies are the consequences of it. At least two cases of this kind have come under my own notice; and I fear that such cases, in the intrepid and extensive employment of mercury in the practice of the United States, are not uncommon.

some effects of it upon the mass of blood. But however it may be in this special case, I am persuaded still from what we have said above, and from many circumstances we shall hereafter mention I conclude, that the chief effects of mercurial medicines are to be ascribed to their general stimulus of the system, and especially to their stimulating the various excretories of it.

I have observed that mercury may, by the circumstances of the constitution, or perhaps by the nature of the preparation employed, be determined to pass off rather by one excretory than another: but in this there is nothing more remarkable than its very constant tendency to pass off by the salivary excretion. It discovers this so readily, that unless diverted by art to another excretion, a very small quantity of it will always take this course.

This determination gives a problem which has always been considered as a principal one in the consideration of mercury; and the solution of it has been variously attempted. The specific gravity has been again here employed; and upon the supposition of its retaining the direct line in which it is impelled, it is supposed that it will thereby be more certainly determined to the vessels of the head: but as we do not admit of the effect of the specific gravity, so we say, that though it were admitted, the application of it here is not founded on a correct anatomy, and that the whole of the reasoning on this subject is manifestly frivolous.

I believe that from every consideration the mechanical operation of mercury will be readily deserted; and we must seek for the solution of our problem from chemical considerations, which, however, I find to be attended with much difficulty.

The supposition of its dissolving the blood in such a manner as to render it particularly fit and disposed to pass off more copiously by the salivary glands, cannot, after what we have said above against the dissolving power in general, be anywise admitted; and we must still therefore seek for another solution of our problem. I shall here offer a conjecture on the subject; but as a conjecture only I allow it to be received.

I suppose that mercury has a particular disposition to unite with ammoniacal salts; and an ammoniacal salt increasing the solubility of corrosive sublimate is to me strongly in proof of this. In illustration of it, I would observe, that the union of mercury with the ammoniacal salt of the serosity, explains well why mercury is so much disposed, and more universally than any other substance we know of, to pass off by the various excretories of the body. At the same time, if we can allow, what is very probable, that ammoniacal

salts pass off by the salivary glands more copiously than by any other excretion, we shall find a reason why mercury, associated with such ammoniacal salt, will readily pass to the salivary glands; and being thus applied to their excretories, will produce the salivation that so readily happens.

I have thus attempted a solution of the problem proposed, but must obviate some objections that seem to arise to my doctrine. The fætor of the breath attending salivation is supposed to show that some putrid dissolution of the fluids has taken place: but however we may account for that fætor, we must still maintain from what we have said above, that there is no such general putrescency taking place. And I must add here, that there is not only no symptoms of putrescency in the other parts of the fluids appearing during the time of the highest salivation; but that mercury has no tendency to induce any such state appears to me from hence, that when the body has been long and largely drenched with mercury, as soon as the irritation of this ceases, there is not the smallest symptom of putrescency, or of any tendency to it, appears in the state of the fluids, which on the contrary immediately appear in their most natural and perfect state. The fætor therefore attending salivation must be referred to some operation upon the saliva itself; upon which I might perhaps offer a conjecture, but do not incline to offer any more of that kind.

However it may be, I think it is probable that the operation of mercury is almost entirely in the mouth; and it is proper to observe, that the business commonly proceeds in this manner. The operation of the mercury is always first perceived by a disagreeable taste in the mouth, which is commonly such as if some preparation of copper had been applied to it. This is always attended with some degree of redness and swelling in the gums and other parts of the mouth. As these symptoms increase, the saliva flows more copiously; and commonly these symptoms of irritation, and the largeness of the salivation, are in proportion to one another; so that there can be no doubt that the flow of saliva depends upon an irritation applied to the excretories of that fluid: and though we should not be able to explain the whole of the phenomena attending it, we have no occasion to seek for any other cause of the excretion produced.

After these remarks upon the operation of mercury, we are led to speak of its effects in curing diseases: and here nothing more remarkable presents itself than its peculiar power in curing the venereal disease. How it is peculiarly adapted to this, it is dif-

ficult to explain; and the explanation has been attempted in different ways.

Some ingenious men have thought that mercury is an antidote to the poison which occasions the disease; and though they have not brought any evidence in proof of this, they have shown that other explanations are so unsatisfying that we are in a manner obliged to have recourse to this; and I have lately met with some facts that are very favourable to the supposition. A physician took a quantity of matter from a venereal chancre, and mixing it with a quantity of PLENCK's gummy solution of mercury, he applied this mixture to a sound person, but could not find that it produced either a chancre or any other syphilitic symptom. This may seem to afford some conclusion; but as I am not acquainted with the circumstances of the experiment, nor have any account of its being repeated with attention, I cannot admit of any conclusion from it; both because it is very possible that the gummy solution might render the mercury inert, without making any change in the nature of it, and because it is still liable to all the objections that can be made to the operation of an antidote.

With respect to this, not to mention the difficulties which occur in explaining the application of the antidote to the poison, I think it necessary only to offer one consideration; which is, that if mercury be an antidote to the venereal poison, the cure of the disease should be always more or less readily finished, according to the quantity of mercury thrown into the body: and considering how universally the poison is diffused, it should seem that a pretty large quantity of mercury should always be necessary; but practitioners will hardly allow that either of these circumstances constantly take place; and we maintain that the most active preparations are most speedy in curing the disease.

Whether corrosive sublimate be always the most proper remedy may be doubtful; but we maintain, that in many instances it cures the disease by a smaller quantity of mercury that can be done by any other preparation, though the latter introduces the mercury in much larger proportion. This to me renders it very probable, and almost certain, that mercury does not cure the disease by being an antidote to the poison, but in some other way, whether we can explain this or not.

The most specious argument in favour of mercury's being an antidote, is its being applied to parts of the body in which the venereal poison is accumulated more largely, and its proving readily a cure of the local disease. This appears especially in the case of

chancres, which are readily cured by the immediate application of mercury to them : but this does not afford a conclusion ; for mercury in like manner cures many ulcerations in which no venereal poison is suspected. And if any body should imagine that mercury cures those ulcerations by its being an antidote to the poison they contain, such an imagination must be corrected, when it is considered that balsams, and more certainly copper, will answer the purpose of curing those ulcerations as well as mercury. The cure of chancres therefore, by the application of mercury, does not necessarily infer its power as an antidote ; nor do I know any other arguments that can be adduced in favour of such an opinion.

It was however observed above, that the chief reason for supposing that mercury cured by being an antidote was, that no other good explanation was given how it otherwise cured the disease. But it is incumbent on us to obviate a conclusion we do not admit of; and therefore, that we should attempt a difficult problem, which is, to explain here in what manner mercury does cure the venereal disease. We are well persuaded that it does it by increasing the excretions, by which the poison is thrown out of the body. In support of this opinion we observe, that we have not known any instance of the disease being cured without an excretion taking place. It seems commonly to be especially by the mouth ; but we always observe, that this excretion is attended with some degree of inflammation of the mouth ; and commonly it is so much as to affect the whole system, so as to induce in it a phlogistic diathesis. This mark of mercury's stimulating the whole system, with what was said above of its affecting the whole excretories, will sufficiently show, that in its ordinary operation, by its promoting all the excretions, it may thereby evacuate every poison that shall happen to be present in the mass of blood, and may thereby entirely cure the venereal disease. We have said that its chief and most evident operation seems to be in the mouth ; but I hold this to be necessary only to show, that mercury, in an active state, has been introduced into the body : and it does not necessarily imply that the venereal poison passes out of the body more readily by the excretories of the saliva than by any other course ; for when a salivation is excited, there is at the same time marks of the other excretions being excited : and practitioners now know very well, that by a longer continuance of the other excretions, the disease may be cured without salivation ; and if there are instances of salivations being more effectual than any other measure, it may imply no more than that, in certain cases, a larger quantity of evacuation is necessary than in certain others.

That salivation alone is often not sufficient, I have this proof.— In a venereal patient, a small quantity of mercury very suddenly excited a copious salivation, and which continued to be very copious for many days after. By this the symptoms were in some measure relieved; but soon after the salivation ceased, and mercury was not farther exhibited, but the symptoms returned with as much violence as they had shown before; and it was only by a nice management that mercury, exhibited and employed for a long time, entirely cured the disease. I have had also several instances, in the use of mercury, when salivation happened to arise and continue for some time, without the cure being advanced in proportion to those fits of salivation. It is my opinion, that it is the due continuance of the excretions being increased that affords the most certain cure of the disease. This leads to consider the question, If the disease is to be cured by evacuation, why other evacuations, however diligently employed, does not cure the disease as well as those by mercury? The answer to this may be, that all other evacuations are partial only: they may largely diminish the quantity of the fluids, but they draw them off by one way only, and without being attended with any general increase of excretion. They for the most part diminish all the excretions, except that which is on the occasion, by special means, increased; and it is mercury only that, under proper management, can be employed to increase the whole excretions at the same time. It seems to be by this peculiar mode of operation that it is peculiarly fitted to cure the venereal disease.

[*MR JOHN HUNTER'S peculiar opinion concerning the manner of operation of mercury ought to be carefully consulted by the student and practitioner. It is the opinion of a man of genius, and of deep reflection on the subject. I am far, however, from thinking, that the theory, notwithstanding its ingenuity, and the highly interesting views of certain laws of the animal œconomy, with which it is connected, is entirely satisfactory. On the contrary, I think it is, in several respects, very unsatisfactory. But I cannot pause, in this place, to point out what I deem the imperfections of this doctrine. See HUNTER on the *Venereal Disease*: and especially DR ADAMS'S valuable work on *Morbid Poisons*.*]

When I have thus spoken of the various operations and effects of mercury, it remains to say how these operations are modified by the various preparations of it which have been proposed and employed.

We have said already, that quicksilver, in its native running state, is absolutely inert with respect to the human body; and to render it active for the various purposes we have mentioned, it must be chemically changed. The changes proposed have been many and various; but in my opinion they may all of them be referred to four heads, as the mercury may be changed, *1st*, By being converted into vapour: *2dly*, By calcination: *3dly*, By triture with viscid fluids; and, *4thly*, By being combined with acids of different kinds.

These various preparations have now been explained and detailed, either in many books of chemistry and pharmacy, or in writings on the venereal disease, that it does not seem necessary for me to give any particular account of them here. Whoever would consider them more particularly, will find the most ample detail in Dr SWEDIAUR's *Pharmacopœia Syphilitica*, at the end of his *Practical Observations on Venereal Complaints*; and I shall dismiss the subject here with a very few remarks.

The employment of mercury in vapour may perhaps be the best adapted to some local complaints; but its application to the whole body is attended with so much hazard and uncertainty in the administration, as hardly ever to be an eligible practice.

The preparation by calcination is not, as had been formerly supposed, of any peculiar power or advantage, and is therefore, I believe, little employed in the present practice: justly, as I judge, because the calcination seems to have no other effect than putting the mercury in a condition to be acted upon by the acids of the stomach, and therefore that this preparation does not differ from those made by a combination with acids.

The preparations by triture seem to be milder than those formed by a combination with acids; but from the incomplete triture that happens often to be given, they render the practitioner often uncertain in their use. The triture with unguinous substances gives the advantage of its being introduced by unction upon the skin; and when it has been properly prepared, and is properly administered, it gives a manner of introducing mercury which is often less liable to purging, and therefore more convenient than the employment of the saline preparations.

The saline preparations are different according to the acid employed. Those made by the vegetable acid are milder, and more manageable, than those formed with any of the fossil acids. Of these, the combination with the muriatic acid, when the acid is in its full proportion to the mercury, as it is in the corrosive sublimate,

is certainly more active and powerful than any other saline preparation. The use of it has been often convenient and effectual; but its operation is so different in men of different constitutions, that the employment of it often requires a good deal of management and discretion.

It is rendered much milder in the preparation of the *mercurius dulcis*, which has given occasion to this being so frequently employed, but it does not seem to me to be a very eligible preparation. It does not seem to be so readily diffusible in the system as many others, and that because it is more ready than many others to operate upon the intestines, and run off by stool. This may give it some advantages for its being combined with purgatives; but for that very reason it is less fit for being employed to act upon the salivary glands, or upon the other excretions of the system.

To conclude the subject of the medicinal powers of mercury, it will readily appear, that whoever considers the general deobstruent powers mentioned above, and at the same time the various effects of it when employed as a purgative, will fully apprehend its very extensive use in the practice of physic.

[*Dr CULLEN's account of mercury is short, and extremely imperfect. It would not be a difficult task to enlarge this account; nor, I trust, to render it, in many respects, more complete and satisfactory.

Besides the venereal, there are many other diseases, in which the preparations of mercury have been used with more or less advantage. Mercury is, unquestionably, a medicine of great value in the affection called yaws, or frambæsia, which is not unallied to syphilis; and in various other diseases of the skin and lymphatic system. The great importance of a mercurial course in hepatitis, seems to be universally acknowledged. A slight salivation has, in many instances (not a few of which have come under my own notice) remarkably suspended the progress of pulmonary consumptions. And it is probable, that the disease has occasionally yielded to this mode of irritation and evacuation. The opinions of physicians concerning the use of mercurials in scrophula are various. I have no doubt, that a mild salivation is well adapted to the removal of certain scrophulous affections: and both calomel and corrosive-sublimate, in union with the Peruvian bark, are highly recommended, by several respectable authorities, as important remedies in the same disease. In dropsical affections, mercury is

often an important auxiliary, though I think it must be admitted, that sometimes it stimulates the exhalents beyond the power of the absorbents. My own experience does not enable me to say any thing in favour of the good effects of mercurials (independently of their cathartic operation) in the common disease of hydrocephalus internus, or dropsy of the brain.—The anthelmintic quality of mercurials is afterwards to be considered.—A mercurial irritation ought always to be attempted in tetanus : and my own practice has afforded me one case of the cure of this disease by mercury. I wish I could say, that in my frequent trials with mercury in epilepsy I had found it of very essential use. But I have no doubt that mercury is equal to the cure of some cases of this dreadful disease. In mania, melancholia and hypochondriasis, the good effects of a mercurial course are more obvious. I am of opinion, however, that in all the *Vesaniae*, or *morbi mentales*, mercury, in the hands of indiscreet, or over-intrepid practitioners, is an ambiguous, and may be a dangerous, medicine.

Hitherto, I have said nothing concerning the use of mercury, as a sialogogue, in the disease of yellow-fever, and in other similar fevers. It would not be a difficult task to discuss this subject ; and somewhat, perhaps, to the advantage of the student. But a full and fair examination of the merits of the mercurial plan of practise in these fevers would swell this volume beyond the limits which have been prescribed to it, and would take up more of our time than we are willing to devote to it. I find it more convenient, therefore, to refer the reader, who is in pursuit of information on this important head, to the writings of other physicians, and particularly those of doctors CHISHOLM, RUSH, WADE, &c.*]

CHAPTER XVIII.

EXPECTORANTIA.

These are medicines which facilitate the bringing up the contents of the cavity of the lungs. This however must always be done by more or less of coughing; but as we do not know, or at least that I do not know, of any internal medicines for exciting this, I have confined my definition of expectorants to be those which render the contents of the bronchia to be more easily brought up. For the external means that may excite coughing, the ancient Cnidians practised such; but whether our modern practitioners will follow their example, I must leave to a further time to determine.

The rendering the matters for the time present in the bronchia more or less ready to be brought up, must depend upon the nature and state of these matters; but as these may be very various according to the difference of the disease that has poured them out, so we cannot here give any general rule; and it appears to me, that in most cases we can neither increase their quantity, or otherwise change them so as to render them fit for being more readily brought up.

The case most frequently occurring, and which we understand the best, is when the mucus which naturally exudes, or is poured out from the follicles of the bronchia, is poured out in unusually larger quantity, and often in a more viscid state than can be easily detached from the cells of the bronchia.

It is in this case especially that expectorants are required; and it is supposed that by their use the mucus may be brought up more largely and with more facility. In what manner however they do this, I find it difficult to explain. They might perhaps do it by merely exciting coughing; but, as said already, I know of no internal medicines capable of doing this: and I must here mention by the way, that I know of no means of exciting cough with expectoration but by employing vomiting. It may also be observed by the way, that the diseases depending upon an accumulation of mucus in the lungs may be often relieved by medicines which determine to the surface of the body, which may diminish the determination to the lungs; and by diminishing the quantity of mucus

poured into the bronchia, the expectoration of what remains may be rendered more easy.

These means, however, do not properly touch the business of expectoration; and it is commonly and justly supposed, that the effectual means of expeding this, is by rendering the mucus less viscid, and upon this account more easily detached from the bronchia.

Here therefore it is very universally supposed, by practical physicians as well as by writers on the *Materia Medica*, that there is place for the medicines named and supposed to be *Attenuantia et Incidentia*; but I suspect that the whole of the theory on this subject is incorrect and mistaken. I am still persuaded, by the arguments employed above, that in general no such medicines do exist; and I am clear that those arguments apply as strongly here as in any other case.

But another and a special consideration occurs with respect to the present subject; as we maintain, not only that attenuants do not operate, but that there is here no subject for them to operate upon. In spite of all that Mr SENAC has said of the existence of a mucus in the mass of blood, neither he nor any one else has brought any evidence of such a matter existing in the circulating mass of our fluids; and it is probable to me that a mucus never appears but in consequence of a stagnation in mucous follicles. Many phænomena show, that whenever the secretion of the liquor to be changed into mucus is increased, it is poured out in a very liquid form; and therefore, from its appearance afterwards as a mucus, there is no conclusion to be drawn that any such viscid fluid existed in the mass of blood. We hold it therefore for certain, that in the diseases depending upon an accumulation of mucus in the bronchia, there is no place for the operation of attenuants, as I believe that nobody will fancy they can operate upon the mucus already poured out into the bronchia.

The common theory of expectoration, therefore, seems to be unsatisfying; and the explaining of it in any other way appears to be difficult. The only explanation that I can find probable is, that by increasing the secretion of the liquid that is to afford a mucus, this, as poured from the arteries into the follicles, being always a thin fluid, it may dilute the mucus in the follicles, and may make it to be poured out from these in a less viscid state, and may thereby render it more easy to be brought up by coughing, that is, to be more freely expectorated.

The means however of increasing this secretion may not be very obvious. We know no internal medicine that seems to increase the secretion of mucus from the Schneiderian membrane; and whether there are any medicines that can expedite the secretion of the same from the bronchia may be doubtful; but I find it probable that there are truly such.

We know now that there is a constant and considerable exhalation of moisture from the cavity of the lungs; and there are many reasons for believing that this is an excrementitious secretion connected with the other excrementitious secretions, particularly with the perspiration from the surface of the body.

If therefore there are medicines disposed to pass by perspiration, it may be presumed that the same are disposed to pass by the exhalation from the lungs. And here therefore is a view of medicines, which, passing through the vessels of the lungs, may possibly operate upon the secretions made there, and particularly the principal one made there, the secretion of the fluid to be changed into mucus. By this, as we have said above, the mucus present in the follicles may be poured out in a less viscid form, and consequently in a state to be more easily brought up by expectoration.

This is the theory of expectorants which we can offer; but how it will apply to explain the operation of particular medicines, I shall leave my readers to determine.

PARTICULAR EXPECTORANTS.

In this list I have first set down a number of the verticillated plants which have had some reputation as expectorants. I have treated of them before in their proper place, and have even there mentioned their supposed expectorant powers; but have said also, that these powers have not at all been confirmed by my experience.

ENULA CAMPANA.

THIS, both by its sensible and chemical qualities, promises to be a medicine of some power, and it has commonly been supposed to be so; but after many trials of it I am at a loss to determine what are its peculiar virtues. I have frequently tried it as an expectorant, but never with any evident success. It has been supposed to determine to the uterus; but in the large use of it, we have never met with any symptoms of its having such a power.

IRIS FLORENTINA.

WHAT this might do in its more recent and acrid state, I cannot determine; but in the dried state in which we commonly have it in our shops, we are persuaded of its being a very insignificant expectorant.

TUSSILAGO.

THIS is a plant, whether we take it in its leaf or flower, of very little sensible quality, and we are afraid of as little virtue. We have very often employed it; but have never found it evidently to be either demulcent or expectorant. There is, however, one virtue of it which I must mention. Upon the testimony and recommendation of FULLER, author of the *Medicina Gymnastica*, I have employed it in scrophulous cases, and in several of these with seeming success. The expressed juice of the fresh leaves, taken to some ounces every day, has in several instances occasioned the healing up of scrophulous sores; and even a strong decoction of the dried leaves, employed as FULLER proposes, have seemed to answer the same purpose. We must own, however, that such decoctions have often failed, and that even in some trials the expressed juice was not sufficiently effectual.

PETASITES.

THIS is a species of the same genus, but of stronger sensible qualities, whereby it might be supposed to have more virtues; and it is agreed that it is more active than the tussilago farfara: but how that activity is to be directed I cannot perceive, either from writers or my own experience. This gives me however an opportunity of observing, as I have done before, that I conceive all supposed alexipharmic virtues, such as are ascribed to the petasites, to be imaginary and very ill founded.

We have now mentioned, in complaisance to the writers on the materia medica, a number of supposed expectorants, which we cannot find either suited to the purpose, or in our experience actually useful; but there are two medicines set down in my list of expectorants which I am persuaded may be really useful as such, as they are medicines which manifestly stimulate the excretories which they any where reach. These medicines are the Nicotiana and Scilla: the former we have treated of already, and the latter we shall have occasion hereafter to mention, as emetic, purgative, and diuretic: and as, in these operations, it gives unquestionable

marks of its power in stimulating excretories, so we shall be more readily allowed to consider it, as what it has been commonly supposed to be, a powerful expectorant. With respect to its employment as such, it is hardly necessary to observe, that it must be given in such small doses as may not occasion its acting upon the stomach or intestines, as the one would prevent its being frequently repeated, and the other would prevent its passing into the mass of blood, where its action as an expectorant can only take place. Its acting as a diuretic is always a mark of its having entered the mass of blood; and it is my opinion that it is not to be expected to act as an expectorant but when it appears also to act upon the kidneys.

With respect to its pharmaceutical treatment, I must observe that it is never properly employed in its fresh state, as in that condition it so readily affects the stomach as to prevent its being given in due quantity; and therefore it cannot be so well directed to its other operations. I would therefore have it almost always employed in its dried state, when that is properly executed, and the powder is afterwards not long kept. In this state it may either be employed, as we speak, in substance, or it may be extracted by different menstruums: and I mention this only to observe, that we cannot find any advantage in extracting it by vinegar; which is the less proper, as, in spite of almost every precaution, vinegar will be in different conditions. We maintain that, in every respect, wine will be a more proper and certain menstruum, especially when the same quantity of ardent spirits is added as in the acetum of the London College. In that of the Edinburgh Dispensatory, I cannot find the management of the ardent spirit so properly managed, as I find that the addition of a quantity of brandy, either with vinegar or wine, would not be unfavourable to the extraction of the squills.

At the end of my list of expectorants, I have set down some medicines which have been supposed to be expectorants: but having treated of each of them before, and having given my opinion with respect to their use in the affections of the lungs, which comprehends the business of expectoration; so I cannot think it necessary to repeat any part of it here.

CHAPTER XIX.

EMETICA.

THESE are medicines which excite vomiting, and thereby bring up and throw out the contents of the stomach for the time present in it. As, upon other subjects, so I shall here, first mention what may be the effects in general or in particular, and afterwards say by what means these are to be obtained.

Although the contents of the stomach may be supposed nowise morbid or noxious, some physicians have been of opinion, that the action of vomiting, and the evacuation of the stomach, may be useful to health; and I am ready to believe, that the moderate practice of this may be useful, both by its exciting the activity of the stomach itself, and by agitating, as vomiting does, the whole body: but I am certain that the practice ought not to be frequent; and I have known instances of the frequency of it being hurtful, by rendering the stomach less fit to retain what is thrown into it, and even to weaken its powers of digestion.

When, however, the contents of the stomach may be supposed to be in a morbid state, and noxious to the stomach itself, or to the whole system, there can be no question or doubt about the propriety of vomiting, except in a few cases, when the action of vomiting may be hurtful to certain conditions of other parts of the body, or when the vomiting cannot be excited but with such straining as may be hurtful to the parts especially concerned in the action, and likewise to other parts of the system.

When such exceptions do not present themselves, it will always be proper to excite vomiting, not only for throwing out the matters as noxious, but frequently also as being ferments to the aliments that are to be afterwards taken in.

The marks of the matter's being noxious by its quality or quantity, are especially the want of the usual appetite; and often not only a want of appetite, but a loathing of food; or, when aliments are taken in, an uneasiness in the time of their digestion, and marks of its imperfect condition, such as heartburn, flatulent and acid eructations; and to these may be added frequent headaches.

These are the marks of noxious matters present in the stomach. They indicate the use of vomiting and the evacuation of the present contents of the stomach, which gives generally more or less of re-

lief; but it is very necessary to be marked, that this relief is seldom very durable, as the noxious matters are more frequently to be considered as effects than as causes. The production of them very commonly depends upon a loss of tone in the muscular fibres of the stomach, which is not to be cured by vomiting, though the effects of it may be relieved by this for a longer or shorter time. They are however unhappy who trust to this mode of relief, and have therefore frequent recourse to it; for I am certain, from much experience, that frequent vomiting hurts the tone of the stomach, and often makes the symptoms of indigestion recur more frequently and sooner than they otherwise would have done.

Upon this subject I judge it proper to remark, that the effects of vomiting, and the degree of disease that required it, are commonly judged of, both by the vulgar, and even by physicians, though not always fairly, by the appearance of the matter thrown up. For example, there is commonly thrown up a considerable quantity of very viscid mucus; and to this the symptoms of the disease are frequently imputed.

It is indeed possible that an unusual accumulation of mucus in the stomach may be the cause of the want of appetite and other symptoms of indigestion, but not always so justly as might be imagined. The mucous follicles of the stomach constantly pour out a considerable quantity of this matter; a considerable quantity of it is to be found in the stomachs of the most healthy persons: and the experiments of Mr SENAC show, that there is always a considerable quantity of it in the mucous follicles, which may very readily be squeezed out very copiously in vomiting. It is not therefore to be judged that the quantity, and even a large quantity, thrown up by vomiting, had either previously existed in the cavity of the stomach, or that such a mucus had been the cause of the morbid symptoms, indicating therefore the repetition of vomiting. It has been upon occasions of this practice that I have known repeated vomiting not only to give no durable relief, but rather to increase the supposed cause.

The effects of emetics and of vomiting first to be mentioned, are those of evacuating the stomach itself: but it is now to be remarked that the evacuation goes further; and the duodenum, with a portion of the jejunum, may be, and commonly is, evacuated at the same time. The peristaltic motion of the alimentary canal may proceed downwards or upwards; and when any portion of it acting is, by any circumstance, directed in one way, the next adjoining portion follows the same direction. From this, in vomiting, as the pe-

ristaltic motion of the stomach is directed upwards, so the motion of the duodenum is directed in the same manner, and pours its contents into the stomach; from which it will appear, that in vomiting, a considerable portion of the upper part of the intestines may be evacuated, as we have alleged.

The most clear proof of the inverted motion of the duodenum is, that in vomiting, and especially after repeated vomiting, a quantity of bile seems to be poured from the duodenum into the stomach, and is in consequence thrown out by the mouth. This frequent appearance may depend entirely upon the quantity of bile for the time present in the duodenum, but it probably extends farther. When, in consequence of digestion, alimentary matters pass into the duodenum, as it may be supposed that Nature intends the gall-bladder and biliary ducts should then pour their fluids more copiously into the duodenum; so it may be supposed, on this occasion, that bile is poured more copiously into the duodenum, and, in consequence of the inverted motion, more copiously into the stomach, from whence it may appear more copiously in what is thrown up by vomiting. If this should not be thought sufficient to account for a quantity of bile being frequently thrown up by vomiting, there is another cause, perhaps one more powerful, to be alleged. In the action of vomiting, as the contraction of the diaphragm and of the abdominal muscles concurs at the same time, the whole viscera of the abdomen are strongly pressed: this pressure must affect the gall-bladder and biliary ducts, and occasion them to pour out their contents very largely; and thereby especially a large portion of bile may be thrown up by vomiting.

On this subject I must remark, that both the vulgar, and even physicians, have been ready to suppose, that the bile thrown up by vomiting existed previously in the stomach itself, and in some instances it may have been so; but it is more probable that it has been brought from the duodenum, and even from the gallbladder and biliary ducts, in the manner we have explained. There is this particular reason for supposing it, that if the bile had been previously lodged in the stomach itself, it might have appeared in the first vomitings as well as in the last: but it happens in most instances that the bile is thrown out by the mouth only after repeated vomitings, and often after repeated strainings in the organs employed in vomiting.

After the evacuation of the stomach, the next effect of vomiting to be marked, is this evacuation of bile, in consequence of the mechanism we have explained; and of what importance this

may be in many diseases will be sufficiently obvious. That the stagnations ready to happen in the system of the vena portarum often lay the foundation of the most obstinate diseases is well known; and therefore, the obviating these by frequent vomiting is likely to be of much importance to the health of the system: and indeed I know no means of expediting the circulation in the liver so powerful as that of vomiting.

An effect of vomiting, which, as it may be considerable, deserves to be taken notice of, is, the compression which we have mentioned to be given to the liver, must at the same time be given to the whole viscera of the abdomen; by which the motion of the blood in their vessels, and the whole of the secretions and excretions in every part of them, may be promoted, and thereby diseases both prevented and cured.

These effects, however, in the abdominal viscera, are not often remarkable; but the effects of the same motions in the thoracic viscera are often evident and considerable. The simultaneous contractions of the diaphragm and abdominal muscles, and the alternate relaxations of these organs of respiration, must variously agitate the motion of the air in the bronchia, and thereby expectoration be most effectually promoted. Both by this, and the agitation of the blood-vessels, it will be obvious that vomiting may be often useful, as we commonly find it to be, in all catarrhal affections. That it may be also useful in many cases of phthisis pulmonalis we readily allow; but that frequent vomiting may cure this disease, we cannot, either from theory or experience, find any reasons to believe.

Besides these operations on the trunk of the body, vomiting excites the force of the circulation in every part of the system, and may thereby be of much use; but as such increased circulation is not durable, and that it commonly becomes languid in proportion to its former increase, so it may be justly doubted if the general stimulus can be commonly of much service. But although the general action of full vomiting may not be considerable, yet as directed and operating in particular parts, it may become of great use. Thus we are of opinion, that there is a special consent between the stomach and the vessels on the surface of the body, so that the several states of these are mutually communicated to one another; whence the action of vomiting excites particularly the action of the vessels on the surface of the body, and may thereby be of use in restoring the tone, and overcoming the spasm of the extreme vessels which take place in fevers.

It is here, however, to be remarked, that as the effects of full vomiting cannot be durable, nor its operation be conveniently repeated, so full vomiting cannot always be employed to prevent the recurrence of the atony and spasm mentioned. But as emetics, though employed in doses not sufficient to excite full vomiting, may still excite a degree of action in the stomach, and be communicated to the extreme vessels, so as in some measure to restore their tone, and overcome the spasm affecting them, they may thus be useful in fevers; and as their operation may be rendered more durable than full vomitings, these nauseating doses may be still more useful. Upon this is founded the present practice in employing emetics in the cure of fevers: But as I have explained all this more fully in my *First Lines*, it is not necessary to insist farther upon it here.

There is an operation of emetics further to be mentioned, which in my opinion depends upon their power of determining to the surface of the body; for to this I refer their use in asthma, so much recommended by Dr AIKENSIDE. I cannot indeed say that I have imitated his practice with much success; for in many cases of spasmodic asthma, I have continued the use of emetics for a long time, without finding that I either prevented the recurrence of fits, or rendered them more moderate when they came; but in some other cases I have found the emetics of benefit in both respects; which however happened especially when the asthma was in any degree of the pituitous or catarrhal kind, and therefore the emetics were of more service in the winter than in the summer asthma.

Of the effects of vomiting and of emetics, so far as I can judge, it remains only to take notice of their employment in hæmorrhagy, which to me presents a difficult problem.

DR BRIAN ROBINSON, lately of Dublin, has recommended frequent vomiting in hæmoptysis, and has assured us of its good effects in several cases. Upon the recommendation of so good authority, I tried this remedy in several cases, and in several I found it might be employed with safety and advantage: But in one case the vomiting increased the hæmorrhagy to a great and dangerous degree; and the possibility of such an accident again happening, has prevented all my further trials of such a remedy.

I can however conceive, that the remedy may be safely employed in many cases, and that really it had, in those in which it was employed by Dr ROBINSON, been of advantage, by taking off the determination of the blood to the lungs; as I had in more than one instance found, that the exercise of a carriage employed to a con-

siderable degree for several days together took off entirely a hæmoptysis, which readily returned upon the person's remaining for a day or two at rest.

It is thus that I would explain the effects of vomiting in a hæmoptysis. But this was not the theory of Dr ROBINSON: He seems to have been of opinion, that during the sickness that introduces vomiting, there is a constriction formed upon the extreme vessels every where; and that by this constriction the hæmoptysis was suppressed. Of the justness of this theory I leave my speculative readers to judge; but what I must add seems to be in confirmation of it. It has been found, and I myself in some instances have found, that nauseating doses of emetics have been of service in several instances of uterine hæmorrhagies; and materia medica writers have commonly alleged, that small doses of emetics have been employed in many different cases of hæmorrhagy with great advantage.

Having now mentioned pretty fully the effects of vomiting and of emetics, I am next to consider the several means which may be employed for obtaining these.

Vomiting may be excited by very various means; of which however many of them cannot be employed in practice, and are therefore not to be taken notice of here. Among the means that may be employed, the first I would mention, as very generally employed, is filling the stomach suddenly with a large quantity of liquid; and it is found that almost any kind of liquid in large quantity will have the effect: but that the vomiting depends not on the quality but on the quantity of liquid, appears clearly from hence, that warm water of the most pure and simple kind is generally sufficient for the purpose.

The theory of this frequent operation has not, in my opinion, been well explained: and it seems therefore allowable for me to attempt to do it here.

As, when meats or drinks are taken into the stomach, it is necessary that they should be retained there for some time, till they shall have undergone certain changes, by operations to be made upon them in the stomach; and therefore, that they may not pass off too soon by the lower orifice, nature has provided, that on every distention of the stomach, the pylorus should be raised up by the longitudinal fibres, which in the small curvature of the stomach pass between its two orifices, and at the same time be contracted by the muscular fibres placed in the duplicate of the coats of the stomach formed near to the pylorus. This constriction in ordinary cases is

moderate; but we know it can be so strong as to shut up that orifice entirely: and it is probable that this, as seems necessary, should always happen in vomiting. It is also probable that this contributes to occasion the vomiting, as this constriction of the pylorus must invert the peristaltic motion of the stomach, and direct it entirely upwards, and even to a vomiting. If it can therefore be supposed, as I think it may, that the sudden distention of the stomach, by a large draught of warm water, can induce a strong contraction of the pylorus, we shall readily understand how it produces vomiting, and at least contributes to promote it.

Having thus attempted to explain the operation of warm water, which is very much confirmed by what was observed above of the effects of a large bulk of liquid thrown suddenly into the stomach, we proceed to speak of some applications of it in practice.

The effect we have said may be produced by warm water alone; but more readily still, when at the same time an emetic medicine is applied to the stomach. These emetics we shall speak of presently; but now it is only necessary to remark, that in many cases, when it may not be proper to give the emetic in such a dose as of itself might be sufficient to excite vomiting, by the assistance of filling the stomach with warm water, small doses of emetics may serve the purpose of evacuating the stomach, and even of obtaining other effects, which we have said may be produced by vomiting. This shows sufficiently the power and operation of warm water employed in the manner we have said: and it is particularly in illustration of the same that several substances of little power in stimulating the stomach, are, however, by the assistance mentioned, employed to excite vomiting, such as the infusions of a bitter herb, as chamomile or *carduus benedictus*.

On the same footing it is that certain substances which stimulate the stomach more powerfully, but which, on account of their inflammatory nature, cannot be safely given in such quantity as by themselves to excite vomiting, may, by the assistance of warm water, and by that only, can be employed as very safe and useful emetics. Such are an infusion of the root of horse-radish, or a teaspoonful of mustard as prepared for the table: These are emetics that can hardly be rendered effectual, or be employed, but by the assistance of warm water. With that assistance, however, they afford a gentle and useful means of exciting vomiting.

But we must now speak of those substances which of themselves, when introduced into the stomach, can excite this action of it.

Of these I have, according to my general plan, set down, in the first place, those taken from the fossil kingdom; but from several considerations I find it proper to begin with treating of those taken from vegetables.

ASARUM.

This, in ancient times, was frequently employed; but since physicians became acquainted with antimonial emetics, it has been very little in use; though we can say, from our own experience, that it is sufficiently fit for the purpose. The root dried only so much as to be powdered, proves, in a moderate dose, a gentle emetic. It will commonly answer in doses of a scruple, sometimes in a less quantity; and though given as some authors have proposed, in larger doses, it may be safe; as commonly a quantity of it will be thrown out in the first vomitings. In repeated vomitings the whole of it is thrown out, so that it is always a moderate and manageable emetic, and as we judge, may be suited to many of the purposes of the ipecacuanha. It appears from writers, that the leaves also have been commonly employed, and perhaps with equal advantage; but as I did not find it easy to ascertain the dose of these, my experiments have been only with the roots.

ERIGERUM.

THIS is a more acrid substance than the materia medica writers seem to have supposed it to be; but from them I have no accounts of it that can lead me to any observation. It has been sometimes by our lower people employed as a powerful emetic; but I have not had any proper information upon this subject. It is not on that account that it has been inserted in my catalogue; but it was to direct my reader's attention to the singular power of it externally applied, as reported by my learned friend Dr STEEDMAN, in the Edinburgh Medical Essays, vol. II. art. v.

IPECACUANHA.

IT does not seem as yet to be well ascertained what genus of plants this celebrated root belongs to, or if to one genus only; but not being fit of myself to settle this matter properly, I must leave it entirely to the botanical critics.* For my purpose at present, it is enough to observe, that what for a long time past has been brought into

* It seems, at length, to be well ascertained by the botanists, that the genuine ipecacuanha of the shops, is the root of a pentandrous plant, the *Cephaelis emetica*.

our shops seems to have been very uniformly the same; and it is this that has been the subject of my observation and experience, and therefore what I am to say now relates entirely to this.

This root then consists of a cortical and medullary part; and I am from some experiments persuaded, that it is in the former only that the emetic quality is to be found. In this cortical part it seems to be a resinous matter; and accordingly it may be extracted by spirit of wine: but at the same time the resinous matter is so intimately blended with, and adheres so tenaciously to, the gummy portion, that the emetic quality can be very well extracted by more watery menstruums. Dr LEWIS advises a menstruum of one part pure spirit, and two or three parts of water. This perhaps may be the most proper; but a thin wine answers the purpose very well, and our Dispensatories have not thought of employing any other.

This medicine is employed either in the wine or in the powder; and the latter, as operating in a smaller dose, gives a more manageable emetic: for the powder is pretty certainly thrown out in the first vomitings, and therefore ceases to operate, whilst the wine often adheres longer to the stomach.

The medicine in either form proves very certainly emetic; and the powder, to the quantity of a grain, or perhaps less in many persons, can hardly be given without exciting nausea and perhaps vomiting. Such small doses do not indeed always produce these effects; but as they frequently do, we mention them to show that small quantities often operate upon the stomach: and the instances of it make me ready to believe the accounts which have been reported of the cure of diseases by very small doses of this medicine.

Among these reports I have difficulty in giving faith to those of Dr PVE, reported in the London Medical Observations, Vol. I. art. 22. whilst he gives no account of the nature of the ipecacuanha that he employed, as different from, or of superior power to, that in common use with us. In this, though I have often observed in certain persons the effects of small doses above mentioned, yet they are not to be observed in every person; and I can assert, that in nine persons of ten they will hardly appear from doses under five grains. For exciting vomiting, and especially to excite repeated vomitings, we hardly depend on any dose under ten grains, and frequently a larger dose is required. It appears to me that the small doses would hardly answer our purpose without the assistance of warm water. Larger doses indeed may be given with safety, because, as we have said, they are commonly thrown out in the first vomitings: but even on this account, they do not answer the purpose that may

be required of repeated vomiting; and our practitioners commonly find, that to give any powerful or permanent stimulus to the stomach, it is necessary to add to the ipecacuanha some portion of emetic tartar.

Ipecacuanha may have all the effects which we have above ascribed to emetics in general; and upon that ground the medicinal powers of this medicine may be understood: but I shall here make a few remarks that more particularly relate to it. We have just now explained why it is not with any certainty suited to give a powerful or permanent stimulus to the stomach; but on this very account, for the mere evacuation of the contents of the stomach, it is the medicine that can be employed with the greatest ease and safety; and wherever it is proper to employ a moderate vomiting only, as for promoting the passage of a biliary concretion through the biliary ducts, it is the most proper emetic, as its stimulus may be safe, and at the same time more effectual than the other gentle means of exciting vomiting which we have mentioned above.

Although ipecacuanha is seldom fitted to produce the effects of strong vomiting, it is by the mildness of its qualities adapted to several useful purposes. As small doses of it, not sufficient to excite vomiting, pass over the pylorus, they pretty certainly act upon the intestines, promote their peristaltic motion downwards, and commonly occasion more or less of evacuation by stool; and it is upon this that I suppose to have been founded the formerly celebrated antidyenteric virtue of ipecacuanha.

If I am right in my opinion of the nature of dysentery, as I have explained it in my *First Lines*, it will be evident, *a priori*, that the cure of it must depend upon the steady support and determination of the peristaltic motion of the intestines downwards; and it seems to be as certainly proved in fact, that the cure is best obtained by the assiduous use of laxative or purgative medicines. From what experience we have had, we are persuaded that wherever neither inflammation nor putrescency have taken place, a dysentery will always be readily cured by these means.

Whatever explanations have been offered of the operation of ipecacuanha in this disease, we can find no other admissible or tenable but that of its laxative power; and in confirmation of this it has been often observed, that ipecacuanha does not answer the purpose, unless when it proves more or less purgative: and a confirmation of the same occurs more strongly from this, that other emetics proving laxative are equally or more effectual. See the learned sir GEORGE BAKER, *De Dysentaria*, p. 26.

[*Ipecacuanha has been much employed in Europe, and especially, I think, by the practitioners of the continent, in cases of hæmorrhagy of red blood. I have imitated this practice, giving at short intervals small doses of the medicine, and can confidently assert, that it is, in many instances of such hæmorrhagies, an important remedy. Even in my employment of the sugar of lead in threatening bleedings, I sometimes combine a portion of ipecacuanha.*]

There have been many other virtues ascribed to the ipecacuanha; but all of them appear to me to depend upon its emetic powers alone, and that they truly may be obtained by the use of other emetics. We might therefore cease from saying more of this drug; but I shall still make a remark or two on some particular uses of it.

It has been particularly commended in the cure of intermittent fevers; and I knew a practitioner who cured these, by giving, an hour before an accession that was expected, five grains, or so much as would occasion a strong degree of nausea and sickness, without vomiting; and by one or two such practices he was frequently successful. It is true that this may be executed by tartar emetic, and I recommended the trial of this to the practitioner I speak of; but he assured me, that in several trials he could not easily adjust the dose of this, so as to produce the proper degree of sickness without vomiting, so well as he could do by the other.

Dr THOMSON, formerly of Montrose, proposed to cure agues by the employment of emetics given at the time of accession, or at the end of the cold stage: and this practice has also been successful, and may indeed be executed by tartar emetic; but in trying such practices I have found the ipecacuanha more manageable than the other, and generally to be more easy to the patient.

The mildness and manageable quality of the ipecacuanha has made some physicians endeavour to employ it in continued fevers; but we have always observed, that the readiness with which even small quantities excite vomiting, and are to be thrown out by it, commonly prevented our obtaining that permanent nausea that we judge to be necessary.

To finish my remarks upon this medicine, I have to observe, that, like other emetics, it has been employed in the cure of hæmorrhagies. And if their salutary effects, in such cases, especially depend upon inducing the first degrees of nausea, I leave it to the ingenious practitioner to judge, whether the small quantities in which ipecacuanha will operate, may not render this a fitter medicine than some other emetics.

After the ipecacuanha in my catalogue, I have set down the Nicotiana: But in treating of this above as a sedative, as I have said all that is necessary with respect to its being employed as an emetic, it seems unnecessary to repeat any part of that here.

The next article is that of

SCILLA.

This, with its expectorant and diuretic powers, has always joined that of stimulating the stomach and of exciting vomiting.

For this single purpose it was sometimes formerly employed; but since the use of ipecacuanha has become known, the squills have been more rarely used; and in my opinion they have been justly neglected, as I find the dose of them not to be easily ascertained; and in a full dose they appear to me to be a harsher and less manageable emetic than the ipecacuanha.

We cannot however pass this subject without observing, that we can never presume upon the operation of squills in any manner, without their being given in such quantity as to excite some degree of nausea; a circumstance that renders the squills a disagreeable remedy, but an attention to it seems to be always necessary.

We have now mentioned the vegetable emetics of our catalogue that are necessary to be taken notice of here; as what relates to the use of the Amara, the Sinapi, and Raphanus Rusticanus, we have spoken of fully enough above, either as assistants to the operation of warm water, or as by the assistance of that they may become useful emetics.

*SPIRÆA TRIFOLIATA.

[*I HAVE elsewhere† treated of the properties of this article, which is at least deserving of the attention of American physicians. The bark of the root is employed, and this is a safe emetic, perhaps more nearly allied to ipecacuanha than any other vegetable emetic. It is principally inconvenient from the size of the dose, which must, in general, be at least twenty grains.*]

Having therefore now considered the vegetable emetics, I am next to take up the subject of the fossil.

The first of these mentioned in my list are the preparations of copper. And many of these, as very universally emetic, might perhaps be employed; but they are seldom fit to be safely or properly managed.

† Collections, &c.

I have known the *Blue Vitriol* employed, but rather as a nauseating dose in the beginning of fevers, or as a diuretic in dropsies, than as an emetic fit to occasion full vomiting; and when it has the last mentioned effect, it is always harsh and unmanageable, and we cannot perceive that it has any better effects than those of tartar emetic. The effects of it in beginning consumptions we have not had any experience of. Its external use as an escharotic is sufficiently known: but I must observe, that in many ulcerations it has appeared to me more useful than any other: and very lately, in an ill-conditioned and spreading ulcer, I found it bring on a good digestion, when both mercurials and arsenic had failed.

With respect to the mercurial emetics, I believe that most of the saline preparations of mercury, if given in large doses, might operate as emetics; but, as in the examples of the corrosive sublimate, they would be employed with very great danger.* The mercurial emetic that has been chiefly and almost only employed is, the turpethum minerale, or mercurius emeticus flavus: but as this must be employed in a very large dose, and always operates in a severe and dangerous manner, I am disposed to assert, that it is never necessary to use it for the purpose it was formerly employed, that is, to excite a salivation; nor that it is ever necessary for removing some obstinate venereal symptoms, such as swelled testicles, as I believe that such symptoms may be as well cured by safer means.

Of the preparations of zinc, the vitriolum album is that only employed as an emetic. This has been chiefly employed on account of the suddenness of its operation, which is frequently required when noxious or poisonous matters have been accidentally taken into the stomach. We do not however always find the white vitriol to be the most convenient for this purpose: for in order to render its effects certain, the dose must generally be large; and if this is not thrown out again immediately, it is apt to continue a disagreeable nausea, or even a vomiting, longer than is necessary.†

* A solution of the corrosive sublimate is sometimes employed with much benefit, and may be used with entire safety, as an emetic, in the case of cyanche trachealis, or croup. In the same affection, the blue vitriol, or sulphate of copper, is still more extensively employed in the United-States. They are both important medicines in this dangerous disease.

† The vitriolic solution, as it is called by Dr Moseley, is a preparation of white vitriol and alum, which I have often used, in some of the affections in which it is so largely praised by this ingenious author. It is a mildly operating nauseative and emetic medicine, and is well suited, by these effects, to the management of certain stages of pulmonary consumption, dysentery, diarrhœa, &c.—See Moseley on *Tropical Diseases*, &c. I have also employed this solution

I find that the purpose of this medicine, that is, a sudden vomiting, may commonly be obtained by employing a large dose of ipecacuanha, either in powder or in the vinum; and by following this soon after with a large draught of warm water impregnated with chamomile, or rather with what is more at hand, a tea spoonful of table mustard, the business may be commonly very effectually executed.

ANTIMONIUM.

THIS, under a certain preparation, affords the metallic emetic now most commonly employed. It is one of the safest and most manageable, and may commonly be rendered sufficiently effectual for every purpose of emetics.

With respect to it, this is first to be observed, that, as produced in the earth, it is a combination of a metallic substance with common sulphur; and while it is in this state, when we name it *Crude Antimony*, it appears to me to be an inert substance with respect to the human body.

This, however, is not the universal opinion; and its manifest effects upon horses favours the supposition that it may have effects also on the human body. Many physicians have adopted the supposition; and particularly the chemist KUNCKEL alleged, that by levigation brought into a very fine powder, it was useful in several diseases, particularly in rheumatism. After several trials, however, of giving a dram of this powder once or twice a day for several weeks together, I have not found it of any benefit. I knew a physician who had an opinion of its being useful in cancers, and he gave the powdered antimony to two drams for a dose; but I could never perceive that any sensible effects, or that any effects either upon the cancerous tumour or ulcer were produced. I must own, however, that in one or two instances in which the crude antimony was largely employed, some nausea, and even vomiting, were produced; so that I was restrained from carrying the dose farther than I had already done. This indeed obliges me to acknowledge, that on some occasions crude antimony may be an active medicine; but at the same time I must allege, that it can hardly ever be proper to employ such an uncertain medicine as the crude antimony, when I suppose we may obtain the same effects by one of its preparations, whose dose and operation can be more exactly measured.

(with and without alum) with much advantage in pertussis, or hooping-cough, to many cases of which it is well adapted.

Supposing therefore the crude antimony laid aside as at least generally inert, we are next to inquire into the means of bringing it into an active state. What are the means of giving it activity, we shall endeavour to point out very fully hereafter ; but, as in other instances of this treatise, I think it proper to consider first the general effects of it in all its active states.

These are universally and constantly its exciting vomiting, or such a degree of action on the stomach as is common to other emetics given in such doses as do not excite full vomiting. The medicinal effects of antimony, therefore, are all those which we ascribe to full vomiting, or to the more partial operation of emetics as above explained.

But antimony, in its active states, differs from other emetics. When it is employed either to excite full vomiting, or to produce a more partial affection, the stimulus given by it to the stomach is stronger than that of ipecacuanha ; and therefore it excites the action of the parts employed in vomiting in a stronger degree.

It therefore more powerfully evacuates the stomach ; and as it is not so readily thrown out again, it is fitter to excite repeated vomitings, and thereby to occasion a more complete evacuation.

It will at the same time be obvious, that the same force of stimulus will produce more certainly all the effects we have ascribed to full vomiting in evacuating the upper part of the intestines, in emulging the biliary ducts, and in expediting the motion of the blood in the vessels of the liver, or in the other abdominal viscera.

It is equally obvious that the same force of stimulus applied to the stomach will be more certainly communicated to the surface of the body, and thereby show the effects of nauseating doses in fevers, and in many cutaneous disorders. Farther, whatever virtues may have been ascribed to ipecacuanha in asthma and in hæmorrhagies, I have found by experience they may be generally obtained by a proper management of antimony ; and, upon the whole, from what has been now said, I hope we may have a pretty complete view of the medicinal virtues of this celebrated medicine.

Having now spoken of these virtues, I am next to say how they are to be obtained ; that is to say, how, from the crude antimony, which we consider as inert, the most active antimonial medicines are to be obtained.

To this purpose we suppose it agreed upon, that the sulphur of crude antimony does not differ from common sulphur ; and there-

fore, that peculiar medicinal virtues are to be obtained only from its metallic, or, as it is commonly named, its Reguline part.

With respect to this, however, it is in the *first* place to be observed, that, like all other metallic substances, this, in its pure metallic state, is absolutely inert with respect to the human body; and that, in order to its becoming active, it must be brought into a saline state, either by its being combined with an acid before it is introduced into the body, or by its being brought into a state in which it may be acted upon by the acids it may meet with in the stomach.

The execution of either of these purposes has given much employment to the chemists, and has produced all the various preparations, as they are justly called, of antimony. The present state of chemistry however is so complete and correct with respect to antimony, and the pharmaceutic treatment of it is so commonly understood, and so clearly delivered in all our books of chemistry and pharmacy, that it is not very necessary for me to repeat it here. But for the sake of a few remarks that I have to offer, I beg leave to attempt a short system on the subject.

I begin with those means of putting antimony into a state in which it may be acted upon by the acids of the stomach.

It is in this state, particularly when it is a pure regulus, entirely free from the sulphur with which it had been joined in its native state; and in this reguline state, it may, for reasons we shall give hereafter, be thrown into the stomach in large quantity.

But here it may be proper to remark, that as antimony may be brought into its reguline state by various means, and particularly by various other metals employed for absorbing and separating the sulphur of the crude antimony; so it has been imagined that, according to the metal employed, there was some difference to be found in the regulus obtained: but it has now been discovered, that there is little foundation for this either with a view to chemistry or medicine.

Although the regulus might be, it is now seldom, employed as a medicine, and especially as it is found to be enough to have it free from a part of that sulphur which prevented it from being acted upon by acids in its crude state; and it is found that the abstraction of a portion of that sulphur is commonly sufficient for putting it into a state in which it may be acted upon by acids even of the mildest kind. Accordingly, for rendering it fit to be acted upon by the acids of the stomach, the chemists have contrived the various

preparations by which more or less of the sulphur is abstracted from the crude antimony.

It may be done, in the *first* place, by a proper calcination, to such a degree, that the remaining matter may be fused into a glass, which we find to be readily acted upon by acids, and to show the same emetic qualities that are to be found in any other active preparation. This vitrum antimonii is found to be so readily soluble as to prove one of the most active preparations; but it is proper to be remarked here, that this preparation may be rendered milder by some calcination with wax, as in preparing the vitrum antimonii ceratum. The theory of this operation is not very obvious; but I can assert, that the mildness of the preparation depends upon the degree of calcination given: for I know from experiment, that by pushing the calcination beyond a certain degree, the medicine can be rendered absolutely inert, and no longer soluble in acids.

A second means of abstracting a portion of the sulphur of antimony, is by the application of alkalines. This may be done first by fusing antimony with a portion of alkaline salt, which abstracts a part of the sulphur, and with it forms a scoria upon the surface of the melted mass, while the part subsiding from that gives the regulus medicinalis of HOFFMAN and others. This is soluble in acids, and, thrown into the stomach, shows emetic qualities; but which are commonly in a moderate degree.

A more common practice for abstracting the sulphur of antimony is, by applying to it a caustic alkaline lixivium. This applied with a boiling heat, readily dissolves a considerable portion of the sulphur of antimony, and in greater proportion than it does the reguline part, though at the same time a portion of this is also taken up. That part of the sulphur which has the greatest proportion of reguline matter adhering to it cannot be suspended but by a boiling heat; and therefore, upon the cooling of the lixivium, this falls down to the bottom of the vessel in the form of a reddish powder, which is named KERMES *Mineral*.

The other portion of the regulus taken up by the lixivium may be readily separated from it by the addition of an acid; and the matter in that case precipitated is what was named the Sulphur Auratum, and now the *Sulphur Antimonii Præcipitatum*.

In both these preparations, the KERMES mineral and sulphur auratum, the proportion of sulphur is not, with respect to the reguline part, so great as to prevent this from being acted upon by acids; and therefore, thrown into the stomach, it proves an active medicine. Both the Colleges of London and Edinburgh seem to think

these medicines nearly of the same quality, by their prescribing only the sulphur antimonii præcipitatum, and giving no place to the KERMES mineral; but I am humbly of opinion, that the latter is the more active medicine, and is more uniformly the same, in different preparations, than the former.

A third, and the most ordinary means of abstracting the sulphur of antimony, is by the application of nitre; which, when the two substances are together exposed to the action of the fire, deflagrates with, and dissipates the sulphur. The effect of this is different according to the proportion in which the nitre is applied to the antimony.

If somewhat less than a fourth part of the nitre is applied, a portion of the sulphur is abstracted; and so much, that the remaining mass may be acted upon by acids, and gives what is much the same with the regulus medicinalis mentioned before.

If the proportion of nitre is equal to that of the antimony, the matter remaining after deflagration makes the noted *crocus metallorum*, readily soluble in vegetable acids; and therefore thrown into the stomach, gives one of the most acrid preparations of antimony.

But if the proportion of the nitre be still farther increased as to double the quantity of the antimony, the sulphur of this is not only dissipated, but the metal is at the same time calcined, so as to be less soluble in acids than the crocus. In this state, however, it commonly remains so far soluble as to give the *Emeticum mite* of BOERHAAVE.

In treating antimony with nitre, if the antimony be calcined so far as to render it fit to be fused into a glass, and in this state be deflagrated with an equal part of nitre, the calx nitrata of the Edinburgh Dispensatory is produced; which is a matter still soluble in acids, and in that respect very much in the condition of the emeticum mite just now mentioned.

It is supposed that the celebrated JAMES's powder is very much the same with the calx nitrata; and the appearance of the two powders, the dose in which they may be employed, and their operation in the stomach, renders this to me very probable.

Lastly, if the nitre applied to the antimony be in the proportion of three parts to one of antimony, this is more entirely calcined, and rendered absolutely insoluble in vegetable acids. It is what is named the Antimonium Diaphoreticum, or Antimonium Calcinatum: a substance formerly supposed by many to be of some power and virtue; but the Edinburgh College are so far from

thinking so, that they have not given it a place in the last edition of their Dispensatory.

These are the chief of the preparations still retained in use, in which antimony is put into a state of being acted upon by vegetable acids; and therefore, when thrown into the stomach, to show more or less of an emetic power: and they seem to be different from one another only by the quantity of the reguline part in them being more or less in a soluble state.

It is hardly necessary to observe, that the operation of these several preparations seems to be also different according to the quantity, and perhaps the quality, of the acid that they meet with in the stomach; and therefore that their operation is so different in different persons, and even in the same person at different times.

After treating of these preparations, we must in the next place mention those which may be made by a combination of the regulus of antimony with acids, before its being thrown into the body.

Of the fossil acids, it is to me doubtful if either the nitrous or vitriolic can be managed so as to give an active antimonial preparation; but the muriatic is in this respect very powerful.

Antimony, combined with the muriatic acid in a fluid form, gives the strong caustic fluid named Butter of Antimony, and which we have spoken of above under the head of Corrosives. From this, however, the acid can be abstracted to such a degree, that the combination may be brought into the form of a crystallized salt, which has been named *Mercurius Vitæ*. This has been formerly employed in practice as an emetic; but its operation is so violent, that the present practice entirely avoids it.

There remains therefore only to speak of the vegetable acids, which may be applied to antimony to give an emetic of the kind we now treat of.

The liquid vegetable acids have been, in their several states, employed for this purpose; but as their different states are not easily ascertained to be at different times the same, they have been all laid aside; and wine, which always contains a sufficient portion of acid, is the only menstruum now employed. Most of the wines in common use might be employed; but both the Colleges have agreed to employ the common Spanish white-wine only. The London College applies this to the *crocus metallorum*; but the Edinburgh apply it to the *vitrum antimonii*, with, however, no different effect in the two preparations that I can perceive. The two Colleges employ the menstruum in a different proportion with respect

to the ingredients they employ ; but this makes no difference, as the wine dissolves only a certain quantity in proportion to its own bulk, which it can always take from the ingredient that is in the smallest proportion to the whole of the wine employed, and this at least in the quantity of wine that is applied in our Dispensatories. This also explains a circumstance well known to practitioners ; which is, that if due care be taken to separate, by a filtration, the ingredient from the wine, the dose of this is never to be estimated by the proportion of the ingredient infused, but merely and exactly by the quantity of wine that is employed in such a dose.

The other vegetable acid which, applied to antimony, may afford the emetic in question, is that which is found in the crystals of tartar. This applied with a large proportion of water to one of the most active preparations of antimony, is found to dissolve a considerable quantity of the reguline matter, and, by a proper evaporation, to give the noted Tartarum Emeticum. The London College, on this occasion, employ the *crocus metallorum*, whilst the former editions of the Edinburgh Dispensatory employed the *vitrum antimonii* ; but little difference was found to result from this difference of the subject. With respect to both it was alleged, and I believe justly, that from some difference in the encheiresis, the medicine came out of unequal strength, and that it was difficult, in the hands of different chemists and apothecaries, to bring it to a standard, which is however much to be desired. On this account the Edinburgh College have given a new prescription, which they think may serve to give a more steady and uniform preparation ; and I am persuaded that, when properly executed, it will do so : but our apothecaries have not yet complied with the prescription, so as to give me an opportunity to judge of it from experience.

The emetic tartar, as commonly prepared, is a safe, and under any proper management a sufficiently effectual, preparation for every purpose of emetics that we have mentioned above ; and after a few trials of any new made preparation, we can ascertain the dose of it pretty exactly.

There remains, therefore, on this subject, one question to be considered ; and that is, as we have referred the whole of the preparations to two heads ; the one of those in which the antimony, without being combined with any acid before it be thrown into the stomach, is only put in a condition in which it may be acted upon by the acid which it meets with there ; and the other is of those in which the regulus is previously combined with an acid before it be thrown into the stomach ; the question is, Whether the one set of

these preparations have any advantage over the other? I am clearly of opinion, that the former have no advantage over the latter; and though there may be many instances of the good effect of the former, the uncertainty of its dose would make me prefer the latter, in which the dose may be pretty exactly ascertained: and I can speak of it from much observation, that the uncertainty of the dose of the former has often given occasion to the timid practitioner to be disappointed, and to the hardy to do much mischief.

CHAPTER XX.

CATHARTICA.

THESE are medicines which evacuate the intestines downwards; or, as the common language is, promote and excite the evacuation by stool, and which, when any thing copious, we shall name a purging.

This evacuation must always be produced by increasing the peristaltic motion of the intestines downwards; and there are various states of the system which, without the application of any medicine, may occasion this; such as obstructed perspiration, cold applied to the lower extremities, and some other circumstances which are not to be further taken notice of here, where we are only to consider the evacuation mentioned, as produced by the application of certain substances directly to the intestines themselves; and these are strictly the cathartics to be treated of here.

Of these, the first thing to be observed, and which has always been observed, is, that the medicines employed are of different degrees of force or power in producing the evacuation: and it is to be desired, that in this respect they could be assorted into different classes, and that it could be determined upon what grounds, besides that of an inaccurate and unequal experience, they might be arranged under the two titles of *Mitiora* and *Acriora*. It may be difficult to do this with any precision; but I think it worth while to attempt it.

To this purpose I conceive, that there are substances which are only capable of stimulating the extremities of the exhalent vessels, or the excretories of the mucous follicles; by both which irritations, a large quantity of fluids may be drawn into the cavity of the intestines, and thereby a copious evacuation by stool be produced, without much increase of the peristaltic motion.

Although I have put this supposition, I cannot certainly determine that there are any medicines which thus act upon the excretories without stimulating the muscular fibres of the intestines; and I believe it is most safe to suppose, that every medicine which increases the evacuation by stool, acts more or less by stimulating the moving fibres of the intestines, and by increasing the peristaltic motion, produces the evacuation.

This being therefore supposed, I would however enquire if there is not a difference in the nature of the stimulus given by different cathartics; and I am persuaded that such a difference may be perceived. In GLAUBER'S salt, for example, a stimulus is applied to the moving fibres of the intestines: but it does not seem to be capable of exciting inflammation in the coats or fibres of the intestines, nor of exciting heat in any other part of the system; whereas in jalap we know that there is an acrid resin, which, applied in a certain manner, inflames the intestines, and excites a considerable degree of heat in the rest of the system. These two substances I take for examples of the assortment that may be made of cathartics, and the grounds on which I have proceeded in arranging them under the two heads of Mitiora and Acriora, or under those of a cooling or of an inflammatory kind. I have not indeed, in this respect, under the first title in my Catalogue, been sufficiently correct, and I find it difficult to be so: but I shall endeavour afterwards to mark what corrections it may be proper to make.

In the mean time, I would fix, as well as I can, to the first set the term of *Laxatives*, and to the other the term of *Purgatives*; intending by these appellations not to express the degree of power as has been usual, but the manner of their operating.

Having thus endeavoured to give an idea of cathartics in general, before proceeding to particulars I shall endeavour to consider their more general effects.

The first effect of them to be taken notice of, is the very general one of their promoting the evacuation of the contents of the intestines for the time present in them; which may be especially necessary when any unusual, noxious, and acrid matters are a part of these.

The next circumstance in the operation of cathartics to be taken notice of is, that it extends to the whole length of the alimentary canal, from the upper orifice of the stomach to the lower extremity of the rectum. They may be substances which are particularly suited to promote the evacuation of the stomach downwards, but we are uncertain of this; and we mean here to observe, that

the operation of cathartics, though only and directly on the intestinal canal, serves to evacuate the stomach; and therefore, that cathartics are so often useful in many of the disorders of this important organ.

In the next place, we are to consider more strictly the operation of cathartics upon the intestinal canal, and the effects of this upon the intestines themselves; and these are, in the first place, to promote the peristaltic motion when preternaturally slow or obstructed.

The slowness of the peristaltic motion seems to be often in fault; but it is not easy, in different cases and persons, to say when it is preternaturally so. The frequency of stools is very different in different persons; and it is not determined what is natural and most healthy in this respect. What seems to be most probable is, that in every person a stool should occur once in the course of every twenty-four hours; and we believe that this is truly the most frequent case: but there are so many instances of longer intervals without any inconvenience, that it is very doubtful if, with respect to different persons, this could be established as a general rule. I am, however, clearly of opinion, that every considerable deviation from a diurnal stool may be considered as an approach to an unnatural state.

In this business, however, it is to be observed that, besides the delay of stools, there is another circumstance to be taken notice of, which is, that whenever stools are delayed, it is probable that there is especially a slowness in the action of the great guts, by which a larger proportion of fæces is accumulated there, and acquire also a greater degree of firmness and hardness; whence they are often voided with difficulty and pain, and thereby give occasion to many disorders in the lower intestines, and even in the whole system. This is what we name a state of costiveness, and which generally depends upon the slowness of the peristaltic motion, and upon what is the consequence of this, the increased bulk and hardness of the fæces.

This state generally indicates the use of cathartics of one kind or other; and in order to be guided in the conduct of these, we judge it to be proper here to enquire more particularly into the causes of this state. The first we would assign is the weakness of the peristaltic motion; and accordingly it is observed that a slow belly is often attended with other marks of that weakness, and on that account occurs very frequently in the female sex, who are often of a slow belly, and suffer many inconveniences from it.

Another cause of a costive habit is of a contrary kind, and depending upon the vigour and rigidity of the alimentary canal. In this state, as some degree of torpor always attends strength, so the contents of the intestines are moved more slowly onwards; but at the same time the concoction, if I may use the expression, of the aliments, is more completely performed, and probably a smaller proportion of fæces is produced. At the same time also, as the absorption of the more liquid parts is more completely performed, a smaller proportion of fæces are deposited in the great guts, and that also in a drier state: from both of which circumstances we may understand why, in rigid and robust persons, a costiveness so commonly takes place.

Nearly the same case with this, seems to be that of hypochondriac or melancholic persons; in whom, with rigid viscera, there is a preternatural torpor in the motions of the whole system, and particularly in the intestinal canal.

Upon this subject, we judge it proper to mention some other causes of costiveness. One of which may be a deficiency of bile, which we suppose to be a chief means of supporting the motion of the intestines downwards. We cannot indeed always perceive when this occurs; but that it may occur, we presume from the case of a jaundice, which is commonly attended with a slow belly.

Although we cannot always perceive the deficiency of bile, or of pancreatic liquor, to be the cause of costiveness, we can with probability, as a cause of it, assign the abstraction of the other intestinal fluids. This we suppose must necessarily happen from an increased perspiration, which I have more frequently observed from any very constant mode of gestation than from bodily exercise; and it is in this manner that I would account for the effects of the constant gestation in sailing in producing costiveness, which so generally happens to persons at sea.

To the causes of costiveness arising from the state of the system, I have but one other to add; and that is, any considerable compression of the intestines which I have had occasion to observe from a steatomatous tumour of the omentum, and which also happens so frequently from the compression of the uterus in pregnant women.

We have now mentioned the several causes of preternatural slowness in the motion of the intestines which may indicate the use of cathartics; and I have also said they are indicated when the passage of the contents is entirely interrupted. It is well known that this happens when any portion of the intestines is affected with

a spasmodic and a somewhat permanent constriction. As this is commonly attended with pain, it gives the disease named Cholic; and this, with some other obstructions which we cannot clearly ascertain, require the use of cathartics; but without entering into the nature of these particular ailments, which cannot be properly done here, I cannot say more on the subject in this place.

After mentioning these operations of cathartics upon the intestines themselves, we proceed to mention the effects of their operation upon the other parts of the system.

The first of these to be mentioned is the evacuation and diminution of the fluids that takes place with respect to the whole system. The great length of the intestinal canal, holding generally in its cavity a quantity of liquid matter, and therefore this alone, when carried out more suddenly by the operation of cathartics, may often afford a large evacuation; but when it may be presumed that the cathartics at the same time excite all the excretions by which liquids are commonly poured into the intestines, as bile, pancreatic juice, ordinary exhalation, and the effusion of mucus ready to be poured out, it will be evident that cathartics, even by a moderate stimulus applied, may occasion a very large evacuation and diminution of the fluids of the body; and this more considerably as the stimulus applied to the moving fibres of the intestines is stronger.

Consequently it is obvious, that the evacuation by stool may be so large as to diminish the quantity of fluids in the whole system; and therefore, that whenever such a diminution is indicated, it may be obtained by the use of such medicines: and I need not say that particularly by this means any preternatural increase of the activity, or of the active powers of the system, may be thus greatly diminished.

It is at the same time however to be remarked, that although by purging a great debility of the system may be induced, it may not produce any great evacuation of the sanguiferous system. A large evacuation by stool may sometimes be merely of the contents for the time present in the intestines, and therefore not drawn from the blood-vessels: and though the evacuation may be still larger by what is drawn from the mucous follicles, this we know may be very copious from the matter contained in the follicles themselves, without much liquid being drawn from the blood-vessels. The evacuation indeed may also be increased by what is drawn from the arteries by the exhalant vessels; but as this must be drawn off slowly in very divided portions, it can have little effect, and at

least no sudden effect in the depletion of the sanguiferous system: and from the whole it will appear, that the evacuation by stool may be very large, without much effect in taking off the tension and tone of the blood-vessels. In this respect, indeed, it seems to fall far short of the powers of blood-letting, though this be contrary to the common opinion, and even contrary to the practice of SYDENHAM: but accordingly we have not found purging to be of very great effect in taking off the phlogistic diathesis of the system.

Besides the general evacuation of the whole system, purging is powerful in changing the distribution of the blood into the several parts of it.

The circumstances according to which the distribution of the blood is made into the several parts of the system, we suppose to be commonly known, and to this effect, That if an evacuation is made from one set of vessels, the afflux of fluids will be increased in these, and that the afflux into other parts of the system will at the same time be diminished. Upon this principle it will be readily understood, that if the afflux of fluids in the descending aorta is increased, as it must be by purging, the afflux must in some proportion be diminished in those vessels which carry the blood to the head. By this the quantity and impetus of the blood in the vessels of the head must be diminished by purging; and hence it is that this operation of cathartics has been often found so useful in the diseases of the head.

It has been commonly supposed that purging, by drawing from the superior parts, may be of use also in the diseases of the thorax, and in several circumstances it may possibly be so; but practitioners have frequently observed, that in the inflammatory diseases of the lungs, purging has not been so useful as might be expected. It is probably owing to this, that by emptying the system of the descending aorta, no considerable derivation can be made from the bronchial arteries, in the extremities of which the inflammations of the lungs are seated.

Many circumstances show that there is a balance in the distribution of the blood between the external and internal parts, so that they mutually increase or diminish one another. We have shown above that the increase of perspiration abstracts the fluids that should be poured into the intestines; and it has been frequently observed, that an obstructed perspiration has occasioned a diarrhoea. If this change of distribution, therefore, is in general the nature of the œconomy, it will be readily understood why purging, by increasing the afflux of blood to the internal, should diminish that

to the external parts, or to the surface of the body, and that it should therefore have considerable effects in many cutaneous diseases. Whenever these depend upon any inflammatory determination to the surface of the body, purging may be a remedy for them; and when it is foreseen that in certain diseases such an inflammatory determination to the skin is to arise, and according to its violence to aggravate the disease, it will be evident that purging, by moderating or taking off that determination, may render the disease more moderate. This I take to be the foundation of the practice of purging in the approach and beginning of the small-pox; and I have no doubt that this, in concurring with other measures, contributes to the mildness of the disease.

Purging therefore may be of use in cutaneous affections; and physicians have very universally employed this remedy in those cases, but often very improperly, as they have not attended to this, that cutaneous affections are often purely topical, and unconnected with any general state of the system, and therefore not to be cured by remedies chiefly affecting this. And upon this occasion I cannot help taking notice, that physicians have considered purging too much as a means of evacuating acrimony diffused over the whole system; and as cutaneous eruptions were commonly considered as a mark of this, so, upon a doubly false principle, cathartics have been more frequently employed in these affections than they ought to have been.

There is still another effect of cathartics and of purging to be mentioned. As in every cavity of the body there is an exhalation and inhalation, or absorption, constantly going on, it is presumed that there is some balance constantly preserved between the secretory and absorbent powers; so that if the former are increased, the latter will be so also: and therefore, that when the secretions are upon occasion much increased, the action of the absorbents may be particularly excited. This explains why purging often excites the action of the absorbents, to take up more copiously the fluids that were otherwise stagnant in the adipose membrane or other cavities of the body, and thereby often proves a cure of dropsy.

These are the different and ordinary effects of cathartics, and they are commonly the effects of them as taken in by the mouth. But, before going further, it is proper to observe that there are two other ways in which they are applied: The one is, by applying or anointing them on the teguments of the lower belly; and the other is, by applying them to the intestinum rectum, either by injecting

them in a liquid form into the cavity, or by applying them in a solid form to the extremity of that intestine.

The first of these practices has been formerly employed, and, for aught I know may, upon certain occasions, be again tried; but the uncertainty of the dose has made me doubt of its propriety, and prevented my ever trying it.

The second means, or the use of glysters, is often a necessary, and very often an useful, practice; and the medicines most proper to be employed in it shall be mentioned hereafter, as shall also those fit for suppositories; though I hold these to be seldom either very necessary or very useful.

PARTICULAR CATHARTICS.

MITIORA.

I HAVE begun with these, which I consider as strictly the *Laxantia*, making, in the sense I have explained above, that is, in their manner of operating, one class of Cathartics. Of particulars, I have set down first the

FRUCTUS ACIDO DULCIS RECENTIS.

As all of these contain a quantity of sugar, and some of them in large proportion, it may be a question, whether their laxative quality may not be ascribed entirely to this. And it is not obvious that the acid joined can contribute to that quality; but it seems to appear from experience, that these fruits which have an acid joined to their sugar are truly more laxative than the more simple sweets.

The reason of this effect of acidity is not very evident; but it may perhaps be explained in this manner: We know that the aliments, as they pass out of the stomach, are commonly more or less acid; but by being mixed with the bile in the duodenum, have this acidity corrected or involved, so as hardly to appear afterwards in the other parts of the system; and accordingly large quantities of acid may be sometimes taken into the body, without showing any laxative effects: But there are considerations which lead us to believe, that the power of the bile in correcting acidity has its limits, and to judge at the same time, that an over proportion of acidity joined with the bile forms a mixture that is considerably laxative.

This renders it doubtful whether the laxative effects of our summer fruits are to be ascribed to the simple combination of acid and sweet; or if always to a mixture of bile with an over proportion of acid,

either as taken in or as acquired by fermentation in the stomach. We find it difficult to judge in this matter; but find it may commonly be done by the proportion in which the acid prevails in the aliment taken in, by the quantity of this taken in, and especially by the state of the stomach, known from other circumstances to be more or less disposed to an acescent fermentation.

After this general discussion, we may speak more clearly of particulars.

The first mentioned are the *Fructus recentes*. These may be considered as constantly laxative; but they are alimentary matters frequently taken in without showing any laxative effects: and though in costive habits they may be advised to be taken in more largely as aliments, they are hardly ever to be prescribed as medicines; because the larger quantity in that case to be prescribed will always be of uncertain effect, and may as readily produce a diarrhoea as prove a proper cure of costiveness.

After this general observation I need not speak of the several species; as the choice of these, so far as they can be employed in the case mentioned, may be learned from what was said of them above when treated of as aliments.

After the *fructus recentes* I have set down the *Fructus siccatae*. These also are certainly laxative, though not so much as the *recentes*; but they are employed with more safety, as deprived of their air: they are for the most part less acescent, and therefore less liable to have their acidity in excess; but at the same time it is to be observed, that these fruits which have more acid in their composition are more laxative than those more purely sweet; and it is on this account that dried prunes are constantly preferred to raisins.

With regard to all the dried fruits it is to be remarked, that they are more powerful when they have been boiled, or otherwise exposed to a considerable heat, than when taken in their raw state; probably for this reason, that being heated, much of their air is exhaled, so that they are less liable to any excess of fermentation.

After the *fructus acido dulces* I have set down the

CASSIA FISTULARIS.

This in my opinion, is very much of the same nature with the fruits mentioned: and I must say further, that I have not found much advantage in the use of it; and I believe that other practitioners observing the same, has occasioned its being now less used than formerly. It is now indeed hardly ever employed by itself,

and almost only as entering into some officinal compositions, in which, however, we have not perceived its peculiar utility. We have particularly tried it with manna; but never found the effects of it to be such as VALISNIERI alleges. It would certainly be proper for our country apothecaries to know that the pulp of prunes might be employed in the place of the more expensive and precarious cassia.

TAMARINDUS.

This is a fruit containing with its sugar a large proportion of acid, which renders it fit for every purpose for which the fructus acido dulces can be employed. It is particularly laxative, though not in a strong degree; and it is most useful when joined with those of the sweeter kind. The acidity of the tamarind renders those more agreeable; and both together are employed with more safety than the cassia or fructus acido dulces, as the tamarind contains an acid of the nature of tartar, that renders it less liable to fermentation; and we have always found, that in our compositions of Diacassia, Lenitivum, and Infusio Tamarindorum, the tamarinds may be employed more largely than they have commonly been.

The tamarinds are commonly imported into this country as they have been taken out of their pods in the West Indies; and there is commonly added to them there a quantity of sugar, which very much changes their state, and destroys the purpose of their acidity. It would certainly be very proper to have them always imported in the pods.

After these acido dulces I have set down what I think akin to them, that is the *Lac ebutryatum*, as containing a sweet and an acid combined; by which it is certainly laxative, though not very strongly, except when taken pretty largely.

We cannot so strictly put here the recent *Serum lactis*, which might be more properly put with the Dulcia, as its ordinary laxative effect may be ascribed especially to the sugar it contains. As this sugar however, or something else that milk contains, is so quickly acescent, they may be considered as becoming readily so in the stomach, and therefore that its laxative qualities may be supposed to depend upon its being an acido dulcis. The flatulency which so commonly attends its operation, and the previous boiling diminishing its laxative quality, are probable grounds of supposing it to act in consequence of fermentation.

Here I was disposed to set down in my Catalogue fermented liquors of all kinds, as I think they may all be considered as res

acido dulces; and in my opinion, were it not for the large proportion of alcohol that is sometimes present in them, they would all show a laxative power. Accordingly, in the view of their being laxatives, they are sometimes ordered more largely in diet; but with respect to them, there is an idiosyncrasy of particular persons that regulates this matter, insomuch that the same wine proves astringent to one person and laxative to another. With respect to wines therefore, this idiosyncrasy is always to be consulted; but I have hardly ever found it necessary with respect to malt-liquors, which I judge to be in all persons, upon the grounds above mentioned, more or less laxative.

After the *res acido dulces*, I have set down the more simple sweets of sugar and honey; which I maintain to be properly marked as laxatives; but all that was necessary to be said of them in that view has been said already above, under the title of the *Attenuantia Dulcia*; and I now proceed to a subject that every one supposes to belong to this title of *Laxantia*.

MANNA.

This is a part of the sugar so universally present in vegetables, and which exudes on the surface of a great number of them. When it exudes in a dry form, it is named Manna. In this form it appears on the surface of a great number of different vegetables; but how far, as proceeding from different vegetables, it is different in its qualities, does not seem to me to be clearly ascertained. We are of opinion they are very little, if at all, different.

But however that may be, I can properly speak only of that species employed in the practice of Britain, which is the manna exuding from, and concreting on the surface of, the *Fraxinus ornus*. The differences of this, as occurring from the season, manner, and circumstances in which it is collected, we must leave to writers on natural history and the *materia medica*, who have taken some pains on this subject; but as not having the opportunity of certain and exact information, I must avoid it; and I must, to speak of its medicinal qualities, be satisfied with taking for the subject of my observations the purest kind I am acquainted with.

Manna then, in its sensible qualities, does not differ from sugar; at least I cannot discover any peculiar taste or acrimony that can mark any difference, and only some unctuousity and mildness that is somewhat more than in refined sugar.

Nor does manna, in its chemical qualities, differ but in the slightest degree from sugar; and therefore, if manna has any pe-

culiar and medicinal qualities, we have not yet discovered, in the constitution of it, upon what these depend. This would lead to suppose, that they are not considerably different from those of sugar; and we are much disposed to think that this is the real state of the case. We dare not indeed deny the laxative powers of manna; but in employing it by itself we could never perceive them to be considerable, and it is not easy to estimate its power in compounds. We have indeed seldom tried it singly; but even when we did in children we have been often disappointed. Though the laxative powers of manna are not considerable, I believe them to be such to a certain degree; as, in the most frequent employment of them along with neutral salts, I have thought that the manna employed supplied the dose that might otherwise have been required of the neutral.

After the *Dulcia* I have set down the *Radices dulces*, as those of the *skirret*, *beet*, *carrot*, &c. as manifestly containing a quantity of saccharine matter rendering them laxative. After these I have put the *olera blanda*, the chief of which is the *brassica*, containing a considerable quantity of saccharine matter disposed to an acescent fermentation; and though not so remarkable for these qualities, I would also mark here the leaves of the *beet* and *spinage*. All these, though employed in diet only, as they may be prescribed in larger quantity than usual as laxatives, I thought it proper to fill up my list with every thing that might belong to this title.

LAXANTIA SALINA.

These are the chief of the *laxantia mitiora*; and they differ both from the saccharine laxatives we have hitherto treated of, and from the purgatives we are to treat of hereafter; being more powerful than the former, but milder than the latter. The difference in comparing them we have endeavoured above to point out and explain, and do not think it necessary to repeat here any account of the difference of stimulus given to the intestines by the one or the other; and therefore, supposing this explanation understood, I proceed to consider particulars.

The first I consider is the fixed alkaline salt. The two species of this are, I believe, nearly of the same nature; but that intitled the Vegetable having been especially the subject of my observation, what I am to say on fixed alkali will especially relate to that.

This comes out somewhat different from some difference in the manufacture of it; but I am not to take any notice of these differences, and must be supposed to speak always of the *sal tartari*, or

of the sal alkalinus fixus vegetabilis purificatus of our Edinburgh Dispensatory. This salt, as it is in chemistry, so in medicine it might be considered as a substance very different from the neutral salts: but its operation in the human body is not so much different as might be imagined; for it can hardly be thrown into a human stomach without meeting there with as much acid as will convert it into a neutral; so that its operation afterwards must be the same with that of a neutral. From this view of the matter, I am uncertain how far the operation of the fixed alkali in the stomach may be that of a simple alkali, or how far it may be that of a neutral; and therefore we must be uncertain how far the virtues ascribed to it by writers are to be considered as the effects of the one or of the other. As an alkali, it must in the first place act as an absorbent, but its proving such converts it into a neutral; so that its laxative and diuretic effects may entirely depend upon its being in this state. Its laxative powers have been commended, but I have never found them to be considerable; and I should never think of exhibiting them with this intention.

The diuretic effects of the fixed alkali we have frequently experienced; and if we have been also very frequently disappointed in this, we are not ready to conclude a want of power in the medicine. There is a great uncertainty in determining to the kidneys; and from this we are often disappointed in the effects of powerful diuretics. With respect to the fixed alkali, I must observe, as I have often done in practice, that I have never found it powerfully diuretic but when it is thrown in in large quantities.

On this subject of the fixed alkali, besides its laxative and diuretic powers, there is another ascribed to it, which I think it necessary to take notice of; and that is, its power of dissolving the fluids, or the concretions which may happen to be formed in them, which the French writers express by the term of *Fondant*. Either for the supposing of this power, or of its effects, I can find no good foundation. I will not deny its having some power in this way; but, as I observed above, this in the mild alkali is very small; and though, in its caustic state, it may be sufficiently powerful, this, in any quantity that can be introduced into the body, cannot possibly have any effect upon the quantity of fluids to which it is applied, and especially when it is considered how much of it must be withdrawn by the acids of the stomach. How much therefore, whether good or bad, may have been said of the solvent power of alkalines in the mass of blood, we hold it to be truly none at all.

After the fixed alkali, I am to speak of the incomplete neutral,

TARTAR.

THIS, in its rude state, may perhaps be employed; but we are acquainted with it only in its refined state, when it is named the *Crystals*, or *Cream*, of *Tartar*.

This consists, for a great part, of the vegetable fixed alkali, supersaturated with a quantity of an acid which, though in the main, of the nature of the vegetable acid, has however something peculiar, which to me is not well ascertained; but in the mean time, the consideration of it does not seem necessary in any application of it to the purposes of medicine.

This subject, the crystals of tartar, has long been employed as a laxative and gentle cathartic, and may be given from one dram to two ounces, according to the constitution of the person to whom it is given, and to the operation intended by it. Under half an ounce, it is commonly a laxative only of moderate power; but given to an ounce or upwards, it often acts as a powerful purgative.

Taken in a moderate dose, in evacuating the intestines, and in producing all the effects of that, it has all the powers of the neutral salts, and is as useful an antiplogistic as any we can employ. In large doses, however, without any inflammatory stimulus applied to the intestines, it acts like a purgative in exciting the action of the absorbents in every part of the system, and that more powerfully than happens from the operation of any entirely neutral salt. I need hardly say, that upon this operation of exciting the absorbents, is chiefly founded the late frequent use of the crystals of tartar in the cure of dropsy.

When the crystals of tartar are thrown into the body in such quantities as to operate little by stool, they pass more readily into the blood-vessels; and even when thrown into the stomach more largely, they sometimes take the same course. In both cases they pass to the urinary passages, and promote the secretion of urine sometimes very copiously. I have, however, been frequently disappointed of their diuretic effects; and it is proper to be remarked by practitioners, that they do not readily take their course to the kidneys unless they are accompanied by a quantity of water, or watery fluid, thrown in at the same time: and therefore, as Dr HOME has taught us, they are most properly given in a liquid form.

SALES NEUTRI.

THESE are the laxatives or gentle cathartics most generally employed. As they do all that can be effected by an evacuation from the intestines, without acting strongly upon the moving fibres, they give no stimulus, or at least no inflammatory stimulus, to the whole system, and are therefore most usefully employed when any phlogistic diathesis prevails in it.

The whole of the neutral salts may be employed for these purposes, but some of them more conveniently than the others.

That formed of the fixed acid of vitriol with the vegetable fixed alkali, from its being of difficult solution, is not a convenient medicine; but if the neutral be formed of the sulphureous, or volatile vitriolic acid, when it comes under the title of Sal Polychrestus, this, to persons who can bear its odour, taken from one dram to four, proves a very convenient laxative. But I must remark here, that those apothecaries mistake the matter much, who take the residuum of the distillation of GLAUBER'S acid of nitre for the sal polychrestus.

The vitriolic acid with the fossil alkali, gives the neutral named GLAUBER'S Salt, in very frequent use; and which indeed, on every occasion, serves the purpose of the neutrals.

It is now well known, that such a neutral may be made of the vitriolic acid with either the fossil alkali or with magnesia alba; and from every observation I can make, there seems to be no difference in the two compositions for all the purposes of a neutral salt.

The nitrous acid with either of the alkalines gives laxative neutrals; but they are not conveniently employed in practice, because the quantity that is necessary to be a laxative dose is commonly very disagreeable to the stomach.

The muriatic acid gives neutrals which may be employed when largely diluted; but to most persons the salt taste is disagreeable, and large doses are ready to excite an uneasy thirst, that continues after the operation of the salt is over.

The vegetable acids, either native or fermented, give neutrals that may be employed; but they are not very powerful, and therefore seldom conveniently used as laxatives.

It is the acid of tartar that gives some of the most convenient laxatives; and they are prepared by saturating the crystals with the quantity of alkali necessary to render the whole exactly neutral. For this purpose, either the fixed vegetable or fossil alkali

may be employed. The former gives the tartarum solubile, or alkali tartarisatum; and the latter gives the sal Rupellensis, or natrum tartarisatum. The tartarum solubile is not easily brought into a crystalline state, or kept in a dry form; whilst the sal Rupellensis has not either of these disadvantages. It is of a less disagreeable taste than almost any other neutral; and as answering every purpose for which these can be required, I expect it will come to be very generally employed. As the acid of tartar is of a weaker attraction than almost any other acid, so it may be often dislodged by the acid of the stomach, and this often renders the operation of the tartarum solubile less certain, as the combination of the alkali with the acid of the stomach is a less powerful laxative; but the sal rupellensis is not liable to this disadvantage, as the acid of the stomach combined with the fossil alkali is still a tolerably powerful laxative.

Under this title of the neutral laxatives, it is proper to mention the magnesia alba, which I have inserted into my catalogue. It is an earthy substance, of itself inert; but meeting with acids in the stomach, has the same operation with neutrals. It is not necessary to say any thing here of its preparation or administration, as both are now commonly well understood.

After the neutrals I have set down the saline mineral waters, which are certainly to be reckoned amongst the laxantia, and are indeed often employed as such with all the effects of the artificial neutrals. To render my work complete, I should have treated of these mineral waters; but neither my leisure, nor the size to which my work must be confined, could admit of such a treatise: and it did not seem necessary, as there are some very good works on the subject in every body's hands. I must not however dismiss the subject without one observation.

Many mineral waters have more effect as laxatives than might be expected from the quantity of saline matter they contain; which shows, that a quantity of water accompanying these salts contributes to their operation; which leads to this lesson, that the artificial neutral salts may have their powers and effects always improved by being exhibited with a large quantity of water.

I have now mentioned the several substances which, by the degree of force they commonly exert, as well as by the nature of their operation, are intitled strictly to the appellation of Laxatives; and I might now proceed to consider those substances which may be as strictly named the Purgatives. But I have set down in my Catalogue several substances that will not properly arrange under

either title, or such as I am uncertain whether to refer to the one or to the other, but which must not be kept entirely out of the sight of the practitioner.

Of these, which by the force they exert may be considered as laxatives, though their manner of operating be very different, I would mention the *olea blanda*, whether obtained by expression from vegetables, or in the form of butter from the milk of animals.

These, I have said, enter into the composition of the chyle and animal fluid: but this happens when taken in to a certain quantity only; for if that is greater than can be properly united with the other fluids, a part of such oil must remain and pass along the intestines in its separate state. In this state it appears, from experience, that it contributes to promote the evacuation by stool. How it does this I am not ready to explain; but its doing so was enough for me to give these oils a place in my catalogue. I knew a person who frequently required a laxative, and the laxative commonly employed was from half an ounce to an ounce of the pulp of cassia, with an ounce of the oil of sweet almonds; but on several occasions, it was found that the pulp would not answer the purpose without the oils being at the same time employed. In another instance, I have had occasion to observe the laxative power of oily matters. A person was advised to take as a medicine, every morning, four ounces of fresh butter; and the effect was constantly to give a stool or two more than usual.

After these oily matters, I choose to mention what has some affinity with these, the *sapo albus hispanus*, or the purer kinds of white soap.

This I have set down in my catalogue in complaisance to the general opinion; but, in my own, its power is never considerable; and when it does appear, it is upon a ground that practitioners do not commonly apprehend. I have had many instances of persons taking this soap to half an ounce or more every day, without its showing laxative effects; and though it does upon many occasions show these, it may I think be a question, by what quality it operates? If the purest soap be dissolved, as it may readily be in rectified spirit of wine, the salt commonly intermixed with the soap is left undissolved, and the dissolved soap, by a proper evaporation, may be recovered in a dry form.

In this state the soap is mild and insipid; and in my opinion cannot give any irritation to the intestines, or to any other the most sensible part of the body.

We presume therefore that soap is not a laxative ; and if ever it appears to be so, this I think must be ascribed to the common salt, which, from the circumstances of the manufacture, it always contains. I formerly gave a stricture with respect to the use of soap in glysters, and I have now another observation to offer. If soap, upon any occasion, come to be employed in nephralgic cases, and, by proving laxative, should thereby limit the use of it more than might be desired, the correction will be easy. The soap, by the process above mentioned, may be deprived of its common salt, and still remain as fit for the cure of the nephralgia as ever, and more useful perhaps, as it may then be taken in much larger quantity than before.

Two other substances yet remain to be mentioned as laxatives ; which, by their degree of power, will from every body obtain that appellation, though their manner of operating may be different.

SULPHUR.

I AM not here to attempt the chemical history of this substance, because I can hardly make application of its various chemical treatment to the purposes of medicine. Many of the preparations of sulphur promise to be active with respect to the human body, and they undoubtedly are so ; but the virtues that have been ascribed to them seem to me to be very uncertain ; and I have not been able, either from experience or reflection, to ascertain their proper use : and, in the mean time, I consider all powerful stimulants, that are not directed by a nice and scientific choice, to be in the hands of the most part of practitioners more frequently mischievous than useful. I do not judge myself skilful enough to direct in this matter, and therefore avoid the subject ; and I have introduced the title of sulphur here, to consider it merely as a laxative. In this view, from half a dram to a dram of the flores sulphuris will seldom fail to give one stool, and will seldom give more. It has this operation without heating the body, and for the most part without griping the bowels. These circumstances render it a most proper and convenient laxative ; and were it not for the fætor that sometimes attends its operation, and is ready to be diffused in the air around, sulphur would be one of the most agreeable laxatives that could be employed. As sulphur is not obviously soluble in the animal fluids, there is some difficulty in accounting for its operation ; but however we may account for it, this is certain, that a laxative quality is in some measure extracted from it : and I would make this use of its being slowly dissolved to allege,

that it passes through a great length of the intestines with little action upon them, and at length acts only upon the great guts. This explains to me both its moderate operation and its particular and frequently observed effect in relieving hæmorrhoidal affections.

SINAPI ALBUM VEL NIGRUM.

THOUGH I have touched this subject before, to give it more fully and clearly, I must repeat a little.

This seed is employed as a laxative in a peculiar manner. In its powdered state it has laxative qualities; but it cannot be employed in the quantity necessary as a laxative without irritating the stomach very much, and even occasioning vomiting. It cannot therefore in powder be employed as a laxative, but by taking the seed in its entire and unbruised state; and by swallowing it in this state to a certain quantity, it seldom fails to prove laxative. Generally a table spoonful, or about half an ounce in weight, is the dose which, taken once a-day, keeps the belly regular, that is, produces one natural stool every day. Sometimes, however, this is not enough; and for the purpose the dose must either be increased, or that mentioned must be taken twice a-day.

With respect to this, it has been apprehended that the seed taken, might be broken down in the stomach, and therefore in large quantity prove a dangerous dose; but I believe there is no ground for this, as I am persuaded that the seed is never broken down in the stomach, and I have known it to appear entire in the stools. I once knew a paralytic woman, into whom more than four ounces of mustard seed had been successively thrown, without any evacuation by stool having happened in the mean time. This however was afterwards produced, when the mustard seed came away seemingly in the same quantity, and in the same entire state, in which it had been taken in.

Though from these accounts it appears that this seed is not broken down or dissolved in the stomach, yet from other circumstances it is certain, that in the stomach or intestines it gives out some portion of its substance. That it gives a stimulus to the system appears clearly from BERGIUS finding it to be useful in intermittent fevers. It is commonly alleged by our practitioners to be useful in palsy and chronic rheumatism; and its operation in the urinary passages is commonly evident by its promoting the secretion of urine.

Two other substances are set down under the title of Cathartica

Mitiora; but whether to be considered as laxantia stricte dicta, we dare not determine.

AMARA.

THE effect of these as laxatives, and even as purgatives interrupting the use of them in the cure of intermittent fevers, we have taken notice of above; but it seems still proper to insert them in our list of cathartics here.

They are seldom employed for this purpose alone; but I have known a strong infusion of chamomile, or a dram of the powder, employed with success: and I have frequently found that when senna was infused in the infusum amarum, a less quantity of the senna was necessary for a dose than in the simple infusions of it.

Next to the amara I have set down the Bilis Animalium; and the analogy is from several considerations specious: but I must own, that without my being able to perceive the cause of it, I have never found the management that was necessary to render this bile a proper laxative. In its dried state I have given pretty large doses of it without any effect.

BALSAMICA.

HERE is an article which I have treated of before; but I still thought it proper to give it the place here which it certainly ought to have among the Cathartica. It does not however appear to be necessary to repeat here what my readers can so easily take from the articles of Turpentine, Balsamum Capivi, and Guaiacum, relative to the laxative, or if you will, the purgative powers of these substances.

II. CATHARTICA ACRIORA,

SIVE

PURGANTIA.

THE distinction of these from the laxantia, not only by their degree of power, but especially by the nature of the stimulus they give to the intestines, I have explained above.

The stimulus of purgatives has been supposed specific with respect to the intestines, and particularly as thus distinguished from emetics. This, with respect to the specific nature of both emetics and purgatives, has been concluded from this, that these medicines, upon being injected into the blood-vessels of a living animal, have commonly operated by occasioning a vomiting or purging; but this does not imply more than that these organs are liable to

be affected by any general disorder of the system : and that it depends upon any specific power in these substances, is contradicted by many other experiments.

It is well known that every emetic, under a certain management, can be rendered a cathartic, and every cathartic of a stronger kind, or in a larger dose, is ready to act as an emetic. If a difference appears in their operation, it seems to me that it is a first application, and a greater solubility, that renders medicines more constantly emetic. That the stimulus of these medicines is not specific, appears clearly from hence, that they are stimulant of every excretory to which they are applied ; and we have frequent instances of their acting readily as errhines when applied to the nose.

The stimulus of purgatives has been commonly supposed to reside in their resinous parts ; but a comparison of a few particulars will show this to be a mistake.

Before entering upon my Catalogue of the Cathartica acriora, I must observe, that there are two or three articles, which I judge to be properly belonging to the order of purgantia, though I have inserted them in the list of the laxantia.

These are the articles of Rosa, Viola, and Polypodium, which, by the moderate power of their operation, have been considered as laxatives. But if there is any foundation for the distinction I have established, it will readily appear that the substances just now mentioned have nothing in their constitution that can lead us to consider them as laxantia strictè dicta. They are certainly of the nature of purgatives, and should have been taken into the list of this order : but as I did not take notice of them in their place, I must now say of them, that their force is so inconsiderable that they do not deserve our attention now, and that they might be entirely neglected in practice.

ALOE.

THIS is a medicine the most frequently employed, and from the gentleness of its operation, as commonly employed, it might be considered as a laxative ; but by the nature of its stimulus, which often appears, it is undoubtedly a purgative.

There are two species of the aloes in use ; one named the *Socotorine* ; the other commonly named the *Hepatic*, but more properly by the place from whence it is the most frequently imported, *Barbadensis*.

These two species are supposed to be somewhat different in their qualities, and the former generally supposed to be the more excel-

lent. It is certainly a purer substance, of more agreeable flavour, and giving more elegant tinctures ; but whether for medicinal use it has any more valuable quality, may, I think, be doubted. Both the species are nearly of the same constitution, the proportion of resinous and gummy parts being nearly the same in each ; and although there was some difference in these respects, it does not appear to be well determined what difference that would make in the medicinal qualities.

When the London College formerly prescribed the separation of the resin and gum of aloes, they seem to have thought the virtue of these two parts to be considerably different ; but by their omitting this preparation in their last edition, they seem to have changed their mind. I do not indeed know of any experiments which clearly determine this matter ; and what is more, I do not know of any decisive experiments which establish the excellency of the Socotorine aloes above that of Barbadoes.

I formerly practised at Glasgow, at the port of which the Barbadoes aloes is chiefly imported, and where, therefore, I had occasion to see it much employed ; but I do not remember any instances of its failing of the effects commonly expected from aloetic medicines. By the best information I can get, our apothecaries at present, though they employ the Socotorine for their tinctures, yet whenever aloes is to be employed in a solid form, they constantly employ the Barbadoensis ; and I doubt if any practitioner complains of the change that is put upon his prescription. But passing this dispute about the two species, I proceed to mention the effects to be expected from the one or the other, and shall speak of them under the general title of Aloes.

This is chiefly employed merely as a medicine to keep the belly regular ; and it hardly ever does more than produce one stool, which seems to be merely an evacuation of what may be supposed to have been present for the time in the great intestines. It is remarkable that it does this in a very small dose. I have known innumerable instances of persons, who very constantly obtained this effect from one or two grains of aloes ; and it is equally remarkable, that though the dose is increased to ten times the quantity, the effect is much the same. I have found that hardly any dose under twenty grains will procure a liquid stool, and when it happens, it is always with pain and griping ; from whence we conclude, that though aloes is more fit than any other laxative or purgative for discharging the present contents of the intestines,

it is never a medicine fit for producing any large or liquid evacuation.

With respect to its ordinary operation, Dr LEWIS has alleged that its effects are more permanent than those of any other purgative ; but this we can hardly admit of ; for we commonly find, that notwithstanding the use of aloes, the state of costiveness will return at its usual period, and that it is often necessary to anticipate this by the use of the aloetic.

Upon this subject of the employment of aloes, two reflections are to be made : One is, that as aloes does not procure liquid stools, and discharges only the contents of the great intestines, it is probable, that though, from causes not well understood, it acts hardly upon the smaller intestines, and almost only upon the greater ; and which may also be presumed from the slowness of its operation, which is hardly in less than ten or twelve hours after its exhibition.

From this my second reflection arises, and is, that as aloes operates especially upon the *intestinum rectum*, there may be a foundation for the common opinion of its producing hæmorrhoidal affections ; and from the large and frequent use of aloes, I have had instances of such effects : but we must at the same time observe, that from the moderate use, it is not a frequent accident, and does not lead to that nicety which some practitioners express with respect to the use of aloes. I have known instances of its safety even in hæmorrhoidal persons ; and I am persuaded that hæmorrhoidal affections are produced by a costive habit, and its circumstances above explained, much more frequently than by the use of aloes.

After mentioning these operations of aloes in the intestines, we would inquire after its operation in the blood-vessels ; and it has been a common opinion that it dissolves or increases the fluidity of the whole mass : and Dr LEWIS alleges that this appears in the blood drawn from persons using aloetics. This, however, appears to me improbable. We have frequently seen the blood drawn from persons using a good deal of aloes, and never could discover any change of its consistence ; and if we can trust to the experiments of SCHWENKE, aloes added to the blood drawn out of the veins seems to coagulate rather than to dissolve it : and whatever may be in this, I would maintain that the quantity of aloes taken in, can hardly have any sensible effect on the whole mass of blood.

The common opinion, however, has prevailed ; and it is alleged, that by its dissolving power it proves an emmenagogue, and is hurtful in all morbid hæmorrhagies. Of the latter, however, I

have no experience; and must say farther, that I have seldom found the emmenagogue powers of this substance. If ever there be any appearance of such a power, it is probably to be ascribed rather to its operation on the rectum, communicating a stimulus to the vessels of the uterus, than to its action on the mass of blood.

On the operation of aloes, I have only further to add, that even when it is not to act as a purgative, it has an action upon the stomach. As it is a bitter, this will be readily admitted; and I have frequently found it to be an antispasmodic, in relieving pains of this organ.

These are the operations of aloes, and I am next to speak of the forms in which it is employed: And my first observation is, that aloes acts as readily in substance as in any solution, and therefore this is never to be practised but for the sake of more convenient exhibition: and we have commonly found it operate in substance in a smaller dose than in the *vinum aloeticum*. It is remarkable that aloes hardly receives improvement by any addition; and our vulgar find as much effect from the aloes alone as from the *pilulæ aloeticæ*. We are however of opinion, that some benefit is obtained by some division of the aloes before it is taken into the body, and that the extract of gentian is properly enough employed; but I am persuaded that the Edinburgh College have not done rightly in withdrawing the whole of the *sal polychrestus* from the aloetic pill.

In the *pilulæ rufi* the myrrh may be useful in dividing the aloes; but we hold the addition of the saffron to be insignificant: and we are certain that though this is added, the *pilulæ rufi*, in the same quantity, never does more than the aloetic pill.

Several practitioners have thought of adding rhubarb to aloes, but to no good purpose that I can perceive. Aloes, as we have said, operates in a very small dose; but rhubarb hardly ever does; and therefore, in the *pilulæ stomachicæ* Ph. Ed. the rhubarb seems to be an useless addition: and I can assert from experience, that these pills never act but in proportion to the aloes they contain, and never more strongly or certainly than the same quantity of aloes taken in the aloetic pill. We are of opinion also that the rhubarb in the *elixir sacrum* is an useless addition; and I know from experience, that a brandy tincture of aloes, to which some aromatic is added, does as much as can be expected or is ever obtained from the *elixir sacrum*.

We are of opinion that the aloes is never properly joined with

the drastic purgatives, as is done in the *pilulæ colocynthide cum aloë*, and in the *extractum colocynthides compositum*: for if such a medicine is intended to produce a liquid evacuation, the aloës is superfluous; and if it is intended only to open the belly, the drastics are unnecessary.

The only aloetic I have now to remark upon is the noted elixir *proprietarys*, introduced from a very bad authority; and the first remark I have to offer is, that the saffron is an insignificant ingredient; and another remark to be made is, that upon account of the menstruum employed by the Edinburgh College, I have never thought of employing it as an evacuant: but I have employed it often with success in curing spasmodic pains of the stomach: and for suiting it better to this purpose, the Edinburgh College seem to have improved it much, by the menstruum they have employed in their elixir *aloes vitriolicum*.

RHABBARBARUM.

Much pains has been taken to ascertain the species of this genus, that gives the root which the physicians of Britain have considered as the species of greatest value, and such as has been imported under the name of Turkey Rhubarb. Whether this may be exactly determined or not, I cannot clearly judge; and in the mean time, I do not think it necessary to prosecute the matter farther with any anxiety, as we have now got the seeds of a plant whose roots, cultivated in this country, show all the properties of what we considered as the most genuine and valuable rhubarb; and which, properly cultivated and dried, will, I believe, in time supersede the importation of any other.

The qualities of this root are that of a gentle purgative; and so gentle that it is often inconvenient, by reason of the bulk of the dose required, which in adults must be from half a dram to a dram. When given in a large dose it will occasion some griping, as other purgatives do; but it is hardly ever heating to the system, or shows the other effects of the more drastic purgatives.

The purgative quality is accompanied with a bitterness, which is often useful in restoring the tone of the stomach when it has been lost; and for the most part its bitterness makes it sit better on the stomach than many other purgatives do. Its operation joins well with that of the neutral laxatives; and both together operate in a lesser dose than either of them would do singly.

Some degree of stypticity is always evident in this medicine; and as this quality acts when that of the purgative has ceased, so

in cases of diarrhœa, when any evacuation is proper, rhubarb has been considered as the most proper means to be employed. I must however remark here, that in many cases of diarrhœa no further evacuation than what is occasioned by the disease is necessary or proper, and therefore the vulgar practice of employing rhubarb in every case of this disease, appears to me to be very injudicious.

The use of it however in many cases of diarrhœa may be proper; but analogy has by a gross mistake transferred it to the case of dysentery, to which its purgative quality is not well suited, as a large and improper dose of it is necessary; and its astringent quality, if it takes place, must certainly be hurtful.

The use of rhubarb in substance, for keeping the belly regular, for which it is frequently employed, is by no means proper, as the astringent quality is ready to undo what the purgative had done; but I have found that the purpose mentioned may be obtained by it, if the rhubarb is chewed in the mouth, and no more is swallowed than what the saliva has dissolved. In that case it appears to me that the astringent quality is not largely extracted, and therefore the cathartic will operate as required: and I must remark, that in this way employed, it is very useful to dyspeptic persons. Analogous to this is the use of rhubarb in solution; in which it appears to me that the astringent quality is not so largely extracted as to operate so powerfully as when the rhubarb was employed in substance.

Water extracts the purgative quality of rhubarb very readily, but does not extract it so powerfully as to allow the dose to come into a small bulk; and therefore the infusion in water is chiefly adapted to the use of children. Wine hardly extracts it more powerfully; and both colleges have given up the use of this menstruum. The only useful solution is that made by brandy, which, if the taste can be reconciled to it, is rendered better by the bitters added in the *tinctura rhei amara*, Ph. Ed.; but the bitters will hardly make up for the rhubarb being in lesser proportion than in the *tinctura rhei dulcis*.

For the use of rhubarb joined with aloes, either in a liquid or in a solid form, I have said enough above in the article of aloes: and here, to the young practitioner I would remark, that the dose of rhubarb is for the most part too bulky to come into the form of pills.

The use of rhubarb in the alimentary canal, as a purgative, a bitter, and in some circumstances as an astringent, may be under-

stood from what has been said ; and whether its operation in other parts of the system is to be mentioned, seems doubtful.

By its colouring the urine, it appears to pass in part by the kidneys ; but I have not perceived it to have any particular effect there : and particularly, though I have often attended to it, I could never find that it promoted in any degree the secretion of urine*.

It has been said to operate upon the liver, and to be useful in jaundice : but I cannot find any foundation for this either in theory or practice ; and I believe the opinion has arisen entirely from the ridiculous doctrine of signatures.

It has been supposed that rhubarb may be a tonic with respect to the whole system, or to particular parts of it ; and accordingly it has been alleged to have been useful in diabetes ; but our experiments here do not at all confirm this.

It has been also represented as useful in the fluor albus ; but we have had no experience in confirmation of this, and cannot find it probable that the quantities employed should, either by their tonic or astringent power, be of any service.

POLYGALA SENEKA.

THIS is a medicine introduced about sixty years ago ; and as a new medicine, was then much commended for its great and singular power : but the esteem of it has since fallen very much. I have put it into the catalogue of purgatives, as this is the only operation of it that is constantly very evident ; and perhaps all its other virtues depend upon this. Some difference is alleged to be between the bark and the woody part of this root, and the latter is alleged to be quite inert. We believe this to be well founded ; but the size of the root, as imported into this country, has not allowed us to attend to this ; and in the smaller twigs we have constantly taken the two parts together.

It has been employed in powder, in a wine infusion, and in decoction with water ; and the last is the most frequently in use. The powder may be given from twenty to forty grains as a purgative ; but it is very ready to excite vomiting, and thereby prevent its purgative operation ; which has occasioned the decoction to be most frequently used. This is made by boiling an ounce of the

* The diuretic effect of rhubarb has, however, been noticed by several writers and physicians. Carolus Piso has particularly noticed this effect of the medicine. I have certainly observed it in several instances, especially, perhaps, when the medicine has acted less abundantly as a cathartic.

root in a pound and a half of water till it is reduced to a pound ; and of this a table-spoonful or two is given every hour till it operates by stool : This it commonly does after six or seven doses ; producing three, four, or more stools ; and this operation is repeated every day, or every second day, till the disease is cured. It frequently, at the same time with its purgative, shows its diuretic effects ; and frequently, when large doses can be admitted, it excites a very free sweat.

This medicine was at first introduced as a cure for the bite of the rattle-snake, and by a supposed analogy was proposed as a remedy for pleurisy and peripneumony. It was accordingly for some time very much employed in America ; and for its good effects in these diseases, we had from America, France, and other countries, many strong testimonies ; but of late these have not been repeated, and I never knew of any instances in this country in which it succeeded, or indeed of its being trusted to without blood-letting. With respect to the use of it at present in France, it may be observed, that Mr LIEUTAUD, on the subject of the inflammatio pectoris, has not once mentioned its use ; and in his second volume, where he was obliged to mention it as an article of the materia medica, he has the following paragraph : “ *A nonnullis frimi sub-sellii laudatur in cachexia et hydrope ; nec desunt qui illam pro egregio resolvente in pulmonum phlogosi deprædicent, fienes quos sit fides.*”

The analogy from its supposed powers in inflammatory diseases has occasioned its being employed in rheumatism ; and we have had some instances of its being useful, especially where it operated by producing sweat.

Mr BOUVART of the Academy of Sciences found the seneka to be a cure of dropsy, and we have had several instances of its efficacy when employed so, as in the manner above mentioned, to operate both by stool and urine ; but it has also in many instances failed : and as a nauseous medicine, which the stomach does not easily bear in the necessary quantity, it has not been often employed.

GENISTA.

THOUGH very little in use, I have inserted this in my Catalogue from my own experience of it. I found it first in use among our common people ; but I have since prescribed it to some of my patients in the manner following : I order half an ounce of fresh broom tops to be boiled in a pound of water till one half of this is

consumed, and of this decoction I give two table-spoonfuls every hour, till it operates by stool, or till the whole is taken. It seldom fails to operate both by stool and urine; and by repeating this exhibition every day, or every second day, some dropsies have been cured.

The cineres genistæ, though employed by SYDENHAM and many others, have no advantage over other fixed alkaline salts.

SAMBUCUS ET EBULUS.

WE put these together as species of the same genus, and of very similar virtues. I have hardly been acquainted with them in practice, but my respect for Dr SYDENHAM engages me to give them a place here.

He has told us that a decoction of the middle bark of this tree operates both upwards and downwards, evacuating a great quantity of water both by stool and urine; and by that means he had cured many cases of dropsy.

Some other practitioners have recommended the same remedy, and I have often thought of imitating the practice, but have been prevented, by being uncertain of the dose; Dr SYDENHAM's three handfuls being a very uncertain measure: and I could not trust the spurious work of BOERHAAVE assigning the dose more exactly, when I perceived from several accounts that the operation of this medicine must be in a strong degree, and that it has been often carried to a dangerous excess.

Both the flowers and berries of the elder have been commended for many virtues, and I will not deny that they have some; but I can say, that in a hundred instances of their employment I could never discover their power and efficacy to be considerable, or indeed to deserve any attention.

OLEUM RICINI.

THE seed which affords this oil may be made into an emulsion, and employed as a purgative. In this form it may be more agreeable to some persons than the oil; but the dose is not easily determined, the state of the seeds, as imported from the West Indies, not being uniformly the same. The oil, therefore, as obtained in the West Indies from the seed by expression or boiling, is the medicine we very constantly make use of, and, when the stomach can be reconciled to it, is one of the most agreeable purgatives we can employ. It has this particular advantage, that it operates sooner after its exhibition than any other purgative I know of, as

it commonly operates in two or three hours. It seldom gives any griping, and its operation is generally moderate, to one, two, or three stools only. It is particularly suited to cases of costiveness, and even to cases of spasmodic cholera. In the West Indies it is found to be one of the most certain remedies in the dry belly-ach, or colica pictonum. I have never found it heating or irritating to the rectum, and therefore have found it sufficiently well suited to hæmorrhoidal persons.

The common dose of this oil is a table-spoonful or half an ounce; but many persons require a double quantity, and there is seldom any harm arises from a little increase of the common dose. It is particularly to be observed of this medicine, that if it be frequently repeated, the dose of it may be gradually more and more diminished; and I know instances of persons who, formerly of a costive habit, at first required half an ounce or more for a dose, but after being frequently repeated, they now find that two drams are enough at least to keep their belly regular.

The only inconvenience attending the use of this medicine is, that as an oil it is nauseous to some persons; and that, when the dose is large, it occasions sickness at stomach for some time after it is taken.

To obviate these inconveniences, several means have been tried; but I shall not detail these here, as I can assert, that the most effectual means is the addition of a little ardent spirit. For this, in the West Indies, they employ rum; but that I might not withdraw any part of the purgative, I employ the tinctura sennæ composita, or elixir salutis of the Edinburgh Dispensatory. This, added in the proportion of one to three parts of the oil, and very intimately mixed by their being shaken together in a phial, both makes the oil less nauseous to the taste, and makes it sit more easy on the stomach.

With respect to this oil, I have only one remark farther to make. As it is imported from the West Indies, and especially as procured there by boiling, it very readily acquires some degree of rancidity; but if the patient's taste and stomach can, by the means above mentioned, be reconciled to it, this rancidity does not seem to diminish the purgative quality.

SENNÆ.

This is a medicine of frequent use in Britain, which I have been much surprised at, as it is not agreeable either in its taste or flavour; as it must be always in a bulky dose; and as it seldom ope-

rates without a good deal of griping. In spite, however, of all this, it is still in frequent use, which shows me how much the most part of practitioners are guided by imitation and habit.

Allowing, however, for the faults of senna hinted at, we must still admit that it is a very certain purgative, operating moderately and seldom to excess; but with these latter qualities, it is still a purgative only without any peculiar virtues.

It is not conveniently employed in substance, as it must be in a bulky dose, not less than a dram or more. It is, however, in substance employed in some compositions, as in the electuarium lenitivum of both colleges. This too is in more frequent use than I would expect; but I have neither time nor patience to enter upon the criticism of this composition, which in many respects I think it might admit of.

The senna is more conveniently employed in solution than in substance. It is very conveniently extracted by water, but does not bear a boiling heat, having much of its purgative quality thereby dissipated. To render it an effectual purgative, that may operate without griping, it requires a large proportion of the menstruum, not less than four ounces of water to a dram of senna, which makes a bulky dose.

The senna may likewise be properly enough extracted by a proof-spirit, but with the same difficulty of having it as a purgative in doses of a moderate bulk. The tincture of the London College can hardly be given as a purgative, without giving a greater bulk of ardent spirit than most men can or should bear. Even the tincture of the Edinburgh College, though not so faulty in this respect, is still too much so, and would be still more, were it not for the substitution of jalap for rhubarb, which has been made in the two last editions of their Dispensatory.

As senna, whether extracted by water or spirit, is still liable to be a griping purgative; so there are almost always some aromatics added to the infusions of it, which, though they do not always obviate the griping, are always useful in covering the flavour and taste of the senna. What aromatics are most fit for every purpose intended we dare not determine; but from some trials and comparisons we have made, it appears that, for covering the taste and flavour the coriander seeds are the most agreeable and the most effectual; but if the purpose is to prevent griping, it is possible that some of the warmer aromatics, as cardamoms or ginger, may be more effectual.

HELLEBORUS NIGER SIVE MELAMPODIUM.

The state of this root is so uncertain and unequal in this country, that I have hardly ever employed it, or seen it employed, by itself as a purgative; and must therefore leave my readers to get information concerning it from better hands.

I have not found any body in this country who had so much faith in BACHIER's tonic pills as to take the trouble of preparing them; and therefore we know nothing of their singular virtues.

Upon the authority of Dr MEAD, the black hellebore has been often, and I have seen it often employed as an emmenagogue; but whether from the imperfect state of the medicine, from improper administration, or from other causes, I would not determine; but I can assure my readers, that in many trials I have never found the emmenagogue virtues of this medicine, nor have I met with any practitioners of this country, though often trying it, who had better success in this respect; and particularly, neither in my own practice nor in that of others, have I met with one instance of the power of hellebore in producing hæmorrhagy.

*PODOPHYLLUM.

[*THIS is an American plant, which is deserving of the attention of practitioners, especially in the United-States, where it is extremely common. It is the root which is employed in practice. This is a safe and active cathartic, in doses of about twenty grains. It may be used either alone, in union with calomel, or with the crystals of tartar. An extract also, prepared from the root, is sometimes employed, and has been found highly useful, as a cathartic, in colica pictonum. Podophyllum has been thought by some practitioners, to whom the use of the medicine has been made known by the editor of this work, to be especially adapted, as a purge, to cases of intermittents, remittents, and dropsy. I believe the medicine possesses some narcotic quality. The leaves are poisonous, the fruit esculent, and innocent.*]

JALAPPA.

HERE is a medicine more uniformly of the same condition, and of more certain efficacy. Even to the eye-sight the entire root contains a resinous part; and which can, in considerable quantity, be extracted from it by spirit of wine, leaving the residuum nearly quite inert. The resin thus separated is an acrid inflaming matter, which, thrown into the stomach, proves a drastic purgative; but it is render-

ed milder by being divided by a triture with any hard powder before it be exhibited. It is certainly by its resinous part that the entire jalap proves purgative, and in large doses proves a strong one; but as it is given in powder, the previous triture, by dividing the resin, renders the entire jalap a milder medicine than the resin taken separately. It may be given to persons not very irritable to half a dram for a dose, but lesser doses will commonly answer; and while it very certainly operates, it is commonly without violence, and often without griping. If it be well triturated, before exhibition, with a hard powder, and the crystals of tartar are the fittest for the purpose, the jalap will operate in lesser doses than when taken by itself, and at the same time very moderately and without griping. Except when given in very large doses, I have not found it to be heating to the system; and if it be triturated with a hard sugar, it becomes, in moderate doses, a safe medicine for children, which in this form they will readily receive, as the jalap of itself has very little taste.

While jalap may be thus rendered mild and safe, it may, however, by being given in large doses, and especially by being joined with Calomel, be rendered one of the most powerful purgatives, either as a hydragogue or as an anthelmintic, and, if we mistake not, with more safety than any of the other drastic purgatives.

Hitherto I have spoken of the jalap as exhibited in a solid form, but it may be conveniently brought into a liquid. It does not give out its purgative quality to water, which renders it therefore of no use in watery infusions: but it is very properly extracted by a proof-spirit: and as this does not extract the resinous part by itself, and only as mixed with, and diffused in the gummy part, the brandy tincture proves a tolerably mild medicine. Rendered more agreeable by the addition of a little syrup, I have known it frequently given to children with great safety; and if I am rightly informed, it was the purgative employed by the inoculators, who got their instructions from SUTTON.

We recommended above the tinctura sennæ composita for certain purposes, to be mixed with the oleum ricini; but we must now observe, that the tinctura jalappæ is equally, and perhaps more, fit for the same purposes.

SCAMMONIUM.

THIS is a medicine which is offered to us in very different conditions, insomuch that I have known different parcels of it at the difference of 200 per cent. in their prices. This must be owing to

its frequent adulteration ; and as we cannot suppose that our apothecaries are always on their guard against this, the practitioners of this country have not employed this medicine so much as to allow me properly to report its effects. When it is genuine, it seems to be an useful purgative ; and though operating in a small dose, it does not seem to be in proportion violent. With respect to the manner of using it, as in its composition it has a considerable portion of resin, upon which its purgative qualities seem to depend, it may certainly be rendered milder by being triturated with sugar, or crystals of tartar, as ordered in the Dispensatories : but in any form it does not seem to have any advantage over the jalap ; and I am persuaded that, either by itself or in composition, it will never come much into the practice of this country.

RHAMNUS CATHARTICUS.

The berries of this shrub are the only part of it employed, and they may be employed in various states ; but the only one known to us, is that of the juice made into a syrup, as ordered in the Dispensatories. In this state they are powerful purgatives : and, as both griping to the bowels, and heating to the system, they may be considered as of the drastic kind, and accordingly they have been frequently employed as hydragogues. In moderate doses they have been employed by our vulgar as a common purgative ; but the state of the medicine, with the hazard of its violence and griping, will prevent their being used by refined practitioners.

As, however, the violence and griping of this medicine can be commonly prevented, by drinking largely, during its operation, of any mild liquid, I have known it frequently used by persons drinking goat-whey.

GAMBOGIA.

THIS is a powerful purgative, and has accordingly been long considered as a chief hydragogue. For this purpose, however, it must be employed in a large dose, when it commonly works with violence both upwards and downwards. Upon account of this violent operation, we have seldom employed it by itself, but have found, that in a few grains it might be usefully and safely added to doses of jalap and calomel.

In this manner I formerly practised with gamboge ; but of late I have thought of using it by itself in the following manner. Observing that it was a purgative which passed through the intestines more quickly than almost any other, I have judged that moderate

doses of it might be repeated soon after one another with more safety, and with more effect, than by giving large doses at once. Accordingly, I have given doses of three or four grains rubbed with a little sugar; and repeating these every three hours, I have found it operate without vomiting or griping: and at the same time, after three or four such exhibitions, a great deal of water was evacuated both by stool and urine. Although I have not yet had much experience of this management, I have no doubt of its being adapted to the cure of dropsy with more ease to the patient than in any other manner of exhibiting it.

For a long time past the gamboge has been famous over Europe as the fittest and most effectual medicine for expelling the tænia or tape-worm. Of this power I have had few opportunities, from experience, that could enable me to make any useful observations upon it; and I judge it best to refer my readers to Professor MURRAY'S Apparatus medicaminum for the most full and accurate information on this subject.

To render my catalogue of purgatives complete, I have inserted here two articles, Nicotiana and Veratrum. Of the former article, and particularly of its purgative powers, as thrown into the rectum, I have treated already; and of the latter I shall say a little here.

VERATRUM.

THE London College, in the edition of their Dispensatory for 1746, as an officinal medicine, gave a tincture of this root, but they have omitted it in their last edition; and I am not surprised at this, as it is a very poisonous plant, which I would hardly think of employing, even upon the authority of the estimable CONRAD GESNER.

It is however possible, that such an active substance may be useful in certain diseases of the human body; and my very ingenious and learned friend Dr SMYTH very properly tried it in some cutaneous diseases, which are commonly very refractory. He succeeded in two or three cases: but his experiments have yet been few; and in some of these he made, the operation of the medicine was such as shows that it is to be employed with a great deal of caution.

COLOCYNTHIS.

THIS is one of the most drastic purgatives; and I have never employed it but as it stood in certain compositions of the Dispensa-

ories. Even these are much less in use than they formerly were. Upon the subject of the *pilulæ ex colocynthide cum aloë*, we made a remark which will also apply to the *extractum colocynthidis compositum* of the London College; and with respect to both I would now add, that as, in employing the colocynth, these medicines are drastic purgatives of no other peculiar virtues, I suppose we may find for them more agreeable substitutes.

ELATERIUM.

THIS peculiar substance is variously prepared, and therefore, in our shops, is in different conditions. When properly prepared, it is a drastic purgative, which however seems to have been very much employed by SYDENHAM and LISTER in the cure of dropsy. I have not known it employed by itself, and only as being added in a grain or two to other purgatives, as SYDENHAM and LISTER employed it; but what is the effect of it in composition it is not easy to determine. If LISTER's observation of its being very heating to the body be founded, I should not think of employing it at all.

CHAPTER XXI.

DIURETICA.

THESE are medicines suited to promote the secretion of urine.

This is to be done either by increasing the quantity of water in the mass of blood; or, that remaining the same, by introducing a matter that may be a stimulus to the kidneys.

As when any quantity of water is taken into the body, we find this commonly, in the course of twenty-four hours, returning to the same weight it was of before; so we conclude that the water thrown in has passed out by the excretions of perspiration and urine, and in general we find it probable that these excretions will be very much in proportion to the quantity of water for the time present in the mass of blood; wherefore, if the perspiration be determined, an increase of the water present in the blood will occasion an increase of the secretion of urine, which accordingly commonly happens: and we commonly find that an increase of the quantity of drink is attended with a proportional increase in the quantity of urine secreted.

This therefore is the foundation of the first means we have assigned for promoting the secretion of urine. The quantity of

water present in the mass of blood may be different from different circumstances ; but the most part of these circumstances are hardly under the direction of our art : and the only one which is very much so, is the quantity of liquid taken into the body by drinking ; which being therefore the chief means in our power of increasing the quantity of water in the blood, may be considered as a chief means of increasing the secretion of urine : and accordingly this increase of drink has always been considered as the chief of diuretics.

There are, however, certain states of the body in which it may be doubtful if this means of increasing the secretion of urine may be safely employed. It sometimes happens that the water of the blood, instead of passing off by the excretions, is effused into some of the cavities, giving occasion to the well known disease of dropsy : and in such a case it may be suspected, that an increase of the water in the blood, made by an increase of drinking, may increase the effusion mentioned, and aggravate the disease. This suspicion has prevailed so much with physicians as to lead them in such cases to enjoin as much as possible an abstinence from drinking ; and it is alleged that such an abstinence has, in some cases, entirely cured the disease.

We would not rigorously inquire into the truth of this fact ; but from all we have seen or heard, we are confident that it has been a very rare occurrence ; and from the many instances we have had of its being attempted with very little benefit, we are not surprised at many physicians being of opinion that it should not be attempted at all.

It is an extremely painful measure, as it resists the urgent desire of drink which commonly attends this disease ; and it may be alleged that it is not always necessary, as the tendency to effusion may have its limits, so that the whole of the drink taken in may not run off this way, but that a portion of it may still pass by the kidneys. So far as this happens, the taking in of drink may be a safe measure ; and I can assert, that in several cases of considerable dropsy, the quantity of urine voided was nearly equal to the quantity of drink taken in, which shows that the drinking had been a very proper measure.

I wonder, indeed, that the practitioners who have enjoined an abstinence from drinking have not thought of a means of determining how far this was to be carried ; and which certainly might be nearly determined by a comparison of the quantity of urine voided

in a given time with the quantity of drink taken in during the same time.

I have frequently made this comparison, and found, that a very entire abstinence from drinking, by diminishing the quantity of urine voided, allowed the secretories of the kidneys to fall into a contracted state, so that the quantity of urine voided was still farther diminished, and, as I judged, tended to increase the effusion, and thereby to aggravate the disease. In other cases I found, that when a quantity of drink was taken in, a considerable portion of it passed by the kidneys; and when, as sometimes happened, that the quantity of urine voided was equal to the drink taken in, I concluded that the giving so much drink was a perfectly safe measure.

To illustrate this matter farther I must observe, that the water of the blood carrying the saline matters of it, by the nature of the animal œconomy is determined to the excretions, and particularly to the kidneys; and therefore, that drinks impregnated with saline matters are naturally determined this way rather than by the preternatural effusions mentioned. The fluid poured out by these effusions is nearly insipid; whilst, though the watery part of the blood is by these withdrawn from the secretories of the kidneys, yet a great quantity of the saline matter of the blood continues to pass this way: and I therefore have been led to give for drinks, not simple water, but always water impregnated with saline matters: and I can assert, that water so impregnated passes more certainly to the kidneys than perfectly insipid liquors.

Thus water impregnated with vegetable acids is not only more grateful to the patient than simple barley-water, or water-gruel, but passes always in greater quantity in proportion to the liquid taken in; and it is commonly by attending to this that I have found, even in dropsy, the quantity of urine voided to be equal to the quantity of drink taken in.

I have thus endeavoured to explain some circumstances in which a total abstinence from drink may be improper, and I have pointed out some in which the giving drink may be a safe measure; whence the avoiding of this should not have been so universal a rule as it has been with the most part of practitioners.

In arguing for the exceptions that are to be made from this rule, we have alleged that the taking in of drink is proper, especially when we can find the quantity of urine voided to be equal or nearly equal, to the quantity of drink taken in; and that we especially found this to be the case when the drink employed was impreg-

nated with some saline matters, which determined it to go more entirely to the kidneys, and even to stimulate these to a more entire secretion. Reflecting upon this, I perceived that I had omitted in my Catalogue of diuretics some matters which are particularly well suited to the purpose of drinks, such as fermented liquors of all kinds, when these are either weak in their quality or taken pretty well diluted with water.

Even ardent spirits, if largely diluted and joined with a portion of vegetable acid, have been found to stimulate the kidneys, and to make a proper part of the ordinary drink. It was also an omission amongst the diuretics not to mention the milk of the non-ruminant animals, and of the other milks, their products of whey and butter-milk, especially when these are in their most acid states.

To finish what relates to the giving of drink in dropsy, I must observe, that whenever we can perceive that the quantity of urine voided is equal to the quantity of drink for the same time taken in, I hold it to be safe to allow as much drink as the patient may desire; and I have no doubt that, by such indulgence, the disease may be often entirely cured. There are indeed many instances of the disease being cured in this manner, as in the cases given by sir GEORGE BAKER in the Medical Transactions, in those quoted by Dr MILMAN from several authors, and especially in the instances given by that ingenious author from his own practice.

I can give none from mine; but one accidentally fell under my observation. A woman labouring under an anasarca was accidentally directed to drink a mineral water, and that in considerable quantity. By this her urine was greatly increased, and the anasarca was soon entirely cured.

From my own practice I can observe, that I always thought it absurd in physicians to employ diuretics while they enjoined an abstinence from drink, which is almost the only means of conveying these diuretics to the kidneys: so whenever I employ diuretics, I at the same time advise drinking freely; and I am persuaded that drinking largely has often contributed to the cures I have made.

Having thus mentioned the conduct of a chief means of promoting the secretion of urine, before I proceed to the other means that may be employed, I judge it proper to mention the chief effects of promoting this secretion.

As it seems to be the purpose of nature to carry out by this secretion the saline matters that, by the nature of the animal œconomy, are constantly generating in the mass of blood; so, by increas-

ing the secretion, we carry out those saline matters, which, from certain causes, abound more than ordinary in the mass of blood.

Such a superabundance of saline matter in the blood I suppose to take place in scurvy; and accordingly we find, that increasing the secretion of urine is the chief means of curing that disease.

But as there are other causes than those producing scurvy which may increase the saline state of our fluids; so the increase of the secretion of urine may be a means of curing many diseases, though we are not ready to point out those in particular that may be so cured.

The supposing an acrimony, or, what I judge to be the same thing, a saline state of the fluids, has been often assumed at random, without evidence; and even in cases where it was certainly existing, there are certain acrimonies which do not readily pass by the kidneys, and therefore diseases depending upon them which are not to be cured by increasing the secretion there.

Hence it is that the increase of this secretion may not prove a remedy in so many cases as we might suppose it. On the other hand, it is to be observed, that as there is a balance between the perspiration and the secretion of urine, so that the one being increased the other is diminished; if there be a matter which nature has intended to pass especially by the perspiration, if this is retained by increasing the secretion of urine, diseases may be produced: and even if the increased secretion of urine should diminish the quantity of water which should pass by the skin, the saline matters which should pass that way by their being less diluted, may be more ready to stick in the vessels of the skin, and thereby give occasion to diseases of this.

Another effect of an increased secretion of urine may be considered as merely the evacuation of the water, or watery parts of the blood, which, when largely increased, may excite an absorption from the cavities, in which a preternatural accumulation of serous fluid had taken place. Thus it is that an increased secretion of urine has often proved a cure of dropsy: and for the conduct of this, by either one means or another, enough has already been said above; for I doubt much if any diuretic medicines will ever be very effectual without being accompanied with an increase of the water in the blood by the taking in of drink.

PARTICULAR DIURETICS.

WE begin with these taken from the vegetable kingdom; and must introduce them by observing, that in making the Catalogue,

I have been more directed by my complaisance to the writers on the subject than by my own opinion and experience. The most part of the diuretic vegetables mentioned by writers are of very little power, and are employed with very little success.

But, to speak of particulars, the first mentioned are the *Umbellata*, the power of which resides especially in their seeds; but we have never found any of them powerful. The *semen dauci silvestris* has been commended as a diuretic; but we have seen it employed in calculous cases in considerable quantities, and for a great length of time, but never found its diuretic power anywise remarkable.

Some of the *plantæ stillatæ* have been commended as diuretics; but none of them deserve our notice except the

RUBIA TINCTORUM.

THIS root passes so much by the kidneys as to give its colour to the urine; and in passing that way it may be supposed to stimulate the secretories: and indeed it has been represented as a powerful diuretic. I have seen it frequently employed as a supposed emmenagogue; but its diuretic powers did not always appear, and never to any considerable degree. As in the many experiments made with this root on brute animals, it has always appeared hurtful to the system, I should not think it fit to be employed to any extent in men.

ALKEKENGI.

THE berries of this, the only part of it ever in use, are not known in the present practice, and I have never seen them employed; but I have some reports of their being employed by others without any effect: and if their diuretic powers had ever been remarkable, we may presume that they would have still continued in use. I cannot dismiss them without an observation, that as it is allowed that the berries often take a taint from the leaves of the plant, it will always require some caution in employing any part of a plant which is taken from an order of a very poisonous kind.

The *Bardana*, *Gramen*, *Lithospermum*, *Ononis*, *Asparagus*, *Enula Campana*, are all substances which seem to pass in some measure by the kidneys; but from frequent experience we can assert, that their diuretic powers are hardly ever to be taken notice of.

In the catalogue of diuretics I have inserted the *Asarum*, for the sake of this remark, that it is doubtful if any of the supposed diu-

retics in stimulating the kidneys show any specific power; and, on the other hand, many which do stimulate these organs show the same power with respect to every other excretory to which they are applied: and hence it is that every emetic or purgative show upon occasion their diuretic powers. This seems to be all that is necessary to be said of the *Asarum*, *Genista*, *Nicotiana*, and *Seneca*, as inserted in our catalogue of diuretics, as these are seldom employed in this intention alone.

The *Arum* in its recent state contains an acrid matter, which like other acrids passes, at least in part, by the kidneys, and in proportion excites the secretion there; but it can never be introduced into the stomach in such quantity as to become a powerful diuretic.

Upon the same ground of their containing a great deal of acrid matter, which passes more or less by the kidneys, I have inserted in my list the *Persicaria* and *Ranunculus*, which have been commonly marked as diuretics. They have, however, as such been hardly employed in practice; and that for the same reason I have given with respect to the arum, that we have not yet learned how they can be introduced in such quantity into the stomach as to become powerful in the kidneys.

DULCAMARA.

WE have employed only the stipites or slender twigs of this shrub; but as we have collected them they come out very unequal, some parcels of them being very mild and inert, and others of them considerably acrid. In the latter state we have employed a decoction of them in the cure of rheumatism, sometimes with advantage, but at other times without any effect. Though the dulcamara is here inserted in the catalogue of diuretics, it has never appeared to us as powerful in this way; for in all the trials made here, it has hardly ever been observed to be in any measure diuretic.

DIGITALIS.

THE powers of this plant as a diuretic are now ascertained by numberless experiments; but upon what sort of operation these powers depend, I am at a loss to explain. Whether it be by a specific stimulus applied to the kidneys, or by a general operation upon the system, which particularly affects the kidneys, does not appear very clearly. The small dose in which the digitalis commonly operates, makes it difficult to suppose that so much of that dose can go

to the kidneys as to be a considerable stimulus to these organs; and, on the other hand, the effects of that dose on the stomach and intestines, and especially its effect in diminishing the frequency of the pulse, are certain proofs of a general operation upon the system.

I have introduced this speculation that some of my readers may prosecute the enquiry; but I do not take any pains at present to decide in the question, because I do not perceive that either opinion can have any influence upon practice. This, abstracted from all speculation, must be established by experience. With respect to this I could wish to lay down here rules for the proper management of this medicine; but I will not attempt it, because I can direct my reader to a more proper means of instruction by referring him to the treatise of my very ingenious and learned friend Dr WITHERING on this subject, which is a treatise in many persons hands, and, in my opinion, should be in the hands of every practitioner of physic.

I cannot however quit this subject of the digitalis without observing, that the speculation with regard to its operation, which I have started above, may occasion the general account of the operation of diuretics which I have given above to appear less complete; as, besides the increased quantity of water in the mass of blood, or a stimulus particularly applied to the kidneys, there may be a medicine which, by a general operation on the system, may promote the secretion of urine. My candour obliges me to mention this; but I do not find myself at present in a condition to prosecute the enquiry.

[*Digitalis still continues to retain no inconsiderable portion of its former reputation in dropsies: and my own experience has convinced me, that it is often an important remedy in such affections. It is much better suited to anasarca and to hydrops pectoris, than to ascites. Yet in some instances of the latter form of dropsy, I have found the good effects of digitalis prompt and remarkable. While I thus venture to give my own feeble testimony in favour of the diuretic quality of digitalis, I cannot hesitate to assert, that the medicine has often done much injury in dropsical and other affections, owing to the indiscretion with which it had been employed.

It is hardly necessary to say any thing concerning the use of digitalis in pulmonary consumption. I believe the public mind is pretty well made up on this subject. My own is fully satisfied: I have never, except in one solitary case, been so fortunate as to observe any *permanent* advantage from the use of digitalis, in *genuine* phthisis pulmonalis. But I advise my young readers, and even

more experienced practitioners, to read with attention, what has been written upon the subject by Dr DRAKE, by the late learned Dr BEDDOES, and by other writers.

The powers of digitalis, as a medicine in cases of hæmorrhages of red blood, seem to be better established. See what Dr CURRIE has said on this head.

The writer just mentioned has detailed his practice with this medicine in cases of epilepsy. Although he made no cures, it is evident, that the use of the digitalis in this disease, ought not to be hastily forsaken.

Dr COXE deserves our thanks for more loudly calling the attention of physicians to the employment of this medicine in cases of mania: in which affection, I have myself exhibited it, with unequivocally good effect.

The saturated tincture of digitalis has, of late, been given in several cases of incarcerated hernia, with excellent effect. Very large doses of the medicine were employed. It is not necessary to take up any time in showing, to those who are acquainted with the history of tobacco in the same case, in what manner digitalis may have been of great use in the disease in question. See page 199, of this volume.*]

RUTA ET SABINA.

THESE two plants, as well as the general title of *Amara*, have been inserted in my catalogue of diuretics inadvertently; for I do not find, either from writers or from my own experience, any authority for ascribing a diuretic virtue to these plants.

SCILLA.

THIS is a root which from the most ancient times has been celebrated as a diuretic; and under a proper management, it seldom fails to operate more or less as such. It has not however any specific power, as it seems to be universally stimulant with respect to every sensible part or excretory to which it is applied. It readily stimulates the stomach, and proves emetic, as we observed above when speaking of it under that title. When it is so managed as to pass the stomach, it stimulates the intestines, and proves purgative; and when carried into the mass of blood, it is generally, and I believe justly, supposed to stimulate the mucous glands of the lungs, and to prove an expectorant.

When it is thus so generally stimulant, we can readily understand why it should prove a diuretic; and I would add, that proba-

bly it has something in the nature of the acrimony it contains, that suits it to be taken up by the serosity, and thereby to pass readily by the kidneys, where its acrimony therefore increases the secretion.

This actually happens, and has rendered it at all times noted as a diuretic.

This effect, however, does not always happen; because, if it be thrown into the stomach in such quantity as to prove emetic or purgative, it is thereby prevented from reaching the blood-vessels and kidneys; and therefore, to obtain its diuretic effects, we must avoid its emetic and purgative operations, which may commonly be done by giving the squills in small doses, to be repeated after proper intervals only: and I have found, that by accompanying the squills with an opiate, the emetic and purgative operation of it may be avoided, and thereby it may be carried more entirely to the kidneys.

A certain writer has alleged, that the diuretic effects of the squill is not to be expected unless it shows some operation on the stomach. This may perhaps be founded; but I understand it no other ways than that some operation on the stomach is a test, and a necessary test, of the squills being in an active state; in the same manner as we are only certain of the activity of mercurial preparations when they have shown some effect in the mouth.

I have often observed, that when the squill operates strongly in the stomach and intestines, that the diuretic effects were less ready to happen; and therefore, as the squill contains an acrimony that is in part very volatile, and which is most ready to act on the stomach, that therefore the fresh squill, by acting more upon the stomach, is less certainly carried to the kidneys than when their volatile part is in some measure dissipated.

It is on this account that the dried squill is more frequently employed than the fresh. We must not however miss to observe here, that the drying of the squill is a business that requires much attention, as it may readily be overdone, and thereby render the squill entirely useless: And it is to be observed also, that the squill may not only be rendered inert by the first drying being too much, but that the dry powder, if kept long in a dry air, may also in time lose much of its power.

This overdrying of the squill, in one way or other, happens more frequently than our apothecaries are aware of; and has led me to allow, that some operation on the stomach, some nausea excited by

the squill, is a necessary test of the activity of the portion of it employed.

When the squill is in good condition, to avoid its operation on the stomach and intestines, I have said it is proper to give it in small doses, to be repeated after long intervals only; but it is proper to observe here, that when the disease requires a repetition, the doses of the squill, as they are repeated, may be gradually increased, and the intervals of their exhibition made shorter; and when they come to be tolerably large, it is then that an opiate may be conveniently employed in directing the operation of the squill more certainly to the kidneys.

In the cases of dropsy; that is, when there is an effusion of water into the cavities, and therefore that less water goes to the kidneys, we are of opinion that a neutral salt accompanying the squill may be of use in determining this more certainly to the kidneys: and whenever it can be perceived that it takes this course, we are persuaded that it will also be always useful, and generally safe, during the exhibition of the squills, to increase the usual quantity of drink.

It may be a question, Whether the diuretic operation of squills may not be assisted by some mercurial preparation given at the same time? And when there is any appearance of the medicine going to the kidneys, it cannot be doubted that the mercury, as stimulant of every excretory to which it is applied, may here also be useful. Accordingly it has been a frequent practice to join mercury with squills; but I doubt much if the common practice of employing calomel on this occasion be proper. Calomel determines the squill more certainly to operate by stool; and unless the cure of the disease is to be trusted entirely to purging, the calomel may readily prevent the diuretic operation of the squill. We have therefore been of opinion that the less purgative preparations of mercury were better suited to the purpose; and we are disposed to judge that the solution of the corrosive sublimate, which so often by itself goes to the kidneys, may be more proper than any other.

After treating of the squills, it seems proper to take notice of a title inserted in my Catalogue that has some affinity with the squills; which is that of the

ALLIACEÆ.

All of these seem to contain an acrimony, which seems by its nature to be determined to pass off by the kidneys, and the species

Allium sativum, or *Garlic*, which possesses the largest portion of this acrimony, has been always celebrated as a diuretic.

I have treated of its other virtues pretty fully above; and have only to add here, that when it is taken into the stomach in its fresh and recent state, it almost always operates as a diuretic: and I am well persuaded, that in several instances of my practice it has contributed to the cure of dropsy; but I have not been so happy as Dr SYDENHAM was, to find the disease cured by garlic alone. Practitioners have been of opinion, that the garlic is most effectual, when, by its being taken in an entire state, as explained above, it has been left to the stomach to extract the more volatile parts of it.

After the alliaceæ I must take notice of some substances which have much affinity with these; and therefore, in the Catalogue, we have given the article of

SILIQUOSÆ.

THESE contain a volatile acrimony, very much akin to that of the alliaceæ, and like these seemingly disposed to pass off by the kidneys; they have therefore been always considered as diuretics.

There is however a considerable difference in this respect, between the different species of this order of plants. In the leaves, stalks, and flowers, and sometimes in the roots, the acrimony peculiar to the order is not very remarkable, and they show little power as diuretics; but in others, especially in their seeds, and sometimes in their roots, the acrimony is very considerable; and so far as it can be introduced to the kidneys, it is a powerful diuretic. This stronger acrimony, however, is so ready to inflame the stomach, that hardly so large a quantity of it can be introduced as to prove a powerful diuretic, or to be depended upon in dropsies, where a large discharge of urine is required. The entire seeds may indeed, as we explained above, be introduced in large quantities, and are in some measure extracted by the stomach, so as to be in some measure diuretic; but never so much as to act in this way very powerfully.

*SENEKA.

[*THIS, which Dr CULLEN has spoken more particularly of under the head of cathartica, and which he has also inserted in his catalogue among the diuretica, is entitled to much more attention, as a diuretic, than the professor seems to have supposed. Dr MILLMAN (now sir FRANCIS MILLMAN) has given a very favour-

able report concerning the powers of this vegetable, as a remedy in dropsies of different kind. PERCIVAL, BOUVART, and other authors have also spoken favourably of the seneka in the same cases, in which I have myself employed it, with the most marked advantage. Like other medicines of the class it will, doubtless, often fail to show the diuretic effect: but again it often succeeds, carrying off the waters of dropsy, as promptly and as largely as I have ever known the effect produced by any other medicine in the whole series of diuretics. I have commonly made use of a strong or nearly saturated decoction of the root of the medicine, and have given it very liberally. Though perhaps entitled to the name of a nauseous medicine, I have not observed with Dr CULLEN (see page 371), "that the stomach does not easily bear it in the necessary quantity."*]

There remain of the Catalogue of vegetable diuretics two articles to be taken notice of; which are the

BALSAMICA ET RESINOSA.

WITH respect to the balsamica, as I have said above that all of them have for their basis a turpentine, so it may be presumed that all the balsams may have the same diuretic quality which we find in the most simple turpentine. This we have said before to be commonly determined to the kidneys, operating there more or less as a diuretic; and therefore the general title of Balsamica is properly enough inserted in our Catalogue. I must however observe with regard to them, that they cannot possibly be introduced into the body in such quantity as to operate powerfully in any diseases requiring a large discharge of urine.

The diuretic substance afforded by turpentine, which has been the most taken notice of, is the essential oil obtained by a distillation with water. In attempting the cure of sciatica by this oil, I have frequently observed its passing by the kidneys, and promoting the secretion of urine; but it can never be introduced in such quantity as to be powerful in this way.

This observation applies to the oleum juniperi, which has been often employed as a diuretic; and it will readily appear, as this oil is drawn from the terebinthinate substance of the juniper, it can hardly have more power than that drawn from the turpentine itself.

On the subject of the balsamica, I have conceived an opinion which I have in some measure explained already in the article of Benzoinum, amounting to this, that the acid found in the benzoine

exists in the oils of turpentine and of the other balsams; and that upon this particularly depends their diuretic virtues. It is therefore that several of the substances inserted under the title of the *Stimulantia Resinosa* might have also been inserted in our Catalogue of diuretics; but their power is not so considerable as to deserve our attention here or in practice.

Having now mentioned the several vegetable diuretics, I am next to speak of those taken from the animal kingdom; and these first deserving our attention are the

CANTHARIDES.

THE acrimony of this insect, and, when applied to the skin, its inflammatory nature, which may be readily carried so far as to raise a blister, is well known to all the world; and the effects of its rubefacient and blistering powers, in the cure of many diseases, are known to every practitioner. These effects, however, are not to be taken notice of here. As they may be the effects of other insects, and of many vegetable substances, they are to be considered as a general remedy, none of which I propose to take into our treatise; and it is only the powers of the cantharides when taken into the body, and employed as an internal medicine, that I am to consider.

The cantharides taken internally, whether in substance or in solution, if in a certain quantity, they may be considered as a stimulant and heating substance; and I have had occasion to know them, taken in large quantity as an aphrodisiac, to have excited violent pains in the stomach, and a feverish state over the whole body.

The cantharides however seems to act only in a concentrated state; for taken in moderate quantity it is so much diffused in the fluids, both in the alimentary canal and in the mass of blood, that it seldom shows any effects on the general system. But this seems to be almost peculiar to this substance, that, given even in moderate quantity, it very readily passes to the kidneys; and from circumstances which we cannot explain, it seems to be there united with a certain portion of the urine only; and being thus in a concentrated state when carried on to the bladder, they give a considerable irritation and inflammation to the neck of it, in consequence of which a frequent stimulus to the voiding of urine, and a painful difficulty in the voiding of it; symptoms very well known to every medical man under the title of *Strangury*, are produced.

In explaining this very peculiar effect of cantharides, I have in-

sinuated a theory of their being united with a certain portion of the urine only, and of their being thereby in a more concentrated state, which will not perhaps appear clear to every body; but that there is a foundation for such reasoning appears to me very strongly from hence, that the effects mentioned are prevented by our rendering the urine more copious, and much diluted.

It was proper for me to begin with an account of this frequent operation of the substance of cantharides; but it does not properly touch the medicinal powers of them, which I must therefore now speak of.

From the effects mentioned, it is sufficiently evident, that the substance of the cantharides goes to the kidneys; and it is with much probability supposed, that such a stimulus applied there must promote the secretion of urine. This effect, however, does not always in fact appear; and Dr SMYTH CARMICHAEL asserts, that in his frequent exhibitions of the tincture of cantharides, he never once observed the secretion of urine increased. In many instances of a strangury produced by the application or exhibition of cantharides, I have not found, though I have often enquired after it, the quantity of urine sensibly increased: And however it may be explained, though the substance of cantharides operates often upon the neck of the bladder, it may be doubted if at the same time it operates upon the kidneys; as, along with the strangury so often occurring, I have never met with pains of the back, or other marks of an affection of the kidneys.

From these observations, it may be doubted if cantharides have properly any diuretic power; but the authority of the late eminent and learned WERLHOF cannot be declined. In the *Commercium Literarium Norimbergense*, WERLHOF gives a remarkable instance of the diuretic power of cantharides, and informs us, that he had frequently experienced the same in dropsy and other diseases; and upon such an authority I can no longer doubt of the power in question.

It however may be considered, whether the obtaining the diuretic effects of cantharides may not depend upon that administration of them which WERLHOF employed. He gave a grain of powdered cantharides for a dose, and repeated this every four hours; and it was only after the third dose, that a suppression of urine, of many days standing, began to yield: and I will give the rest of what relates to this subject in his own words, *Operum* pag. 699. "Post tertium granum fluere urina parum grumosa sanguinolenta, dein pituitosa, tandem limpida coepit, cum dysuria. Continuavi,

quia symptomata cetera statim mitigata sunt, medicaminis usum, ad nonam usque dosin: quo facto magis magisque, et tandem largissime ad plures in dies mensuras sine febre, dolore, prodiit urina limpida, imminutis symptomatis omnibus, sensimque sola ejus remedii ὑστερηγία, convaluit homo, jamque sanus vivit.”

By accidental circumstances I have myself been prevented from imitating this practice; and I was less intent upon it, because WICHMAN, the editor of WERLHOF'S works, in a note on this subject, observes that WERLHOF himself did not continue the use of c antharides in dropsy and other diseases.†

All this, however, I thought necessary to lay before my readers.

Cantharides have been frequently employed in the cure of cutaneous diseases, and are for this particularly recommended by Dr Mead; and as they may justly be supposed to pass by perspiration as well as by urine, the instances given of their utility may be very true. My learned friend Dr SMYTH CARMICHAEL, amongst other attempts which he thought of for the cure of cutaneous diseases, very properly thought of trying the cantharides. In one case they proved a remedy; but in some others, though given in large quantities, they entirely failed; and, so far as I know, the experiment has not been prosecuted further.

In another disease the cantharides have been frequently employed, and that is in a gonorrhœa and gleet. For their efficacy in such cases, we have the testimony of the same respectable physician WERLHOF. His words, in the page of his works above referred to, are the following: “Dedi in gonorrhœa in substantia ad granum unum, duo, tria, cum ossis sæpiæ drachma, et pro efficaciæ observatione, continuavi ad plures dies, et minori id cum molestia fieri observavi, quam si pro more *Bartholini, Listeri*, et aliorum mihi itidiem feliciter tentato, infusio in vino facta sit.”

His editor however tells us, that WERLHOF did not continue this practice, as he had found out a safer method of cure.

As I suppose the operation of cantharides, in the cure of gonorrhœa and gleet, to be by inducing some degree of inflammation upon the urethra, I hold the practice to be of very doubtful safety.

* LYTTÆ.

[* Besides the cantharides of the shops, we are now pretty well acquainted with several other insects, belonging to the same natural

† I cannot hesitate to believe, that cantharides have frequently shown their diuretic effect: since I have myself not unfrequently observed it. But I depend still more upon the reports of other practitioners. See what Dr CHALMERS and Dr JACKSON have said on this subject.

genus, which possess all the active and useful properties of the European insect; and which may, consequently, be employed,—as I have often employed them,—for the same purposes, whether as internal medicines, or as external applications. The most important of the newly-discovered insects, to which I allude, are the *Lytta vittata*, *L. marginata*, and *L. cinerea*, all natives of North-America, where they are common insects, inhabiting and devouring many, and very different species of plants†.*]

MILLEPEDÆ.

THESE insects, like many others, contain a saline acrimony, which is supposed to go to the kidneys, and prove diuretic.

What large quantities might do I dare not determine; but I can join my testimony to the account of Dr LEWIS, that I have known a large quantity, that of a hundred, given twice a-day, without any sensible effect upon the kidneys, and without any effect in curing the diseases for which they were given.

SALES DIURETICI.

THESE, in the printing of my Catalogue, should have been separated from the foregoing articles by a proper space, as they cannot be properly placed under the titles of either animal or vegetable diuretics.

With respect to the whole of them, it is to be observed, in the first place, that as it seems to be determined by the nature of the animal œconomy, that all saline substances received into the mass of blood should soon pass out again by the excretions, and particularly by that of urine, it will be obvious that, as all saline matters are more or less stimulant, they must all of them, in passing by the kidneys, be more or less diuretic.

Accordingly their power in this way is a matter of common experience; and all of them may be employed as diuretic medicines except the volatile alkali, which cannot be introduced in the quantity necessary to have much effect on the kidneys.

The acids, in their concentrated state, cannot be admitted; but by being largely diluted with water, or watery liquors, they can be admitted in considerable quantity: and in this diluted state they sometimes prove powerful diuretics. The fossil acids, however, can hardly be admitted in such quantity as to produce any considerable discharge of urine; but the vegetable acid, in its various

† See the Editor's Discourse on some of the principal desiderata in Natural History, &c. pages 35, 36. Philadelphia: 1807.

forms, can be taken in more largely, and prove very useful, particularly by rendering watery liquors more agreeable as drinks, and by conveying these more certainly to the kidneys, as explained above.

The neutral salts, whether formed of acids and alkalines, or of acids and earths, are all of them diuretics in so far as they reach the kidneys; but many of them are at the same time laxative cathartics, and their operating by this quality commonly prevents their diuretic effects. These therefore can only be obtained by the exhibition of neutrals, when they are given in such small doses as cannot act upon the intestines, and when these doses are repeated at certain intervals only; but even in this way I could hardly ever render the diuretic effects of neutrals, even those of nitre, considerable.

There is however a neutral salt that is judged to be more certainly diuretic than any other, and has therefore been intitled *Sal Diureticus*. It is very possible that this salt may be more active in the kidneys than some others, and I think I have sometimes observed it to be so; but with respect to it in general, I must declare, that, though trying the exhibition of it in various ways, I could never render its diuretic effects remarkable, or fit to be depended upon, when a large discharge of urine was required.

To conclude this subject, they are the fixed alkaline salts that have been especially depended upon as diuretics. It has been the vegetable fixed alkali only that I have employed, and have sometimes obtained its diuretic effects in a remarkable degree; but I have often also been disappointed of these: and I was not surprised at this, as I believe that the alkali is almost always rendered neutral in the stomach; and in that state they could have no other effect than that of other neutrals, which I have just now represented as commonly inconsiderable.

It is however still a matter of fact, that alkalines do, upon occasion, show their diuretic power; and upon the supposition just now made of their neutral state in the stomach, their considerable operation as diuretics is not easily accounted for. On this subject, however, I shall offer two explanations. One is, that the quantity of alkali thrown into the stomach may be more than the acid there can neutralize; and therefore, that some portion of it may reach the kidneys in its alkaline state, and prove there a more powerful stimulus than any neutral salt would be. It is upon this ground that I find a large quantity of alkali to be always necessary to show diuretic effects.

Another explanation of the powers of alkali in producing these, is the following: As the acid of the stomach may be presumed to be of the nature of the fermented acid of vegetables, so an alkali joined with it must form a regenerated tartar, a sal diureticus, or kali acetatum; and if this be less purgative, and more diuretic than other neutrals, while it is also conveyed to the blood-vessels in larger quantity, we can understand why, from these circumstances, the fixed alkali may often appear diuretic. With respect to its operation as diuretic, I have another conjecture to offer. I have commonly found it prove diuretic when given with bitters, as was the manner of Sir JOHN PRINGLE; and I have imagined that, as the bitters are absorbents of acid, they might absorb so much of that present in the stomach as to prevent this from being so fully applied to the alkali.

I have now only to add on this subject, that as alkalines may be often prevented, by purging, from reaching the kidneys; so their diuretic effect may be often more certainly secured by giving an opiate at the same time: and for the utility of this practice, see Dr MEAD on the subject of Dropsy.

After the diuretic salts, I have set down in my Catalogue the Sapo Albus Hispanus; but after what has been said above with respect to this medicine, I need not add any reflections here.

CHAPTER XXII.

DIAPHORETICA.

UNDER this title I comprehend all the medicines suited to promote a discharge by the skin, whether it be by insensible perspiration or by sweat. In the common language of writers, the term of Diaphoretica is applied to those medicines only which promote the insensible perspiration; and those which occasion sweating they distinguish by the term of Sudorifera, or Sudorifica: but as, in the medicines ranged by authors under these titles, we can find no difference but in the degree of force, or what arises from the manner of administration, we comprehend the whole under the title of Diaphoretica, and shall employ this term only, though the effects of the medicine may be often the occasioning of sweat.

We set out with the following proposition.

All of the diaphoretics operate either by exciting the force of the circulation, or by exciting the action of the extreme vessels on the surface of the body only; and these two operations take place sometimes separately and sometimes together.

The medicines which operate in these two ways are properly the diaphoretics we are to treat of; but there are various circumstances of the body which may produce these effects, and there may be medicines which produce these general circumstances of the system, which may be, though not strictly, named Diaphoretics; but they are the proper diaphoretics we are only to treat of here.

With respect to the operation of these, as the water of the blood passes out by urine or perspiration, so the quantity of these excretions, as said above, will be in proportion to the quantity of water for the time present in the mass of blood; and the passing of it by the one excretion or the other will be determined by certain circumstances of the economy, which it is proper for us here to consider.

The general force of the circulation, and the activity of the extreme vessels, are what determine to, and support both perspiration and sweat. The latter circumstance, the activity of the extreme vessels, may depend upon the heat of the air applied to the surface of the body, or upon cold applied, whilst the circulation is by exercise, or other causes, in a vigorous state.

The determination to the kidneys seems to depend upon the saline state of the serocity fitted to pass by that secretion, whilst the situation of the kidneys is fitted for a copious secretion of the watery parts of the blood.

Whether there are any parts of the mass of blood which, without exciting the general circulation, are particularly fitted to pass by the skin, I cannot positively determine; but am disposed to think there are none such, as the function of perspiration does not appear to be a glandular secretion, but merely an exhalation.

The action of the exhalant vessels may be excited by heat, friction, and stimulant substances applied externally; but it is difficult for me to conceive that any medicine, without affecting the general circulation, can be conveyed to the extreme vessels so as to act on these only, or so universally on these, as in the production of sweat must be supposed.

From the whole of what is said, it would appear that there are no diaphoretics strictly to be so called, that is, internal medicines act-

ing upon the organs of perspiration alone; and if, however, it appears that the action of the extreme vessels is excited without any increased action of the general powers of circulation, it must be by medicines acting upon certain parts of the system, which, by a consent of nerves, can excite the action of these extreme vessels. When we are therefore to speak of the particular medicines enumerated under the present title, we are to speak of all of them under the idea of their being sudorifics, whether acting upon the general circulation or upon the extreme vessels only, and in either case under a certain administration. But before entering upon this last circumstance of administration, and to explain wherein it consists, it is necessary to observe, that under the most powerful determination to the skin, we find that a certain application of heat to the surface of the body, without any assistance from powers internally applied, is sufficient to produce sweating; and that external cold applied can almost certainly prevent the same, though considerable powers are employed from within.

The application of heat therefore to the surface of the body, and the avoiding of external cold, are circumstances almost absolutely necessary to favour the operation of sudorifics.

These circumstances may be obtained by the heat of the air applied, as in what is called the dry bagnio, or by increasing the heat of the surface by previous warm bathing, or by accumulating the warm effluvia of the body itself upon its surface. This last may be done by covering up the body very closely with such coverings as may both prevent the escape of the warm effluvia arising from the body itself, and may at the same time prevent the access of external cold; the theory of both which contrivances is, we believe, commonly understood.

To favour the operation of sudorifics, another means may be joined, which is, the taking into the stomach a quantity of warm liquid, which not only excites the general circulation, but particularly, by the consent of the vessels on the surface of the body with the stomach, excites the action of those vessels which pour out sweat.

These two means of covering up the body very closely, and taking warm liquids into the stomach, are what we call the sudorific regimen; which will often alone answer the purpose of exciting sweat; is often necessary to the operation of sudorifics; and will always render their operation more complete and permanent.

Having thus, as well as we can, explained the operation of dia-

phoretics in general, and the measures proper and often necessary in their administration, we would next consider their general effects upon the system.

To this purpose we say, that as their operation often depends upon their exciting the action of the heart and arteries, and thereby exciting the impetus of the blood in every part of the system; so they may be useful in all cases in which the circulation is languid, and when the powers of it are inert. This is sufficiently evident in general; but the application of it to particular diseases is somewhat uncertain, for it is difficult to determine in what circumstances the practice may be safe. The languour of the circulation may be owing to the diminished energy of the brain, from causes acting especially in the brain itself; and in what cases the increased action of the heart and arteries will remove these causes, and restore the energy of the brain, is very uncertain.

For example, in what cases of apoplexy and palsy the action of the heart and arteries may be safely increased, it is difficult to determine: and I am persuaded, that in very few instances of these diseases the practice is admissible; and that, for the most part, it is ready to do much harm.

When the effects of the diminished energy of the brain appear, especially in the state of the circulation, the applying of a stimulus to the heart and arteries may seem to be more safe and proper; but it is difficult to give the due measure to such a stimulus, so as to render it both safe and durable; and we commonly find that tonics and exercise are both safer, and at the same time commonly more effectual. In that general loss of tone which we call a Cachexy, tonics, rather than stimulants, are found to be the remedies.

When there are any fixed obstructions in any part of the system, it is difficult to determine when the increased impetus of the circulation is capable of overcoming and removing them; and much random judgment has been produced on this subject, while it is very evident, that when such increased impetus is not capable of overcoming the obstruction, it is likely to prove very hurtful.

When it happens that the action of the heart and arteries is already considerably increased, it will be readily supposed, that medicines which increase the same would be improper; and so far as they operate only by increasing the action of the heart and arteries, they may certainly be hurtful: but as nature has intended that the effects of the increased impetus of the blood should be obviated by the flowing of sweat; so, when the operation of sudo-

rifics, especially of those acting upon the extreme vessels alone, produces this effect, it is possible that this sweating may not only render the first operation of sudorifics safe, even in cases where the impetus of the blood was before preternaturally increased, but may also prove a means of removing the causes of that preternatural increase, and prove a remedy of the disease.

This leads to the consideration of the effects and benefit of sweating in fevers and phlegmasiæ. In the former, we do not doubt but that sweating any how excited, may sometimes prove a remedy; but it is at the same time extremely doubtful whether it can be such when it is excited by medicines acting upon the heart and arteries; and we are certain that such medicines are generally hurtful. But on the other hand, when the sweating has been brought on by medicines which act upon the extreme vessels only, as these remove the spasm of the extreme vessels which supports the fever, they may be a cure of the disease. I am clearly of opinion, that sweating, by such a remedy, may in most cases be employed; but I have not attempted it so often as to allow me to be very positive in advising it to be universally practised.

In certain fevers, in which it is supposed that the contagion which had produced the disease continues to be diffused over the system, and that the cure of the disease depends upon the expulsion of this matter, it has been proposed to cure such a disease by copious sweating. Such is the case of the plague, which has been very universally treated by such a remedy; and without having had some experience in the disease, I cannot presume to condemn the practice; but I have many doubts to propose with respect to it, and that is enough to be said here, where the discussion could not be properly introduced. We cannot however dismiss the subject without observing, that CHENOT, an experienced practitioner, and one of the latest writers, is of opinion, that the copious sweatings formerly practised are by no means necessary; and that the judicious DE MERTENS, who writes of the plague of Moscow 1771, does not propose sweating as one of the remedies to be employed.

In the case of the phlegmasiæ, there is more difficulty in determining the propriety of sweating; but it may in some measure be determined in the same manner, that is, according to the means of bringing it on. By heating, and what may be called inflammatory medicines, it is certainly improper; but by medicines acting upon the extreme vessels alone, it may be more safe. As we have however found, that sweating, even by the most simple sudorific regi-

men, sometimes aggravated inflammatory diseases, we must say, that it is to be employed with doubt and caution. At the same time, however, the effects of DOVER'S powder in rheumatism show, that sweating is not only compatible with, but may prove a remedy in a very inflammatory state of the system. We must however conclude with observing, that what are the circumstances of the particular phlegmasiæ that may determine for or against this practice are not sufficiently ascertained.

Medicines which promote the discharge by the skin may be supposed to be remedies in the diseases of that part of the system, and they may probably be such; but the distinction and pathology of cutaneous affections are with me still involved in so much obscurity, that I am not able to speak with any precision or clearness on the subject.

It may be supposed, when certain acrimonies are diffused over the whole system, that sweating may be a probable means of carrying them out; and upon this footing it has been supposed, that sweating, by certain very powerful sudorifics, may be a means of curing the lues venerea, and it is alleged that it has actually proved such. But it is not necessary at present to enter into the discussions either of the fact or the probability of it, as it is in few cases that we shall think of having recourse to the practice.

It has been supposed that sweating, like other serous evacuations, may occasion an absorption of serum from the cavities in which it has been accumulated in the various species of dropsy: and in some instances this seems to have happened; but it does not happen so readily and constantly as to render the practice preferable to the other practices which may be employed for the same purpose.

PARTICULAR DIAPHORETICS.

THESE are arranged in my Catalogue according as they seem to act especially upon the heart and great arteries, or as we suppose them to act more especially upon the extreme vessels; and I have begun to enumerate these as we suppose them to act in the first manner.

These may all be allowed to stimulate the heart and arteries here enumerated: but in this they are of very different degrees of force; and many of them are so weak, that without great assistance from a sudorific regimen, they are not capable to excite sweat. Such are the *Calendula*, *Crocus*, *Dulcamara*, *Salvia*, *Scordium*, *Sassafras*,

Sarsaparilla; all of which, with very little choice, may be employed, but without any advantage that I can perceive.

There are other medicines in my list which are more powerful, and require less assistance of the sudorific regimen; such as the volatile alkali, wine, and alcohol, and the essential oils, or the aromatics from which these are obtained. The volatile alkali, in moderate quantity, may be often conveniently employed for assisting the sudorific regimen; and the same may be said of wine and alcohol in moderate doses: but they are in danger of going to excess, and in large doses are to be considered in another light. The essential oils, or the aromatics from which they are drawn, are of the heating and inflammatory kind, and may be employed sometimes as diaphoretic stimulants, but hardly in any case for the purpose of sweating.

The *Contrayerva* and *Serpentaria* are powerful stimulants, especially the last; and both have been employed in fevers in which a debility prevailed; but with what propriety seems to me very doubtful. I am persuaded that wine may always supersede the stimulant power of these medicines, and that debility is better remedied by the tonic and antiseptic powers of cold and Peruvian bark, than by any stimulants.

On the subject of the *Contrayerva* and *Serpentaria*, I cannot avoid transcribing the words of the judicious De MERTENS.

“*Radices contrayervæ et serpentariæ Virginianæ a præstantissimis in arte viris tanquam optima remedia antiseptica laudatas, in febribus putridis, solummodo quando vires deficiunt, et quidem rarissime adhibeo; experientia edoctus, illas corpori ingestas minus prodesse virtute antiseptica, qualem experimenta in lagenis vel ollis instituta ipsis inesse demonstrant, quamvi calefaciente nocere. Putredinis humorum arcendæ et corrigendæ scopum solus absolvit cortex Peruvianus, et ubi cardiacis opus est, vinum cæteris anteferendum mihi videtur.*” And in a note he has this stricture on two celebrated English physicians: “*HUXHAM et PRINGLE, qui has radices commendant, venæ sectionem initio harum febrium suadent, et in statu morbi vires stimulantibus excitare tentant.*”

Of all the diaphoretics that may be employed to excite the general circulation, I hold the *guaicum* to be one of the most valuable, as it affords a matter which passes more entirely to the extreme vessels, and seems to stimulate the exhalants more in proportion than it does the heart and great arteries. By this means it is both a more safe and more effectual sudorific than those which stimulate the latter almost only. It is on this account that it may

be justly considered as more effectual than other sudorifics in the cure of the lues venerea; and it is probably upon the same ground that it has been found so useful in all cases of rheumatism, and perhaps in those of gout.

Having thus considered the several diaphoretics which operate by exciting the powers of the general circulation, I must now speak of those which operate more especially, or almost only, upon the extreme vessels.

In making up my Catalogue I thought of inserting in this place *Aqua frigida*. I still think I should have done it, and therefore shall speak of it here.

Taken into the stomach, it is a powerful means of exciting the action of the extreme vessels; and with the assistance of covering the body very closely, it may be employed for exciting sweat.

GALEN and his immediate followers, as well as those of the 16th century, seem to have made much use of cold water, and frequently for the purpose of exciting sweat: but in more modern times, such practices, so far as I know, have been seldom followed; and therefore, with respect to the effects or propriety of them, I cannot properly give any opinion, but must advise my readers to consult the Galenic writers, particularly LOMMIUS, upon the subject; and further, to consider two passages in CÆLSUS, in Chap. VII. and IX. of his third book, which mention the exciting sweat by a large quantity of cold water thrown into the stomach, and thereby curing fevers.

After thus supplying my omission of cold water, I proceed to mention the other articles of my Catalogue, which act especially upon the extreme vessels.

The first are the Acid Salts, of which the fossil species may be employed, but cannot be conveniently thrown in so suddenly as to be well adapted to sweating; and therefore the vegetable acids have been more commonly employed. Of these the fermented acid or vinegar has been considered as the most effectual; and a whey made with a large proportion of vinegar proves commonly a very effectual sudorific. It has therefore been supposed, that vinegar has the power of attenuating the fluids; but this, upon the doctrines laid down before with respect to attenuants, cannot be admitted: and we maintain that its sudorific power depends entirely upon its refrigerant power in the stomach, analogous to what we are to say with regard to other saline diaphoretics.

SALES NEUTRI.

THESE are evidently, with a proper regimen, powerful sudorifics, and have been frequently employed as such. For the use of nitre in this way, see Dr BROCKLESBY'S Observations, published 1764.

For the sudorific powers of the sal ammoniacus, see MUYS de Sale Ammoniaco; and it appears from BOERHAAVE, that the sal digestivum, or febrifugum sylvii, has been employed to the same purpose. In mentioning these sudorific neutrals I need hardly add, that the saline mixture or neutral, formed of an alkali joined with the native acid of vegetables, is properly employed in favouring and supporting sweat.

ANTIMONIUM.

We have said above that this medicine, operating, as it always does, more or less on the stomach, by that operation excites the action of the extreme vessels. This is often to the degree of exciting sweat; and whether for this purpose certain preparations of it are more fit than others, I would not positively determine. In the case of fevers, we are clearly of opinion that our nauseating doses have the best effects when they produce some sweating; and that when the antimonial alone does not readily do that, it should be assisted by some neutral salt joined to it.

In other cases, as of rheumatism, or other inflammatory disease, the antimonial may be more certainly and properly determined to excite some sweating, by being joined with more or less of opium.

In my Catalogue, I think I should have set down a general title of Emetics; as, from the analogy of antimony, we conclude, that all emetics are at the same time diaphoretics, and may very often be employed for exciting sweat.

OPIUM.

THIS substance has been at all times considered as a powerful sudorific; and there has hardly been any celebrated sudorific composition that has not had this as a chief ingredient in it. Though I have treated above pretty largely of the medicinal qualities of this substance, it is still properly considered here; and the question that especially occurs to us, is to explain upon what the sudorific powers of opium especially depend.

To this purpose we shall allow, that the stimulant power of opium in exciting the action of the heart and arteries, may have a chief

part in its producing sweat; but I maintain that opium does this more readily, and more safely, than any stimulants which operate in the same manner: and this may be accounted for, and in my opinion can only be accounted for, by supposing that opium with its stimulant at the same time exerts its sedative powers.

These must especially affect the parts most distant from the sensorium, which are the extreme vessels every where. It manifestly diminishes the activity of these vessels, and therefore suppresses all excretions; but even this must be with some relaxation of their tone and tension, whence they may more easily yield to the increased impetus of the blood in the great vessels. In this manner we account for the sudorific powers of this substance; and we presume that it is consistent with all the several operations and medicinal qualities of opium which we have mentioned above, and which it is not therefore necessary for us to repeat here.

MOSCHUS.

WHEN this is given in large doses, it commonly induces sleep, and almost as certainly occasions a profuse sweat. It is therefore properly considered here as a sudorific; and its operation is explained by the same reasoning we have just now employed on the subject of opium. In its turn the consideration of musk illustrates and confirms that reasoning.

In the catalogue of diaphoretics there are two articles which I have not yet taken notice of; and I doubt if they should have been inserted. The first of these is Camphire, which, with a sudorific regimen, might perhaps be employed: But in the frequent exhibitions of it which I have been acquainted with, I have not observed its tendency to excite sweating; and therefore think it was not properly inserted in my list.

The other article I should take notice of is the *Hydrargyrus*. This certainly reaches the extreme vessels, and excites their action; and the most acrid preparation, the corrosive sublimate, sometimes excites sweating: but neither this nor the other preparations are given intentionally for this purpose; nor in my opinion could they be conveniently employed as sudorifics, which must always operate more suddenly than a moderate dose of mercury could be supposed to concur with them.

CHAPTER XXIII.

MENAGOGA.

THESE are the medicines suited to promote the menstrual discharge which occurs in the female sex.—A set of medicines the most unfaithful; and very frequently disappointing our expectations from them.

The writers on the materia medica, both ancient and modern, particularly the former, mention many medicines as emmenagogues; and I have employed a great number of these recommended by them: but I have been so very often disappointed of the wished for effects, that I have ventured to allege that the ancient writers had not on this subject spoken from experience. These disappointments which I have met with, I find to have also happened to my fellow practitioners; and I have not, amongst the most experienced, found any one who does not acknowledge his failures in employing the emmenagogue medicines recommended by writers; nor who does not own, that he cannot almost in any case of amenorrhœa, with much confidence, promise success in curing it.

What is the foundation of this failure, it is not easy to assign; but I judge it to be owing to this, that we have not yet found out a medicine which has any specific power in stimulating the vessels of the uterus: and farther, to explain this, I must make a few remarks upon the nature of the menstrual discharge.

I suppose then, that in consequence of the gradual evolution of the system, at a certain period of life, the vessels of the uterus are dilated and filled; and that by this congestion these vessels are stimulated to a stronger action, by which their extremities are forced open, and pour out blood. According to this idea it will appear, that I suppose the menstrual discharge to be upon the footing of an active hæmorrhagy; which by the laws of the œconomy is disposed to return after a certain interval, and which, after some repetition, may, by the power of habit, be determined to return at regular periods.

This is my general idea, which I think may be rendered applicable to all the various phenomena and accidental occurrences which happen with respect to this discharge. It would not however be proper to enter into such an explanation here; and for my present

purpose I am to make use of one circumstance only : This is, that as in all active hæmorrhagies, the flowing of blood depends especially upon the increased action of the vessels of the part, so in the uterine discharge it depends upon an increased action in the vessels of the uterus.

To apply this more particularly, we must observe, that the interruption of this discharge is in two different states ; one of which is, when the menses do not flow about the time of life that is the most usual with the sex ; and the other is, when the flow has been established at its usual periods for some time, it is by certain causes interrupted from returning at its usual times. These two states are well known under the titles of the *Retention* and the *Suppression* of the menstrual discharge. The first state, that of retention, we suppose to depend upon some weakness of action in the vessels of the uterus ; the other, of suppression, we suppose to depend upon some constriction in the extremities of the same vessels, which prevents their yielding to the usual impetus of the blood flowing in the larger portions of them.

The whole of the above remarks might perhaps have been omitted here, by referring my readers to the VI. and VIII. Chapters of the Fourth Book of my *First Lines*, from which they may still take the doctrine more fully ; but in an introduction to the *Medicamenta Menagoga*, I thought it necessary to give the general doctrine ; which amounts to this, that the medicines which are to be employed in both the states of amenorrhœa are chiefly those which strengthen and increase the action of the vessels of the uterus : And with this explanation I proceed now to make some remarks upon

PARTICULAR EMMENAGOGUES.

ALOE.

Of this we have treated in its proper place amongst the purgatives ; and there too we have made our remarks upon its supposed emmenagogue virtues.

GUMMI FOETIDA, ET PLANTÆ FOETIDÆ.

OF these I have treated above under the head of antispasmodics, and have there insinuated, that they have seldom or never answered my expectations in practice as emmenagogues ; but I have said that there may be some fallacy in my experiments, and cer-

tainly I could not disregard the general opinion so much as to omit them here.

CROCUS.

I MUST say the same with respect to this article ; but I have given above my reasons for suspecting that it is a medicine for the most part insignificant.

CASTOREUM.

OF this also I have treated above as an antispasmodic, and perhaps that virtue is a good reason for introducing it here ; but besides that, it has as good a right to be considered as an emmenagogue, as any of the disagreeable odours which we have mentioned as such before. The castor is commonly enough joined with the fetid gums ; and whenever I have employed these with any success, I am of opinion that the castor had a great share in producing the effects.

With respect to the castor let it be observed, that as it is in our shops it is in different conditions ; that the most odorous is the most powerful medicine ; and that some of the kinds of little odour have hardly any power at all.

FERRUM.

THIS we have also treated of before as an astringent and tonic medicine ; but we have introduced it here as commonly supposed to be a very powerful emmenagogue. From the principles we have laid down above, it will readily appear that, in the cases of retention, attended as they commonly are with a general flaccidity of the system, the tonic powers of iron are likely to be the most powerful remedy ; but at the same time it will be probable, that, in the cases of suppression depending upon a constriction of the extremities of the vessels of the uterus, the same tonic powers may not be so properly employed.

HYDRARGYRUS.

THIS, as an universal stimulant, and as very commonly reaching the extreme vessels, may be capable of stimulating those of the uterus, and therefore of proving an emmenagogue. Upon this supposition it is introduced here ; and, from several trials, I am persuaded that the continued use of mercury has proved a cure of suppressions. How far it may be employed in cases of reten-

tion I am uncertain; but am of opinion, that it can be neither so safely nor so effectually employed in these as in the cases of suppression.

[* To the preceding very brief, and I may venture to add unsatisfactory, history of EMMENAGOGUE MEDICINES, I shall make a few additions, still, however, leaving the subject in a most unfinished state. I shall not be studious of much order.*]

BITTERS.

[* MANY of these have been usefully employed in cases of retention and suppression of the menses: and it will often be proper to have recourse to them. It may be difficult, perhaps, to say which are the bitters, to which the preference should be given, with a view to these effects. I shall not, therefore, trouble my readers with any mention of individual articles of the general class of bitters, with the exception of two. It would be an easy task to compile a long list of bitter emmenagogues from the books of botany and materia medica.*]

CHAMÆMELUM.

[* See the late learned Dr HEBERDEN'S *Commentaries*, &c. page 311.*]

LUPULUS.

[* SOME of the properties of this article have already been considered, under the general head of TONICS. I can venture to assert, that the infusion of hop, liberally taken, and especially the well-hopped malt-liquors, are important medicines, by virtue of their tonic power, in many cases of retention and suppression of the menses.*]

* * * * *

RUBIA TINCTORUM.

[* See pages 29, 384, of this volume, where Dr CULLEN has said something respecting the emmenagogue powers of this plant. On this subject, the testimony of Dr HOME and some other British practitioners is very pointed, and ought not to be neglected. In

my employment of the powder of madder, both in public and in private practice, I have so frequently observed it to show considerable effects upon the uterus, that it is without any degree of hesitation, that I speak of it as a remedy worthy of the attention of practitioners. It appears to be suited both to cases of retention and suppression of the menses: but it is chiefly in the latter condition that I have employed it. I have chiefly prescribed it in substance, giving it in large doses. But a tincture, made with a proof spirit, has been beneficially employed.*]

ROSMARINUS.

[* This has already been taken notice of, in a former part of the work. See page 108. My own experience does not enable me to say any thing concerning the emmenagogue power of rosemary. But this power is so pointedly and unambiguously mentioned by BERGIUS, and other writers, that I have thought it proper to give place to the plant, in the present chapter. I understand, too, that the emmenagogue quality of rosemary has been observed by some of the physicians of Philadelphia.*]

PULEGIUM.

[* CONCERNING the emmenagogue power of this article, see page 108. I shall only add, that, from a variety of circumstances, I cannot but repose considerable confidence in the testimony of different authors concerning the effects of this medicine upon the uterus.*]

POLYGALA SENEKA.

[* THE root of this plant, whose cathartic, diuretic, and other properties, have already been treated of, has lately been recommended as a valuable menagogue, by some of the physicians of Philadelphia.*]

COFFEE.

[* I CAN, with great confidence, recommend a *strong* infusion of this common and delicious article of the table, with or without sugar and milk, as a very useful medicine in cases of retention and suppression of the menses, accompanied with very weak arterial action. With equal confidence, my experience teaches me to dissuade from the use of coffee in all cases of active hæmorrhagies; and even in the common disease of fluor albus, when this is connected, as it often is, with a febrile state of the system.*]

[* It forms no part of my plan to treat here of the good effects, in very many cases of retention and suppression of the menses, of the cold and warm bath; of general and topical blood-letting; of electricity; of frictions; of compression applied to different parts of the body; of stimulating enemata, &c. Nor need I say any thing concerning the diet that may be peculiarly suited to cases of this kind; though it cannot be denied, that an attention to diet, and in particular a proper selection of animal and of vegetable food, is almost always a matter of importance in the morbid conditions of the uterus which we have been considering.*]

CHAPTER XXIV.

ANTHELMINTICA.*

WE shall now add to this *Treatise*, a few observations on the medicines, or remedies, which are called ANTHELMINTICA, or ANTHELMINTICS. These are such articles as have the power of destroying, or expelling the worms which inhabit the human alimentary canal.

It is the special province of the naturalist to detail the minute history of these *vermes*. But every practitioner of medicine should make himself acquainted with the forms, appearances, and ordinary places of residence, of a set of animals, which, though sometimes our quiet and even innocent inmates, do unquestionably, in many persons, and in some countries more than others, occasion great inconvenience to the system; and even lay the foundation of mortal, or of long-lasting diseases: of convulsions of the milder kind; of chorea, epilepsy, hydrocephalus internus, hypochondriasis, mania.

The more common symptoms by which the presence of worms in the alimentary canal (when they do occasion a visible inconvenience) is characterised or known, may be learned from the writings of medical practitioners, to whom I must refer my readers for information on this subject. It is the exclusive object of this chapter to enumerate a few of the more important anthelmintics, which now are, or which deserve to be, employed in the practice of diffe-

* As the *whole* of this and the succeeding Chapter are additions of the Editor, he has not thought it necessary to mark their contents by distinguishing signs, as he has done in the preceding pages of the work.

rent countries. The principal of these I shall speak of, as they are derived from the vegetable, or from the mineral kingdom.

VEGETABLES.

THE vegetable kingdom supplies us with some of the most important anthelmintics with which we are acquainted. A few of these I shall enumerate somewhat in the order of their degrees of power, or general effect, and without any regard to their botanical affinity to each other.

SPIGELIA.

This, which is well known by the name of Carolina pink-root, appears to be exclusively a native of America. Its power as an anthelmintic is sufficiently established by the experience of many physicians, for more than half a century : indeed, it may be doubted whether there is, in the whole series of anthelmintics yet known, a more efficacious medicine against worms, especially the common round worm,* than this spigelia. On this account, the plant is deserving of a more particular attention than several others, which are mentioned in the present chapter.

Every part of the spigelia may be employed as an anthelmintic : but the active power of the plant resides principally in the root. This is most conveniently exhibited in the shape of decoction or infusion, though it is also employed in powder. As it does not, in general, prove purgative, it is commonly advisable to give, at the end of some hours after the exhibition of the spigelia, a dose of rhubarb, or some other cathartic.

Spigelia is an article capable of injuring the system : and death, it is believed, has sometimes been the consequence of its indiscreet employment.

It may not be improper to observe, in taking leave of this active and valuable plant, that it has often been advantageously prescribed in the intermittent and remittent fevers of children, though the presence of worms could hardly be suspected, since none were evacuated.

MELIA.

THE bark of this Asiatic tree, now naturalized in the southern parts of the United-States, is a powerful anthelmintic. I have of-

* *Ascaris lumbricoides* of Linnaeus : *Ascaris intestinalis* of Bloch : *Lumbricus intestinalis* of Pallas : *Lumbricus intestinalis humanus teres* of Klein.

ten employed it, and believe it to be one of the most useful articles of the class. It is most conveniently exhibited in the shape of decoction and infusion: and the bark of the root is more powerful than that of the stem or branches.

Though more especially adapted to the destruction and removal of the common round intestinal worm, the melia also exerts its power over tænia.* Like the spigelia, it acts, in certain doses, as an inebriant or narcotic: and like that article, it should be used with prudence, in the management of young and delicate constitutions.—See my *Collections*, &c. parts first and second.

HELLEBORUS FOETIDUS.

THIS is a powerful vegetable, the leaves of which have been strongly recommended by BISSET and others as an efficacious anthelmintic. The powdered leaves, mixed and disguised with ethiops mineral, were at one time much employed in Pennsylvania, under the name of “Dr WITT’s worm-powders.”

VALERIANA SYLVESTRIS.

The anthelmintic power of this plant has already been hinted at. See page 263. But this quality of valerian is deserving of more notice, under this special head of anthelmintics.

MARCHANT, DONALD MONRO, and other physicians, have all spoken of the powers of valerian as an anthelmintic. The first of these writers, indeed, mentions the cure of several persons labouring under epilepsy, by means of this vegetable root. In all these cases, the epileptic convulsions seemed to depend upon worms. One case of the same kind came under my own notice. The epilepsy was effectually cured by the powder of the valerian, which discharged many worms, after calomel and other medicines had been ineffectually exhibited.

CENOPODIUM ANTHELMINTICUM.

THIS is a very strong-smelling plant, the odour of which is not unlike that of valerian. The leaves and seeds may both be employed; but the latter are generally preferred, and are, I believe, the most powerful. I am not certain, however, that the essential oil of this, so much in use in the United-States, is the most proper formula. But in whatever way employed, I am inclined to think,

* *Tænia lata oculis lateralibus solitariis* of Linnæus:—*Tænia lata hominis* of Bloch.—Also, *Tænia solium* of Linnæus.

that chenopodium anthelminticum is an useful and active anthelmintic ; in cases of ascaris intestinalis especially.

TURPENTINE.

THE oil of this, formerly mentioned, has lately come into much notice, and many testimonies have been published of its efficacy, in cases of tænia, both in Europe and in America. My own experience with this article, though it has been very inconsiderable, has been sufficient to convince me, that the oil of turpentine is a valuable addition to the list of anthelmintic remedies. It is to be hoped, that the physicians of Lower-Canada, where tænia is said to occur much more frequently than in most parts of the United-States, will give us the results of their practice with it in these cases. Nothing is more extraordinary, with respect to this article, than the large doses of it which the constitution will bear, with impunity.

CAMPHOR.

THE experiments of CARMINATI and other writers have shown, that few vegetable substances yet discovered are more constantly deleterious to animals than camphor. These experiments should of themselves authorise us to assert, that camphor might be so managed as to prove a valuable anthelmintic : and the observations of PRANGE and other writers have fully established the useful powers of this medicine, in such cases, and especially in the case of ascarides.† For the removal of this species of vermis, whose principal residence is in the rectum, from which, however, it sometimes emigrates into the vagina, occasioning there most insufferable *pruritus*, enemata of camphor have been found among the more powerful means which have yet been employed.

NICOTIANA.

THE anthelmintic power of this article is particularly taken notice of in my *Collections*,‡ whither I beg leave to refer my readers for information. I will only add, that it is a fact well established, that tobacco shows the anthelmintic effect, even when it is externally applied to the body. The seed are sometimes exhibited internally.

† *Ascaris vermicularis* & *pollicaris* of Linnaeus :

Ascaris vermicularis of Bloch :

Ascaris græcorum of Pallas.

‡ Part First.

DOLICHOS PRURIENS.

THE operation of this article I take to be purely *mechanical*, and so far it cannot fail to attract the notice of the physician. Nor do I doubt that the setous covering of the legume of this dolichos does really exert the anthelmintic effect. But I must doubt, notwithstanding the encomiums which Mr CHAMBERLAIN has bestowed upon it, whether this article will, or indeed ought to, come into general practice as an anthelmintic.

BITTERS.

CONCERNING the anthelmintic property of certain articles of this assortment of tonics, as anthelmintics, see page 44 of this volume. I doubt not the testimony of physicians, who tell us, that they have often given bitters, with great advantage, in cases of worms: because I know, from my own observation, that not a few of these articles, such as tansy, some species of prunus, or cherry, &c., are really good anthelmintics. But I must be permitted to doubt, what a certain British writer has asserted, that the Peruvian bark is the best of all anthelmintics.

PURGATIVES AS ANTHELMINTICS.

ALL the vegetable cathartics may be considered as anthelmintics: and the anthelmintic effect is not unfrequently exerted by even the mild cathartics, such as oleum ricini, the expressed oil of the walnut and hickory nut, rhubarb, &c. But, in general, in our employment of cathartics, with a view to the removal or destruction of worms, we select the more drastic articles of the class, such as aloe, gamboge, scammony, jallap, podophyllum.

The anthelmintic property of some of these articles has already been mentioned in preceding parts of this work. In particular, the celebrated powder of gamboge, "as the fittest and most effectual medicine for expelling the tænia or tape-worm," has been noticed,* and I have little doubt, that the chief efficacy of Madame NOUFFER's worm-medicine, which was purchased by the French government, depends more upon the employment of this cathartic gum-resin, than upon the male fern, which was said to be the more active ingredient in the composition of the powder.

* See page 378.

SACCHARINE MATTERS.

EXPERIMENTS have proved, that saccharine matters, and especially common sugar, prove extremely injurious to various species of animals, and among others to certain vermes, nearly allied to those which inhabit the human stomach and intestines. I believe, that the anthelmintic quality of sugar, so far as the common *ascaris lumbricoides* is concerned, must be admitted : but I doubt if sugar extends this influence to the *ascaris vermicularis*. As to the *tænia*, the observations of some judicious travellers and others rather favour the notion, that sugar and saccharated fruits contribute to the increase of the species of this genus of worms. The matter may require further inquiry : but, in the meanwhile, I would not advise a diet of sugar to children or others, labouring under either of the two species of vermis just mentioned.

MINERALS.

HITHERTO, we have received fewer anthelmintics from the mineral than from the vegetable kingdom. But some of our most active and indispensable articles of this class are preparations of metallic bodies. Those which seem especially entitled to attention are the following :

HYDRARGYRUS.

Two of the more common preparations of mercury, viz. Calomel and Corrosive-sublimate, maintain their reputation, as anthelmintics, wherever medicine is known as a science. The corrosive sublimate is chiefly employed in cases of *tænia* : calomel in the more common case of *ascaris lumbricoides*. Though calomel, when given in proper doses, and persisted in sufficiently, will generally succeed in removing the round worm, it must not be denied, that it often fails, when *spigelia*, *melia*, and other vegetable anthelmintics will fully answer the purpose. I have not unfrequently observed this in my own practice. The severe operation of mercurial medicines upon the salivary glands, and their occasional effect in greatly disordering the intestinal canal, may often forbid their use, as anthelmintics, when less dangerous, and equally efficacious means are at hand.

BLUE VITRIOL.

LARGE doses of this metallic salt have been found very efficacious in dislodging tænia. The medicine, so far as I have yet learned, has been principally employed as an anthelmintic, in the southern parts of the United-States, where tænia is a very common vermis in the bodies of the negro slaves.

ARSENICUM.

IN my very frequent employment of this article, I do not recollect to have ever once observed its anthelmintic quality. But I place entire dependence upon the testimony of Dr FISHER, of Massachusetts, who informs us, that he has frequently employed arsenic as a powerful anthelmintic.

IRON.

DIFFERENT preparations of this metal, and especially the rubigo ferri, formerly treated of, have often been mentioned, and recommended as efficacious anthelmintics. And there can be no doubt, that they have often proved such, by virtue of their tonic powers. But I doubt if the rubigo ferri be, for general purposes, as valuable an anthelmintic as it has sometimes been represented. In giving this article to the extent of one ounce in the day, and continuing the practice for some time, a patient labouring under tænia never discharged more than a few small links, or portions, of the worm.

TIN.

ALTHOUGH the anthelmintic power of tin has been highly praised by ALSTON, and many other writers of good credit, I doubt if it be entitled to much attention, in the present state of our knowledge of remedies against worms. Is not the operation of tin, as an anthelmintic, almost entirely *mechanical*?

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COMMON SALT.

THIS is a powerful medicine, and with proper attention to the dose, will, if I mistake not, be found adequate to the removal of every species of intestinal worm. But its use is more especially confined

to the removal of the ascarides in the rectum; and with this intention it is used in the shape of enema. Among other practitioners, my worthy and experienced friend and preceptor, Dr АДАМ КУHN, informs me, that he has found no article so useful in the destruction of the last mentioned vermis, as injections of common salt.

IN many of the more morbid cases of worms, an attention to diet and to exercise may be a matter of the first importance. ROSENSTEIN has strongly recommended the use of salted provisions. And as to exercise, the great Linnæus has furnished us with a very impressive instance of the importance of this, in a long continued case of ascarides.

Besides the anthelmintic articles which are enumerated in this chapter, the reader will find, scattered through various other parts of the *Treatise*, hints or observations concerning other anthelmintics, of greater or of less importance. See, among others, the articles HYSOPIUS, ASSAFOETIDA, &c. I ought, perhaps, in my own list of anthelmintics, to have taken some notice of the following articles, viz. IGNATIA, GEOFFRÆA INERMIS, HELONIAS LUTEA, (*Veratrum Luteum*), different species of GALEGA, AQUA CALCIS, Water impregnated with Fixed-air, or Carbonic acid Gas.

CHAPTER XXV.

ANTILITHICA.

IN the *Dictionary* of terms which the reader will find in the first volume of this work, I have fully explained the meaning of the term **ANTILITHICA**, or **ANTILITHICS**, which I assume as the name of the last class of medicines which I am to treat of.*

I shall not here enter into any defence of the propriety of this term, but assume it as a fact, that physicians are now acquainted with many articles, which may often be advantageously employed to relieve the symptoms of a calculus or stone in the kidneys or bladder, and this without taking into our view any of the palliative methods, such as preparations of opium.

The symptoms which denote the presence of a stone in either of the organs which I have just mentioned, and the series of phenomena which constitute the disease of nephritis arthritica, or nephritis from retrocedent gout, may be collected from many works which are easy of access, and to which, therefore, I beg leave to refer my readers. It is, certainly, not necessary to enter into an enumeration of these symptoms in the present inquiry, in which I am of nothing, next to accuracy, so studious as of brevity. I will only observe, that the paroxysm of nephritic gout, or in other words of gout in the kidneys, is not to be distinguished, by any signs with which I am acquainted, from a paroxysm of nephritis calculosa: and that repeated attacks of gout in the kidneys, seem ever disposed to lay the foundation of genuine nephritis with stone or gravel.

* It was originally my intention to have introduced this class immediately after the class of Diuretica: and this, I am persuaded, would have been a better arrangement than the one which I have adopted: a better arrangement, since our diuretics and antilithics are intended to affect, either directly, or indirectly, the same sets of organs; and because it is a fact, that many of the diuretic medicines are antilithics. Or the class of antilithics might have been placed immediately before, or immediately after, the class of menagoga. That the uterus is capable of forming, or occasionally becomes the repository, as it were, of calculi, apparently the same as those of the kidneys and bladder, is one reason why this arrangement might have been adopted. But I have consulted *convenience* to myself.

Having said thus much, I might proceed immediately to enumerate some of the principal antilithics with which we are acquainted. But before doing this, it may be expected that I should say something concerning the chemical nature and composition of the calculi of the human kidney and bladder. Our knowledge on this subject, on which Dr CULLEN has said a few words in a former part of this treatise,* has been greatly increased by the late researches of several writers, particularly Messrs. FOURCROY and VAUQUELIN, Dr PEARSON, Mr TENNANT, and Dr WOLLASTON. But I deem it much more expedient to refer my readers to the memoirs of these distinguished writers, than to attempt to make an imperfect abridgement of them. I believe the researches of the able Dr WOLLASTON may be consulted with peculiar satisfaction. I may add, that an abstract of almost every thing that has been said or done on this highly important investigation, may be seen in Dr THOMAS THOMSON'S *System of Chemistry*: a work of inappreciable value.

In forming my catalogue of antilithics, I am little solicitous of any other method than that of throwing these articles into different assortments, as they are derived from the vegetable or from any other kingdom: I begin with the

VEGETABLE ANTILITHICS.

The catalogue of these, if we might depend upon the testimony and assertions of materia medica and botanical writers, is very extensive. Nor is it to be wondered at, that all nations have gone in search of medicines of this nature, since it seems to be a melancholy fact, that of the diseases to which the human kind is subject, in every stage and condition of its society, *lithiasis* of the kidneys and bladder is one of the more common. This, too, is truly one of the diseases which are common to man, and to many other species of animals, both wild and domesticated.

ASTRINGENTS.

HOWEVER difficult it may be to offer any thing like a satisfactory theory of the fact, I believe it must be admitted to be a fact, that several of the vegetable astringents have really been employed with no small advantage, in cases of calculus and gravel. Dr HEUCHER, we have already seen (see page 8) published a treatise on this subject; and Dr CULLEN has ventured to offer a theory to explain the *modus operandi* of the astringents as antilithics. We

* See page 292.

are not obliged to adopt the theory, of which a late writer has observed, that "though it seems to approach near the truth," it "still gives us an effect for a cause." "Perhaps, (says the same judicious author,) the secret is to be sought in the undiscovered generation of calculus."

UVA URSI.

THE antilithic quality of this vegetable has already been mentioned, under the head of Astringents. But the subject is worthy of much more attention. I will only, however, observe, in this place, that besides the testimony which has lately been borne in favour of the good effects of this article in nephritis, by the learned Dr FERRIAR and other writers, I have myself employed the uva ursi, with no inconsiderable advantage, in several cases of nephritis, both *calculosa* and *arthritica*. In one case, on several occasions, it seemed to be of essential service in favouring the excretion of small calculi. This case, indeed, fully reconciled me to believe, that DE HEUCHER had really observed the power of different astringents in expelling calculi.

In my employment of uva ursi, I have generally made use of a watery infusion of the leaves of the plant, which I have given in liberal quantity. In my own nephritic paroxysms, alternating with attacks of gout in the feet, I have, certainly, found the medicine of of much service; and I confidently, and with pleasure, recommend it to the notice and trial of other sufferers from the same affections.

The student may, if he think proper, consult the theories of LINNÆUS, Blizard, and other writers, besides that of Dr CULLEN, concerning the *modus operandi* of uva ursi, in calculous cases. To me, all these theories, the result of very limited and imperfect observation, are extremely unsatisfactory: but none of them is more so, than that which ascribes all the good effects of the medicine to its tonic, or roborant quality!!

I must not entirely take leave of this article, without observing that I have myself employed it, with success, in some cases of hæmaturia, in which I saw no cause to suspect the presence of calculus: and that I have more frequently found it an important remedy, internally and very liberally taken, in the disease of gonorrhœa of long continuance.

PYROLA UMBELLATA.

BOTANICALLY considered, this article is very closely allied to *uva ursi*: nor are the sensible properties of the two plants much less alike. I am assured, that this *pyrola* has been very advantageously used, as an antilithic, by certain physicians of the United-States. See my *Collections*, &c. parts first and second.

I might easily mention several other astringent vegetables, which have been found of use in mitigating, at least, the violence of nephritic paroxysms. But I proceed to speak of other assortments of plants, more or less entitled to the name of antilithics.

BITTERS.

NOR a few of the bitters, as well as the astringents, have acquired some reputation as antilithic medicines: and, even upon theoretical principles, it is not difficult to conceive, that the bitters have really, on many occasions, afforded relief, temporary if not permanent, in cases of nephritis calculosa, &c. For the affinity between nephritis and gout is well established: and the power of certain bitters in putting off, for a time at least, the paroxysms of gout, and essentially changing the form of the disease, seems to be admitted by physicians, and has been noticed in various parts of the preceding pages.

OF the purer bitters which are said to have afforded relief in cases of calculus and gravel, I might mention many: but I think it sufficient to notice only the three following, viz. *gentiana lutea*, *quassia*, and *lupulus*. The evidence in favour of the antilithic quality of the two first of these plants is not unworthy of regard. Concerning *lupulus*, I shall say something more particular.

LUPULUS.

PHYSICIANS of great respectability have entertained very different and opposite opinions concerning the powers of this vegetable bitter (and of the malt liquors into which it so generally enters as an ingredient), in cases of stone and nephritis. It is not my business to attempt to reconcile the two opinions. In the view of this subject, we might adduce the testimony of the learned and elegant ERASMUS, and the assertion of Dr DARWIN. These, however, would weigh but little against the noted observation of A. CYPRIANUS, the great lithotomist. The experiments of LOBB, who subjected calculi to the action of hop, *out of the body*, are of little or no importance. My own experience,—as the experience of an in-

dividual, with a very peculiarly organized system,—in his own person, is perhaps of little value. But I cannot, I think, be mistaken, when I assert, that the use of the highly hopped malt liquors has always more certainly subjected me to nephritic attacks, than the use of sound wines of any kind, even when these latter have been more liberally taken.

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DIGITALIS.

THIS has not, I think, been much employed as an antilithic medicine: nor do I know that it possesses any remarkable power of mitigating the pain, or otherwise alleviating the symptoms of a calculus. But I have, in several instances, prescribed the tincture and other preparations of digitalis, with the effect of relieving, in a very remarkable manner, and in a short time, an extremely troublesome dysuria, which (in one case at least) I had pretty good reason to believe, was dependent upon a stone, or gravel.

NICOTIANA.

THIS, also, has been found useful in cases of dysuria; and its well-known powers lead me to believe, that it might often be advantageously prescribed in the case of nephritis calculosa.



PAREIRA BRAVA.

As I have never employed, nor even seen, this vegetable, the *Cissampelos Pareira* of LINNÆUS, I shall only observe, that its root has been much praised as a remedy in cases of calculus, nephritis, and suppressions of urine: and I refer my readers to the writings of GEOFFROY, professor MURRAY, and others, for the ample medical history of the plant.



CONVOLVULUS PANDURATUS.

See my *Collections*.

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