FIRST DIVISION.—OF GENERAL STIMULANTS.

This division, according to the preceding table of classification, includes the four classes of Narcotics, Antispasmodics, Tonics, and Astringents,—these agreeing in the general stimulant operation they exert on the system, and differing principally in the diffusibility and permanence of action. They are therefore strictly connected, at least so far as to form a series through which the transition is easily traced.

CHAP. III.

OF NARCOTICS.

Narcotics, according to the definition that has usually been given, are substances which diminish the actions and powers of the system without occasioning any sensible evacuation. This definition is imperfect, in as much as it does not include that stimulant operation which they equally produce, and which in part at least must be admitted as the cause of these effects. The term Narcotic is

the most unexceptionable that can be assigned to these remedies. They are also named Sedatives, from their power of diminishing action; Anodynes, from their capability of alleviating pain; and Hypnotics, or Soporifics, from their power of inducing sleep.

The following are the general effects resulting from the operation of Narcotics. In a moderate dose they increase the force and frequency of the pulse, promote the secretions, give vigour to the body, and rouse the faculties of the mind, rendering its conceptions more vivid and forcible, and inducing hilarity or intoxication. These effects are however only temporary, and after some time symptoms of an opposite kind make their appearance; the pulse not only returns to its former standard, but becomes more slow, and at the same time full and soft; the respiration is more easy; the secretions, excepting that by the skin, are diminished; pain and inordinate motion, if present, are alleviated or repressed: there is a general languor, averseness to motion, and dulness of sense: the mind is placid and inactive, a state which generally soon terminates in sleep. This, after continuing for some time, is succeeded by temporary debility, marked by some degree of sickness, tremors, anxiety, and oppression. If the dose has been large, these symptoms of diminished sense and action are induced, even without any previous increased action; or, if a still larger dose has been given, the immediate consequences are delirium, paralysis, convulsions, coma, and death.

These effects are considerably diversified, as arising

from different Narcotics. In some, any stimulant operation is scarcely perceptible, even in a very moderate dose; others, with the narcotic power, possess an acrid quality; and in a large dose, with the general effects above enumerated, induce irritation or inflammation of the stomach, by which their action is modified. Some are more apt to induce sickness than others; and there is reason to believe that there are others in which the action is not equal upon the nervous and vascular systems, but is more determined to the one than to the other.

The medicines belonging to this class evidently act primarily upon the stomach, whence their action is propagated by nervous communication to the rest of the system. That they do not act by being received into the blood is evident from the fact, that their effects are apparent in general in a very short time, after they have been swallowed; and it has been ascertained by experiments, that if dissection be made immediately after these effects have appeared, the whole of the quantity administered is found in the stomach undissolved.

Applied externally, these medicines often exert their usual action, though with much less force. Opium applied to the skin deadens pain, and represses spasmodic muscular action, not only in the part to which it is immediately applied, but in others more distant. Several others of this class have similar effects.

Narcotics applied to the muscles of animals, quicken at first their action; but in a very short time they exhaust all irritability and sensibility. The heart even of

cold blooded animals is deprived of all power of motion by the application of a strong solution of opium for a few minutes. When injected into the blood vessels, the animal instantly dies without convulsions, and all the muscles of the body, voluntary or involuntary, are totally deprived of the power of contraction.

There is a singularity in the operation of narcotics, that by repetition their action on the system is diminished more than that of any other class of medicines, so that, after having been used for some time, they require to be given in increased doses to produce their usual effects, and quantities of them have at length been taken, which at first would have destroyed life. No very satisfactory explanation has been given of this singularity, for it is not connected with any proportional reduction of irritability, or any apparent permanent change in the system; but the fact is generally true with respect to these medicines, and requires to be attended to in their administration. It appears too to be more peculiarly the case with some than with others.

The theory of the operation of narcotics is attended with considerable difficulty, and very different opinions have been maintained with regard to it.

As they in general diminish the actions of the system, when given even in a small dose, it happened, that from their exhibition those effects were in general most obvious, and their stimulant operation was more rarely observed. Hence their primary action was generally considered as of a depressing kind, and they were described

by authors under the appellation of Sedatives. The stimulant effects which were also observed to arise from their action, were ascribed to what was termed the reaction of the system. It was supposed, that there belonged to the animal frame a power, the tendency of which is to resist and obviate the effects of any thing noxious. If such an agent were applied, this principle was believed to be roused into action, and all the powers of the system were excited to throw off the noxious application. On this hypothesis, the action of narcotics was attempted to be explained by Cullen. Their natural tendency was supposed to be to depress the powers of life; if given in a large dose, this power was exerted with effect, and hence arose symptoms of exhaustion; but, if given in a smaller dose, the vis medicatrix, or preserving power, was enabled to resist, and by its resistance occasioned the symptoms of increased action that first appeared. These substances, therefore, were considered as directly sedative, and as indirectly stimulant.

Precisely the reverse of this view was advanced by Brown, narcotics being regarded as stimulants, surpassing all others in the diffusibility and little durability of their action, and on this principle their effects were explained in the following manner.

It is the necessary effect of stimulant operation, to produce for a time increased action, but as this is attended with a diminution of vital power, the excitement soon ceases, and diminished action succeeds. These effects are proportional, partly to the absolute force of the ex-

citing power, and partly to the rapidity with which it operates. If sufficiently strong, and if, at the same time, it be diffusible and transient in its operation, the excitement it produces is quickly raised to its highest point, and is as quickly followed by proportional languor and diminished action. Or if the dose is large, the stimulant effect is so rapid, as to be hardly perceptible, and hence the sedative or depressing effects only appear. Thus narcotics were regarded as powerful stimulants, whose action is not confined to the part to which they are applied, but is rapidly extended over the system. In a moderate dose, they promote action of every kind, which is succeeded by a degree of languor or debility, proportioned to the excitement that had been raised; and in a large dose, they produce diminution of power, and consequently of action, without any symptom of previous excitement. Hence they were regarded as directly stimulant, and indirectly sedative.

If in investigating this subject, we merely contrast these two theories, little doubt can remain of the superiority of the latter. The former is founded on a hypothesis established by no evidence, that a power presides over the system, ready to resist every noxious application; the latter is apparently more strictly deduced from the properties of the substances whose operation is to be explained: for, as it is proved, and indeed admitted, that the stimulant operation resulting from the exhibition of narcotics follows immediately, and previous to any symptoms of languor and debility, these ought strictly to

be considered as the consequences of the former. The most extensive analogy too has been traced between the operation of narcotics, and other substances allowed to be stimulant, but which are less rapid in their action; as, for example, between ardent spirit and opium, though in the one, the stimulant, in the other the sedative operation is usually more apparent. And, lastly, the advantage derived from the cautious administration of narcotics in some diseases of diminished action, is scarcely compatible with the supposition of their exerting a direct depressing power.

The principal difficulty attending the theory, appears to arise from the fact apparently established, that the sedative power of these substances does not appear to be always proportional to their stimulant operation, but is greater than this, and that in several of them any previous stimulant effect is even scarcely perceptible. Yet this difficulty is in some measure obviated by the acknowledged fact, that substances, the stimulating action of which is unquestionable, as ardent spirit, if given in a very large dose, produce depression without any previous perceptible increased action. In like manner, electricity, applied in moderate quantity, stimulates the muscular fibre to contraction; while, applied in a highly concentrated state, it instantaneously produces total exhausion of the contractile power. The more forcibly, therefore, a stimulant operates, the more rapid does the immediate action appear to be produced, and the more quickly to cease, so as to be followed by the secondary effect; and with the admis-

sion of this principle, may perhaps be explained, on this hypothesis, the fact, that the sedative effects of narcotics appear often to be greater than their previous stimulating operation; the exhaustion following so rapidly, that any previous excitement is scarcely to be perceived. Narcotics, therefore, so far as we can speculate with any probability on their action, may be regarded as general diffusible stimulants.

The hypothesis may also, however, be maintained perhaps, that along with their stimulating operation, they *directly* exhaust the powers of life; and that these two modes of action are not strictly proportional, but are different in different narcotics. The effects of certain chemical agents on the system, as of nitrous oxide, and carburetted hydrogen, favour an hypothesis of this kind; the one producing high excitement without any proportional depression, the other producing exhaustion of power without any previous increased action. The truth, however, is, that from our imperfect knowledge of the laws of the living system, all such speculations are deficient in precision; nor can we do more than state the most general analogies, without attempting to extend them to any very minute applications. Thus, in all the theories which have been advanced with regard to the operation of narcotics, the principles have been inferred from the action of a few of the most powerful,—alkohol or opium. They are, after all, imperfectly adapted to these, and are still more deficient when considered in relation to the others.

As narcotics are capable of being administered, so as to obtain from their action either stimulant or sedative effects, it is obvious, that they may be employed as remedies, with the view of producing either of these. The exciting operation, however, is in general so transient, that few of them can be administered with advantage as stimulants. When given with this intention, they are applied in small doses, frequently repeated, as thus the state of excitement is best sustained. More usually they are given with the view of obtaining that state of diminished action and susceptibility to impression, which is obtained from their operation with more certainty and permanence; they are then given in larger doses at more distant intervals. As stimulants, they are employed in various forms of continued fever, remittent and intermittent fever, and numerous diseases of debility. As sedatives, they are still more extensively used to alleviate or remove spasmodic action, to allay pain and irritation, to induce sleep, and to restrain morbidly increased evacuations and secretions.

NARCOTICS.

Alkohol.
Ether.
Camphor.
Papaver Somniferum.
Hyoscyamus Niger.
Atropa Belladona.
Aconitum Napellus.
Conium Maculatum.
Digitalis Purpurea.
Nicotiana Tabacum.
Lactuca Virosa.
Datura Stramonium.
Rhododendron Chrysanthum.
Rhus Toxicodendron.
Arnica Montana.
Humulus Lupulus.
Strychnos Nux Vomica.
Prunus Lauro-Cerasus.

ALKOHOL. *Ardent Spirit. Spirit of Wine.*

By the process of vinous fermentation, a product is formed, which, combined in the fermented liquor, gives to it its peculiar properties—pungency, spiritous flavour, and intoxicating power. Being volatile, it can be obtained by the process of distillation, and in the diluted state in which it is at first procured forms the spiritous liquors of commerce. By repeated distillations, it is procured more pure and concentrated, and then forms what was named Pure Ardent Spirit, or Spirit of Wine by the older chemists,—names for which that of Alkohol is substituted in modern chemical language. This substance operates on the living system as a highly diffusible stimulant; in the state of spiritous and vinous liquors, it is employed for medicinal purposes; and in its pure form is an important pharmaceutic agent.

Alkohol is formed during the process of fermentation; and from the changes which occur during that process, we endeavour to infer the theory of its formation. Saccharine matter, in the state in which it exists in sweet vegetable juices, and fecula, which has been converted by malting into sugar, or even to a certain extent unmalted, are the substances chiefly susceptible of this process: the access of the air is not necessary to it; and the water of the fermenting liquor does not appear to suffer decomposition. The series of changes, whence the alkohol is formed, must arise therefore from the reaction of the elements of the saccharine matter, and the new combinations which are established. These elements are carbon,

hydrogen, and oxygen; during the fermentation, carbonic acid is formed and disengaged: this must be derived from the combination of portions of the oxygen and carbon of the saccharine matter, (or of the fecula, which is of similar composition); and the alkohol, which is the only other product of the process, may, under this point of view, be considered as a compound of the remaining elements; in other words, of the hydrogen of the sugar with its remaining carbon and oxygen. This is the theory of the vinous fermentation, and of the composition of alkohol inferred by Lavoisier, from experiments undertaken with the view of investigating this subject.

More recent researches, however, have shewn, that it is imperfect. Lavoisier had supposed that pure saccharine matter alone is capable of fermenting, and that the whole changes which occur during the process are changes in its composition. This is not, however, strictly true. To excite fermentation in a solution of pure sugar, a certain quantity of what is named Ferment, of which yeast is a variety, is necessary, and sweet vegetable juices suffer it only from naturally containing this ferment. Now the agency of this substance remains to be explained, and this has not yet been done in a satisfactory manner. It appears to approach to gluten or albumen in its nature, and in particular contains nitrogen in its composition. This nitrogen, it is shewn by the experiments of Thenard, disappears during the fermentation, and he has supposed it to enter into the composition of the alkohol, while a portion too of the carbon of the ferment combines with part

of the oxygen of the sugar, and contributes to form the carbonic acid disengaged. The whole of this subject, however, requires to be farther elucidated.

From the analysis of alkohol, it appears to be a compound of carbon, hydrogen, and oxygen; hence, in burning, it affords merely water and carbonic acid, and the quantity of water produced exceeds even the alkohol in weight. Lavoisier inferred, that it consists of 28.5 of carbon, 7.8 of hydrogen, and 63.5 of water, without any conclusive proof, however, that this large quantity of water exists in it fully formed, and not in part at least in the state of its elements. Saussure, in decomposing alkohol, by detonating the vapour of it with oxygen gas, or by passing it through an ignited tube, discovered a little nitrogen in its composition, and has given the following as the proportions of its elements: carbon 43.65, oxygen 37.85, hydrogen 14.94, nitrogen 3.52. But with regard to the results of this analysis, it still remains altogether uncertain, what proportions of oxygen and hydrogen exist in the composition of the alkohol as immediate principles, and what exist in it in the state of water.

The process for obtaining alkohol, consists in submitting vinous or fermented liquors to distillation. It distils over with a quantity of water, and in this manner are formed the spiritous liquors of commerce, these deriving peculiar flavour from the substances from which the fermented liquor has been prepared. These spiritous liquors, by repeated distillations, afford alkohol in a more concentrated state, different substances being added to

facilitate the concentration and rectification. The process belongs to the pharmaceutical part of the work.

Pure alkohol is colourless and transparent; its odour is fragrant, and its taste highly pungent; it is lighter than water, the difference being greater, as the alkohol is more pure and concentrated, and hence the specific gravity is the best test of its strength. As prepared by the usual processes, it is of the specific gravity .835, and it is of this strength that it is ordered in the Pharmacopœias, as fit for pharmaceutical purposes. By careful rectification, however, it may be brought to .815, and even to 800; and even, when of this degree of concentration, we have no method of discovering what quantity of water is contained in it: hence, we do not know what constitutes real alkohol. When of the common strength, it is so volatile, as to evaporate speedily at the common temperature of the atmosphere; it boils at 165° of Fahrenheit. It is highly inflammable, burning when in contact with the air, when its temperature is raised not much above 300°; the products of its combustion are water and carbonic acid.

Alkohol exerts chemical affinities to a number of substances. With water it combines in every proportion. It dissolves a number of saline substances, especially the pure alkalis, and several neutral salts. It likewise dissolves sulphur and phosphorus; and it is the solvent of a number of the vegetable proximate principles, such as resin, camphor, essential oil, balsam, extract, and saccharine matter.

From this solvent power, alkohol is a very important pharmaceutic agent, particularly as applied to the vegetable articles of the Materia Medica; the principles which it dissolves being those in which medicinal powers frequently reside, and being dissolved by it in such quantity as to afford very active preparations. It has another important property, that of counteracting the spontaneous changes to which vegetables are liable from the reaction of their elements; and hence these solutions retain their properties unimpaired. When diluted with an equal weight of water, it still retains its solvent power to a certain extent, added to the solvent power of the water; and this diluted alkohol, as it is named, is even more generally employed in pharmacy as a solvent of vegetable matter, than alkohol in its pure form. Its specific gravity, when of the due strength, is .935.

Alkohol is a powerful and highly diffusible stimulant. Taken in a moderate quantity, it almost immediately increases the force of the circulation, communicates a greater degree of muscular vigour, and excites exhilaration of mind: these gradually subside, and are followed by proportional languor. If the quantity is more considerable, its exciting effects are more quickly produced, and are followed by intoxication, temporary delirium, and stupor; and in a large dose it occasions death, with scarcely any symptom of previous excitement. Its analogy in producing these effects to other narcotics is sufficiently obvious. Its exciting power, however, appears to be rather more permanent than that of some of the medicines of

this class; and hence, while it can be successfully employed to rouse the powers of the system, it can scarcely be used with equal advantage to repress irregular action, diminish irritation, or induce sleep.

Alkohol, in its pure state, can scarcely be said to be employed in medicine. Sometimes it is used as an application to burns, and to certain states of local inflammation not connected with increased action; it is applied by friction to the surface to relieve muscular pains; or to bleeding wounds to restrain hæmorrhage.

Spiritous liquors, which consist merely of diluted alkohol, are employed as general stimulants to excite the actions of the system. Their stimulant operation, however, is not sufficiently permanent or capable of being regulated, so as to avoid the injurious consequences they are liable to produce, to admit of their being employed, except as occasional remedies.

Wines and fermented liquors owe their exhilarating power probably to the portion of alkohol they contain. The opinion has been advanced indeed, that the alkohol they afford by distillation does not pre-exist in them, but is formed during the distillation; this opinion resting on the facts, that the alkohol cannot be procured from them in the same quantity by any other method; and that when the product of the distillation is added to the residual liquor, wine is not reproduced. These facts are inconclusive; the similarity of power in vinous liquors to that of alkohol, affords perhaps sufficient reason to conclude, that it exists in them actually formed, though it

may be disguised by combination with their other principles.

The action of wine on the system, though analogous to that of alkohol, is not precisely alike; its stimulant operation appears to be less sudden and more durable; and hence it can be employed with more advantage as a tonic. It is as a tonic indeed, rather than as a narcotic, that wine is administered. Its chief medicinal application is in the treatment of fevers of the typhoid type, in which it is employed to support the strength of the system, and to obviate symptoms arising from debility. With these views, it is given with more advantage than any other tonic,—a superiority derived from its stimulating power being obtained with more certainty, and being more easily regulated, from its being more grateful, and probably not requiring to be assimilated by the digestive organs to produce its effects. The quantity in which it is given is altogether dependent on the state of disease; the object to be attained is that of supporting the strength of the system until the disease has run its course; the danger to be avoided is that of giving it so largely, as to occasion any degree of exhaustion. Its administration is regulated, therefore, by the effects it produces; advantage being always derived from it, when it renders the pulse more slow and firm; when the recurrence of delirium is prevented; when irritation is lessened, and sleep induced. If the pulse is quickened, and the countenance becomes flushed; if it excite thirst, increase the heat of the body, and occasion restlessness or delirium, it is obviously inju-

rious; and the dose must either be diminished, or its use altogether suspended. In general its operation is less powerful than it is on the system in a state of health; larger quantities therefore can be taken, and are even required to produce any exciting effect.

In various diseases of chronic weakness, or where the strength of the system has been reduced by profuse evacuations, or by any other debilitating operation, wine is in common use as a cordial and tonic.

Different wines have effects somewhat different, according as they are possessed of astringency, or as they are sweet or acescent; and are hence adapted to answer different indications.

The wines prepared from other fruits than the grape, are less spiritous and more acescent, and are hence inferior in tonic power. Fermented liquors, especially porter, are sometimes substituted for wine, where this is necessary from idiosyncracy, and their powers are somewhat modified by their other qualities, particularly by their bitterness, and by the pungency arising from their excess of carbonic acid. Their narcotic power too is often greater than is proportioned to their vinous strength, owing to the addition of narcotic substances which they often receive in their preparation.

From the immoderate and long continued use of vinous and spiritous liquors, many diseases derive their origin; as dyspepsia, hypochondriasis, visceral obstructions, chronic inflammation of the liver, and gout,—morbid states probably arising either from the increased action it excites,

giving rise to organic derangements, or from the exhaustion of power, general or local, produced by stimulant operation unnecessarily excited or too long continued.

ETHER SULPHURICUS. *Sulphuric Ether.*

ALKOHOL suffers decomposition from the action of the more powerful acids upon it; and substances are formed by these decompositions which have a resemblance in their general properties, though, as produced by the action of the different acids, they have also peculiar powers. They are denominated Ethers. Sulphuric ether, formed by the action of sulphuric acid on alkohol, is the one that has been chiefly applied to any medicinal purpose; and its powers are those of a narcotic. Nitric ether, in the state in which it has been used, dilute, and with a portion of free acid, acts principally as a diuretic, and is therefore placed under that class. The other ethers are of more difficult preparation, and have scarcely been introduced into the Materia Medica.

Sulphuric ether is obtained by exposing a mixture of sulphuric acid and alkohol, in equal weights, to a heat sufficient to produce ebullition; it distils over, and is purified by a second distillation, any free acid being abstracted by an alkali. The process is considered more fully in the pharmaceutical part of the work. A diluted preparation is ordered in the pharmacopœias, in which the rectified ether is mixed with two parts of alkohol; and in the London Pharmacopœia there is another preparation, in which a product that is obtained at the end of

the distillation, of an oily appearance, etherial oil, is added to this diluted ether; neither of these preparations is of any importance.

Sulphuric ether is colourless and transparent, highly odorous and pungent, and of a specific gravity inferior even to that of alkohol, being, when it is rectified, not more than .730, compared with the standard specific gravity of water. It is very volatile, evaporating speedily at natural temperatures; and from its rapid transition to vapour, producing much cold during its evaporation. In vacuo it boils below the freezing point of water, and under the atmospheric pressure it boils at 98. It is also highly inflammable, and affords by its combustion water and carbonic acid. It differs from alkohol, principally in containing a larger proportion of hydrogen, and to this its greater levity and volatility are probably owing. The proportions of its elements, as assigned by Saussure, are carbon 59, oxygen 19, hydrogen 22.

Sulphuric ether is a powerful diffusible stimulant, somewhat analogous to alkohol in its action, and, like it, capable of producing intoxication. Its stimulant operation appears to be even more suddenly exerted, and to be less durable: hence its superiority as a narcotic and antispasmodic. As a stimulant, it is sometimes given in occasional doses in typhus fever, more particularly in those cases where symptoms are present, connected with spasmodic action; it is also given in other forms of fever to obviate nausea; and it is said to be useful in abating the violence of sea sickness. As an antispasmodic, it is em-

ployed in spasmodic asthma, and sometimes affords sudden and complete relief, producing for a time at least remission of the paroxysm: it is also given with advantage in the hysteric paroxysm; it is one of the most powerful remedies in cramp of the stomach, and singultus; and it sometimes relieves some of the symptoms of cholera, especially the vomiting. Its usual dose is a tea spoonful, equal to about a drachm; but its beneficial effects are frequently not obtained, unless it be given in a larger dose, or until the dose has been repeated at short intervals. In dyspnœa and cattarh, its vapour inhaled into the lungs affords relief, probably from its antispasmodic power. Externally applied, it relieves muscular pains; it is an excellent application to burns; and from the degree of cold which attends its evaporation, it has been employed to favour the reduction of strangulated hernia, being dropt on the tumor, and allowed to evaporate freely.

CAMPHORA. Camphor. Laurus Camphora, Lin. *Cl. Enneandria. Ord. Monogynia. Nat. Ord. Oleraceæ. Habitat, Japan, India.*

CAMPHOR is not the produce exclusively of one vegetable, but is contained in many plants, especially those of the aromatic kind, diffused through their wood or bark, and is often deposited from their essential oils when these are long kept. The oils of peppermint, thyme, sage, and a number of others, thus afford it. For the purposes of commerce, it is obtained from a species of laurel, the Laurus Camphora, a native of Japan. It exists in dis-

tinct grains in the wood of the root and branches of this tree. It is extracted by sublimation, the wood being exposed to heat with a quantity of water, and the temperature thus communicated being sufficient to volatilize the camphor; in Europe, it is purified by a second sublimation, with the addition of one-twentieth of its weight of lime.

Pure camphor is colourless, semi-transparent, tenacious, and somewhat unctuous to the touch; its smell is strong and fragrant; its taste pungent and bitter. It is volatile at every natural temperature, and soon diminishes in bulk from exposure to the air; it melts at a heat inferior to 212°; is highly inflammable; it is scarcely soluble in water, but entirely soluble in alkohol, ether, and oils essential or expressed. The alkalis do not act upon it. The acids dissolve it, and the more powerful acids decompose it. These properties are sufficient to distinguish it from the other proximate principles of vegetables. It approaches nearest in its characters to essential oil, and appears to differ from oil in chemical composition, principally in containing a larger proportion of carbon. Hence, when its volatilization is prevented, and it is subjected to a temperature so high as to decompose it, as may be done by exposing it in mixture with pure clay to a heat suddenly raised, it affords a liquid, having all the properties of an essential oil, odorous and pungent. There remains a considerable proportion of charcoal; carbonic acid, and carburetted hydrogen gases are disengaged, and an acid liquid is obtained, named camphoric acid. This

acid, which is also formed from camphor by combustion, and by the action of nitric acid, has some resemblance to benzoic acid.

In a moderate dose, camphor produces effects similar to those of other narcotics, exciting first the actions of the system. This stimulant operation, however, is not considerable, even in a small dose; and in a large dose it diminishes the force of the circulation, induces sleep, and sometimes causes delirium, vertigo, convulsions, or coma.

As a stimulant, camphor has been used in typhus, cynanche maligna, confluent small-pox, and other febrile affections accompanied with debility; in retrocedent gout, and to check the progress of gangrene; but its stimulant operation is scarcely sufficiently permanent to admit of being easily regulated. As a sedative, it is used in affections of an opposite nature, as in pneumonia, rheumatism, and gonorrhœa, combined with nitre or antimonials, or by itself, where evacuations have been previously employed. In mania, it has sometimes succeeded as an anodyne: as an antispasmodic, it has been employed in asthma, chorea, and epilepsy.

The dose of camphor is from 5 to 20 grains, but it is seldom that it is given at once in so large a dose as the latter quantity, from being liable to produce nausea and irritation. In small doses, on the other hand, it produces little effect; unless these are frequently repeated. In divided doses, it may be given to the extent of a drachm or more in the day. Its power of checking the progress

of gangrene has been supposed to be promoted by combination with musk, or carbonate of ammonia: combined with opium, it forms a powerful diaphoretic; and its efficacy in inflammatory diseases is augmented by antimonials.

Camphor ought generally to be given in a state of mixture in some liquid form, as in the solid state it is very apt to excite nausea. It may be diffused in water by trituration with sugar, mucilage, or almonds. The camphorated mixture of the London Pharmacopœia, in which camphor is triturated with water, and strained, is a preparation which, from the small quantity water can dissolve, can have scarcely any power. In the pharmaceutic treatment of camphor, it is necessary, in order to reduce it to powder, to add a few drops of alkohol during the trituration. Magnesia, by being triturated with it, has the effect of dividing and rendering it smooth, and may be used for its suspension; a number of the gum-resins also act on it in such a manner, that, from their mixture, a soft uniform mass is formed, and this affords another mode of diffusing it in water. From this chemical action, it cannot well be combined with gum-resins in the solid form.

Externally applied, camphor is used as an anodyne in rheumatism and muscular pains, and as a discutient in bruises and inflammatory affections; it is dissolved in alkohol or expressed oil, and applied by friction to the part. Added to collyria, or mixed with lard, it is of advantage in ophthalmia. Suspended in oil, it is used as an injection in ardor urinæ, and as an enema to relieve the un-

easy sensations occasioned by ascarides. The combination of it with opium is useful as a local application in toothach.

Officinal Preparations.—Acid. Acetos. Camph. Emuls. Camph. Ol. Camph. Tinct. Camph. *Pharm. Ed.*—Mist. Camph. Lin. Camph. Lin. Camph. Comp. Tinct. Camph. Comp. *Pharm. Lond* *.

Papaver somniferum. White Poppy. *Polyand. Monogyn. Rhœad. Capsula et Succus spissat. Europe, Asia.*

The White Poppy is a native of the warmer regions of Europe and Asia; it also grows in colder climates, and without any diminution of its powers. The large capsule which it bears, affords, by incision in its cortical part, a milky juice, which, by exposure to the sun and air, becomes concrete, and of a brown colour. This is named Opium, and is the production of the plant that is chiefly medicinally employed. The leaves and stalks afford by expression a juice inferior in narcotic power; the seeds are inert.

The opium of commerce is in flat or rounded masses, which when cut present a substance soft and tenacious,

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* In annexing a list of the officinal preparations of each article to its history, I place first those of the Edinburgh Pharmacopœia, and, without extending it unnecessarily, by inserting the names of the corresponding preparations of the London and Dublin Pharmacopœias, I merely add those which are peculiar to either of the latter.

of a dark reddish brown colour, having a strong odour, somewhat fœtid, and a taste bitter and acrid. These are the properties of what is named Turkey Opium. A kind of inferior quality is known in the shops by the name of East India Opium, which is softer, of a blackish colour, and has a fainter smell.

Though opium has been often submitted to analysis, its proximate principles are still imperfectly determined. It is highly inflammable; submitted to the action of alkohol, a considerable portion of it is dissolved; and water likewise dissolves it in part. The solution in alkohol is much more highly impregnated than that in water; and it possesses, in a much higher degree, the narcotic power. Diluted alkohol, composed of equal parts of alkohol and water, appears to dissolve all its active matter; the tincture prepared by this menstruum, when the due proportion of solvent is employed, being equal, or very nearly so, in power, to the quantity of opium submitted to its action. After the joint action of alkohol and water on opium, there remains, mixed with the accidental impurities, a substance plastic and glutinous, the nature of which has not been ascertained; Bucholz considering it as similar to caoutchouc, and Gren supposing it analogous to gluten; it retains no activity. By boiling in water under exposure to the air, the narcotic power of opium is impaired; this can scarcely be ascribed, however, to the dissipation of any active volatile principle; for when water is distilled from it, and condensed, it is found to have scarcely any narcotic power: it must therefore be owing

to changes produced at this temperature in the principles in which the activity of the opium resides.

From these facts it is not easy to draw any precise conclusion with regard to the nature of the active matter of opium. As it is partly soluble both in water and in alkohol, and appears to suffer decomposition when boiled in water under exposure to the air, it might be concluded to be of the nature of extractive matter. On the contrary, being inflammable, and much more soluble in alkohol than in water, it approaches more in its characters to resin; yet it is not purely resinous, for its solution in pure alkohol is but slightly decomposed by water. The analysis of opium, in common with that of many of the other articles of the Materia Medica, affords sufficient proof of our very imperfect knowledge of the constituent proximate principles of vegetable matter.

It has lately been stated by Dérosne, that a peculiar principle resides in opium on which its narcotic quality depends. It is obtained by digesting water on opium, and evaporating the solution; a matter which precipitates during the evaporation, and which consists of this principle with a portion of resin and extract, is to be digested with alkohol; the resin and this principle are dissolved; and as the solution cools, the latter separates in crystalline grains, which may be purified by solution and crystallization; it is described as being in prisms, white, insipid and inodorous; insoluble in cold water, very sparingly soluble in hot water, but dissolved by alkohol, ether, and by the acids and alkalis; and possessed of narcotic power.

These experiments present results so little analogous to those of former researches on the principles of opium, that they require confirmation; nor, were they confirmed, can this be properly regarded as the narcotic principle of opium, since its power, though it exists in small proportion only to the other principles, does not appear to have much exceeded that of opium itself.

The facts ascertained with regard to the action of the usual re-agents upon opium, are of importance, as pointing out its proper pharmaceutic treatment. Diluted alkohol dissolving all its active matter, is the menstruum best adapted to its preparation under the form of tincture. Water dissolving it less perfectly, can scarcely be employed with advantage. Vinegar dissolves its active matter, but has been found to impair much its narcotic power, probably by causing in it some chemical change. Wine, though it dissolves sufficiently its active principles, being liable to pass to the state of vinegar, is an improper menstruum. Any purification of opium, by dissolving it, and evaporating the solution, only weakens its strength, and renders it uncertain; and hence this process formerly employed is now discarded from the Pharmacopœias; or at least is retained only in that of the Dublin College.

With regard to the nature of the action of opium on the living system, very different opinions have been maintained. The effects it produces appear sufficiently to establish the conclusion, that it is a powerful and highly diffusible stimulant. In a moderate dose, it increases immediately the frequency, force, and fulness of the pulse;

augments the animal temperature, and gives vigour to every function of the body and mind, occasioning often intoxication and delirium. These are succeeded by diminution of the force and frequency of the pulse, by lassitude, impaired sensibility and sleep; and these again are frequently followed by sickness, headach, thirst, tremors, and other symptoms of debility. The primary operation is therefore evidently exciting; and the state of diminished susceptibility and action which follows, must be considered as the effect of this, conformable to the general law, that excitement suddenly raised is followed by exhaustion of power.

If a larger dose of opium be given, the symptoms of diminished action appear without any previous excitement, and are followed by delirium, stupor, deep and difficult breathing, convulsions and death. In this too the analogy of opium to other diffusible stimulants is sufficiently strict.

From its topical application, similar effects are produced: at first, increase of pain, augmented muscular contraction, increased heat, and even inflammation, which are more or less quickly succeeded by a greater insensibility to impressions, and a greater difficulty of being excited to contraction by the application of other stimuli. The latter symptoms are also immediately induced by the application of a large quantity to the muscular fibre.

The action of opium on the system in a diseased state is precisely analogous. In typhus and other diseases of debility, its exhibition in a moderate dose produces all the salutary effects resulting from the administration of wine

and other powerful stimulants, while in diseases of an opposite nature, where there is already increased action, it is not less prejudicial.

It is to be admitted, however, with regard to opium, that its apparent sedative effects, displayed in its lessening the sensibility to external impressions, diminishing action, and inducing sleep, are greater than are proportional to the previous excitement it raises, or to an equal or greater excitement produced by other stimulants, as by alkohol. This has been accounted for from the greater diffusibility, and less durability of its primary operation; in consequence of which, the excitement it produces is soon extended over the system, and is more quickly succeeded by the secondary state of diminished power. Whether this theory of its action be satisfactory or not, and whether it be regarded as a powerful stimulant, or as a direct sedative, it is to be observed, and the observation extends to analogous narcotics, that the practical application of it is nearly the same; since it is admitted that it may be exhibited so as to obtain from it stimulant and also depressing effects, and that the former are primary, and are obtained from it in a moderate dose, while the latter are secondary, and are only produced by a larger dose. Although, therefore, the explanation of the mode of operation be different, there is no dispute as to the operation itself, or the effects it produces.

Opium was at one time supposed to act on the system, by the medium of the blood; but experiments have sufficiently shewn, that its general effects are produced when the circulation is entirely interrupted, that its action is on

the living solids, and is propagated to distant parts by nervous communication.

The principal indications which opium is capable of fulfilling, are, supporting the actions of the system, allaying pain and irritation, relieving spasmodic action, inducing sleep, and checking morbidly increased evacuations. It is differently administered, as it is designed to fulfil one or other of these indications. When given with the view of obtaining its stimulant operation, it ought to be administered in small doses, frequently repeated, and slowly increased, as by this mode the excitement it produces is best kept up. But where the design is to mitigate pain or irritation, or the symptoms arising from these, it ought to be given in a full dose, and at distant intervals, by which the state of diminished power and sensibility is most completely induced.

One other general rule with respect to the administration of opium, is, that it ought not to be given in any pure inflammatory affection, at least unless evacuations have been used, or unless means are employed to determine it to the surface, and produce diaphoresis.

In continued fever, not inflammatory, opium is administered sometimes as a general stimulant; but its operation being less permanent than that of wine, it is not so well adapted to obviate debility; or at least with this intention it is employed only as subsidiary to wine. It is more frequently used to diminish irritation, and lessen that state of increased susceptibility to impressions connected with debility, which frequently gives rise to rest-

lessness, watchfulness, delirium, and spasmodic affections, particularly tremors, and subsultus tendinum. A full dose is usually given at bed-time; and to obviate these symptoms when they are urgent, it is farther occasionally administered, generally in combination with wine, in the course of the day. Its exhibition is improper, or requires to be conducted with much caution, where there is any tendency to local inflammation, or to determination to the head. If it increase delirium, it is obviously injurious.

In intermittent fever, the administration of an opiate, previous to the expected approach of the paroxysm, renders it milder, or sometimes even prevents its attack; given even during the hot stage, it lessens its violence: and administered in either mode, it facilitates the cure by other remedies, the stimulant operation of which is less transient.

In the plegmasiæ, the employment of opium is from its stimulant operation more doubtful, and in any pure inflammatory affection, attended with highly increased vascular action, must be hazardous. Where it is given so as to determine its action to the surface of the body, and produce sweat, it is often advantageously employed, particularly in rheumatism; or in some of the other diseases of this order, where the inflammatory stage has subsided, its exhibition is occasionally necessary to obviate symptoms connected with irritation.

In the exanthemata, opium is employed with similar intentions, and is often more peculiarly advantageous, by lessening the irritation connected with the eruption. In

small pox, it is peculiarly useful with this intention after the eruption is completed where it is copious; and if the concomitant fever be of the typhoid type, the same advantage is derived from it as in pure typhus. In measles, the state of the system being more purely inflammatory, its use is rather contraindicated.

In hæmorrhagies, not connected with a state of highly increased vascular action, opium is a valuable remedy, by removing that state of increased irritability whence the discharge frequently arises; it is thus employed more particularly in passive menorrhagia, and in the hæmorrhage which sometimes succeeds abortion or delivery.

In the greater number of the profluvia, opium is employed with the same intention, and is the remedy in several of these diseases principally relied on. In dysentery, the propriety of its administration is more doubtful, or at least it can be given with advantage only in such doses as to relieve the pain and irritation which prevail; care being taken to obviate the constipation it might produce, by the exhibition of mild purgatives.

In spasmodic and convulsive diseases, opium is obviously indicated, and in many of them is the remedy of greatest power. In chorea, it has been advantageously employed; though the dependence of this disease, on the accumulation of feculent matter in the intestines, as established by Dr Hamilton's observations, suggests the necessity of its being employed with caution, and of its constipating effect being carefully guarded against. In epilepsy, it sometimes abates the violence of the paroxysm,

especially where this is liable to recur during sleep. In tetanus, to produce any relief, it requires to be given in very large doses, and these must be frequently repeated; and even then the system is often little affected by it: when pushed, however, to a great extent, the violence of the spasmodic affection has at length been overcome, and a cure obtained. A similar remark applies to hydrophobia, in which very large quantities of opium have been given without any sensible effect on the state of the functions, but in some cases with ultimate success. In mania, the system is in general little susceptible to the action of any medicine; but opium, when given in sufficient doses, is frequently useful in diminishing irritation, and producing composure or sleep. In other cases it altogether fails, when given even in a very large dose, and sometimes even aggravates the restlessness and agitation of the patient. In the hysteric paroxysm, opium is often employed with advantage, either introduced into the stomach, or given under the form of enema. In purely spasmodic asthma, the paroxysm is shortened, and even sometimes cut short by a full dose of an opiate. In cholic, it relieves the violence of the pain; though its administration requires caution, where there is any tendency to an inflammatory state; and the constipation it is liable to produce requires also to be obviated. In cholera it is the principal remedy. In pyrosis, a moderate dose generally affords at least temporary relief; and it also frequently succeeds in checking vomiting from morbid irritability of the stomach.

In syphilis, opium is employed, principally with the intention of alleviating the irritation arising from the operation of mercury; for there is no sufficient evidence for the opinion, which has been advanced with regard to the anti-syphilitic power of opium alone. Considerable advantage is derived from its use in extensive venereal ulceration; as well as in the treatment of painful and irritable ulcers, not connected with a venereal taint. It is given too as a stimulant to check the progress of gangrene.

In many other cases of morbid affection, opium is had recourse to merely to lessen irritation, relieve pain, or induce sleep. As a palliative, it is indeed the most valuable article of the Materia Medica.

Externally applied, opium alleviates pain and spasmodic action. Applied by friction, it thus relieves the pain of cramp, and even of tetanus; and rubbed over the abdomen, it alleviates spasmodic pain of the stomach and intestines. It often relieves the pain of toothach. Applied under the form of enema, it is of singular efficacy in relieving tenesmus, and that painful affection of the prostate gland which is sometimes the consequence of the discharge in gonorrhœa having been suddenly checked; and also that irritable state of the neck of the bladder, which renders the discharge of urine painful. It is used under the same form in diseases where it cannot be introduced into the stomach.

The dose of this narcotic is very various, according to the state of disease, and the intention with which it is ad-

ministered. One grain is the medium quantity to a person unaccustomed to its use. Its power on the system soon becomes weaker; and from habitual use is so much impaired, that very large doses are required to produce its usual effects. In some diseases, too, particularly mania, tetanus and hydrophobia, it produces little sensible effect unless the dose be very large. In the last disease, it has been taken to the extent of two drachms in twelve hours, without abating the violence of the symptoms. Lastly, the operation of opium is much varied by idiosyncracy, the same dose producing very different effects on different individuals.

By the immoderate or long continued use of opium, the vigour of the digestive organs is impaired; hence loss of appetite, wasting of the body, and muscular weakness; the nervous system, and even the functions of the mind, are also affected; the patient is distressed with uneasy sensations, which are only imperfectly relieved by other stimulants, if opium is withheld, and at length fatuity and stupor are induced.

When such a dose of opium is taken, as would prove fatal if its effects were not obviated, the symptoms are, insensibility, so that the patient cannot be roused by any exertion; a pulse usually slow and full; deep and difficult breathing, and the countenance generally somewhat flushed; this state of stupor continues sometimes with occasional convulsions, until it terminate in death. The principal remedy in such a case is the immediate exhibition of an emetic, which requires to be of the most

powerful kind. Sulphate of zinc, or sulphate of copper, is generally used, dissolved in water, and introduced by a flexible tube into the stomach, the former in the dose of one scruple, the latter in a dose from five to ten grains; and if vomiting is not soon induced, the dose is repeated. Along with this is employed free dilution with the vegetable acids; as vinegar, which is to be swallowed in as large draughts as the stomach can receive it. The powers of the stomach and of the general system may be roused and sustained by small doses of warm brandy; coffee has been said to have been taken with advantage, and the patient ought to be be kept awake, and, if possible, in a state of gentle motion, at least for some hours.

Opium is used either solid, or under the form of tincture, twenty-five drops of the tincture being equal to one grain of crude opium. It is employed in the solid state when we wish it to act slowly, or on the stomach and intestinal canal, otherwise it is more convenient in the liquid form. There are, besides, various preparations, in which it is either the principal ingredient, or modifies the power of others.

Officinal Preparations.—Elect. Opiat. Pil. Opiat. Pulv. Opiat. Pulv. Ipecac. cum opio. Tinctura Opii. Tinct. Opii Ammoniatæ. Tinct. Saponis cum opio. Troch. Glycirrhiz. cum opio, *Pharm. Ed.*—Pil. Opii cum Sapon. Pulv. Cornu Usti cum opio. Tinct. Opii Camph. Vin. Opii. Emplast. Opii. *Pharm. Lond.*—Opium. Purification. Extr. Opii. Syrup. Opii. *Dub.*

The dried capsule of the poppy is sometimes employed for medicinal purposes. Its active matter is extracted by decoction with water; this evaporated, affords an extract similar in power to opium, but weaker, or made into a syrup, by boiling with sugar, it is used as an anodyne. This syrup is a weak preparation, and is in general only given to children. One ounce of it is supposed to be equal to one grain of opium, but it is liable to be variable in strength. The dose to a child a year old is one drachm. A syrup made from opium has been supposed to be preferable, as the dose can be regulated with much more certainty, and a formula of this kind is accordingly adopted by the Dublin College; being prepared by dissolving the watery extract of opium, and forming this into a syrup, by adding the due proportion of sugar. An infusion of the capsules is used as an anodyne fomentation.

Offic. Prep.—Extr. Papav. alb. Syr. Papav. somnif. *Ed.*—Decoct. Papav. Somn. *Lond.*

Hyoscyamus Niger. Black Henbane. *Pentand. Monog. Solanaceæ. Herba, Semen. Indigenous.*

The leaves of this plant, when recent, have a slightly fœtid smell, and a mucilaginous taste; when dried, they lose both taste and smell, and their narcotic power is in part impaired. The root possesses the same qualities as the leaves, and even in a more eminent degree, but is liable to be more variable in strength. The seeds also are narcotic.

Henbane has an analogy to opium in its action more than

any other narcotic, particularly in the power of inducing sleep. In a moderate dose, it increases at first the strength of the pulse, and occasions some sense of heat, which are followed by diminished sensibility and motion; in some cases by thirst, sickness, stupor, and dimness of vision. In a larger quantity, it occasions profound sleep, hard pulse, and sometimes delirium; and in a dose which proves fatal, its operation soon terminates in coma, with a remarkable dilatation of the pupil, distortion of the countenance, a weak tremulous pulse, and eruption of petechiæ. On dissection, inflamed or gangrenous spots have been observed on the internal surface of the stomach, and the vessels on the membranes of the brain have appeared enlarged. Its baneful effects, like those of other vegetable narcotics, are best counteracted by a powerful emetic, and by drinking largely of the vegetable acids.

Henbane is one of the narcotics which has been longest known to physicians, having been employed by the ancients for mitigating pain, and restraining hæmorrhage. Störk of Vienna introduced it, and several other vegetable narcotics, to the notice of modern practitioners. He employed it in various spasmodic and painful diseases, as in epilepsy, hysteria, palpitation, headach, paralysis, mania and scirrhus. It was given in the form of the inspissated juice of the fresh leaves, the dose of which is from one to two grains, which requires to be gradually increased. At present, it is principally employed as a substitute for opium, where the latter, from idiosyncrasy, occasions any disagreeable symptom. The henbane also

is free from the constipating quality of the opium. A tincture of it has been introduced into the Pharmacopœias, which affords a preparation probably more uniform in strength than the inspissated juice. Its dose is thirty drops.

Offic. Prep.—Succ. spiss. Hyosc. N. Tinct. Hyosc. N. *Ed. Lond. Dub.*

ATROPA BELLADONNA. Deadly Nightshade. *Pentand. Monogyn. Solanaceæ. Folia. Indigenous.*

THE leaves have scarcely any smell, and only a slightly nauseous, sub-acrid taste. The berries are sweetish. Both are narcotic, as is also the root, but the leaves are preferred for medicinal use, as being more uniform in strength. In a moderate dose, belladona occasions a sense of warmth, followed by diaphoresis, and a disposition to sleep, frequently with neausea and headach; in large dose, symptoms of intoxication, vertigo, sickness and thirst: the pulse becomes low and feeble, the pupils are dilated, vision is impaired, and these symptoms terminate in convulsions, coma, or paralysis. On dissection, where it has proved fatal, the stomach and intestines have been found inflamed, or gangrenous, and the blood in a dissolved state. The remedies are an emetic in a sufficiently large dose, and dilution with the vegetablea cids.

Belladona was first employed as an external application, in the form of fomentation, to scirrhus and cancer. It was afterwards administered internally in the same

affections; and numerous cases in which it had proved successful, were given on the authority of the German practitioners. It has been recommended too, as a remedy in extensive ulceration, in paralysis, chronic rheumatism, epilepsy, mania, and hydrophobia, but with so little discrimination, that little reliance can be placed on the testimonies in its favour: and in modern practice, it is little employed. It appears to have a peculiar action on the eye; hence it has been used in amaurosis; and from its power of causing dilatation of the pupil, when topically applied under the form of infusion, it has been used before performing the operation for cataract,—a practice which is hazardous, as the pupil, though much dilated by the application, instantly contracts when the instrument is introduced. When given internally, its dose is from one to three grains of the dried leaves, or one grain of the inspissated juice.

Offic. Prep.—Succ. Spiss. Atrop. Bellad. *Ed. Lond.*

Aconitum Napellus. Aconite, Monk's-hood, or Wolfsbane. *Polyand. Trigyn. Multisiliquæ. Herba. Europe, America.*

The smell of the leaves of aconite, when recent, is narcotic, but is lost by drying. Their taste is sub-acrid. In a moderate dose its effects are those of a narcotic, accompanied with slight diaphoresis; in a larger dose it occasions vertigo, syncope, paralysis and convulsions.

Aconite was employed by Störk in obstinate chronic rheumatism, exostosis, paralysis, ulceration, and scirrhus.

Though highly praised, it has fallen almost entirely into disuse. Its dose is from one to two grains of the dried leaves; of the inspissated juice half a grain, this dose being gradually increased.

Offic. Prep.—Succ. Spiss. Aconit. Napell. *Ed. Lond.*

CONIUM MACULATUM. Cicuta. Hemlock. *Pentand. Digyn. Umbellatæ. Folia, Semen. Indigenous.*

THIS plant, which grows abundantly in this country in waste grounds, is of the umbelliferous kind. It is distinguished from other similar vegetables by its large and spotted stalk, by the dark green colour of the lower leaves, and by its peculiar faint disagreeable smell, which becomes more perceptible in the leaves when they are bruised. The seeds have a fainter odour, and are inferior in power. The root has similar powers, but varies in strength at different seasons.

Hemlock is a very powerful narcotic. Even in a moderate dose, it is liable to produce sickness and vertigo; in a larger dose it occasions permanent sickness, with great anxiety, dimness of vision, delirium, convulsions and coma. The use of it was confined to external application, until it was introduced by Störk, principally as a remedy in scirrhus and cancer; and the beneficial effects obtained from it were in many cases so conspicuous, that sanguine expectations were formed of its efficacy; in cancerous ulceration in particular, the pain abates, and the discharge becomes less copious and acrid under its use, and the ulcer frequently contracts in size, and shews

a disposition to heal. These effects, however, are usually only temporary, or cannot be carried beyond a certain extent; and though many cases were related by Störck and others, of permanent cures having been obtained from it, there is much reason to believe that its efficacy was exaggerated. It is now regarded only as a palliative, but, considering it even as such, it is still a valuable remedy; it relieves the pain, and corrects the discharge even more effectually sometimes than opium, and it is not liable to occasion the disagreeable consequences which arise from that narcotic. And when opium is employed, hemlock is a valuable auxiliary, as it renders a smaller quantity necessary.

Much benefit is derived frequently from cicuta in other cases of extensive ulceration; particularly in those connected with a scrofulous taint; it promotes the operation of mercury in healing venereal ulcers; and it is useful in removing glandular obstruction and induration.

Cicuta is given either under the form of the dried leaves, or of the juice of the fresh leaves inspissated by a gentle heat to the consistence of an extract, the former being given in a dose of two or three grains, the latter in a dose of two grains. The dose of either requires to be increased, and that more quickly, and to a greater extent, than is the case with almost any other substance in the Materia Medica, so that at length it has been taken to the extent of a number of drachms in the course of the day. The inspissated juice is a preparation on the oper-

ation of which we can never depend; hence it is seldom used; and even the powder of the dried leaves is liable to be variable in strength. Its pharmaceutic treatment, therefore, is of much importance. The leaves ought to be collected when the flowers are about falling off: they ought to be dried before a gentle fire, be reduced to powder as soon as they are dried, and kept in small phials, carefully secluded from the air and light. The proofs of their proper preparation, and of their activity, are the powder being of a lively green colour, and retaining the peculiar odour of the plant.

The recent leaves are sometimes applied externally to painful or ill-conditioned ulcers, or a cataplasm for the same purpose may be formed from the dried powder mixed with crumbs of bread.

Offic. Prep.—Succus. Spiss. Conii Macul. *Ph. Ed. Lond. Dub.*

DIGITALIS PURPUREA. *Foxglove. Didynam. Angiosperm. Solanaceæ. Folia. Indigenous.*

THIS indigenous plant grows on dry elevated situations, and, from the beauty of its flowers, has often a place in our gardens. All its parts are powerfully narcotic, but the leaves being most uniform in strength, are preferred for medicinal use. They are large and oblong, of a green colour rather dark, have little smell, and a bitter somewhat acrid taste. They are collected when the plant is in blossom, and are dried before a gentle

fire, the thicker stalks being removed; and they ought to be kept without being reduced to powder.

The operation of digitalis on the system is extremely peculiar, and there is even considerable difficulty in ascertaining its real effects. In a full dose, it produces exhaustion of power, marked by a great and sudden reduction in the force of the circulation; the pulse being reduced both in frequency and force, falling sometimes from 70 to 40 or 35 beats in a minute, and being small and tremulous. This is accompanied with sickness, anxiety, vertigo, dimness of vision, and, in a large dose, with vomiting, syncope, coldness of the extremities, convulsions, and coma, with sometimes a fatal termination. Yet these effects are not uniform, but even from the same dose we observe considerable diversity of operation in different individuals: thus the pulse is sometimes rendered lower, without being diminished in fulness; at other times it is rendered irregular: nor does sickness always accompany the reduction of the force of the circulation. Sometimes none of these effects, and scarcely any perceptible change in the state of the functions are immediately apparent; but if the dose be continued, they are suddenly produced.

Effects are even observed from the operation of foxglove, apparently of a very opposite kind. While it reduces the force of the circulation, it appears to increase the action of the absorbent system, and hence proves a powerful remedy in dropsy; and Dr Withering, by whom its powers were first particularly investigated, observed, that when given in a state of disease, it was most success-

ful, not where there existed increased action in the system, but, on the contrary, in states of debility, where the pulse was feeble and intermitting, and the countenance pale. Other authors have remarked its stimulant operation; and Dr Sanders, from a series of observations and experiments, has inferred, that it always acts primarily as a stimulant, augmenting, when given in a dose not too large, the force and frequency of the pulse, and inducing a state of increased action; it is only when it is accumulated by repetition, or by too large a dose, that reduction of the force of the circulation and other symptoms of diminished power are produced; and hence, according to this view, it is strictly analogous in its operation to other narcotics.

It must be admitted, however, that it is more difficult to regulate the administration of digitalis, so as to obtain its continued stimulant operation, than it is with regard to other stimulants; that there is a rapid transition to a state of diminished action, and that this is greater, and more permanent, compared with the primary stimulant effect, than in other stimulants even of the diffusible kind.

Foxglove, producing very different effects according to the mode in which it is administered, or according to the state of the system, is employed as a remedy in different diseases. Under the present class, those applications are to be considered, which appear to be connected with its action as a narcotic.

On this, in part at least, has been supposed to depend

the advantage derived from it as a remedy in phthisis pulmonalis. When given to that extent in which it reduces the velocity and force of the circulation, it proves useful, by counteracting that state of increased action which prevails in the incipient stage of the disease; and by diminishing the rapidity of the circulation through the lungs, it may facilitate the removal of the local affection. In the more advanced stages, it may operate, it has been conceived, by promoting absorption, thus removing the tuberculous affection, or withdrawing the purulent matter, before it has been rendered acrid by the action of the air. Sanguine expectations have been formed of the advantages to be derived from it in the treatment of phthisis, many of the symptoms disappearing under its use, and the progress of the disease appearing to be arrested. The change of organic structure is, however, so considerable, at least in the advanced state of the disease, as scarcely to admit of a cure from the operation of any remedy; and the operation of foxglove is so much diversified, that perhaps the proper mode of administering it has not been precisely determined, so as to admit of all the advantage being received from it that might be derived: it is difficult, as Dr W. Hamilton has remarked, to give it so as to reduce the force of the circulation, and continue this effect, without its inducing other consequences, which compel us to relinquish its use.

Foxglove has been proposed as a remedy in pneumonia, from its power of reducing the force of the circulation when given in a sufficient dose, conjoined with

blood-letting; and cases have been related of the success attending the practice, while some authors have condemned it as hazardous, from the excitement it is liable to produce. On a similar principle, it has been proposed to be employed in croup.

In active hæmorrhage, it might be expected, from the same operation, to be a remedy of much power; and, according to the observations of Ferriar and others, it may be employed with signal advantage in epistaxis, hæmoptysis, and menorrhagia, either alone or in combination with opium.

In spasmodic asthma, the combination of it with opium has afforded much relief. In palpitation arising from intemperance, or from passions of the mind, and not connected with dyspepsia, the irregular action of the heart has been abated, and at length entirely removed by its operation.

Foxglove is given in substance, or under the form of infusion, decoction, or tincture. The medium dose of the powder of the dried leaves is half a grain; the dose of the infusion, prepared according to the formula in the Edinburgh Pharmacopœia, is half an ounce; that of the tincture is fifteen drops; these quantities being given twice a-day. The decoction is an improper form, as being variable in strength. The tincture is the form of preparation under which it has usually been given as a narcotic: the infusion that in which it has been employed as a diuretic. Given in substance, there is supposed to be rather more risk of its effects accumulating from repeti-

tion of the dose, so as to induce the unpleasant symptoms which arise from an over dose.

To obtain the full narcotic operation of foxglove, the dose given at first requires to be gradually increased, but this increase must be made with much caution, not only from the hazard attending an over dose, but from the circumstance that the action of the remedy is for a time not apparent; but if the dose has been too large, or repeated at intervals not sufficiently distant, it appears suddenly, and continues progressive. Hence the necessity of the practitioner's watching with the greatest attention the effects it produces. The augmentation may proceed at the rate of one-fourth of the original quantity every second day, and the dose should not be repeated more than twice, or at farthest thrice a-day, unless in acute diseases, where the effect must be more speedily obtained, and where, therefore, the augmentation must be more rapid. The increase is continued until the effect intended to be obtained from the remedy is produced, or until its operation is apparent on the system; and whenever the pulse begins to diminish in frequency or force, the increase of dose must be stopt; and if the reduction be considerable, or proceed rapidly, the administration of the remedy must be suspended, and, only after a sufficient interval, cautiously renewed. This is more especially necessary when nausea is induced, dimness of vision, vertigo, or any tendency to fainting. When these symptoms do occur, they are best obviated by small doses of stimulants, warm wine, or brandy and water, with aromatics,

ether, and, as some have recommended, strong bitter infusions, small doses of opium, and a blister applied to the region of the stomach.

The infusion of foxglove has been applied externally as an anodyne lotion to painful cutaneous eruptions, or ulceration. An ointment composed of the powder mixed with lard, has been found successful in obstinate tinea capitis.

The application of foxglove, as a diuretic, will be considered under the class of diuretics.

Offic. Prep.—Infus. Digit. P. Tinct. Digit. P. *Ed. Lond. Dub.* Decoct. Digit. *Dub.*

NICOTIANA TABACUM. Tobacco. *Pentand. Monogyn. Solanaceæ. Folia. America.*

THIS plant, though sometimes cultivated in this country, is usually imported from America. Its leaves, which are of a large size, are of a light green colour, which they retain with little change when merely dried; but in the usual preparation to which they are subjected, they are rendered brown by the action of a little sulphate of iron. Their smell is fœtid, their taste extremely bitter and acrid. They deflagrate in burning, from a quantity of nitre they contain. Their active matter is extracted both by water and by alkohol; by decoction, their powers are much impaired. The essential oil obtained from them by distillation has been said to be very highly narcotic; —an assertion which has been denied, however, by some authors.

Tobacco operates as a very powerful narcotic. This is apparent, even in the common practices of smoking and chewing it, though its effects, like those of other narcotics, become less powerful from continued use. In a person unaccustomed to it, or in an over dose, it excites the most severe and permanent sickness, with vomiting, reduces the force of the circulation, and occasions extreme muscular debility, with insensibility, cold sweats, and convulsions. Taken repeatedly in small doses, it acts as a diuretic, probably by promoting absorption.

As a diffusible stimulant, the smoke of tobacco, thrown into the rectum, was at one time employed in the recovery of drowned persons,—a practice unquestionably hurtful, and now exploded. The same practice is still occasionally employed in ileus and incarcerated hernia; in the former disease, with the view of removing the constricted state of the intestines; in the latter, with the intention of producing that state of muscular relaxation which may favour the reduction of the protruded intestine. The practice, though not without hazard, has sometimes proved successful. The watery infusion of the strength of one drachm of the dried leaves to a pound of tepid water, is a more convenient form of employing it than the smoke, as an enema; and even the infusion of this strength has sometimes produced alarming symptoms of exhaustion. Unless it be used, however, in such a state of activity, as to produce some degree of muscular debility, no advantage can be derived from it; and the practice is therefore only to be had recourse to, where other methods

have failed. The smoke of tobacco received into the mouth, relieves the pain of toothach, either by its narcotic power, or by exciting a profuse salivary discharge. The powder is in common use as an errhine. The infusion or decoction is sometimes used as an emetic, but its operation is extremely harsh, and accompanied with severe sickness. The medicated wine is the form under which it has been used as a diuretic, in dropsy and dysuria, its dose being 30 drops. The leaves bruised, or moistened, have been employed as a local application in tinea capitis, and in various cutaneous eruptions; incautiously applied, they have sometimes occasioned the effects which arise from the internal administration of tobacco in too large a dose.

Offic. Prep.—Vin. Nicot. Tab. *Ph. Ed.*—Infus. Nicot. Tab. *Lond.*

LACTUCA VIROSA. Strong-scented Lettuce. *Syngenes. Polygam. æqual. Compositæ. Folia. Indigenous.*

THE leaves of this plant have a strong fœtid smell, similar to opium, and yield a white juice, in which their activity resides. Their taste is bitter and acrid. Though narcotic, they have been used principally as a diuretic in dropsy, under the form of the expressed juice inspissated. The dose of this is 5 or 10 grains, which is gradually increased to 1 or 2 drachms in twenty-four hours. By the German practitioners, by whom principally this plant has been recommended, it has also been used as a remedy in palpitation of the heart, and in intermittent fever.

Off. Prep.—Succ. Spiss. Lact. Vir. *Ed.*

DATURA STRAMONIUM. Thorn-Apple. *Pentand. Monog. Solanaceæ. Herba. Indigenous.*

THE leaves have a narcotic odour, and a bitter taste. They possess all the powers of a narcotic, producing, when taken in too large a quantity, vertigo, sickness, delirium, and convulsions. With other plants of the same family, stramonium was made the subject of clinical experiments by Störck; and it was recommended by him as a remedy in convulsive diseases, especially in epilepsy, and also in mania. The usual form in which it has been given, is that of the inspissated expressed juice of the leaves, the dose of which is from 1 to 3 grains twice a-day, gradually increased.

ARNICA MONTANA. Leopards-Bane. *Syngenes. Polygam. superf. Compositæ. Flores, Radix. Germany.*

THE flowers of this plant have a smell slightly fœtid, and a penetrating bitter taste. In their action on the system, their direct stimulating power is very apparent along with their narcotic action; they increase the force of the vascular system, and appear to communicate tone to the muscular fibre. In a larger dose, they produce vomiting and purging, sometimes followed by muscular pains, vertigo and convulsions. Along with narcotic effects, they excite vomiting and catharsis. They have been used in amaurosis, paralysis, convulsive disorders, gout, and rheumatism. The dose is 5 grains in substance dried, or half-a-drachm in infusion.

The root of arnica is aromatic and tonic, and has been used as a substitute for Peruvian bark.

RHODODENDRON CHRYSANTHUM. Yellow flowered Rhododendron. *Decand. Monogyn. Bicornes. Folia. Siberia.*

THE leaves of this plant are destitute of smell, but have a bitter, rough and subacrid taste, which they communicate to water by infusion or decoction. They are stimulating and narcotic, and occasion in a small dose increased vascular action; in a large dose intoxication and delirium. They have been employed principally in chronic rheumatism and gout; their power is said to be marked by a sensation of creeping in the skin and diaphoresis being induced. The form in which they have been given is decoction, 2 drachms being boiled in 10 ounces of water, and 1 or 2 ounces of the strained liquor being given twice a-day, and gradually increased.

RHUS TOXICODENDRON. Poison Oak. *Pentand. Trigyn. Dumosæ. Folia. North America.*

THIS plant has so much acrimony, that the touching of the leaves, or rubbing them on the skin, occasions itching, inflammation, and desquamation; taken internally, it excites nausea, vertigo, and pain in the head. The dried leaves have been used in paralysis, in some cases related by Mr Alderson with marked advantage. The dose given was half a grain twice or thrice a-day in the form of bolus, and gradually increased to three or four grains

daily. It excited a sense of heat, and irregular motions in the parts affected.

HUMULUS LUPULUS. *Hop. Dioecia. Pentand. Scabridæ. Indigenous.*

THIS plant is cultivated in England, being used in large quantity to give a degree of bitterness to fermented malt liquors. It is a very strong bitter, accompanied with a degree of aromatic flavour and some astringency; these are extracted by water by infusion; by decoction the aromatic flavour is lost. Along with its bitterness it has a narcotic power: of this the popular remedy, sometimes successful, of a pillow of hops to procure sleep in the delirium of fever and in mania, is a proof. It accordingly, when given internally in a full dose, reduces the frequency of the pulse and procures sleep. It has been employed as an anodyne, either in substance, in the dose of three grains, or under the form of infusion or tincture. A cataplasm or ointment, prepared from it, has been also used as an anodyne application to cancerous sores. It has now a place in the London Pharmacopœia.

Off. Prep.—Tinct. Humul. Extr. Humul. *Ph. Lond.*

STRYCHNOS NUX VOMICA. Vomica Nut. *Pentand. Monogyn. Solanaceæ. East Indies.*

THE kernel of the fruit is the part of this plant that is powerfully narcotic; its taste is intensely bitter; it has

little or no smell, and is so hard that it cannot be reduced into powder by beating, but requires to be filed down. Its narcotic operation is well exemplified in the effects it produces when given as a poison to dogs and other animals. It occasions extreme anxiety, paralysis of the hinder extremities, convulsions, and death; and on dissection, no marks of inflammation, or local affection, are to be discovered in the stomach.

As a narcotic, it has scarcely been used, though it has been recommended in mania, epilepsy, and hysteria. It has been given in dysentery and intermittent fever, in a dose of 5 grains twice a-day; but the use of it is so hazardous, that it has not been established in practice, nor received into the Pharmacopœias.

PRUNUS LAURO-CERASUS. Cherry-Tree Laurel. *Icosand. Monog. Pomaceæ. Folia. Europe.*

THE leaves of this plant have an odour slightly fragrant; their taste is extremely bitter. They possess a highly narcotic quality, which is extracted by infusion in alkohol or water, and is even brought over by distillation in the state of an essential oil, which the water partly dissolves. And the very singular fact has been established, that the volatile principle in which the narcotic quality of this plant resides is the prussic acid. It had often been observed, that the odour of this acid is similar to that of the cherry laurel, peach blossom, and bitter almond. Bohn found, that the distilled water of the bitter almond contained prussic acid. Schroeder discovered it in the

distilled water of the peach blossom and cherry laurel, prussiate of potash being obtained by distilling them from the alkali; and Bucholz succeeded in separating the prussic acid from the essential oil of the cherry laurel by agitation with an alkaline solution. This acid in its pure state has been further found to be highly narcotic; and the narcotic power of all these plants no doubt depends on it.

The distilled water of the cherry laurel has long been known as a poison to animals, and its effects are those of a pure narcotic. It has not been employed in medicine, but a cataplasm prepared from the leaves has been used as an anodyne application to painful tumors and ulcers.

CHAP. IV.

OF ANTISPASMODICS.

It is not easy to assign precisely the differences in kind of action between Narcotics and what are named Antispasmodics. The effects they produce are similar; they are capable of exciting the actions of the system, and they are often equally powerful in allaying pain and inordinate muscular action. But they do not in general produce that state of insensibility and diminished power which follows the application of narcotics, and this constitutes the difference between these classes. This might be supposed owing to a mere difference in strength; yet there seems also to be something farther than this, since antispasmodics produce no such effect in any dose, and since, although they are so much inferior to narcotics in these effects, they are equally powerful in repressing inordinate and irregular muscular action. This difference has been explained on the supposition, that as stimulants they have less diffusibility and greater durability of action; or else, that with their stimulant operation, they have no direct power of diminishing the powers of the system. Considered under either view, they form an intermediate class between Narcotics, which are so highly diffusible,

and Tonics, which are much more permanent in their stimulant operation; and experience shews, that they partake of the properties of both; several narcotics and tonics being frequently used as antispasmodics, and the powers of those which more particularly constitute the class, in obviating spasmodic affections, being apparently connected principally with their stimulant power.

From the name given to this class, their medicinal applications may be understood. Spasm is an irregular contraction of a muscle; sometimes the contraction is permanent; at other times it alternates with relaxation, but even then both are performed with more velocity, and the contractions are more powerful and more permanent than natural. Many diseases depend on spasmodic action, and others are accompanied with affections of this kind. The medicines which obviate and remove such a state are termed Antispasmodics.

Spasm may originate from various causes. One of the most frequent is a strong irritation, continually applied, such as dentition, worms, or the presence of any foreign substance in wounds. In such cases, narcotics must prove useful, by diminishing the irritability and sensibility of the system. Sometimes spasm appears to arise from mere debility, and the obvious means of removing this is by the use of tonics. Both narcotics and tonics, therefore, are occasionally useful as antispasmodics; such, for example, as opium and ether in the one class, and zinc, mercury and Peruvian bark in the other; and

these are accordingly in common practice regarded as antispasmodics. But there are farther several substances which cannot be with propriety referred to either of these divisions, as musk, castor, assafœtida, galbanum, valerian, &c.; they are in some measure intermediate; and it is to these that the name of Antispasmodic is more exclusively appropriated.

Few general observations can be made on this class of medicines. As their effect is not very permanent, they require to be given during the paroxysm of the spasmodic disorder, or a short time before its approach. For the same reason, the dose requires to be frequently repeated. Those, however, which belong to the class of tonics, require an opposite mode of administration; their beneficial effects being obtained only from their continued use. Some of those more strictly antispasmodics, stimulate the general system, and render the pulse more frequent; but in general they can scarcely be regarded as medicines of much power.

ANTISPASMODICS.

Moschus.
Castoreum.
Oleum animale empyreumaticum.
Succinum, oleum and acidum succini.
Bitumen petroleum.
Carbonas ammoniæ pyro-oleosus.
Ferula assafoetida.
Bubon galbanum.
Sagapenum.
Valeriana officinalis.
Crocus sativus.
Melaleuca cajuputi.

Narcotics used as Antispasmodics.

Ether.
Camphor.
Opium.

Tonics used as Antispasmodics.

Cuprum.
Zincum.
Hydrargyrus.
Cinchona.

MOSCHUS. Musk. Moschus moschiferus. *Cl. Mammalia. Ord. Pecora. Asia.*

THE animal which affords musk is a native of the elevated regions of the East of Asia. The musk appears to be a peculiar secretion, which is deposited in a small sac situated nigh the umbilicus of the male. It is brought from China, or from India, in small membranous bags, covered externally with coarse hair. The musk within is in grains, is slightly unctuous, of a black colour, having a strong durable smell, and a bitter taste. It yields part of its active matter to water, by infusion; by distillation the water is impregnated with its flavour; alkohol dissolves it, the impurities excepted.

Musk is an antispasmodic supposed to be of considerable power; it is administered occasionally in the greater number of spasmodic diseases, especially in hysteria and singultus, and also in diseases of debility. In typhus fever it is employed to relieve subsultus tendinum, and other symptoms of a spasmodic nature. In cholera, it is given with the view of checking vomiting. Combined with ammonia, it has been celebrated for its power of arresting the progress of gangrene. With regard to its efficacy in some of these affections, its virtues have been perhaps exaggerated, and from this, as well as from its high price, it is not very often employed. Its dose is from 6 to 20 grains, repeated, if necessary, every five or

six hours. It is best given in the form of bolus. To children, it has been given under the form of enema, as a remedy in the convulsions arising sometimes from the irritation of dentition.

Offic. Prep. — Mist. Mosch. *Lond.* — Tinct. Mosch. *Dub.*

CASTOREUM. Castor. Castor Fiber. *Mammalia. Glires.*

THE beaver, an amphibious quadruped, is a native of the North of Europe, Asia and America. Castor is a peculiar product collected in cells near the extremity of the rectum, in this animal. It is imported of superior quality from Russia, and an inferior kind from New England. The former is dry, slightly unctuous, of a reddish brown colour, intermixed with fibres, and covered with a tough membrane; it has a strong unpleasant smell, and a bitter acrid taste. The American castor is more shrivelled, and inferior in taste and smell. The active matter of castor is dissolved by alkohol, proof spirit, and partially by water; the tincture with alkohol is the least nauseous.

Castor is used as an antispasmodic, in hysteria principally, in a dose from 10 to 20 grains, or from 1 to 2 drachms of the tincture. From the experiments of Dr Alexander, it appears to be a remedy of no power, as, given in a quantity larger than its usual dose, it produced no sensible effect on the system.

Offic. Prep.—T. Castor. *Ph. Ed. Lond. Dub.* T. Castor. Comp. *Ed.*

OLEUM ANIMALE EMPYREUMATICUM. Empyreumatic Animal Oil. Ol. Cornu Cervi.

THE fresh bones or horns of animals, when exposed to heat in close vessels, afford an empyreumatic oil, derived from new combinations of the elements of the animal matter attached to the phosphate of lime, which is the base of bone. This oil is at first of a thick consistence, black colour, and extremely fœtid smell, but by repeated distillations becomes thinner, nearly colourless and transparent, though it remains still fœtid. In this state it has been used as an antispasmodic, in a dose of 10 or 15 drops. It retains its place in the Dublin Pharmacopœia, under the name of Oleum Cornu Corvini Rectificatum, being obtained in the distillation of hartshorn or bones, for the preparation of carbonate of ammonia; but it is entirely discarded from practice.

SUCCINUM. OLEUM et ACIDUM SUCCINI.

THE bituminous substance, amber, though it has a place in the list of the Materia Medica of the different Pharmacopœias, is perfectly inert, and is introduced only as affording, by distillation, an empyreumatic oil, which has been applied to some medicinal uses. This oil is at first thick and of a dark brown colour; but by repeated distillations with water it becomes limpid, still retaining however a very fœtid odour. It has been celebrated for its antispasmodic power, and has been employed in hysteria and amenorrhœa in a dose of from 10 to 15 drops.

It is now discarded from practice, or is used only occasionally as an external stimulating application in paralysis and chronic rheumatism.

Along with this oil, a peculiar concrete acid is produced in the distillation, which is at first impure, but is purified by sublimation, or by solution and crystallization. It has a place in the Edinburgh and Dublin Pharmacopœias, but appears destitute of any medicinal power, and is never applied to any use.

Bitumen Petroleum. Petroleum Barbadense. Mineral Tar.

Various kinds of liquid bitumens exist as natural productions, of different degrees of thickness, of a colour more or less deep, and also more or less volatile. That which has been usually kept in the shops, and applied to any medicinal use, under the name of Barbadoes Tar, is thick, of a dark brown colour, having a smell that is fœtid, and a warm bitter taste. It has an analogy to the preceding empyreumatic oils in its properties; it has been used as an antispasmodic and sudorific, and externally as a stimulating application in paralysis. Though it retains its place in the Pharmacopœias, it is scarcely ever used.

Carbonas Ammoniæ Pyro-Oleosus. Empyreumatic Carbonate of Ammonia. Sal Cornu Cervi.

The bones of animals, when exposed to a sufficient degree of heat, afford a large quantity of carbonate of

ammonia, formed by new combinations of the elements of the animal matter contained in the bone. There is a similar production of empyreumatic oil, and with this oil the ammoniacal carbonate is always impregnated, whence it derives a peculiar fœtid odour. It has also been supposed to derive from it certain medicinal powers, and has been used in preference to the pure carbonate of ammonia as an antispasmodic. Having been first procured from the bones of the deer, it has retained the name of Sal Cornu Cervi, and it still retains its place in the Dublin Pharmacopœia; being procured dissolved in the water which distils over, and this being rectified by repeated distillations. When thus rectified, it differs in little from pure carbonate of ammonia; and even combined with the empyreumatic oil, it has probably no additional medicinal efficacy, while from its fœtor it is unpleasant. Pure ammonia, dissolved in alkohol, is used as a solvent of the active matter of castor, assafœtida, and other antispasmodics, on the supposition that it coincides with them in their action on the system.

FERULA ASSAFOETIDA. Assafœtida. *Pentand. Digyn. Umbellatæ. Gummi-Resina. Persia.*

ASSAFOETIDA is a concrete gum-resin, obtained by exudation from incisions in the roots of the plant; the juice, after it exudes, being hardened by exposure to the sun. It is in small masses, adhering to each other, of a variegated texture, yellow on the external surface, white within, having an extremely fœtid smell, and a taste bit-

ter and subacrid. It consists of about two-thirds of gum, and one-third of resin, its taste and smell residing in the resinous part. It yields all its virtues to alkohol. Triturated with water, it forms a milky-like mixture, the resin being diffused by the medium of the gum. Distilled with water, it affords a small quantity of essential oil, extremely fœtid.

Assafœtida is used as an antispasmodic in different nervous diseases, especially in hysteria, dyspnœa, dyspepsia attended with flatulence, and tympanitis, and is superior in efficacy to any of the fœtid gums. Its usual dose is from 5 to 20 grains, in the form of pill, or diffused in water. It is likewise given under the form of enema, in tympanitis, flatulent colic, in the violent hysteric paroxysm, and as a remedy against worms, 2 drachms being diffused in 8 ounces of warm milk or water; it is sometimes applied externally as a plaster.

Offic. Prep.—Alkohol Ammon. Fœtid. Emp. Assafœt. Pil. Assafœt. Comp. Tinct. Assafœt. *Ed.*—Mist. Assafœt. *Lond. Dub.* Enem. Fœtid. *Dub.*

BUBON GALBANUM. Galbanum. *Petand. Digyn. Umbellatæ. Gummi-Resina. Africa.*

GALBANUM is obtained in the form of a milky juice, by exudation from incisions in the stem of the plant; when hardened it is in the form of a mass somewhat variegated in its texture, tenacious, of a yellowish brown colour, having a fœtid smell, and a bitter acrid taste.

Alkohol dissolves its resin, in which its powers have

been supposed to reside; proof-spirit dissolves it entirely, the impurities excepted. Triturated with water, it is diffused, and forms a milky-like fluid; by distillation it affords about one-twentieth of its weight of essential oil.

Galbanum has the virtues of the fœtid gums, and is used for the same purposes; but being inferior in strength to assafœtida, it is less employed. Its dose is 10 grains. Externally, it is more frequently used as a discutient to indolent tumors, and as a stimulant to promote suppuration.

Offic. Prep.—Pil. Galb. Comp. *Lond.*—Tinct. Galban. *Dub.* Emp. Galb. Comp. *Lond. Dub.*

SAGAPENUM. *Gummi-Resina.*

THIS gum-resin, usually imported from Alexandria, is the produce of an unknown tree said to be a native of Persia. It is in small masses, of a yellow colour, having a smell slightly fœtid, and a pungent nauseous taste; it is soluble in proof spirit; by distillation it affords a small quantity of essential oil.

Its virtues and uses are the same as those of assafœtida, to which, however, it is much inferior in power, and is therefore seldom employed. Its dose is from 10 to 20 grains. It is sometimes applied externally as a discutient.

VALERIANA OFFICINALIS. Wild Valerian. *Triand. Monogyn. Aggregatæ. Radix. Indigenous.*

THE root of this plant, which is the part used in me-

dicine, consists of a number of slender fibres twisted, and attached to one head, of a light brown colour, having a smell strong and unpleasant, and a warm bitter taste. Its active matter is dissolved equally by water and alkohol, and appears therefore to consist of extractive matter, with perhaps a small portion of tannin, as its infusion changes colour on the addition of sulphate of iron. By distillation, water is impregnated with its flavour, but not with its taste, and no sensible quantity of essential oil is obtained.

Valerian is one of the principal modern antispasmodics, and is employed in hysteria, chorea, and epilepsy, where these depend not on organic derangement, or on any permanent irritation, but on increased susceptibility of the nervous system. Sometimes, also, it is used with advantage in hemicrania. Its dose is from one scruple to one drachm, three or four times a-day, which is increased gradually as far as the stomach can bear it. Sometimes it is taken under the form of infusion.

Offic. Prep.—Tinct. Valer. Tinct. Valer. Ammon. *Ph. Lond.* et *Dub.* Extr. Valer. Infus. Valer. *Dub.*

Crocus Sativus. Saffron. *Triand. Monogyn. Liliaceæ. Floris Stigmata. Indigenous.*

This substance is composed of the stigmata which crown the pistil of the flower. These are pressed together, and form a soft mass of intermixed fibres, named Cake Saffron; when dried separately, they form Flower Saffron. The former is what is usually kept in the

shops. It is somewhat moist, of a deep reddish yellow colour, its flavour is aromatic and diffusive, the taste warm and bitterish. The active matter is equally extracted by alkohol, water, proof spirit, and vinegar; the residuum, which is not more than six parts out of 16, being inert ligneous fibre. By distillation with water, a small quantity of essential oil is obtained.

Saffron was formerly regarded as a very active medicine, possessed of high stimulant and antispasmodic power, and requiring, it was imagined, to be given with much caution. Experience has proved it to be nearly inert, and it is now banished from medical practice. It is used as a popular remedy in the exanthemata, particularly in small-pox.

Offic. Prep.—Tinct. Croci. *Ed. Dub.*—Syr. Croci. *Lond.*

MELALEUCA CAJUPUTI. *Polyadelph. Polyand. Hesperideæ. Oleum Volatile. Ol. Cajeputæ. Cajeput Oil. India.*

THE essential oil, known by the name of Cajuput Oil, was supposed to be obtained from the Melaleuca Leucadendron; but, from later investigation, it appears to be procured from another species, to which the name of Melaleuca Cajuputi has been given. It is obtained by distillation from the leaves and fruit, has a green or yellowish colour, a strong fragrant odour, somewhat similar to that of camphor, and an extremely pungent taste. It is highly volatile and inflammable.

This oil has been used as a highly diffusible stimulant and antispasmodic, in tympanitis, flatulent cholic, hysteria, palsy, chronic rheumatism, and various other diseases of debility. Its dose is 3 or 4 drops. It is also applied externally to relieve rheumatic and gouty pains, and it often succeeds in relieving the pain of toothach, when applied to the affected tooth.

Several substances are employed as antispasmodics, and which I have therefore placed in the table, which more strictly belong, however, to some of the other classes. Under these, therefore, their history is given, including the notice of those few applications of them as remedies, connected with their antispasmodic power.

CHAP. V.

OF TONICS.

By Tonics, are understood those substances, the primary operation of which is to give strength to the system. It has been conceived, that muscular vigour depends on a certain degree of tension, or tone as it is termed, of the muscular fibre; and those substances which renew that vigour when impaired, have been considered as restoring this due degree of tension, and have thus received the appellation of Tonics. They are not, however, to be considered as acting by producing any mechanical change in the state of the solids, as this opinion implies. They act upon the living principle, and, so far as their action is understood, are stimulants of considerable power, permanent in their operation.

The distinction has been already pointed out between stimulants, which is founded not so much on a difference in their power, as in the quickness with which their full effect is produced, and in the transient nature of that effect. If a medicine suddenly raises a high state of excitement, this is as quickly followed by proportional languor or debility, and the changes from both modes of action, in the state of the functions of the body, are suf-

ficiently evident. But, if the stimulant operation be more slowly exerted, any change is much less conspicuous, and the succeeding collapse takes place to no considerable extent; but even when the administration of the remedy is suspended, the effect is merely a gradual abatement of excitement, counteracted even by the action of the stimulants habitually applied. On these principles, the action of tonics is to be explained. It is only by their stimulant operation that they can obviate debility; and as their effect is gradual, their action is not followed by that exhaustion and diminished susceptibility which invariably follows from excitement suddenly raised. If their administration, however, be carried to excess, or be continued too long, it may at length diminish the powers of the system; and if employed in a state of health, or high vigour, their effects may be injurious.

Tonics act primarily on the stomach, the action they excite in that organ being conveyed generally by nervous communication to the rest of the system. This is evident, from their effects often taking place in a short time; and there are experiments which prove, that when some tonics, as Peruvian bark, have been taken for a considerable length of time, no portion of them can be discovered by any chemical test in the blood. There are some of them, however, especially the metallic tonics, which are received into the circulation.

The stimulating effect of tonics is principally to be observed from their continued administration; they increase gradually the force of the circulation, promote the action

of the digestive organs, augment the secretions, or moderate them when they have been morbidly increased, and give vigour to the muscular system. From the action of some of the more powerful remedies of this class, these effects are apparent, even in a short time. The diseases in which they are employed, must be obviously those of diminished power.

Tonics may be subdivided into those derived from the mineral, and those from the vegetable kingdoms: the former division comprehends several of the metals, and one or two of the earths. Under the vegetable tonics are comprised a number of substances possessing bitterness, and an aromatic pungency. These two qualities are generally blended in the most powerful tonics belonging to the vegetable kingdom; and there is a transition from these to the more pure bitters and aromatics. The stimulating action of the latter is rather too local and transient to give rise to much permanent tonic effect: yet they can scarcely be placed under any other class, and I have therefore associated them with the substances with which they are thus connected.

TONICS.

From the Mineral Kingdom.

Argentum.
Hydrargyrum.
Ferrum.
Zincum.
Cuprum.
Arsenicum.
Bismuthum.
Barytes.
Calx.
Acidum nitricum.
Oxy-murias potassæ.

From the Vegetable Kingdom.

Cinchona officinalis.
Cinchona caribæa.
Cinchona floribunda.
Aristolochia serpentaria.
Dorstenia contrayerva.
Croton eleutheria.
Cusparia febrifuga.

SWIETENIA FEBRIFUGA.
SWIETENIA MAHAGONI.
COLOMBA.
QUASSIA SIMAROUBA.
QUASSIA EXCELSA.
GENTIANA LUTEA.
ANTHEMIS NOBILIS.
CITRUS AURANTIUM.
CITRUS MEDICA.
LAURUS CINNAMOMUM.
LAURUS CASSIA.
CANELLA ALBA.
MYRISTICA MOSCHATA.
CARYOPHYLLUS AROMATICUS.
CAPSICUM ANNUUM.
PIPER NIGRUM.
PIPER LONGUM.
MYRTUS PIMENTA.
AMOMUM ZINGIBER.
AMOMUM ZEDOARIA.
AMOMUM REPENS.
CARUM CARUI.
CORIANDRUM SATIVUM.
PIMPINELLA ANISUM.
MENTHA PIPERITA.

Tonics from the Mineral Kingdom.

These are in general more local in their action than the vegetable tonics; they either operate more directly on the stomach without their action being so quickly extended to the whole system, or they act by being received into the circulating mass. Hence they produce less immediate general excitement, and it is only from their continued administration, generally in small doses, that their tonic effect is obtained. The analogies from which I have placed together the substances associated under this division, are perhaps somewhat remote and imperfect; and, to some of them, the appellation of tonic may be considered as applied by rather too free an extension of the term. But such imperfections in the classification of substances, from their action on the living system, are in the present state of medical science unavoidable to a certain extent. The substances, with regard to which this objection may be urged in the present case, could scarcely be referred with propriety to any other class: affinities may be traced in their operation, sufficient to connect them by their medicinal effects; and, even considered individually, the claim of each may be established to a certain degree of tonic power.

Argentum. Silver.

This metal is distinguished by its pure white colour,

its high degree of lustre, and its great ductility and malleability. It is not very susceptible of oxidation; it does not suffer that change from exposure, even in a state of fusion, to the atmosphere. Those acids which yield oxygen readily oxidate and dissolve it, particularly nitric acid, which is hence employed as its usual solvent. The solution, when evaporated, affords the nitrate of silver in a crystalline form.

It appears that nitrate of silver was sometimes employed by the older physicians, but the harshness and violence of its operation led to its disuse. More lately, it has been introduced as a remedy in epilepsy,—a disease which, when not depending on organic derangement, is frequently connected with morbid susceptibility, and which tonics sometimes remove. The advantage derived from the administration of nitrate of silver has been established on the testimony of Dr Sims, Dr Cappe, Dr Bostock, and others. The dose is a quarter of a grain of the crystallized nitrate, which may be given three or four times a-day. Distilled water must be employed to dissolve it, as spring water would decompose it; and the solution may be made into pills with bread. It sometimes acts as a cathartic, and if it occasion much cathartic effect with griping, or excite nausea, the dose must be diminished. Dr Cappe has related a case of Angina Pectoris, the symptoms of which were removed by a similar administration of nitrate of silver.

HYDRARGYRUM. HYDRARGYRUS. ARGENTUM VIVUM. MERCURIUS. Mercury or Quicksilver.

IT has not been usual, in arrangements of the articles of the Materia Medica from their medicinal power, to place mercury under the class of tonics, but rather under that of sialogogues. Its power, however, of exciting the salivary discharge, is merely a secondary effect, not constant nor uniform, and which is not essential to its efficacy in any disease. On the contrary, its tonic power is its primary operation; it is the most general stimulant belonging to the Materia Medica, pervading every part of the system; acting, as Cullen has remarked, as a stimulus to every sensible and moving fibre of the body, and producing the most permanent effects. Hence, it is the most general evacuant we possess; and from its stimulant operation, exerted directly or indirectly, we are able to explain its utility in many diseases.

This metal is peculiarly distinguished by its fluidity at all natural temperatures, with the exception of the intense cold that sometimes prevails in very northern regions. Its congealing point is —40° of Fahrenheit. In its liquid state, it has the perfect opacity and lustre characteristic of metals, and likewise the property of great density, its specific gravity being to that of water as 13.5 to 1 nearly: it boils at a temperature a little above 600°, and when boiling suffers oxidation from the action of the atmospheric air. It is oxidated even at natural temperatures, when subjected to agitation; or still more easily,

when triturated with any viscid matter, which is interposed between its globules, extending their surface.

Quicksilver is usually obtained from the ore in which it is combined with sulphur, this being submitted to heat mixed with iron or lime, either of which combines with the sulphur, and the mercury is obtained by distillation. The quicksilver of commerce is sometimes impure, or adulterated by the intermixture of other metals, particularly lead and bismuth. This may be suspected when the metal loses its lustre speedily, and is covered with a grey film, or from its diminished mobility, in consequence of which its globules do not preserve exactly the spherical form, nor unite easily with each other; and it may be discovered, with more certainty, by exposing it to a heat sufficient to volatilize the quicksilver, when any other metal present will remain. It is best purified by distillation from iron-filings in an iron retort.

Mercury is not, in its metallic state, applied to any medicinal use; but under various forms of preparation, it is extensively employed, and affords a series of very active remedies.

When rendered active on the system by any of the modes of preparation to which it is subjected, it operates as a very powerful and general stimulant; as from being received into the blood, it is enabled to act on every part of the system. Hence, when given in moderate quantity, it communicates general vigour: it increases the force of the circulation when this has been languid; by the increased vascular action which it excites, it gives to the

blood the disposition to assume the buffy coat; and by its stimulant operation on secreting organs, it promotes the secretions, and hence is the most general evacuant we have. On its general stimulant operation probably depends its efficacy in diseases connected with spasmodic action, as tetanus and hydrophobia; and perhaps also that derived from it in various forms of fever, particularly the remitting fever of warm climates, and yellow fever; and its local operation is distinctly marked in the advantage derived from it in chronic hepatitis, and other varieties of visceral and glandular obstructions, and in the different species of cutaneous eruptions.

Its most important medicinal operation, however, is that displayed in removing the disease induced by the syphilitic poison. In this, its power is nearly, if not altogether specific; no article of the Materia Medica could be substituted for it; and there may be affirmed of it, what cannot with equal justice be said of any remedy employed in the treatment of any other morbid affection, that if duely administered, it will scarcely ever fail in effecting a cure. It is difficult to assign any satisfactory theory of its operation. Its efficacy has been ascribed to its general evacuant power, in consequence of which the syphilitic virus is discharged from the body. But the speedy disappearance of the local symptoms of syphilis under its use, affords a proof that it operates on some other principle; no similar advantage is derived from other evacuants; and its efficacy is not proportional to the evacuation it excites, but is frequently displayed

where this is altogether insensible. The opinion has been advanced, that it acts as an antidote to the venereal virus, neutralizing it somewhat in the manner in which one chemical agent subdues the properties of another,—an opinion extremely vague and hypothetical, and rendered improbable from the consideration of the very small quantity of some of the more active preparations of mercury, from which a cure may be obtained, compared with the large quantity of others less active, that requires to be administered. The explanation advanced by Mr Hunter, that the efficacy of mercury in the treatment of syphilis depends on its general and permanent stimulant operation on the system, by which it induces and keeps up an action incompatible with that morbid action which constitutes the disease, until the virus is destroyed by the chemical changes going on in the system, or until it is eliminated from the body by the usual excretion, is on the whole most probable: it rests on a principle undoubted, that there are states of morbid action incompatible, so that one suspends the action of the other; and mercury does exert a very general action, inducing and keeping up what may be regarded as a morbid state.

The mode of administering mercury, for the cure of the venereal disease, under all its forms, is now ascertained with sufficient precision. There is no advantage in giving it so as to induce profuse salivation; this is even to be avoided as hurtful; at the same time, it is proper that salivation should be excited to a certain extent, not probably as essential to its efficacy, but as a

proof of its full action on the system being obtained. This is kept up for a certain time, longer or shorter, according to the state of the symptoms, and the previous continuance of the disease. Exposure to cold is avoided, as being liable to cause the more partial operation of mercury on the salivary glands; and the state of irritation is diminished, or determination to the intestines producing purging is obviated, by the exhibition of an opiate. When profuse salivation occurs, the remedies employed to check it are cathartics in moderate doses, small doses of opium, the application of a blister to the throat, and the administration of sulphuret of potash; the last being employed from the doubtful hypothesis, that its chemical agency may neutralize the mercury. Free exposure to a cool dry air is, according to the observation of Mr Pearson, more effectual than any other method. When the morbid irritation, from the action of mercury, rises too high, producing a state of exhaustion, which sometimes proceeds rapidly to an alarming extent, the administration of the remedy must be immediately suspended; and in this case also, exposure to a cool atmosphere is advantageous.

The preparations of mercury, medicinally employed, are those in which it is oxidized, in which the oxidized metal is combined with an acid, or in which either the metal or the oxides of it are combined with sulphur.

The grey oxide, formed by the trituration of mercury, is the basis of a number of preparations. In these, the metal has been supposed indeed to be merely mechani-

cally divided; but in its metallic state, mercury does not appear to exert any sensible action on the living system, and the activity of it in these preparations is a proof that it is oxidated. This is established more directly; quicksilver, by agitation, being converted into a black powder, which is soluble in muriatic acid, which metallic mercury is not.

This oxidation is facilitated by the quicksilver being triturated with any viscous substance which facilitates the division of its globules. By trituration with mucilage of gum arabic, a preparation is obtained, named Plenk's Mercurial Solution, the operation of which is extremely mild. Rubbed with chalk, it forms the Hydrargus cum Creta of the London Pharmacopœia, a preparation having nothing to recommend it. The Mercurial Pill is, of all the preparations adapted to affect the general system, the one most commonly employed, and is perhaps equal to any other, having the advantage of not being liable to produce much irritation, while we can depend on the certainty and permanence of its action. It is prepared by triturating quicksilver with conserve of roses, and adding a sufficient quantity of starch to form a pill mass. In a dose of eight grains, morning and evening, it soon affects the general system; in a larger dose, it is liable to occasion purging. Triturated with lard, quicksilver soon loses its metallic form; and the ointment, after it has been kept for some time, contains little metallic matter, the unctuous matter probably promoting the oxidation. The oxide is diffused through the

lard, and it has been conjectured, is in part too combined with sebacic acid, formed from the oxygenation of the fat. Rubbed on the skin, in the quantity of one drachm of the strongest ointment, (that composed of equal parts of quicksilver and lard,) it is forced through the cuticle, and is taken up by the absorbents; the system is thus affected, without the unpleasant consequences of nausea and purging, sometimes occasioned by the internal administration of even the mildest mercurial preparation; this method is employed, therefore, where, from the state of the system, these affections are liable to be produced. Where it is necessary too to give the remedy in a large dose, or to bring the system speedily under its action, mercurial friction is employed, along with the administration of some of the mercurial preparations by the mouth. And, lastly, it has been supposed, that in certain local affections, particularly bubo, some advantage is derived from the mercury being conveyed through the affected gland.

The Mercurial Plaster is the metal triturated with melted resin and oil, and mixed with litharge plaster: it is sometimes applied to indolent glandular tumors as a discutient. Its power is supposed to be increased by the addition of gum-ammoniac, and this compound plaster has a place in the London and Dublin Pharmacopœias.

Mercury oxidated by exposure to atmospheric air, at a high temperature, gives an oxide in scales of a red colour, containing about 7 of oxygen in 100 parts. This, the red oxide, (Oxidum Hydrargyri Rubrum of the Lon-

don Pharmacopœia), affords a preparation, supposed by some to be the most uniform in its strength, and most certain in its operation, of all the mercurials. Its dose is one grain night and morning. It is more active than the grey oxide, but is more liable to produce irritation.

Various preparations are obtained from the metal oxidated by the acids. The nitrate of mercury decomposed by heat, furnishes what is named Oxidum Hydrargyri Rubrum per Acidum Nitricum by the Edinburgh College, Hydrargyri Nitrico-Oxydum by the London. It is probably not an oxide, but a sub-nitrate, and, from the acid combined with it, is derived its escharotic power, for which only it is employed, being applied externally to change the diseased surface of ulcers, or to other purposes for which escharotics are used.

When the nitrate of mercury, containing the mercury in a low state of oxidation, is decomposed by ammonia, a precipitate is thrown down of a grey colour, which appears to be nearly a pure oxide. It is the Oxidum Hydrargyri Cinereum of the Pharmacopœias; is comparatively mild in its operation, and is frequently employed, its dose being one or two grains. It is also sometimes used under the form of ointment, as a mode of applying mercurial friction.

Mercury, oxidated by sulphuric acid, forms the sulphate of mercury, which, decomposed by the affusion of boiling water, affords a yellow powder, the Sub-sulphate, or as it was formerly named, Turbith Mineral. This acts with too much violence to be used as a mercurial.

In a dose of 3 or 4 grains, it acts as a powerful emetic, and it is sometimes used as an errhine.

The preparations in which the mercury is saturated with an acid, are very active. The nitrous solution of it is highly caustic. Mixed with lard, it forms an ointment, Unguentum Nitratis Hydrargyri, used with much advantage in cutaneous diseases.

Mercury, oxidated and combined with muriatic acid, forms two very active preparations, differing in the degree of oxidation, and in the proportion of acid with which the oxide is combined. The one has been long known by the name of Corrosive Sublimate of Mercury, the other by that of Mild Sublimate or Calomel. The former is now named Muriate of Quicksilver by the Edinburgh College, and Oxymuriate of Quicksilver by the London College; the latter by both Colleges Submuriate of Mercury;—names not sufficiently distinctive, and chemically incorrect. The old distinguishing epithets are still the least ambiguous, and even as a chemical nomenclature are properly used.

The first of these, Corrosive Muriate of Mercury is composed of the metal highly oxidated, and this oxide is combined with a large proportion of muriatic acid. The proportions are 69.6 mercury, 12.3 oxygen, and 18 of acid. It is soluble in water and in alkohol, has a taste styptic and metallic, and exerts a degree of escharotic power. It is the most virulent of all the preparations of this metal, and cannot be given with safety in a larger quantity than $\frac{1}{4}$th of a grain: its medium dose is $\frac{1}{6}$th or

$\frac{1}{8}$th. It acts more generally on the system than any other preparation, and very speedily arrests the progress of syphilis, advantages which have frequently recommended its use. But it is liable to be violent in its operation, and its effects have been supposed not to be permanent, the disease frequently returning in the same or some other form; hence, as an antisyphilitic, it is not much employed in regular practice. A very dilute solution of it is used as a collyrium in venereal ophthalmia, as a gargle in venereal sore-throat, and as a lotion in some cutaneous affections.

The Mild Muriate of Mercury, or Calomel, is obtained by triturating the corrosive muriate with nearly an equal part of the metal, and favouring their mutual action by the action of heat, the product being sublimed. The additional metallic mercury which is thus brought into combination, shares the oxygen and the acid of the corrosive muriate; so that the whole of the metal is in a lower degree of oxidation, and this oxide is combined with less muriatic acid. The quantity of acid, however, is as much as the oxide requires to combine with it, and hence the product is not a sub-muriate. The proportions of its principles, according to its analysis by Chenevix, are mercury 79, oxygen 9.5, and acid 11.5. It is mild in its operation, and is one of the most useful of the mercurial preparations. In syphilis it is given in the dose of a grain night and morning; it is likewise administered with the greatest advantage in glandular obstructions, dropsy, chronic rheumatism, hydrocephalus, hydrophobia, and in

the fevers of warm climates, being given in several of these diseases in much larger quantities. It not only produces the general effects of a mercurial, but also, when given in sufficient doses, acts as a cathartic: it is often employed to promote the operation of other cathartics; and its peculiar determination to the intestines probably adapts it better to the treatment of diseases of the neighbouring organs, or to states of disease connected with affections of the intestinal canal.

Muriate of Mercury and Ammonia, Hydrargyrus Præcipitatus Albus of the London Pharmacopœia, is prepared by decomposing corrosive muriate of mercury by ammonia. A precipitate is obtained, which consists of oxide of mercury combined with a portion of muriatic acid and a small quantity of ammonia, the proportions being 81 of oxide, 16 of acid, and 3 of ammonia. It is too acrid for internal use, but is employed externally as a mild escharotic, and as an application in various cutaneous affections. An ointment adapted to these purposes has a place in the London and Dublin Pharmacopœias.

With acetous acid mercury forms the Acetis Hydrargyri,—a preparation which, as the basis of Keyser's pill, was at one time much celebrated for the mildness of its operation; it is given in a dose of from 2 to 5 grains; its operation has been supposed, however, to be uncertain, and it has fallen into disuse.

With phosphoric acid, Phosphate of Mercury is formed,—a preparation of considerable activity and certainty, but which, though introduced, has not been established

in practice. The dose of it is one grain. These, as well as other saline compounds of Mercury, are most easily obtained by adding to a solution of nitrate of mercury a solution of a compound salt, containing the acid with which the oxide of mercury is designed to be combined. Thus, to form the acetate, a solution of acetate of potash is added; or to form the phosphate, a solution of phosphate of soda.

United with sulphur, mercury forms two preparations, the black sulphuret, and the red. In both of them the metal has been supposed to be oxidized, and in the red a large quantity of oxygen has been supposed to be contained. This has not been established, however, and it is probable that they are metallic sulphurets without oxygen. The black sulphuret, formerly named Ethiops Mineral, is prepared by triturating equal parts of mercury and sulphur together, so as to form a black powder. It is a very inactive preparation, and has been used only as an anthelmintic, in a dose to an adult of one scruple or half a drachm. The red sulphuret, or Cinnabar, is the mercury united with about one-sixth of its weight of sulphur by sublimation. It is applied principally by fumigation, with the view of stopping the progress of venereal ulcers, being converted into vapour by being laid on a hot iron, and this vapour being directed on the part.

FERRUM. Iron.

THIS metal is the one which has been regarded as most salutary to the animal system. It exists as a constituent

part of the blood, and other varieties of animal matter, and it acts as a powerful tonic, increasing the power of digestion, quickening the circulation, and causing the blood, it is said, to assume a more florid hue, promoting the secretions, or restraining them when they have been morbidly increased. It has been considered as doubtful whether it acts by being received into the mass of blood; its existence as a constituent principle of the blood, and the slowness of its operation, render it probable that it does.

The diseases in which iron is used are those of chronic debility, especially chlorosis, dyspepsia, hypochondriasis, hysteria, paralysis, and rickets. It succeeds best when given in small doses continued for a considerable time.

The Limatura Ferri, or Filings of Iron, are given in any dose from one scruple to a drachm or two; their activity is probably dependent on the oxidation they may suffer in the stomach, from the action of the gastric fluids.

The Carbonate, or Rust of Iron, Carbonas Ferri, Rubigo Ferri, is the metal oxidated by exposure to the air with moisture, and combined with carbonic acid; it is more active than the pure metal, and less irritating than the saline preparations. It is given in a dose from 5 to 20 grains. Another form of it, supposed to be more pure, is what is named Carbonas Ferri Præcipitatus, prepared by adding a solution of carbonate of soda to a solution of sulphate of iron, washing and drying the precipitate formed by the mutual decomposition.

Muriate of Iron and Ammonia, of the Edinburgh Pharmacopœia, what is named by the London College Ferrum Ammoniatum, is obtained, by sublimation, from a mixture of muriate of ammonia and red oxide or carbonate of iron. It is an active preparation, but liable to be variable in composition. It is given in a dose from 5 to 10 grains. Dissolved in diluted alkohol it forms an officinal tincture, the dose of which is 30 drops.

The Muriate of Iron employed under the form of tincture, prepared by dissolving black oxide of iron in muriatic acid, and diluting the solution with alkohol, Tinctura Ferri Muriati, is a very active preparation; sometimes too much so to admit of being used in an irritable state of the stomach. Its dose is 10 or 15 drops diluted with water, or taken in wine.

Sulphate of Iron is formed in the large way, by the oxygenation of the native sulphuret by exposure to air and humidity; or it is obtained more pure by dissolving iron in diluted sulphuric acid, and evaporating the solution. It crystallizes in rhomboidal prisms of a green colour. It is one of the most active preparations of the metal, and is not unfrequently prescribed in amenorrhœa. Its dose is from one to five grains. The red sulphate, in which the metal is more highly oxidated, is also employed as a tonic in a similar dose.

The Tartrate of Potash and Iron has a place in the London Pharmacopœia, though not much employed in practice. It is prepared by rubbing equal weights of iron-filings and super-tartrate of potash with water, exposing

the mixture to the action of the air, drying the mass, and again subjecting it to the action of water to render the oxidation and combination of the iron more complete. The preparation is a mild one, and can be given to the extent of 10 or 15 grains as a dose. A similar preparation, in which the iron is more highly oxidated, and its combination with the tartaric acid probably more perfect, is obtained by a process given by the London College, in which carbonate of iron and super-tartrate of potash are boiled with a portion of water, the liquor filtered, and evaporated until on cooling it form a saline mass. This, in a dose of three or four grains twice a-day, acts not only as a tonic, but also as a diuretic, and, from the combination of these powers, has been employed with advantage as a remedy in dropsy.

The Wine of Iron, which has a place in the London and Dublin Pharmacopœias, prepared by digesting iron-filings in white wine, is another form under which the tartrate is used; the metal being dissolved by the tartaric acid of the wine. Its dose is one or two drachms.

Acetate of iron has been introduced by the Dublin College, being prepared, according to one process they have given, by digesting carbonate of iron in acetic acid; according to another, by rubbing together acetate of potash and sulphate of iron until they become soft; drying this with a moderate heat, and digesting it with alkohol. Of the tincture thus formed, 20 or 30 drops are a dose.

The London College have given a place to a preparation of iron, (Liquor Ferri Alkalini), of rather a singular

nature. Iron is dissolved in nitric acid largely diluted; and to this solution a solution of sub-carbonate of potash is added, while effervescence is excited: the liquor, after standing for six hours, is poured off. It is probably a ternary combination of oxide of iron, potash and carbonic acid; any nitric acid remaining undecomposed in the oxidation of the iron, being probably combined with a portion of potash, and this nitrate being deposited. This preparation has been long known by the name of Stahl's Martial Alkaline Tincture. It is not very apparent what advantage it has over others in common use, and it is always liable to be variable in strength.

The Mineral Chalybeate Waters afford another form under which iron may be administered. The iron is generally dissolved in them by the carbonic acid; and from the state of dilution, they are often used with more advantage than the more active preparations of the metal.

ZINCUM. Zinc.

THIS metal is of a white colour, with a shade of grey; it is brittle, except at a temperature been 200 and 300 of Fahrenheit, when it has considerable ductility and malleability; it is fusible at a heat approaching to that of ignition, and when raised to that temperature burns with a bright flame, forming a white oxide.

Zinc exerts no sensible action on the system in its metallic state; it is employed therefore under various forms of preparation.

White oxide of zinc, obtained from the combustion of

the metal, has been employed as a remedy in various spasmodic affections, particularly chorea and epilepsy, in a dose of five grains, gradually increased. There are cases on record where a cure was obtained; but it does not appear to be very active or certain in its operation, and it is not often prescribed. An ointment composed of it is used as a healing cerate, and as an application in ophthalmia.

There is a substance named Impure Oxide of Zinc by the Edinburgh College, long known by the appellation of Tutia, the nature and origin of which are not very well ascertained. It has been supposed to be artificial, and to be prepared from oxide of zinc obtained in the roasting of zinc ores, which is afterwards mixed with clay. It is used sometimes as the basis of a cerate employed as a dressing to wounds, or applied to the eye in some forms of ophthalmia.

What has been named Calamine Stone, (Lapis Calaminaris), is regarded as a carbonate of zinc; and it generally is so, though there are varieties of it composed of oxide of zinc and silicious earth. It is employed only externally as the basis of the common healing cerate.

Sulphate of Zinc, formed by exposure of the native sulphuret to air and humidity, is obtained by evaporation of its solution in a solid mass, forming the white vitriol of commerce; or it is procured more pure, and in a crystalline form, by evaporation of the solution of zinc in diluted sulphuric acid. It has been employed in the same cases as the oxide, and Dr Cullen has observed that it is

possessed of the same powers; it has likewise been given as a tonic in intermittent fever, and as a tonic and astringent in chronic dysentery. It is difficult, however, to regulate its administration so as to obviate the nausea which it is liable to occasion. It is given sometimes as a powerful emetic, in a dose from 10 to 20 grains, particularly where the stomach is not easily roused to action, as where a narcotic poison has been swallowed. Its solution is a common astringent injection in gonorrhœa in the strength of a grain and a half to an ounce of water; and nearly of the same strength it is often employed as a collyrium in ophthalmia.

Acetate of Zinc, under the form of solution, has a place in the Edinburgh Pharmacopœia, being obtained by mixing solutions of acetate of lead and sulphate of zinc, when sulphate of lead is precipitated, and the acetate of zinc remains dissolved. It is used as a collyrium in ophthalmia, and an astringent injection in gonorrhœa.

Cuprum. Copper.

This metal is not like the greater number of the metals, insipid and inodorous; it has an unpleasant styptic taste, and when rubbed a perceptible smell. It is extremely noxious to animal life. Still, when properly administered, it proves a remedy of some value, and like zinc has some claim to be ranked as a tonic, from its successful operation in epilepsy, chorea, and several other spasmodic affections dependent on or connected with debility.

Copper is employed in various forms of saline combination. The sulphate is rather too active to admit of internal administration; even in a very small dose it excites nausea and vomiting; and as a powerful emetic it is employed, where from the state of the stomach it is difficult to excite vomiting, as where a narcotic has been taken in too large a quantity; the dose being from 2 to 5 grains, or even larger, according as it is more difficult to excite vomiting. Externally it is used as an astringent and escharotic,—applications of it to be afterwards noticed.

Sub-acetate of Copper, Verdegrease as it has been named, is also employed on account of its escharotic power.

The preparation named Ammoniuret of Copper (Ammoniaretum Cupri, Cuprum Ammoniatum) is the one usually employed to obtain the action of copper on the system. It is prepared by triturating sulphate of copper and carbonate of ammonia together, and is either a ternary compound of oxide of copper, ammonia and sulphuric acid, or a mixture of sulphate of ammonia, and the compound of ammonia with oxide of copper. It is given in epilepsy, in a dose of half a grain twice a-day, increasing it gradually as far as the stomach or system will bear it, continuing it until the remedy has received a fair trial. It has in many cases proved successful, though in a disease arising from such various causes, and so frequently depending on derangement of organic structure, any

remedy must frequently fail. It has been given in a similar manner with advantage in chorea and dysphagia.

ARSENICUM. Arsenic.

THE name arsenic, used to be appropriated to what has been ascertained to be the oxide of a peculiar metal, and in chemical nomenclature it is to this metal that the name is now applied. In its metallic state, it is of a dark grey colour, with considerable lustre; its texture is foliated, and it is extremely brittle. It is volatile at a heat considerably inferior to that of ignition, and when in vapour has a peculiar smell, often compared to that of garlic. At the same temperature, it is oxidated rapidly by the action of the air, forming a white vapour which condenses. At a higher temperature it burns, and affords the same product. This product used to be regarded as an oxide. Being soluble however in water, capable of crystallizing, reddening the infusion of litmus, and combining with the alkalis, it has been regarded as an acid, and has been named Arsenious Acid. Though there is some foundation for this conclusion, this substance may perhaps still be ranked as an oxide; for it does not neutralize the alkaline properties, nor act on them more forcibly than many other metallic oxides; and it even neutralizes the properties of acids. By a higher degree of oxygenation, it is converted into a substance of undoubted acid powers, the arsénic acid.

The oxide of arsenic, or white arsenic of commerce, is not formed from the oxygenation of the metal, but is ob-

tained by sublimation from various metallic ores in which it exists. The sublimate is in the form of a white dense cake, which is reduced to powder, for the uses to which it is applied. In the London Pharmacopœia, this is ordered to be prepared for medicinal use by a second sublimation. It consists of 75.2 of arsenic, and 24.8 of oxygen. Its taste is acrid and penetrating; it is soluble in 80 parts of cold, and in 15 parts of boiling water; the latter solution, on cooling, affording minute crystals.

This substance has been long known as the most virulent of the mineral poisons. Even in a very small quantity, it occasions vomiting, purging, tremors, and paralysis; in a quantity a little larger, it excites severe pain in the stomach, extreme thirst, violent vomiting, with great anxiety and depression. The pain extends over the abdomen, respiration becomes difficult, the pulse is quick and irregular, the vomiting is incessant, accompanied with tremors and convulsions, and the patient dies exhausted. On dissection, the internal surface of the stomach and upper part of the intestines is found inflamed or eroded.

Though so violent in its operation, arsenic has been frequently employed in medical practice; and when properly administered, we obtain from it, in certain diseases, all the advantage which is derived from the operation of the most safe and powerful tonic. This is well displayed in its efficacy in the treatment of intermittent fever, the disease in which it has been principally used.

It is employed medicinally under various forms. A preparation of it introduced by Fowler, and analogous to

one which had been known under the name of Tasteless Ague Drop, has been adopted by the London College, and named Liquor Arsenicalis. It is prepared by dissolving sixty-four grains of the white oxide, and the same quantity of sub-carbonate of potash, in sixteen ounces of water, adding half an ounce of compound spirit of lavender. This is given in a dose of 4 drops, three times a-day, and gradually increased to double that quantity; its use being occasionally intermitted, not persisted in if it does not soon prove effectual, and immediately relinquished if it occasion nausea or purging. The arseniate of potash, prepared by exposing the white oxide of arsenic with an equal weight of nitre, to a heat gradually raised to redness, and crystallizing the residual mass, is another preparation which has been employed, and has been lately sanctioned by the Dublin College. It is used in the same manner, in the dose of the eighth part of a grain of the crystallized salt. Under the same forms arsenic has been used in remitting fever, in periodical headach, in dropsy, hydrophobia, lepra, and elephantiasis, and undoubtedly with safety and advantage, though its administration will always require to be conducted with much care. Externally, it is used in scirrhus and cancer;—applications of it which will be noticed under the class of Escharotics.

The antidotes which have been employed to counteract the poisonous operation of arsenic are various. Vomiting, if not produced by the arsenic, which it generally is, must be immediately excited, and as the stomach is highly irritable in such cases, the milder emetics, and espe-

cially oil, which is supposed to involve the particles of the poison, have been recommended. According to the assertion of Renault, oil appears from experiments rather to favour its action; and tepid water, or mucilaginous liquors, ought to be preferred; these too are useful in facilitating vomiting, and scarcely any thing more than this is within the power of the practitioner. Reliance has been placed on solutions of the alkaline sulphurets, or of sulphuretted hydrogen. The latter appears, from Renault's experiments, to have some power, since, if it were previously combined with the arsenious acid, it rendered it nearly inert; but if merely introduced into the stomach with it, or after it had been swallowed, especially if the arsenic were not dissolved, it seemed to have little efficacy as an antidote, and indeed cannot be expected to have much effect.

BISMUTHUM. Bismuth.

THIS metal is of a white colour, with a shade of yellow, has a foliated fracture, is brittle, very fusible, capable of being volatilized, and easily susceptible of oxidation. Though it has not been received into the Pharmacopœias, it has a claim to a place in the Materia Medica, as its oxide, or rather sub-nitrate, has been employed with considerable advantage in Gastrodynia, Pyrosis, and other affections connected with debility of the digestive organs. This preparation is obtained by decomposing the solution of bismuth in nitric acid by the affusion of water; the sub-nitrate is precipitated, and is washed and dried. It

is given in a dose from two to six grains, two grains being given twice or thrice a-day, or in more severe cases five grains being given at once. In these doses, it scarcely produces any other sensible effect than a remission of pain, and ultimately a removal of the morbid state from which this has arisen.

BARYTES. Terra Ponderosa. Barytes. Heavy Earth.

THIS earth is found in nature combined with sulphuric acid, and with carbonic acid. The native carbonate was known to prove poisonous to animals, and this suggested the application of it to medicinal purposes. The form under which the barytes has been used, is in combination with the muriatic acid; for the preparation of which a formula has been inserted in the Edinburgh Pharmacopœia, either by decomposing the native carbonate by muriatic acid, or decomposing the sulphate by heating it with charcoal, and adding this acid to the solution obtained by washing the residual matter with water. The muriate is obtained by crystallization. This salt has been employed as a remedy in scrofula, in cancer, some forms of syphilis, and in hectic fever connected with ulceration. Its sensible effects, where advantage has been derived from it, have been improving the appetite and general strength; sometimes it occasions diaphoresis or diuresis, and in an over dose is liable to produce nausea, vertigo, tremors, and insensibility. Its usual dose is 5 drops, gradually increased to 20 or more. Its virtues have been perhaps overrated, as it is rather falling into disuse.

CALX. Lime.

THIS earth exists abundantly in nature combined with carbonic and other acids. From the native carbonate it is obtained by expelling the carbonic acid by heat. It is soluble in water in small quantity; the solution has a styptic taste, and is the form under which lime has been medicinally employed. It is used with advantage in dyspepsia, its beneficial effects arising principally from its tonic and astringent quality, as in the small quantity which water can dissolve, it can have little effect by any chemical agency in obviating acidity. It is employed too as an astringent in chronic diarrhœa and in leucorrhœa. As a pure tonic, the product of the combination of it with muriatic acid, the muriate has been introduced into practice as much superior in efficacy to muriate of barytes, and a formula for preparing it is given by the Edinburgh and Dublin Colleges. It has been used principally in scrofula and hectic fever, and in dyspepsia. Its dose is from half a drachm to a drachm of the saturated solution; and as it is a medicine of considerable activity, it requires to be given with caution. Carbonate of lime is used as an antacid: and Phosphate of lime has from theoretical views been proposed as a remedy in rickets and mollities ossium.

THE two following substances, though not strictly belonging to the mineral kingdom, may be associated with the preceding tonics, as connected with them by chemical relations.

ACIDUM NITRICUM. Nitric Acid.

THIS acid is the product of the saturation of nitrogen with oxygen, and consists of 29.5 of the former, and 70.5 of the latter. It is generally obtained by decomposing nitrate of potash by sulphuric acid, assisted by heat. It is colourless; emits white fumes; its specific gravity is 1.504; is extremely corrosive, acts with much energy on inflammables and metals from parting with oxygen readily, and is eminently possessed of all the acid properties.

The tonic powers of this acid are conspicuous in supporting the system under the irritation of a mercurial course. As a remedy against lues venerea, it was some years ago introduced into practice, and received a very extensive trial; and the result appears to have been sufficiently established, that it is, to a certain extent at least, capable of counteracting the syphilitic poison. The secondary symptoms of the disease have disappeared under its use, and the primary symptoms been completely removed. It is however inferior to mercury in the certainty of its operation, but still is a valuable remedy combined with it, both as promoting its operation, and as obviating the injurious effects of mercurial irritation. With such views, it is given in a dose of from 1 to 2 drachms, this being taken largely diluted with water, in the course of the day. It is likewise administered with advantage in that chronic affection of the liver frequently arising from residence in a warm climate, in dyspepsia particularly with the view of relieving sickness and anorexia, and in obstinate cutaneous eruptions.

OXY-MURIAS POTASSÆ. Oxy-muriate of Potash.

THIS salt, which, strictly speaking, is the Hyper-oxy-muriate of Potash, is prepared by introducing a current of oxy-muriatic acid gas into a solution of potash. The acid is decomposed, one portion of it yielding oxygen to the other; the one therefore returns to the state of muriatic acid, the other becomes hyper-oxymuriatic acid, and common muriate and hyper-oxymuriate of potash are formed, the latter separating by crystallization in brilliant white flakes. The process has been introduced into the Dublin Pharmacopœia.

As a remedy, it may be classed with the nitric acid, and it was the hypothesis of nitric acid acting medicinally by imparting oxygen to the system, that led to its medicinal use. Its operation in checking or removing the symptoms of syphilis is similar; it also increases the force of the circulation, and excites the actions of the system. Its efficacy as an anti-venereal is considered as superior to that of the nitric acid, but it does not appear to be equally advantageous as an auxiliary to mercury. Hence, as its operation alone cannot be relied on for certainty, and as it frequently fails, it is little employed, while nitric acid still continues to be occasionally used. The dose in which the oxy-muriate has been given, is 10 grains three or four times a-day, and increased gradually to 20 or 25.

Tonics from the Vegetable Kingdom.

The tonic power of vegetable substances is intimately connected with certain sensible properties which they possess, particularly with bitterness, and the aromatic quality. In those tonics in which these qualities are blended, they are their most distinctive properties; and in those in which either of them is predominant, we still discover a degree of tonic power, or of that stimulating operation on which this power depends.

The vegetable products in which bitterness, without any other marked sensible medicinal quality, predominates, have always more or less of a tonic power; the stimulant operation on which this depends, seems, however, to be not much extended over the system: hence they have scarcely any sensible effect in augmenting the force of the circulation, or the heat of the body, in increasing the secretions, or in stimulating to action any particular part: their operation is principally in giving vigour to the stomach, and other digestive organs, and obviating those symptoms connected with debility of these organs. Still their operation is not entirely local; they prove tonic to the general system, not only indirectly by their action on the stomach, but by a more direct operation. This is displayed in their power of removing diseases connected with general debility, as intermittent

fever, or the different species of dropsy, particularly anasarca, which so frequently depend on diminished energy of the absorbents. The injurious consequences which sometimes arise from the use of bitters too long continued, affords another proof of their action on the general system.

Bitterness in vegetables has been supposed to reside in a peculiar proximate principle, which has been named the Bitter Principle. This opinion, however, is extremely vague, and rests on no sufficient evidence. The quality of bitterness may reside in any of the known principles of vegetable matter: in many of the bitters of the Materia Medica, it appears to be connected with their extract, as it is obtained equally by the action of water in alkohol; it is not volatile, and in general is not much impaired by decoction.

Aromatics are more rapid and diffusible in their action; they sensibly stimulate the general system, and augment the force of the circulation; but this is scarcely sufficiently permanent to admit of their being administered with advantage as tonics. They are therefore rather employed as temporary stimulants, to obviate debility of the digestive organs, or as promoting the action of bitters. Still, as strictly connected with the substances belonging to this class, I have not hesitated to place them under it. There is one general virtue they possess, and for which they are often used, that of preventing or relieving nausea; this they do partly from their agreeable taste and odour, and partly probably from their stimulant

operation on the stomach. The aromatic quality in general resides in their essential oil; hence it is communicated both to water and alkohol by infusion: their oils are usually pungent and stimulant, and their distilled waters and spirits partake of these powers.

From the qualities which bitters and aromatics possess, the stimulant operation of the one being slow and permanent, that of the other being more diffusible and transient, it might be inferred perhaps, that their combination will afford a superiority of tonic power. In the most powerful vegetable tonics, accordingly, these qualities are generally blended; these may be placed first, and from them there is a series to the more pure bitters and aromatics.

CINCHONA OFFICINALIS. *Cortex Peruvianus.* Cinchona. Peruvian Bark. *Pentand. Monogyn. Contortæ. Cortex, Peru.*

THE natural history of the genus Cinchona has been but imperfectly elucidated, and hence the Edinburgh College have inserted in their catalogue of the articles of the Materia Medica, the three kinds of Peruvian bark at present met with in the shops, the Pale, the Red, and the Yellow, leaving undetermined their natural distinctions. The species of this genus, it now appears, are numerous, and many of them natives of Peru; and it is not improbable that all, or the greater number of these contribute to furnish the Peruvian bark of commerce. The London College have inserted three species, Cinchona Lancifolia, Cinchona Cordifolia, and Cinchona Oblongi-

folia; the first, according to Dr Powel, furnishing the pale bark, the second the yellow, and the third the red.

These barks appear to be procured and prepared in a similar manner. The bark is stripped from the trunk and branches; it is dried by exposure to the sun, and after being imported into Europe, is sorted by separating the finer from the coarser.

The pale bark is in the form of small quilled twigs, thin, breaking close and smooth, friable between the teeth, covered with a rough coat of a greyish brown colour, internally smooth and of a light brown; when thick and not convoluted, it is considered as of inferior quality; its taste is bitter, and slightly astringent; its flavour slightly aromatic, with some degree of mustiness.

The Red is in large thick pieces, usually flat, though sometimes quilled, externally covered with a brown rugged coat, internally more smooth and compact, but fibrous, of a dark red colour; its taste and smell are similar to those of the pale, but the taste is rather stronger.

The Yellow, so named because it approaches more to that colour than either of the others do, is the variety last introduced. It is in flat pieces, not convoluted like the pale, nor dark-coloured like the red; externally smooth, internally of a light cinnamon colour, friable and fibrous; it has no peculiar odour different from the others, but a taste incomparably more bitter, with some degree of astringency.

Cinchona has often been subjected to chemical exami-

nation, but its constituent proximate principles are still not well determined. This indeed appears to be attended with peculiar difficulties, from the different species containing different principles, and from the nature of some of these being not well ascertained.

The basis of all of them is the ligneous fibre, constituting the greater part of their weight, but to this are attached various principles capable of being extracted by different solvents. Cold water infused on pale bark for some hours, acquires a bitter taste, with some share of its odour; when assisted by a moderate heat, the water takes up more of the active matter; this infusion is transparent while warm, but as it cools becomes slightly turbid; by decoction, a fluid, deep coloured, of a bitter styptic taste, is obtained, which, when cold, deposites a precipitate soluble in alkohol. By long decoction, the virtues of the bark are nearly impaired or destroyed, owing to the chemical change and precipitation of its active matter. Alkohol is a more powerful solvent of its active principles than water, the tincture being of a much deeper colour and stronger taste, and holding more matter dissolved. Brandy and other spirits and wines afford also strong solutions in proportion to the quantity of alkohol they contain. A saturated solution of ammonia is also a powerful solvent; vinegar is less so even than water. By distillation, water is slightly impregnated with the flavour of bark; but it is doubtful whether any essential oil can be obtained.

The action of menstrua on the red bark is nearly the

same, the solutions only being stronger, or containing a larger quantity of the matter which is precipitated from the decoction as it cools, and which is more peculiarly soluble in alkohol, this matter being apparently composed of the principles in which the activity of the bark resides.

The analysis of the yellow bark shows that its active principles are more powerful than in either of the others, as it affords to water, alkohol, &c. tinctures much stronger both in bitterness and astringency, especially in the former quality.

It is not easy to determine from these results, the nature of the principles extracted, or what relation they have to the powers of the bark. As the active matter appears to be more soluble in hot than in cold water, being partially precipitated from the former as it cools, and as it is still more soluble in alkohol, it might be concluded to be of a resinous nature. Being soluble to a certain extent, however, in water, and suffering at least a partial decomposition when boiled under exposure to the air, it may also be considered as approaching in its characters to extract.

Besides this, from the effects of re-agents, Peruvian bark has been considered as containing a quantity of astringent matter, and this matter appears to have some relation to the matter extracted by water with the aid of heat, and by alkohol. On adding a solution of sulphate of iron to the infusion, a deep colour is struck, not purple indeed like that usually produced by the action of

that test in the vegetable astringents, but rather of a dark olive green; the same colour is still deeper when the salt is added to the decoction, or the tincture. This was regarded as a proof of the presence of the astringent principle or tannin, and hence it might be inferred, that a precipitate would be produced by the addition of gelatin. This accordingly happens with some kinds of Peruvian bark; a solution of gelatin added to the infusion giving a precipitate more or less copious. But the singular fact has been discovered, that there are other varieties which do not precipitate gelatin, but have the opposite property of giving a precipitate with tannin, or at least with infusion of oak bark, or of infusion of galls. This latter phenomenon, Seguin considered absurdly as depending on the presence of gelatin, and pretended that gelatin exerted the specific power of Peruvian bark on the system, so that with animal glue he had cured intermittent fever. Dr Duncan inferred, that the phenomenon is owing to the presence of a peculiar proximate principle of vegetable matter not before observed, to which he has given the name of Cinchonin. Vanquelin, in his analysis of the different species of Peruvian bark, found generally, that their aqueous infusion gave a precipitate both with tannin and gelatin; some, however, gave no sensible precipitate with gelatin, while they precipitated tannin. Among these, he ranks the common pale bark. Others again did not precipitate tannin, but formed a precipitate with gelatin. His observations, however, are of less value, as although deduced from experiments on seven-

teen species, as he calls them, of cinchona, these are not distinguished by their specific characters, and we therefore scarcely know to what the observations apply. From the intermixture of different kinds of Peruvian bark in commerce, and the uncertainty of their uniformity, it is not easy to determine what species more peculiarly afford this principle. I have found, that the watery infusion of the pale bark is not sensibly precipitated either by gelatin or tannin; that of the red bark is not precipitated by gelatin, but gives a copious precipitate with tannin; and that of the yellow is rendered turbid by gelatin, and precipitated copiously by tannin.

There is a difficulty in determining the nature of the principles on which these phenomena depend,—either that which gives a precipitate with gelatin, or is precipitated by tannin, if these differ from each other. Neither is it very apparent what relation they have to the matter in which the active powers reside; it may be concluded, however, that they are not essential to it, since they are not found in pale bark, and since they are not uniform in the other species in any relation to the medicinal qualities. The same facts prove, that they have no relation to the resino-extractive matter, the principle probably of greatest activity of any which bark contains.

The infusions of some varieties of bark redden the more delicate vegetable infusions, and Vauquelin has discovered, in the matter extracted by water with the aid of heat, a salt composed of lime, with a peculiar crystallizable acid, which he has named Kinic Acid.

The active matter of bark is rendered more soluble in water by acids, a circumstance of some importance in its pharmaceutic preparation. The alkalis also add to its solubility; and some of the earths, particularly lime and magnesia, have the same effect.

The comparative medicinal activity of the different kinds of Peruvian bark is not easily determined, owing to the variable state in which they are found in the shops. The red, at its first introduction, was represented as much superior in efficacy to the pale, and this appeared to be confirmed by chemical experiments on the proportion of active matter in it to that of the ligneous fibre; but there is some reason to doubt of this superiority with regard to the red bark now frequently met with. The yellow bark has a much greater degree of bitterness, and some clinical observations appeared to establish its superior medicinal power. Even if this be admitted, its intense bitterness renders it unpleasant, and liable to occasion nausea.

The effects of Peruvian bark are those of a powerful and permanent tonic, so slow in its operation as to be scarcely perceptible by any alteration in the state of the pulse, or of the temperature of the body. Its tonic power is inferred, therefore, principally from obviating states of debility; and it is one of those medicines, the efficacy of which, in removing disease, is much greater than could be expected, *à priori*, from its effects on the system in a healthy state. The only effects arising from too large a dose are nausea and headach.

Intermittent fever is the disease for the cure of which bark was introduced into practice, and there is still no remedy which equals it in power,—a superiority of which, from its known operation, it is difficult to give any explanation. Little diversity of opinion now exists with regard to the rules regulating its administration. It is given freely in the earliest stage of the disease, and without any previous preparation, farther than the exhibition of an emetic to evacuate the stomach. And it may be employed with safety and advantage in every period of the fever. It has been supposed rather more effectual when given before the recurrence of the paroxysm, and that from this mode of employing it, less is required for that cure. The usual practice, however, is to give it in doses of a scruple or half a drachm every fifth or sixth hour during the interval of the paroxysm; and it may be given with safety during the hot fit, being then only more apt to excite nausea. It requires to be given for some time, and continued after the fever has been removed, in order to prevent a relapse.

In remittent fever it is given with equal freedom, even though the remission of the fever may be obscure, and frequently with advantage.

In those forms of continued fever which are connected with debility, as in typhus, cynanche maligna, and confluent small-pox, &c. bark has been regarded as one of the most valuable remedies. It is difficult, however, to give it in such quantities as to obtain much sensible effect from it, as from the weakened state of the organs of

digestion, it remains in the stomach unaltered, and is liable to produce nausea and irritation. In modern practice, therefore, bark is less employed in typhus, preference being given to the more powerful exciting operation of opium and wine. It has been regarded as hurtful even in those forms of fever, where the brain or its membranes are inflamed, or where there is much irritation, marked by subsultus tendinum, and convulsive motions of the extremities. Advantage is sometimes derived from it in the convalescent stage of the disease.

Even in fevers of an opposite type, where there are marks of inflammatory action, particularly in acute rheumatism, bark has been found useful, blood-letting being generally previously employed.

In erysipelas, in gangrene, in extensive suppuration, and in scrofulous and venereal ulceration, the free use of bark is of the greatest advantage.

In the various forms of passive hæmorrhagy, in many other diseases of chronic debility, dyspepsia, hypochondriasis, paralysis, rickets, scrofula, dropsy, and in a variety of spasmodic affections, epilepsy, chorea, and hysteria, cinchona is administered as a powerful and permanent tonic, either alone, or combined with other remedies suited to the particular case. The more common combinations of it are with sulphuric acid as an astringent, with preparations of iron as a tonic, with mercury in syphilis, in spasmodic diseases with valerian, and with cicuta in scrofula, and extensive ulceration.

Its usual dose is half a drachm. The only inconvenience of a larger dose is its sitting uneasy on the stomach. It may, therefore, if necessary, be frequently repeated, and in urgent cases may be taken to the extent of an ounce or even 2 ounces, in twenty-four hours, though from such large doses probably no adequate advantage is derived.

The powder is more effectual than any of the preparations; it is given in wine, in any spiritous liquor, or, if it excite nausea, combined with an aromatic. The cold infusion is the least powerful preparation, but is grateful and sits easy on the stomach; it is however so weak, that it is scarcely used but as a bitter in dyspepsia. Prepared by previous trituration of the bark with a little magnesia, it is rather more active. The decoction contains more of the active matter of the bark, and is the preparation generally used when the powder is rejected; its dose is from 2 to 4 ounces; but even it cannot be relied on for any important effect. The spiritous tincture, though containing more of the active principles, cannot be extensively used on account of the menstruum, but is principally employed, occasionally and in small doses, of 2 or 3 drachms, as a stomachic. The extract is a preparation of some power, when properly prepared by the joint action of alkohol and water; but as this is expensive, the watery extract only is usually found in the shops, and it is very variable in strength. It is given in the form of pill, in a dose from 5 to 15 grains, and affords the best form for combining bark with iron.

Bark is likewise sometimes given in the form of enema; 1 scruple of the extract, or 2 drachms of the powder, being diffused in 4 ounces of starch mucilage. The decoction is sometimes applied as a fomentation to ill-conditioned ulcers, or the powder is sprinkled on the ulcerated surface.

Offic. Prep.—Decoct. Cinch. Extr. Cinch. Inf. Cinch. Tinct. Cinch. *Ed.*—T. Cinch. C. *Lond. Dub.*

CINCHONA CARIBÆA. Caribæan Bark.

THIS species, belonging to the same genus, a native of the Caribee Islands, has been proposed as a substitute for Peruvian bark, and has as such been received into the Edinburgh Pharmacopœia. It is more bitter, and less aromatic, is of a brown colour, somewhat convoluted and fibrous. According to the observations of Dr Wright, who employed it in Jamaica, its effects are similar to those of the officinal cinchona. The Cinchona Floribunda, or St Lucia bark, has been also sometimes used. It is of a darker brown colour; its taste is sweetish, but becomes extremely bitter. It has been found more liable than the other species to produce nausea and purging.

ARISTOLOCHIA SERPENTARIA. Serpentaria Virginiana. Virginian Snake-root. *Gynand. Hexand. Sarmentosæ. Radix. Virginia, Carolina.*

THIS root consists of a number of small fibres, issuing from one head, of a greyish brown colour; it has a slightly aromatic smell, and a warm bitterish taste. Its active

matter is extracted partially by water, and by alkohol; entirely by proof spirit. By distillation, it affords a small quantity of an essential oil; somewhat fragrant, but not pungent.

Serpentaria is a stimulating aromatic tonic, which used formerly to be much employed in fevers of the typhoid type, to support the powers of the system. It was given in a dose of from 10 to 20 grains every fourth or fifth hour; with this intention, it is now however very rarely prescribed, and in any tonic power it possesses is probably considerably inferior to cinchona. It is sometimes combined with cinchona in the treatment of intermittent fever, and occasionally enters as an ingredient into the composition of bitter infusions and tinctures used in dyspepsia.

Offic. Prep.—T. Arist. Serpent. *Ed. L. D.*

DORSTENIA CONTRAYERVA. Contrayerva. *Tetrand. Monog. Scabridæ. Radix. Peru, West Indies.*

THIS root is in small twisted fibres, of a yellowish colour; has an aromatic smell, and a bitterish taste; yields its active matter to water and alkohol. Contrayerva, like serpentaria, was formerly used as a stimulant in typhoid fever, in a dose from 5 to 20 grains, but like it too has fallen into disuse. Mixed with carbonate of lime, it forms the compound powder of contrayerva of the London Pharmacopœia, which is used as a remedy in diarrhœa.

Offic. Prep.—P. Contrayerv. C. *Lond.*

CROTON ELEUTHERIA. Cascarilla. *Monoec. Monadelph. Tricoccæ. Cortex. Bahama Islands, North America.*

CASCARILLA bark is in small quills of a grey colour; has a slightly aromatic smell, and a warm bitter taste; it is highly inflammable. It has been used as a substitute for the Peruvian bark, and has been employed too as a remedy in dysentery, and in obstinate diarrhœa. Its usual dose is a scruple or half a drachm, but in modern practice it is little used.

Offic. Prep.—Infus. Casc. Tinct. Casc. *Lond.*—Extr. Casc. Resin. *Dub.*

CUSPARIA FEBRIFUGA. Angustura. *Pentand. Monogyn. South America.*

THIS bark was imported a few years ago from the Spanish West Indies, the botanical characters of the tree producing it being unknown. These have been lately determined by Humboldt, and the London College have adopted the name Cusparia Febrifuga, by which they distinguish it. It is in flat pieces, externally grey and wrinkled, internally of a yellowish-brown colour, and smooth; it has little odour; its taste is bitter and slightly aromatic. Water, assisted by heat, takes up the greater part of its active matter, which does not seem to be injured by decoction. Alkohol dissolves its bitter and aromatic parts, but precipitates the extractive matter dissolved by water, and its solution is on the contrary decomposed by water. Proof spirit appears to be its proper menstruum. By distillation, it affords a small quantity

of essential oil. The bark, triturated with lime or potash, and water, gives a smell of ammonia.

Angustura is a powerful antiseptic. It was originally introduced in the West Indies as a remedy in fevers, equal or even superior to the Peruvian bark. In this country it has not been much employed as a substitute for cinchona; and in the treatment of intermittent, it has in the trials that have been made of it failed. It has been used principally in obstinate diarrhœa, and in chronic dysentery, or as a remedy in dyspepsia. Its dose is from 10 to 20 grains of the powder, or one drachm in infusion or decoction. Its tincture with proof spirit is given in a dose of one or two drachms.

Offic. Prep.—Infus. Cuspar. *Lond.*—Tinct. Angust. *Ph. Dub.*

SWIETENIA FEBRIFUGA. Swietenia. *Decand. Monogyn. Trihilatæ. Cortex. East Indies.*

THE bark of the wood of this tree is of a red colour internally; externally it is covered with a gray epidermis; it has an astringent bitter taste; it yields its active matter to water, by infusion or decoction, and by evaporation an extract is obtained, highly astringent. It was introduced as a substitute for Peruvian bark, and in India has been used as such with advantage. Its dose in substance is half a drachm.

SWIETENIA MAHAGONI. Mahogany. *Cortex. Spanish America, West Indies.*

THIS species, of the same genus as the preceding, has similar qualities and virtues, being equally bitter and astringent. It has therefore been received into the Edinburgh Pharmacopœia, and may be employed to answer similar indications.

COLOMBA. (Calumba, *Pharm. Lond.*) Colomba.

OF the plant which furnishes this root, no botanical account has been obtained. It has been said to be brought from Ceylon; but from later accounts, it appears to be the produce of Southern Africa. It is in round thin pieces, evidently formed by transverse sections of the root; the circumference of these is covered with a bark; the woody part is of a light yellow colour. It has an aromatic smell, and a bitter taste. It yields its bitterness to water; but proof spirit is its proper menstruum, though the tincture is not very strong.

Colomba is a powerful antiseptic and bitter; it is used with much advantage in affections of the stomach and intestinal canal, accompanied with redundance of bile; it is also employed in dyspepsia, and forms a more powerful and grateful stomachic than the common bitters. Its dose is half a drachm of the powder, which in urgent cases may be repeated every third or fourth hour.

Offic. Prep.—Tinct. Colomb. *Ed. Lond. Dub.*—Infus. Colomb. *Lond.*

QUASSIA SIMAROUBA. Simarouba. *Decand. Monogyn. Gruinales. Cortex. South America.*

THE bark of the root of this tree, which is the part medicinally employed, is in long pieces, of a fibrous texture and yellowish colour; destitute of odour, and having a strong bitter taste. It is however very variable in its sensible qualities, some having scarcely any bitterness. Water and alkohol dissolve its active matter; the solution in either suffers no change from sulphate of iron.

Simarouba has been celebrated as a remedy in intermittent fever, dysentery and chronic diarrhœa, and has been given generally in the form of decoction: in substance the dose is one scruple. Though used in the countries of which it is a native, it is with us rarely prescribed. An infusion of it has a place in the London Pharmacopœia.

Offic. Prep.—Infus. Simaroub. *Ph. Lond.*

QUASSIA EXCELSA. Quassia. *Decand. Monogyn. Gruinales. Lignum. West Indies.*

THE wood of the root of this tree is of a yellowish white colour; it has a taste intensely bitter, without any odour or aromatic flavour. The bitterness is extracted equally by water and by alkohol.

It is used as a remedy in dyspepsia, diarrhœa, and in remittent and intermittent fevers, and is also sometimes employed to check vomiting. It is commonly given under the form of the watery infusion; in substance, in

substance, in which state it has been employed in the treatment of intermittents; its dose is from 10 to 30 grains.

Offic. Prep.—Infus. Quass. *Ph. Lond.*—Tinct. Quass. *Ph. Dub.*

GENTIANA LUTEA. Gentian. *Pentand. Digyn. Rotaceæ. Radix. Switzerland, Germany.*

THIS root is in long slender pieces, soft and flexible, of a yellowish colour, with a greyish epidermis. It has a very bitter taste, without any peculiar flavour. This bitterness is extracted both by water and alkohol. Diluted alkohol is its proper solvent.

Gentian is a common remedy in dyspepsia, in the form of infusion or tincture; and as a bitter, usually forms the basis of stomachic remedies. In substance, it has been used, though much more rarely, for the cure of intermittents, in a dose of half a drachm.

Offic. Prep.—Extr. Gent. Lut. Inf. Gent. C. T. Gent. C. *Ph. Ed. Lond. Dub.*—Vin. Gent. C. *Ed.*

ANTHEMIS NOBILIS. Chamæmelum. Chamomile. *Syngenes. Polygam. superfl. Compositæ. Flores. Indigenous.*

THERE are two varieties of these flowers obtained by cultivation, the single and double flowered: the former is much stronger, the odour and taste residing not in the white petals, but in the disk or tubular florets. Both have a bitter nauseous taste, and a strong unpleasant odour. The bitterness, with part of the odour, is ex-

tracted by water and alkohol, and if the infusion has been made with warm water, it is nauseous. Distilled with water, they yield a small quantity of essential oil.

Chamomile is a powerful bitter, and as such is useful in dyspepsia, forming a popular remedy which is in common use. When employed for this purpose, it ought to be under the form of the cold infusion, which is most grateful. The infusion in tepid water, when strong, acts as an emetic, and is often used to promote the action of other emetics. In substance, it has been given as a remedy in intermittent fever, in a dose of half a drachm three or four times a-day. Externally, the flowers steeped in water are employed as a fomentation. The extract, which is intensely bitter, is a convenient vehicle for forming pills, especially when it coincides in virtue with the substance prescribed under that form.

Offic. Prep.—Extr. Anth. N. *Edin. Dub. Lond.*—Inf. Anth. Ol. Anth. *Lond.*—Decoct. Anthem. *Ed. Dub.*

THE following plants, possessing bitterness in a greater or less degree, were formerly much employed, but are now discarded from practice. They possess no virtues but those of bitters, and as they have all more or less of a nauseous flavour, gentian, colomba or quassia is preferred to them. It is necessary to notice only their botanical characters.

ARTEMISIA ABSINTHIUM. Wormwood. *Syngenes. Polygam. superfl. Compositæ. Herba. Indigenous.*

CHIRONIA CENTAURIUM. Centaury. *Pentand. Monogyn. Rotaceæ. Herba.*

MARRUBIUM VULGARE. Hoarhound. *Didynam. Gymnosperm. Verticillatæ. Herba.*

MENYANTHES TRIFOLIATA. Trefoil. *Pentand. Monog. Rotaceæ. Herba.*

CENTAUREA BENEDICTA. Blessed Thistle. *Syngenes. Polygam. frustran. Compositæ. Herba. Spain.*

THE remaining substances belonging to this class are those in which the aromatic quality predominates, blended in some of them with a degree of bitterness.

CITRUS AURANTIUM. Orange. *Polyadelph. Icosand. Pomaceæ. Cortex flavus Fructus; Fructus; Fructus immaturus. India.*

THOUGH a native of India, this fruit is abundantly cultivated in the south of Europe. The outer rind of the fruit has a grateful aromatic flavour, and a warm bitterish taste. It is dried for use; both taste and flavour are extracted by water by infusion, as well as by alkohol; and by distillation a small quantity of essential oil is obtained. Its qualities are those of an aromatic and bitter. It has been employed to restore the tone of

the stomach; and it is a very common addition to combinations of bitters used in dyspepsia, communicating to them its grateful odour, and coinciding with them in power. It has likewise been given in intermittents in a dose of a drachm twice or thrice a-day.

Offic. Prep.—Aq. Citri Aur. Cons. Citr. Aur. Syr. Citr. Aur. *Ed.*—T. Cort. Aur. *Lond. Dub.*—Inf. Citr. Aur. *Lond.*

The unripe fruit, *Aurantia Curasslaventia*, Curassoa Oranges as they are named, retain when dried the aromatic flavour of the peel, with rather a larger share of bitterness, and are applied to the same uses. The juice of the ripe fruit consists principally of acid and saccharine matter, and so far as it has any medicinal virtue is a refrigerant.

Citrus medica. Lemon. *Polyadelph. Icosand. Pomaceæ. Cortex fructus. Asia.*

The exterior rind of the fruit of the lemon is similar in flavour and taste to that of the orange, but is rather less bitter and aromatic; its flavour too is more perishable, and from both circumstances it is less frequently used, though it may be employed for similar purposes. The juice is strongly acid, consisting chiefly of citric acid; its medicinal applications fall to be considered under the class of refrigerants.

Offic. Prep.—Aq. Citr. Med.—Syr. Citr. Med. *Ed.*—Acid. Citric. *Pharm. Lond.*

LAURUS CINNAMOMUM. Cinnamon. *Enneand. Monogyn. Oleraceæ. Cortex. Ceylon.*

THIS tree, a native of Ceylon, is now cultivated in India. The cinnamon is the interior bark of the branches of the tree; it is thin and much convoluted, of a texture somewhat fibrous, friable, of a light brown colour, having an agreeable pungent taste, with a degree of sweetness, and a grateful aromatic flavour. Its virtues chiefly depend on a small quantity of essential oil which it contains, and which, when obtained by distillation, is highly odorous and pungent.

Cinnamon is the most grateful of the aromatics. It is used to cover the unpleasant taste and flavour of other medicines, and to reconcile them to the stomach. It is also employed by itself as a moderate stimulant, given generally under the form of the watery infusion or distilled water. The former is more grateful, and is often successful in relieving nausea and checking vomiting.

Offic. Prep.—Aq. L. Cinn. Sp. L. Cinn. T. L. Cinn. T. L. Cinn. C. Pulv. Cinn. Comp. *Ed. Lond. Dub.*

LAURUS CASSIA. Cassia. *Enneand. Monogyn. Oleraceæ. Cortex. Flores nondum expliciti. India.*

THE Cassia Bark resembles that of cinnamon in appearance, taste and flavour; but is distinguished by its taste being more pungent, less sweet, and more mucilaginous than that of the real cinnamon; by its texture being denser, or less shivery, so that it breaks close and smooth, and by the pieces of it being thicker and less

convoluted. Its aromatic quality, like that of cinnamon, resides in an essential oil. It affords a distilled water, stronger than that of the genuine cinnamon, and yields also its taste and flavour to water by infusion. It is used for the same purposes as cinnamon; it is, however, much less agreeable to the stomach, and rather more pungent and stimulating. It cannot, therefore, be always with propriety substituted for the other, especially where the stomach is in an irritable state. The Cassia buds dried, are similar in taste and flavour to the bark, and are often substituted for it in officinal preparations.

Offic. Prep.—Aq. L. Cass. *Ed.*

CANELLA ALBA. *Dodecand. Monogyn. Oloraceæ. Cortex. West Indies.*

THIS is the inner bark of the branches of the tree. It is in quills or flat pieces, of a light greyish colour; its flavour is somewhat aromatic, and its taste is pungent. By distillation it affords a thick essential oil.

Canella is employed principally on account of its aromatic quality, and generally in combination with other remedies to render them more grateful. It thus enters into the composition of several officinal tinctures, and has been supposed, in particular, well adapted to cover the flavour of aloes.

Offic. Prep.—V. Aloes cum Canella. *Ph. Ed.* Pulv. Aloes cum Canella. *Ph. Dub.*

MYRISTICA MOSCHATA. *Monoec. Monand. Oleraceæ. Fructus nucleus, Nux Moschata dictus; Macis; Hujus Oleum fixum. India.*

UNDER the officinal name Myristica, are comprehended Nux Moschata or Nutmeg, and Macis or Mace; the former being the seed or kernel of the fruit, the latter the covering with which it is immediately surrounded. The tree is a native of the Molucca islands. The external covering and pulp of the fruit are removed, and the nutmeg and mace are dried by exposure to the sun.

Nutmegs are round, of a greyish colour, streaked with brown lines, slightly unctuous; they have a strong aromatic flavour, and a pungent taste. They yield their active matter entirely to alkohol: distilled with water, they afford a fragrant and pungent essential oil; by expression, a sebaceous oil is obtained from them, retaining their fragrant odour, and part of their pungency.

Nutmeg is used in medicine as a grateful aromatic. It may be given in a dose from 5 to 15 grains, and is sometimes employed to relieve nausea or vomiting, or to check diarrhœa, taken generally in wine. It has been said to prove narcotic in a large dose. It is also frequently employed to conceal the taste and flavour of unpleasant medicines, and to obviate the nausea they might excite.

Mace is a membranous substance, unctuous, of an orange yellow colour, and having a flavour and taste similar to the nutmeg, but rather less strong. It is used for the same purposes.

The expressed oil of nutmeg, which is generally known

by the name of Oil of Mace, derives its smell and taste from the essential oil mixed with it. It is sometimes used as an external stimulating application, but in the shops is seldom found genuine.

Offic. Prep.—Ol. Myrist. Mosch. Sp. Myrist. Mosch. —*Ed. Lond. Dub.*

EUGENIA CARYOPHYLLATA. Caryophyllus Aromaticus. Clove. *Polyand. Monog. Hesperideæ. Flores cum pericarpio immaturo. India.*

THE tree producing cloves is a native of the Molucca islands, and is cultivated in other parts of India. The cloves are the unexpanded flowers, which are dried by fumigating them, and exposing them to the sun. They are somewhat round, the division of the petals of the corolla being perceptible, of a greyish brown colour, slightly unctuous; they have a strong aromatic odour, and a pungent taste. They afford to water their flavour principally; to alkohol their taste. By distillation with water, they yield a fragrant essential oil, not very pungent. The oil of cloves commonly met with is rendered acrid by a portion of the resinous extract obtained by the action of alkohol being dissolved in it.

Cloves are among the most stimulating of the aromatics. They are employed principally as adjuvants or corrigents to other medicines. The essential oil is used with the same intention, and likewise as a local application to toothach. The infusion in tepid water has been employ-

ed as a grateful stimulant to relieve the sense of coldness in the stomach, which attends some forms of dyspepsia.

Offic. Prep.—Infus. Caryoph. *Ph. Lond.*—Ol. Caryoph. Ar.—*Ph. Ed.*

CAPSICUM ANNUUM. Capsicum. Guinea Pepper, or Capsicum. *Pentand. Monog. Solanaceæ. Fructus. East and West Indies.*

THE fruit of this plant is an oblong pod, of an orange colour, containing a pulp inclosing seeds. The membranous pod has an odour aromatic and penetrating, but which is impaired by drying; its taste is extremely hot and acrid, the sensation which it excites remaining long impressed on the palate. Its pungency is completely extracted by alkohol, and partially by water.

Capsicum is a very powerful stimulant. As such, it has been given in atonic gout, in palsy and dyspepsia, and in the latter stage of fever where the powers of life are nearly exhausted. It is also used as a condiment to food, especially in warm climates, and proves useful by obviating flatulence and promoting digestion. An infusion of it in vinegar, with the addition of salt, has been used as a gargle in cynanche; but the practice, though it has been successful in the West Indies, is not without danger from the inflammation it is liable to induce. The seeds have been found useful in obstinate intermittents, two grains being given at the approach of the cold paroxysm. The dose of the pod is from 5 to 10 grains.

Offic. Prep.—Tinct. Capsici. *Ph. Lond.*

PIPER NIGRUM. Black Pepper. *Diand. Trigyn. Piperitæ. Fruct. India.*

BLACK or Common Culinary Pepper is the unripe fruit of this plant dried in the sun. Its smell is aromatic; its taste pungent. Both taste and smell are extracted by water, and partially by alkohol. The essential oil, obtained by distillation, has little or no pungency.

Pepper, from its stimulating and aromatic quality, is employed as a condiment to promote digestion: as a medicine it is given to relieve nausea, or check vomiting, to remove singultus, and as a stimulant in retrocedent gout, and paralysis. Its dose is 10 to 15 grains. Its infusion has been used as a gargle in relaxation of the uvula.

White Pepper is the ripe berries of the same plant, freed from the outer covering, and dried in the sun. It is less pungent than the black.

PIPER LONGUM. Long Pepper. *Diand. Trigyn. Piperitæ. Fructus. East Indies.*

THIS is the berry of the plant, gathered before it is fully ripened, and dried in the sun. It is oblong, indented on the surface, of a dark grey colour. In flavour, taste, and other qualities, it is similar to the black pepper, and may be used for the same purposes.

PIPER CUBEBA. Cubebs. *Diand. Trigyn. Piperitæ. Fructus. East Indies.*

CUBEBS are the dried fruit of this tree. They have an aromatic odour, and a moderately warm taste. Their

virtues are similar to those of the other peppers, and being rather weaker, they are little used.

MYRTUS PIMENTA. Piper Jamaicensis. Jamaica Pepper. *Icosand. Monog. Hesperideæ. Baccæ. West Indies.*

THE berries of this tree are collected before they are ripe, and are dried in the sun. Their taste, though pungent, is much less so than that of the peppers; their flavour is fragrant, and has often been compared to that of a mixture of cloves, nutmeg, and cinnamon. The flavour resides in an essential oil; the pungency in a resin. Pimento is used in medicine merely as an aromatic, and principally on account of its flavour.

Offic. Prep.—Aq. Myrt. Pim. Ol. Vol. Myrt. Pim. Sp. Myrt. Pim. *Ph. Ed. Lond. Dub.*

AMOMUM ZEDOARIA. Zedoaria. Zedoary. *Monand. Monog. Scitamineæ. Radix. India.*

THIS root is in oblong pieces, of an ash colour; its smell is aromatic; its taste pungent and bitterish. It contains a portion of camphor along with its essential oil.

Its virtues are merely those of an aromatic, and as it is rather weak, it is little used.

AMOMUM ZINGIBER. Ginger. *Monand. Monog. Scitamineæ. Radix. India.*

THIS plant is cultivated in the West Indies, whence the dried root is imported. It is in small wrinkled pie-

ces, of a greyish or white colour, having an aromatic odour, and a very pungent, somewhat acrid taste. The Black Ginger is the root prepared with less care than the White; the latter, previous to drying, being scraped and washed.

Ginger yields its active matter completely to alkohol, and in a great measure to water. By distillation it affords a small quantity of essential oil, which is fragrant, but not pungent, the pungency residing in a resino-extractive matter.

This root is frequently employed as a grateful and moderately powerful aromatic, either in combination with other remedies, to promote their efficacy, or obviate symptoms arising from their operation, or by itself as a stimulant. With the latter intention, it is used in dyspepsia, flatulence, and tympanitis. Its dose may be 10 grains.

Offic. Prep.—Syrup. Amom. Zingib. *Ph. Ed. Lond. Dub.*—Tinct. Zingib. *P. Lond Dub.*

AMOMUM REPENS. Amomum Cardamomum. Cardamomum minus. Lesser Cardamom. *Monand. Monogyn. Scitamineæ. Semen. India.*

IT was always somewhat uncertain, from which of the above species these seeds are obtained; and more lately, from a more accurate description of the plant, it has been entirely removed from the genus amomum; and placed under a new genus, named Elettaria, the name chosen for

the species being Elettaria Cardamomum. This has been admitted by the London College.

The seeds are dried, and imported in their capsules, by which their flavour is better preserved. Their smell is aromatic; their taste pungent, and both are communicated by infusion to water, as well as to alkohol. They afford by distillation an essential oil. They are used merely as grateful aromatics, and are frequently combined with bitters.

Offic. Prep.—Tinct. Amom. R. *Ed. Lond. Dub.*—Tinct. Cardom. Comp. *Lond. Dub.*

CARUM CARUI. Caraway. *Pentand. Digyn. Umbellatæ. Semen. Indigenous.*

CARAWAY Seeds have an aromatic flavour, and a warm taste, depending principally on an essential oil, which they contain in considerable quantity. They are used to relieve flatulence, one or two drachms being swallowed entire; their essential oil, which has considerable pungency, and is grateful, is not unfrequently added to other medicines, to obviate nausea or griping.

Offic. Prep.—Sp. Car. Carv. *Ed. Lond. Dub.*—Aq. Car. *Lond.*—Ol. Car. *Lond. Dub.*

CORIANDRUM SATIVUM. Coriander. *Pentand. Digyn. Umbellatæ. Semen. South of Europe.*

THE seeds of this plant have a more pleasant odour when dried than when fresh; their taste is moderately warm. Like caraway, they are used as carminative, and

likewise to cover the taste and flavour of some medicines, particularly of senna, when given under the form of infusion or tincture.

PIMPINELLA ANISUM. Anise. *Pentand. Digyn. Umbellatæ. Semen. Egypt.*

THE seeds of anise have an aromatic odour, and a warm taste, with a share of sweetness. They afford, by distillation with water, a considerable quantity of an essential oil, having a strong, rather unpleasant odour, and a sweet taste, without much pungency. They are used chiefly as a carminative in dyspepsia, and in the flatulence to which infants are subject. A small quantity of the seeds may be taken, or, what is preferable, a powder composed of a few drops of the oil rubbed with sugar.

Offic. Prep.—Ol. Pimpin. Anis. *Ed. Lond. Dub.*—Sp. Anis. *Lond.*—Sp. Anis. C. *Dub.*

THE seeds of the following plants have qualities and virtues so very similar to those of the anise or caraway, that they do not require distinct consideration. They are used for similar purposes, but are scarcely entitled to a place in the Materia Medica.

ANETHUM FOENICULUM. Fœniculum dulce. Sweet Fennel. *Pentand. Digyn. Umbellatæ. Semen. Indigenous.*

ANETHUM GRAVEOLENS. Dill. *Pentand. Digyn. Umbellatæ. Semen. Spain and Portugal.*

CUMINUM CYMINUM. Cumin. *Pentand. Digyn. Umbellatæ. Semen. South of Europe.*

ANGELICA ARCHANGELICA. Angelica sativa. Garden Angelica. *Pentand. Digyn. Umbellatæ. Semen; Folia; Radix. North of Europe.*

Of this plant, the root possesses the greatest share of the aromatic quality, though it also belongs to the seeds and leaves.

MENTHA PIPERITA. Mentha Piperitis. Peppermint. *Didynam. Gymnosp. Verticillatæ. Herba. Indigenous.*

Of the different mints, this is the one which has the greatest degree of pungency. The leaves have a considerable degree of aromatic odour and taste. They afford an essential oil, rich in the aromatic quality and pungency of the herb. Peppermint is used as a stimulant and carminative, to obviate nausea or griping, or to relieve the symptoms arising from flatulence, and very frequently to cover the taste and odour of other medicines. It is used for these purposes under the forms of the watery infusion, the distilled water, and the essential oil.

Offic. Prep.—Aq. Menth. P. Sp. Menth. P. Ol. Menth. P. *Ed.*

MENTHA VIRIDIS. Mentha sativa. Spearmint. *Didynam. Gymnosperm. Verticillatæ. Herb. Indigenous.*

MENTHA PULEGIUM. Pennyroyal. *Didynam. Gymnosp. Verticillatæ. Herba. Indigenous.*

THESE two mints, spearmint and pennyroyal, resemble the peppermint in their general qualities, and are used for the same purposes, but are rather less agreeable and pungent. Their essential oil and distilled water are also inserted in the Pharmacopœia.

HYSSOPUS OFFICINALIS. Hyssop. *Didynam. Gymnosp. Verticillatæ. Herba. Asia, South and East of Europe.*

THIS plant, nearly allied to the preceding in botanical characters, is possessed of very similar qualities and virtues, and is sometimes employed for the purposes for which they are used. It has also been considered as a remedy in catarrh, though it can have no efficacy.

CHAP. VI.

OF ASTRINGENTS.

It has been supposed that the fibres of the living body, either over the whole, or in part of the system, may become relaxed, or lose that density and contraction which is necessary for the due performance of the several functions. And this is considered as an affection of the matter of which the fibre is composed, and not of the living or irritable principle connected with it. It has farther been imagined, that this relaxation may be removed by the application of those substances, which, when applied to dead animal matter, condense and constringe it; and such substances, classed as remedies, have received the appellation of Astringents. They are defined by Cullen: "Such substances as applied to the "human body produce contraction and condensation in "the soft solids, and thereby increase their density and "force of cohesion." And by the operation of this corrugating power, either directly exerted on a part, or extended by sympathetic action, the morbid affections arising from a state of relaxation are supposed to be removed.

The arguments adduced in support of these medicines exerting such a power, appear more conclusive than those brought in proof of any of the other explanations of the operations of medicines, founded on the mechanical physiology. Astringents, it is observed, exert, in a remarkable manner, this corrugating power on dead matter; they are serviceable as medicines in those affections which seem to depend on a relaxed state of the solids; they even corrugate the fibres of living matter, as is evident from the sensation they impress on the tongue and fauces; and applied to bleeding wounds, they restrain the hæmorrhage apparently by the same power.

We cannot, however, admit, without limitation, the suppositions on which this hypothesis is founded,—that the affections which astringents obviate depend on mechanical laxity of the solids, and that these substances act solely by removing that laxity, by inducing a mechanical or chemical change. Debility was indeed once ascribed to such a cause; but it is now admitted, that every degree of strength or weakness depends much more on correspondent variations in the state of the powers peculiar to living matter; and substances capable of obviating diseases dependent on any state of debility, must be such as are capable of acting on these powers. Many substances accordingly, arranged as Astringents, occasion very considerable alterations in some of the functions: they produce effects which cannot be referred to their condensing power, allowing them to possess it; and therefore, in all the changes they produce, part of

their operation at least must be referred to actions conformable to the laws of the living system.

For reasons of this kind, some have denied the existence of such a class of medicines as astringents. The substances which have usually received that appellation, they have considered as merely moderate stimulants, permanent in their action, and as differing little therefore from tonics.

It must be admitted, however, that there are substances which immediately restrain excessive evacuations; and that although between these and tonics there is in several respects a close resemblance, in others they differ widely. The most powerful astringents, oak bark for example, or galls, are much inferior in their tonic power to other substances having little or no astringency; while there are powerful tonics which do not produce the immediate effects of astringents.

There appears, therefore, to be a foundation for establishing such a class as astringents, though it is very difficult to point out the precise nature of their operation. It must be admitted, perhaps, that astringents possess a power of corrugating or condensing the animal fibre. The very sensation they excite in the mouth appears to be a sufficient proof of this, and it is farther established by chemical facts. That they likewise act as permanent stimulants, is proved by their power of removing intermittent fever and other states of the system connected with debility. The one power may be conceived perhaps to modify the other; and to this modification, or

to their combined action, the effects of astringents may be ascribed. The hypothesis of Darwin, that they act by producing absorption, accounts for some of their effects, but not for others, particularly their power of stopping hæmorrhage.

Astringents, from the powers they possess, are capable of being applied extensively to the treatment of diseases.

As stimulants, acting with considerable permanence, they may be substituted for tonics in diseases of debility. It has been found accordingly, that they have power to stop the paroxysm of an intermittent fever, when given a short time before its accession: and in cases of debility, they seem to be often of utility, independent of their power of checking debilitating evacuations.

It is however for restraining evacuations that astringents are most usually employed. Hæmorrhage, where it does not arise from a solution of continuity, depends on the contraction of the extreme arterial branches not being sufficient to resist the impulse of blood from the larger branches,—a deficiency of contraction generally owing to a debilitated state of these vessels. Astringents, as stimulants, slow and permanent in their action, and not sensibly increasing the force of the circulation, are calculated to obviate such a state; and this may be farther promoted by their corrugating power, extended by sympathetic action to the vascular fibre. Hence their use in menorrhagia, hæmoptysis, and other discharges of blood; though they likewise frequently fail, from their

operation being too slow and feeble, to resist the impetus of the circulation, or counteract the flow from a ruptured vessel. In epistaxis, or bleeding wounds, they are more powerful, as they can be more directly applied to the part.

By a similar operation, they in some measure check serous effusions; hence their use to restrain colliquative sweats. In diarrhœa too, they appear to operate by checking the effusion of fluid from the exhalant vessels, and thus diminishing the increased stimulant operation, which from this cause is exerted on the intestines, and increases their peristaltic motion. In the latter stage of dysentery, where an increased evacuation appears to be connected with debility of the exhalant vessels, their cautious administration is advantageous. And in passive inflammation, attended with increased serous discharge, as in gleet, and in some forms of ophthalmia, the topical application of astringents affords the most successful mode of treatment.

In the administration of astringents, it is an obvious caution, that they ought not to be applied to check evacuations where these are critical, or where they are necessary to relieve a plethoric state of the vessels, or a state of increased action; at least unless the evacuation proceed to an alarming extent.

Some narcotics, as opium, have sometimes effects apparently astringent. When increased discharges take place from irritation, these remedies, by diminishing irritability, lessen the discharge; they are thus serviceable

both in hæmorrhage and in diarrhœa arising from that cause. But their mode of operation is obviously different from that of astringents, and in the cases in which they are useful, astringents would be less useful, and only by an indirect operation.

Astringents may be subdivided into those belonging to the mineral, and those belonging to the vegetable kingdoms, which differ considerably from each other in their chemical properties, and probably therefore in the mode in which they produce their astringent effect.

ASTRINGENTS.

From the Mineral Kingdom.

Acidum sulphuricum.
Argilla.
Super-sulphas argillæ et potassæ.
Calx.
Ferrum.
Zincum.
Cuprum.
Plumbum.

From the Vegetable Kingdom.

Quercus robur.
Quercus cerris.
Tormentilla erecta.
Polygonum bistorta.
Anchusa tinctoria.
Hæmatoxylon campechianum.
Rosa gallica.
Arbutus uva ursi.
Mimosa catechu.
Kino.
Pterocarpus draco.
Pistacia lentiscus.

Of Astringents from the Mineral Kingdom.

Acidum sulphuricum. Sulphuric Acid. Acidum Vitriolicum. Vitriolic Acid.

Sulphur combines with oxygen in different proportions; when united with the largest proportion, it forms an acid extremely powerful from its state of concentration, the Sulphuric Acid. This acid used to be obtained from the decomposition of sulphate of iron, the Green Vitriol of commerce, by heat, and hence the name of Vitriolic Acid which was given to it. It is now formed by the combustion of sulphur. The sulphur, reduced to powder, is mixed with from one-eighth to one-tenth of its weight of nitrate of potash, by which its combustion, when begun, can be continued without the free access of atmospheric air, the nitric acid of the nitrate affording the requisite quantity of oxygen. It is thus burnt in a large leaden chamber; the sulphuric acid, which is slowly formed, is absorbed by water placed in the bottom of the chamber, and the acid liquor is brought to the due degree of concentration, by exposing it to heat in glass retorts. It is of a thick consistence, and has an apparent unctuosity; its specific gravity is 1.850; it is colourless and transparent; is highly corrosive, and possesses all the general acid properties in an eminent degree. As obtained by this process, it is not perfectly

pure, but contains a little sulphate of potash, and sometimes a little sulphate of lead. The quantities of these, however, especially of the latter, are very inconsiderable; they are in a great measure separated when the acid is diluted, and hence this dilution not only renders it more convenient for administration, but likewise more pure.

As a medicine, this acid is employed as a refrigerant, but principally as an astringent, and in this property it is undoubtedly superior to any other acid. It is used as an astringent to check the flow of blood in hæmoptysis, and the colliquative sweat in hectic fever, indications which it fulfils better than any other article in the Materia Medica. It is sometimes also used in menorrhagia and diabetes; and as a tonic, founded on its astringent property, in dyspepsia. In its concentrated state, its dose can scarcely be measured. In the Pharmacopœias, it is therefore ordered to be diluted. According to the formula given by the Dublin and Edinburgh Colleges, the Acidum Sulphuricum Dilutum consists of one part of the strong acid with seven of water; it is given in a dose from 10 to 30 drops. The London College, without any sufficient reason for the deviation, have ordered, under the same name, an acid diluted with not much more than five parts of water. The Acidum Sulphuricum Aromaticum consists of the acid diluted with alkohol impregnated with aromatics, and is given in a similar dose. From its astringency, this acid is frequently added to gargles, which are employed to check salivation, or relieve relaxation of the uvula. Externally

mixed with lard, in the proportion of half a drachm to an ounce, it has been used with advantage in psora, and it has also been given internally in the same disease.

Offic. Prep.—Acid. Sulph. Dil. *Ph. Ed. Lond. Dub.* —Acid. Sulph. Aromat. *Ed.*

ARGILLA. Argil.

THIS earth, in its pure form, is insipid and inert; but in its saline combinations, at least all of them which, from their solubility, are sufficiently active, there exists a greater or less degree of astringent power. The Boles, of which the Armenian Bole (Bolus Armena) is the chief, are argillaceous earth, impregnated with oxide of iron; they were at one time employed as astringents, but are entirely inert, and are now expunged from practice.

SUPER-SULPHAS ARGILLÆ ET POTASSÆ. Alumen. Alum.

THIS is a salt composed chiefly of argillaceous earth and sulphuric acid, the acid being in excess. It likewise always contains, however, a smaller portion of potash, and in some of the forms of it met with in commerce, sometimes also ammonia. It is found native, effloresing generally in the interstices of what is named alum slate; or it is prepared by exposing alum ores, which are native compounds of argillaceous earth and sulphur, to atmospheric air; the sulphur absorbing oxygen, forms sulphuric acid, which unites with the argillaceous earth, with a portion of potash which the ore contains; or if this alkali is not present in sufficient quantity, either it

or impure ammonia is added to the liquor obtained by lixiviation, so as to dispose it to crystallize. This liquor is then concentrated by boiling, so as to obtain, on cooling, the alum in a solid state, of a crystalline structure, though of no regular form.

This salt is in large transparent masses; it has a styptic taste, with a degree of sweetness. From the excess of its acid it reddens the vegetable colours. It is soluble in eighteen parts of cold, and in less than two of boiling water. The variety termed Roche or Rock Alum (Alumen Rupeum) has a reddish colour from the presence of a portion of oxide of iron. Common alum consists of 26 of acid, 12.5 of argil, 10 of potash, and 51.5 of water.

Alum, from its astringent power, is employed to check hæmorrhagies and serous evacuations: it is thus given in menorrhagia, leucorrhœa, and diabetes; and in leucorrhœa, is perhaps more successful than any other astringent. It has likewise been used, though less frequently, in intermittent fever, and in colica pictonum. Its dose is from 5 to 10 grains. The addition of an aromatic is generally necessary, to prevent it from exciting nausea, when it is given in the solid form; but the best form of administering it, is that of Alum Whey (Serum Aluminosum), prepared by adding two drachms of pounded alum to a pint of hot milk; the dose of this is 3 or 4 ounces. Externally alum is frequently used as the basis of astringent gargles, and of injections used in gleet; and dissolved with sulphate of zinc or copper, it forms

very styptic solutions, employed to check hæmorrhage by direct application.

Offic. Prep.—Sulph. Alum. Exs. Pulv. Sulph. Alum. C. *Ed.*—Liq. Alum. C. *Lond.*

CALX. Lime. Calx Viva. Quicklime.

LIME is a primary earth, found abundantly in nature, in several states of combination. It is obtained by exposing any of the native compounds of it with carbonic acid, usually chalk, limestone, or marble, to a heat gradually raised, so that the acid is expelled, and the lime remains pure. It is soluble in water, in sparing quantity; about 700 parts being required for its solution. Yet even in this weak state of impregnation, the solution which is known by the name of Lime Water (Aqua Calcis) has a strong styptic taste, and is capable of exerting important chemical agencies, as well as of acting on the living system. As an astringent lime water is employed in diabetes, and in diarrhœa: the dose is one or two pounds in the course of the day. It is used likewise in dyspepsia, in which it proves useful, more by its tonic and astringent power, than by its effect in neutralizing acid in the stomach. Externally it is applied as a wash in ill-conditioned ulcers.

Offic. Prep.—Aq. Calc. Ol. Lini cum Calce. *Ed.*

CARBONAS CALCIS. Carbonate of Lime.

THE various kinds of carbonate of lime, Chalk (Creta Alba), Crabs Claws (Chelæ Cancrorum), Oyster Shells

(Testæ Ostreorum), are not unfrequently used in diarrhœa, but they evidently prove useful, not by any real astringent power, but by correcting the acidity which so frequently occasions or aggravates that disease. They rather belong, therefore, to the class of Antacids.

FERRUM. Iron. (Page 223.)

THIS metal has been already considered as a tonic; it is likewise employed as an astringent to check increased evacuations. It is thus used with advantage in some forms of passive hæmorrhage, particularly menorrhagia. The advantages derived from it in such cases, may be supposed to depend on its tonic power; the styptic taste, however, of its saline preparations, is a sufficient proof of the presence of astringency to a certain extent; and it is not improbable that this may coincide with, or modify the operation connected with its action as a tonic. The sulphate of iron is the preparation in which this astringent property is most obvious.

ZINCUM. Zinc. (Page 227.)

THIS metal has likewise been considered as a tonic. Its saline preparations have, however, a considerable degree of astringency, and there are several medicinal applications of them founded on this quality.

Sulphate of Zinc (Sulphas Zinci) has been employed internally as an astringent in chronic dysentery, and in the treatment of intermittent fever; but from its emetic power its operation is liable to be harsh, and is not

easily regulated. Its solution is in common use as an injection in gonorrhœa, when the inflammatory state has subsided, and in gleet; two grains being dissolved in an ounce of water, and it frequently succeeds in checking the discharge, apparently from its astringent power. A solution of nearly the same strength is likewise used as a collyrium in ophthalmia; the astringent power of this being increased, according to a formula in the Edinburgh Pharmacopœia, by the addition of a few drops of diluted sulphuric acid. Dissolved with alum, it forms a very styptic liquor, which has long been in use for stopping hæmorrhage, and checking increased discharges by external application.

Offic. Prep.—Sol. Sulph. Zinc. *Ph. Ed.*—Liq. Alum. Comp. *Ph. Lond.*

Acetate of Zinc, under the form of solution (Solutio Acetitis Zinci), is obtained by adding a solution of acetate of lead to a solution of sulphate of zinc, a decomposition immediately taking place, and sulphate of lead being precipitated, while acetate of zinc remains dissolved. This has long been in use as a mild astringent injection in gonorrhœa, less liable to produce irritation, or to check the discharge suddenly than the solution of sulphate of zinc, and rather more active than the solution of acetate of lead. It has therefore received a place in the Edinburgh Pharmacopœia. A solution of the salt in alkohol has been introduced into the Dublin Pharmacopœia, and when used is largely diluted with water.

CUPRUM. Copper. (Page 229.)

THIS metal has so far an analogy to the preceding ones, that, along with the general action which it exerts on the system, capable of obviating spasmodic affections, it has a degree of astringent power. This too is conspicuous, principally in its combination with sulphuric acid, the sulphate of copper. This in solution is sometimes used externally as an astringent; and dissolved with alum in water, to which a portion of sulphuric acid is added, it forms a very styptic solution, formerly named Aqua Styptica, sometimes employed by direct application to restrain hæmorrhage. The formula has a place in the Edinburgh Pharmacopœia.

Offic. Prep.—Sol. Sulph. Cupr. Comp. *Ph. Ed.*

PLUMBUM. Lead.

THIS metal, when rendered capable of acting on the system by oxidation, or combination with acids, produces very deleterious effects, and proves a powerful, though insidious poison. Nor is it easy to explain its mode of action. It appears to act peculiarly on the muscular fibre, repressing action, and at length exhausting the irritability of the muscles. When introduced slowly into the system, the intestines are first affected, constipation from diminished action takes place, accompanied frequently with severe pain. Tremor and debility of the voluntary muscles succeed, and are followed by complete paralysis, the muscles losing their firmness and cohesion. When a large quantity of any of the active preparations of lead is

received into the stomach, these symptoms occur suddenly and with violence, giving rise to what is named Colica Pictonum, and the same disease is sometimes suddenly induced by the progressive accumulation of the metal in smaller quantities. A sense of constriction is felt in the stomach and bowels, with obstinate constipation and the most severe pain; the pulse is small and hard; respiration becomes laborious; there is general muscular debility and tremor, accompanied with cold sweats and convulsions, which have often a fatal termination.

From this power of repressing muscular action, lead produces effects analogous in some respects to those of astringents, and it is regarded as an astringent, though its mode of operation is probably dissimilar. The preparations of it which have been applied to medicinal use, are the semi-vitrified oxide, white oxide or sub-carbonate, and the acetate and super-acetate.

Lithargyrum. Litharge. The substance thus named is the semi-vitrified oxide (Oxidum Plumbi Semi-Vitreum). It is usually obtained in the calcination of lead, with the view of separating the silver, which is frequently associated with it; the flame, with a current of air, being made to reverberate on the surface of the melted metal. It is in flakes of a yellow colour, with somewhat of a vitreous lustre. A small quantity of carbonic acid, not exceeding 4 parts in 100, exists in it, apparently, however, not essential to its constitution. It is used only in some phar-

maceutical preparations, particularly for forming, when boiled with oil, a plaster which serves as the basis of other compound plasters, and which is itself sometimes applied as a healing dressing to wounds, proving useful by excluding the air.

Offic. Prep.—Emp. Oxid. Plumb. *Ph. Ed. Lond. Dub.*

Minium. Red Lead.—This is an oxide containing about 12 of oxygen in 100 parts. It is sometimes applied to the same purposes as litharge, and an ointment formerly in use as a cooling application was prepared by rubbing it with vinegar and oil. It might be discarded, however, from the Pharmacopœia.

Cerussa. Cerusse, or White Lead.—This is prepared by exposing plates of lead to the vapour arising from vinegar; a white crust is formed on their surfaces, which, when it has accumulated sufficiently, is scraped off, and reduced to a fine powder by levigation. The nature of this substance has not been very well ascertained. It has been regarded merely as an oxide; hence the name Oxidum Plumbi Album, given to it by the Edinburgh College. A little carbonic acid being generally contained in it, either absorbed from the atmosphere, or formed from the partial decomposition of the acetic acid, it has been considered as a sub-carbonate; and the London College have defined it as such, while, for a reason not easily imagined, they have named it Carbonas Plumbi. From theory, it might be inferred to contain a portion of the acetic acid by which it is formed; the Dublin College have accordingly named it Sub-Acetas Plumbi, and it is

not improbable that this is most correct. It is used only externally, being applied in fine powder to slight cases of excoriation or inflammation, and used particularly to relieve these affections in children,—a practice, however, which, from some observations, appears not to be altogether without danger, and which is unnecessary, as the levigated calamine stone answers equally well. It is used likewise as the basis of an ointment, which is sometimes applied as a cooling dressing to inflamed parts.

Offic. Prep.—Ungt. Oxid. Plumb. Alb. *Ph. Ed.*

Acetas Plumbi. Acetate of Lead.—There are two compounds of lead with acetic acid, medicinally employed. One is the salt which has been long known by the name of Sugar of Lead, (Saccharum Saturni); the other a solution, which was named Goulard's Extract of Lead; and it is only lately that the relation between these has been established.

The first had been regarded as the proper acetate of lead. Thenard found, that it is the super-acetate, or contains an excess of acid, which is necessary to give it its usual crystalline form, which is that of a slender four or six sided prism. When its solution is boiled with a little oxide of lead, the neutral acetate is formed, which crystallizes in plates. Goulard's Extract, which is prepared by boiling vinegar on litharge, Dr Bostock found to be a solution of the neutral acetate. And the terms of Acetate and Super-acetate are now employed by the London College to distinguish these preparations.

Super-Acetas Plumbi. Super-Acetate of Lead.—

This is still named Acetate of Lead (Acetas Plumbi) in the Edinburgh Pharmacopœia, the nature of it having only lately been ascertained. It is the sugar of lead of the old nomenclature. The process for preparing it consists in boiling vinegar on cerusse, until the acid acquire a sweet taste, and evaporating the liquid, so that on cooling it affords crystals: it is usually prepared on a large scale. It is in masses composed of slender prismatic crystals, aggregated, of a yellowish colour, slightly efflorescent: it has a very sweet and styptic taste, is abundantly soluble in water, but scarcely forms a transparent solution even with distilled water, owing to a slight decomposition, in consequence of which a little sub-acetate is precipitated. It consists, according to Thenard's analysis, of 58 of oxide, 26 of acid, and 16 of water.

The medicinal use of this salt is nearly limited to its external application. Yet some practitioners have recommended it in different cases of profuse evacuation, particularly in hæmorrhage, where other remedies have failed: it has thus been given in menorrhagia, in the dose of half a grain repeated every four hours: it has likewise been employed in obstinate leucorrhœa, and to restrain the colliquative sweat accompanying hectic fever. From the deleterious agency, however, of lead on the system, it is a remedy which must be used with reluctance, and which is accordingly scarcely ever ventured on in modern practice. There is one circumstance too, that renders its administration more difficult,—its being liable to be considerably influenced by idiosyncrasy; many facts having

sufficiently established, that its action is extremely unequal, quantities of it having been often taken without any injurious effect, which, in other cases, would have proved in the highest degree deleterious.

As an external application, it is often employed to obtain its astringent effect. A solution of it, of the strength of three grains to an ounce of water, is used as an injection in gonorrhœa; and producing no irritation, is not liable to be attended with the injurious consequences which sometimes arise from preparations more active. A solution rather weaker is employed as a collyrium in ophthalmia, and can be applied with safety, even in the state of active inflammation. A solution somewhat stronger is a common application in superficial inflammation; and an ointment, of which it is the basis, is often employed as a dressing to inflamed or excoriated parts. Its saturated solution, combined with vinegar, is also frequently employed as a discutient. Facts have been brought forward, which apparently prove, that the general effects of lead on the system have been produced by the incautious or too long continued use of these external applications; while, in many cases, they have unquestionably been extensively employed without the production of any bad effect, and indeed are so in common practice; the opposite facts, therefore, if the observations with regard to them have been correct, are probably to be accounted for from the peculiar idiosyncracy, which, as has been remarked, exists with regard to the action of lead

on the system, in consequence of which some individuals are more liable to be affected by it than others.

The neutral acetate of lead, it has been stated above, forms the basis of what has been named Goulard's Extract,—a preparation which has long been in use among surgeons. It is the Aqua Lithargyri Acetati of the former edition of the London College, now named Liquor Plumbi Acetatis; and prepared by boiling vinegar on litharge. Although it differs in chemical composition from the preceding preparation, it does not appear to differ from it in medicinal powers. It is used diluted with water, as a lotion in cutaneous diseases, or as an application to inflamed surfaces. In the original formula for the preparation of this lotion given by Goulard, a little ardent spirit was added to it, and this being in common use has been received as an officinal preparation by the London and Dublin Colleges.

Offic. Prep.—Ungt. Acet. Plumb. *Ph. Ed. Lond. Dub.* —Liq. Plumb. Acet. Dilut. *Ph. Lond. Dub.*—Cerat. Plumb. Composit. *Ph. Lond.*

Of Vegetable Astringents.

The property of astringency in vegetables, denoted by its effect of corrugating the animal fibre, appears to be dependent on a common chemical principle, or at least to be connected with some peculiarity of composition; since

vegetable astringents uniformly possess certain common chemical properties. Thus, their astringency is extracted both by water and by alkohol; these infusions strike a purple or black colour with any of the salts of iron, deeper in general as the astringent is more powerful; and they are capable of corrugating, more or less strongly, dead animal matter, as is shewn in their operation in the process of tanning.

In the farther investigation of this subject, it was found, that a peculiar acid exists in the more powerful astringents; the acid which, from being contained abundantly in galls, has been named Gallic, and the general chemical characters of which, in the preliminary sketch on the principles of Pharmaceutic Chemistry, have been enumerated. This acid having the property of striking a deep purple colour with the salts of iron, the chemical change which had been more particularly considered as the test of astringency, was supposed to be the astringent principle.

To this, however, there existed a very obvious objection, that the acid, when obtained insulated, was possessed of no great astringency, and scarcely indeed of that property in any sensible degree; and farther, that the colour it did strike with the salts of iron was less deep than that from the infusions of the more powerful astringents.

The researches of Seguin, some years ago, threw more light on this subject by the discovery of a different principle existing in astringents, and having a better claim to

be ranked as the principle of astringency. Applying the proper test to discover it, that of the animal matter, on which it peculiarly operates, he found, that on adding a solution of animal gelatin to the infusion of a vegetable astringent, as that of galls or oak bark, a copious precipitation takes place, consisting of this principle in combination with the gelatin. Being the agent which gives to astringents their property of tanning, it has received the name of Tannin, and its properties, as a proximate principle of vegetables, have been already stated.

That it is the principle of astringency in vegetables, admits now of little doubt. Gallic acid has no such power, while tannin has a harsh styptic taste, and the power of corrugating the animal fibre. Seguin had supposed, that in the operation of tanning, its action is facilitated by that of the gallic acid, the acid partially deoxidizing the skin, and thus bringing it nearer to the state of gelatin with which the tannin combined. A similar action might be supposed to be exerted on the animal fibre in the production of the astringent effect. The theory of Seguin, however, was established by no proof, and the fact alone that some of the most powerful astringents, as catechu or kino, contain no gallic acid, but tannin mixed only with mucilage or extract, is a proof that it is to the action of this principle that the whole effect is to be ascribed.

If astringency, as exerted by vegetables, is thus to be considered as the result of the chemical action of the principle on which it depends, there is considerable diffi-

culty, as has been already remarked, in conceiving how it can be exerted in the animal system, especially in a distant part, when the astringent acts only on the stomach. It can only be conceived, that corrugation, or some similar change, is produced by it in the fibres of the stomach, which may be propagated by sympathy to distant parts, nearly in the same way as the impression of cold is communicated.

QUERCUS ROBUR. Oak. *Monoec. Polyand. Amentaceæ. Cortex. Indigenous.*

THE bark of this tree possesses a large share of astringency, which it yields to water. The infusion contains both gallic acid and the tanning principle, the latter in a considerable quantity, attached to the ligneous fibre which forms the basis of the bark; an ounce of bark afforded, in Mr Davy's experiments on the principal astringents, 111 grains of solid matter by lixiviation, of which 77 were tannin.

Oak bark has been used as a remedy in hæmorrhage, diarrhœa, and intermittent fever, given in a dose from 15 to 30 grains. In modern practice, its strong infusion or decoction is occasionally employed as an astringent gargle in cynanche, as an injection in leucorrhœa and profuse menorrhagia, and as a fomentation in hæmorrhoids and prolapsus ani.

Offic. Prep.—Extr. Cort. Querc. *Dub.*

QUERCUS CERRIS. *Monoec. Polyand. Amentaceæ. Cynips nidus. Galla. Galls. South of Europe.*

THE tubercles, named Galls, are found on the branches of this tree. Their production is occasioned by the bark being pierced by an insect of the cynips genus, to deposite its egg. The juice exuding slowly, is inspissated, and hardens. The best galls are heavy, knotted on the surface, and of a blue colour, They are nearly entirely soluble in water, at least with the assistance of heat; the infusion reddens the vegetable colours from the action of the gallic acid, and this acid can be procured in considerable quantity, by allowing the infusion to remain exposed to the air until its other principles are decomposed, or by sublimation from the galls. The infusion too contains a large quantity of tannin, as it gives a very copious precipitate with solution of gelatin. It has farther been supposed to hold dissolved extract and mucilage; but the existence of extract is doubtful, and from Dr Bostock's experiments there appears to be no sensible portion of mucilage. The proportion of tannin varies considerably in different specimens of galls. In Mr Davy's analysis of Aleppo galls, 500 grains afforded to water by lixiviation 185 grains of solid matter, of which 130 were tannin, 31 gallic acid, 12 saline and earthy matter, and 12 supposed to be mucilaginous and extractive matter.

In medical practice, galls, though so powerfully astringent, are not much employed, and are seldom internally administered. The strong infusion or decoction has been applied to the same purposes as the decoction of oak bark.

And an ointment composed of the galls in fine powder with eight parts of simple ointment is used as an astringent application to hæmorrhoidal affections.

Offic. Prep.—Tinct. Gallar. *Ph. Dub.*

Tormentilla erecta. Tormentil. *Icosand. Polygyn. Senticosæ. Radix. Indigenous.*

The root of tormentil is strongly astringent, with little flavour or bitterness, and though not chemically examined probably owes its astringency to tannin. It has been used in diarrhœa, under the form of decoction, and in intermittent fever, in substance, in the dose of from half a drachm to a drachm. But it is now nearly discarded from practice.

Polygonum bistorta. Bistort. *Octand. Trigyn. Oleraceæ. Radix. Indigenous.*

The root of this plant is a pure and very strong astringent; as such it has been used in diarrhœa and in intermittent fever, in a dose from a scruple to a drachm. But having probably no superiority over other astringents, and no peculiar virtue, it has fallen into disuse.

Anchusa tinctoria. *Alkanet. Pentand. Monogyn. Asperifoliæ. Radix. South of Europe.*

The cortical part of the root of this plant has a deep red colour, which has the singular property of not being extracted either by water or alkohol, but readily by expressed oils. It possesses a slight degree of astringency;

but it is now only employed to communicate colour to ointments.

HÆMATOXYLON CAMPECHIANUM. Lignum Campechense. Logwood. *Decand. Monog. Lomentaceæ. Lignum. South America.*

THE wood of this tree is of a very deep red colour; it has scarcely any smell; its taste is sweetish and astringent. Its active matter is extracted by water, and by alkohol, leaving the ligneous fibre which is its base undissolved; both solutions strike a deep purple colour with the salts of iron, and give a precipitate with gelatin. Logwood has been employed in medicine as an astringent, in diarrhœa and chronic dysentery, under the form of the decoction, or the watery extract. The extract has been proposed to be used as a substitute for kino.

Offic. Prep. — Extr. Hæmatoxyl. Camp. *Ph. Ed. Dub. Lond.*

ROSA GALLICA. Rosa Rubra. Red Rose. *Icosand. Polyg. Senticosæ. Petala. South of Europe.*

THE petals of this species of rose have a slight degree of astringency, which is most considerable before they are expanded, and it is in this state that they are collected and dried for use. The fresh leaves of the flowers are made into a conserve with sugar, which was at one time regarded as a remedy of some power in hæmoptysis and phthisis, but which has long been acknowledged to be perfectly inert. The infusion of the dried leaves,

slightly acidulated by the addition of sulphuric acid, forms a pleasant astringent gargle.

Offic. Prep.—Inf. Ros. Gall. Cons. Ros. R. Syr. Rosæ. *Ph. Ed.*—Mel. Rosæ. *Lond. Dub.*

ARBUTUS UVA URSI. Bears Whortle-Berry. *Decand. Monog. Bicornes. Folia. Europe, America.*

THE leaves of this plant have a bitter astringent taste, without any odour. Their watery infusion strikes a deep black colour with the salts of iron, and from their known astringency, which adapts them even to the purpose of tanning, probably contains a large proportion of tannin.

From its astringency, uva ursi has been employed in menorrhagia and other fluxes. It has however been used more particularly in cystirrhœa, calculus, and ulcerations of the urinary organs. In checking the increased secretion of mucus from the bladder, which constitutes the first of these diseases, it appears to be superior to other astringents; to calculus, in common with other bitters and astringents, it affords relief, probably by its action on the stomach preventing the generation of acid. More lately it has been recommended in phthisis. Its dose is half a drachm of the leaves in powder, twice or thrice a-day.

MIMOSA CATECHU. *Polygam. Monoec. Lomentaceæ. India. Ligni Extractum. Catechu. Terra. Japonica.*

To this substance, formerly known by the absurd name

of Japan earth, the appellation of Catechu is now appropriated. It is an extract prepared by boiling the interior wood of the tree with water, and the tenacious residual mass is dried by exposure to the air and sun. It is of a yellow or brown colour, has a bitter and astringent taste, leaving an impression of sweetishness; but its qualities vary considerably. Two kinds are at present met with in the shops; one is of a light yellowish brown colour, is smooth and uniform in texture, breaks short, is soft and light; the other is of a dark brown colour, more heterogeneous, heavier, and considerably harder.

Catechu is almost entirely soluble in water with the assistance of heat, the residuum consisting of accidental impurities. It is nearly equally soluble in alkohol. Its solution strikes a deep black colour with the salts of iron, and gives an abundant precipitate with animal gelatin. From Mr Davy's experiments, it appears to be composed of tannin, extractive matter and mucilage; the proportions in the best catechu being 54.5 of the first, 34 of the second, 6.5 of the third, and 5 residual matter. Our knowledge with regard to the principle named Extract is so imperfect, that it is difficult to establish any certain conclusion with regard to it; and the subsequent experiments of Dr Bostock, as to the modes of separating what is called Extract from the Tannin of catechu, do not exactly accord with those of Mr Davy. Dr Bostock has remarked, too, that catechu gives indications of the presence of gallic acid, and that its watery infusion even reddens the more delicate vegetable colours.

Catechu is in common use as an astringent, and in the uniformity and certainty of its operation is probably equal, or even superior to any of the vegetable astringents. It is used in diarrhœa generally under the form of the infusion, or the tincture: or the officinal preparation, the electuary of catechu, consisting of catechu and kino with some aromatics and a little opium is diffused in water, forming what has been named the Japonic Mixture. In substance it may be given in a dose from 10 to 20 grains, which may be frequently repeated. Under the form of troches, it is sometimes used in relaxation of the uvula, or sponginess of the gums, being allowed to dissolve slowly in the mouth.

Offic. Prep.—Elect. Catechu. Inf. Catech. Tinct. Catech.—*Ph. Ed. Lond. Dub.*

Kino.

The substance distinguished by this name was introduced a number of years ago into the Materia Medica as a powerful astringent, little being known with regard to its origin, farther than it was said to be the produce of Africa, and obtained probably from the plant affording it by exudation. Subsequent to its introduction, it was met with in the shops very various in its qualities: it still is so, and is obviously of different origin, though there is considerable obscurity with regard to the natural history of these varieties. The London College have described it merely as the produce of an African plant unknown. The Edinburgh College have inserted it in their catalogue

of simples, as the concrete juice of the Eucalyptus Resinifera,—a tree a native of New Holland; and there is reason to believe that at least part of what is called Kino in the shops is imported from that country, and is the produce of this vegetable. The Dublin College have considered kino as the product of the Butea Frondosa, on the authority of Roxburgh; but incorrectly, as Dr Duncan has remarked. He has farther observed, what is perfectly just, that much of the kino of the shops bears all the appearance of an extract artificially prepared, and is known to be formed from different astringent vegetables.

It is not very easy to discriminate exactly among these various substances, and to assign to each its real origin. One variety, and which bears the highest price in the shops, has all the appearance of a natural production: slender twigs are intermixed in its substance; it is of a reddish brown colour, with a resinous lustre, is very brittle, and has a bitterish astringent taste. This corresponds in its characters with the substance first introduced as kino, and is still said to be the produce of Africa, and to be imported from Senegal. The kind from New Holland has also the appearance of a natural production, fragments of bark being intermixed with it; it is in more solid masses than the other, is less brittle, and with its astringency has a disagreeable mawkish sweetish taste. The third kind, and which is most commonly met with, has the appearance of an extract thoroughly dried; it is in small fragments, with a resinous fracture, is of a brown colour, more approaching to black than the others, and has a

taste astringent and slightly bitter. This Dr Duncan has stated is said to be the produce of the Coccoloba Uvifera. I have also been informed, that it is the Extract of the wood of the mahogany.

The analysis of kino has been executed; but from the difficulty of ascertaining exactly to what substance the name is applied, there is a difficulty in appropriating the results to any of the varieties that are met with. All of them, however, appear to contain a large proportion of tannin; their solutions giving a deep colour, not purple however, but green, with salts of iron, and a copious precipitate with gelatin. The active matter of all or the greater number of them is soluble in water with the assistance of heat, and is still more easily soluble in alkohol.

Kino has been employed as an astringent for the same purposes as catechu, and they are often given in combination. The catechu being more uniform in its qualities, ought perhaps to be preferred.

Offic. Prep.—Tinct. Kino, *Ph. Ed. Lond. Dub.*—Pulv. Kino. Comp. *Lond.*

PTEROCARPUS DRACO. Sanguis Draconis. *Dragon's Blood. Diadelph. Decand. Papilionaceæ. Resina. South America.*

THE substance to which the absurd name of Dragon's Blood has been given, is a resinous concrete of a dark red colour, and heterogeneous texture, varying also frequently in its qualities as it is met with in the shops. It

is insipid; and though it has been considered as an astringent, has probably no such power, nor is it now applied to any medical use.

PISTACIA LENTISCUS. Mastiche. Mastich. *Dioecia. Pentand. Amentaceæ. Resina. South of Europe.*

THE resin named Mastiche is the produce of this shrub by exudation. It is in small rounded fragments of a light yellowish colour, nearly transparent, brittle, and hard, but when pressed or chewed becoming somewhat tenacious. It is chiefly resinous, and is hence dissolved by alkohol, a substance however remaining undissolved, tenacious and elastic, approaching in its characters to caoutchouc. Mastiche is insipid, and nearly inodorous, giving only a slightly fragrant smell when heated. Though it has been regarded as an astringent, and as such was at one time employed in medical practice, it has no sensible activity, and might be discarded from the lists of the Materia Medica. It is used from its insolubility and tenacity to fill the cavity in carious teeth.