
 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.

NARCOTICA—NARCOTICS.

NARCOTICS, according to the definition that has usually been given of them, 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 from their operation. 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 depressed: there is a general languor, averseness to motion, and dulness of sense: the mind is placid and inactive; and this state generally soon terminates in sleep. This, after continuing for some time, is followed 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 prima-

rily 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 found on dissection immediately after these effects have appeared, that the whole of the quantity administered has remained in the stomach undissolved.

Applied externally, these medicines often exert their usual action, though with much less force. Opium deadens pain, and represses spasmodic muscular action, and this not only in the part to which it is immediately applied, but in others more distant. Several others of the class have similar effects; and their operation in this mode of application, too, seems to be extended by the medium of the nerves.

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 deprived of the power of contraction. When applied to an wound, they often affect the general system, and in this case they appear to act, by being received through the divided veins into the circulation; the interposition of a ligature on the blood-vessels preventing the effect.

In the production of the effects arising from the action of Narcotics, the brain seems to be the organ chiefly affected, and it is in a great measure from this affection that death seems to follow from their operation, the direct action on the heart being much less considerable. This has recently been more clearly established by the experiments of Mr Brodie. On

injecting alkohol into the stomach of a small animal, or introducing a small quantity of the juice of aconite, or of the essential oil of the bitter almond diffused in water, or of the leaves of tobacco, into the rectum, or in a concentrated state into an wound, the entire loss of voluntary motion, and total insensibility were produced; yet even when this state was allowed to continue until all the external signs of apparent death were produced, the heart, when exposed to view, was found contracting with considerable force, and by inflating the lungs and producing artificial respiration, its action could be kept up nearly to the natural standard for a considerable period. It appears, therefore, that while the nervous system was so much affected, the powers of the circulating system were little impaired; and the cessation of the circulation ultimately producing death, farther appears in such cases to arise principally from the respiration being affected, and at length ceasing in consequence of this function being so much more dependent on the influence of the nerves. The immediate effects of narcotics arise, therefore, from affection of the functions of the brain; the function of respiration is affected in consequence of this, and at length ceases, and this occasions, or at least accelerates, the failure of the circulation, which produces death. From this an important conclusion follows. In the case of insensibility produced by the operation of a narcotic, as the heart continues to act, it is possible, that if the cessation of its action be prevented by keeping up respiration artificially, the affection of the brain may gradually pass off, and the functions of life be restored. A striking experiment in illustration of this, is stated by Mr Brodie, in which the state of total insensibility was induced in a rabbit by a drop of the essential oil of almond inserted into an wound; after five minutes respiration had ceased, but the heart was still felt beating through the ribs:

its motion must, however, have soon ceased, and of course life have been extinguished: artificial respiration was excited, in six minutes the animal moved and made an effort to breathe; these efforts were repeated, after sixteen minutes the artificial respiration was discontinued, spontaneous respiration being established; all the functions revived, and in two hours the animal appeared to be perfectly well. In another case the animal recovered from a state of insensibility, after artificial respiration had been excited for nearly three hours. From these facts, the preventing the failure of respiration, and the exciting it if necessary artificially, at the same time keeping up the proper animal temperature, would appear to be important indications in the extreme state of exhaustion occasioned by the operation of a narcotic.

There are some narcotics which appear to operate with more force on the muscular fibre, and which directly affect the heart. The infusion of tobacco injected into the intestines occasions immediate loss of motion and sensibility, and the heart, instead of continuing to contract, was found by Mr Brodie to have ceased contracting, and to be distended with blood. The poison of the *upas antiar* has a similar effect: but what is singular, the distilled oil of tobacco does not act like the infusion, but like other narcotics.

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 this effect was 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 re-action of the system. It was supposed, that there belongs 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 was exerted with effect, and hence the 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 exciting 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, the operation of which 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, arises from the fact apparently established, that the sedative power of these substances is not always proportional to their sti-

mulant operation, but is greater than this, and in several of them indeed any previous stimulant effect is even scarcely perceptible. Yet this difficulty is in some measure obviated by the 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 exhaustion 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 admission 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 specu-

lations 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 conclusions have been drawn 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 the more common and more easily regulated consequence of their operation; they are then given in larger doses at more distant intervals. As stimulants, they are sometimes 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.

There is a peculiarity 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, 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. It is remarkably so, for example, with opium, with tobacco, or with hemlock, while it is scarcely to be observed with regard to foxglove.

The individual narcotics may be arranged partly according to their chemical relations, and partly according to analogies in power.

 NARCOTICS.

ALCOHOL.

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.

ALCOHOL. Alcohol. *Ardent Spirit. Spirit of Wine.*

By the process of vinous fermentation, liquors are formed from certain vegetable juices, or infusions, possessed of pungency, spiritous flavour, and intoxicating power. From these liquors a product is obtained by the process of distillation, which, 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 Alcohol 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.

Alcohol 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 fecula 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 alcohol is formed, must arise therefore from the reaction of the elements of the vegetable 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 alcohol, 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. But this is not 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. 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 that it enters 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 farther elucidation.

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 alcohol, 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 remains altogether uncertain, what proportions of oxygen and hydrogen exist in the composition of the alcohol as immediate principles, and what exist in it in the state of water.

The process for obtaining alcohol, 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 alcohol 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.

It had usually been supposed, that the alcohol obtained by distillation from fermented liquors, pre-exists in them. The opposite opinion, that it is formed during the distillation, was advanced by Fabroni, principally from his finding that no portion of alcohol can be detected in wine previous to distillation, by dissolving potash in it to saturation, though by this method a small quantity of alcohol added to the wine is, according to his experiments, easily separated, and floats on the solution. This result always appeared improbable, and Mr Brande, on repeating Fabroni's experiments, found them incorrect. He afterwards succeeded in obtaining spirit from wine without distillation, by first precipitating the extractive and colouring matter by acetate of lead, and then adding subcarbonate of potash in large quan-

tity, which combines with the water and separates the spirit. It is singular, however, that the intoxicating power of wine is not equal to what might be expected from the portion of spirit it yields by distillation. Brandy, for example, according to Brande's experiment, affords about 53 *per cent.* of alcohol, while Port Wine yields from 21 to 25 *per cent.* Yet the spiritous strength of the latter, estimated by its action on the living system, is certainly not equal to one half that of the former. If the whole of the alcohol, therefore, obtained from wine by distillation, pre-exist in it, its powers must be materially modified by the other principles with which it is combined.

Pure alcohol is colourless and transparent; its odour is fragrant, and its taste highly pungent; it is lighter than water, the difference being greater as the alcohol 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 still, 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 alcohol. 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.

Alcohol 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 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, alcohol is a very important pharmaceutical 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 or tinctures retain their properties unimpaired. When diluted with an equal weight of water, it still exerts its solvent power to a certain extent, added to the solvent power of the water; and this diluted alcohol, or Proof Spirit, as it is named, the standard specific gravity of which is .935, is even more generally employed in pharmacy as a solvent of vegetable matter, than alcohol in its pure form.

Alcohol 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 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.

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, 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 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 exhaus-

tion. 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 injurious; 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 idiosyncrasy, 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 in-

flammation of the liver, and gout,—morbid states probably arising either from the increased action it excites, giving rise to organic derangement, or from the exhaustion of power, general or local, produced by stimulant operation unnecessarily excited or too long continued. In an excessive dose, spiritous liquors produce a state of coma or apoplexy, which has sometimes a fatal termination. Evacuation of the stomach by a principal emetic, is the remedy obviously indicated, and from what has been stated under the general account of the operation of narcotics, (page 118.), the propriety of sustaining respiration by artificial inflation of the lungs, if necessary, is equally obvious.

ÆTHER SULPHURICUS. *Sulphuric Ether.*

ALCOHOL 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, forming the spirit of Nitrous ether, or Dulcified Spirit of Nitre, 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; the ether is the product of the action of the acid on the alkohol; 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, ethereal oil as it is named, 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 highly rectified, not more than .730, compared with the standard specific gravity of water. It is very volatile, so as to evaporate speedily at natural temperatures; and from its rapid transition to vapour, it produces 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 employed 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 dyspnoea and catarh, 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 and Sumatra. It exists in grains in the wood of the root and branches of this tree. It is extracted by sublimation; the wood is exposed to heat with a quan-

tity of water, and the temperature thus communicated is 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.

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 natural temperatures, and soon diminishes in bulk from exposure to the air; it melts at a heat a little superior to 212° ; is highly inflammable; it is very sparingly soluble in water, but is entirely soluble in alkohol, ether, and oils essential or expressed. The alkalis do not act upon it. The weaker 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. Its stimulant operation, however, is not considerable; 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, cyananche 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, though in these cases also it is little employed in modern practice. In mania, it has sometimes succeeded as an anodyne: as an antispasmodic, it has been used 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 they 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 augmented by combination with musk, or carbonate of ammonia: combined with opium, it forms a powerful diaphoretic; and its efficacy in inflammatory diseases is promoted by antimonials.

Camphor ought to be given in a state of mixture in some liquid form, as in the solid state it is liable 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 sparing solubility of camphor in water, 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 alcohol 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 in water; 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. 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 alcohol 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 uneasy 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. *Ed.*—Mist. Camph. Lin. Camph. Lin. Camph. Comp. Tinct. Camph. Comp. *Lond.**

PAPAVÉR SOMNIFERUM. White Poppy. *Polyand. Monogyn. Rhæades. Capsula et Succus spissatus. Europe, Asia.*

THE White Poppy is a native of the warmer regions of Europe and Asia; it also grows in colder climates without any diminution of its powers. The large capsule which it

* 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, add those peculiar to either of the latter.

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 product of the plant that is chiefly medicinally employed. The leaves and stalks afford by expression a juice inferior in narcotic power; the seeds contained in the capsule, are bland and inert. Opium, though it has been obtained in this country of full narcotic power, is usually prepared in Syria and India. When the capsule has nearly attained maturity, a longitudinal incision is made in its side, care being taken that it does not penetrate into the cavity. This is done in the evening; the milky narcotic juice exudes apparently from the vessels of the bark of the capsule; it adheres to the sides of the incision, is collected in the morning; and a large quantity being procured from a field of poppies, it is inspissated by exposure to the sun.

The opium of commerce is in flat or rounded masses, which when cut present a substance soft and tenacious, of a dark reddish-brown colour, having a strong odour somewhat foetid, and a taste bitter and acrid. If kept in a dry place it becomes hard, but it retains its brown colour, and its fracture presents a resinous appearance. It also softens when pressed in the hand. These are the properties of what are named Turkey Opium, the kind usually met with in the shops. If hard, brittle, and of a grey colour with black spots, it is of inferior quality. What is sold by the name of East India Opium, is soft, of a blackish colour, has a fainter smell, and is much inferior in narcotic power.

Though opium has been oftensubmitted to analysis, its proximate principles are still imperfectly determined. It is highly inflammable; submitted to the action of alcohol, a considerable portion of it is dissolved; and water likewise dissolves it in part. The solution in alcohol is much more highly im-

pregnated with dissolved matter 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 the active matter of opium; 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, 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; its proportion is about one part from twelve of Turkey opium; it is not present in India opium. 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 quality: it must therefore be owing to changes produced at this temperature in the principles in which the activity of the opium resides. The distilled water from opium is slightly milky, and has its odour, and in part its taste; a thin film collects on its surface, but no sensible portion of oil is obtained.

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 more soluble in alkohol than in water, it approaches in its characters to resin; yet it is not purely resinous, for its solution in pure alkohol is but slightly decomposed by water.

The quantity of this principle more peculiarly soluble in alcohol, and in which the powers of opium chiefly reside, appears to amount to about five parts in twelve. The quantity of matter soluble in water is, according to Crumpe, in nearly the same proportion. It is not precipitated by alcohol, and its nature is not well known. The slight narcotic power it possesses, is probably derived from a portion of the other matter adhering to it. 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 been stated by Dérosne, that a peculiar principle exists in opium, in which its narcotic quality resides. 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 alcohol; 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 alcohol, ether, and by the acids and alkalis, and possessed of narcotic power. The nature of this substance is not well determined, but it cannot be 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. Mr Thomson states, in his *London Dispensatory*, that in repeating Dérosne's experiments, he had obtained a much larger proportion of crystals of this salt from the East Indian, than from the Turkey opium.

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 alcohol 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 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 is now discarded from the Pharmacopœias, or at least is retained only in that of the Dublin College.

The effects of opium on the system, are those of a very powerful narcotic. When given in a moderate dose, as that of one grain, to a person unaccustomed to its use, the pulse is soon sensibly increased in frequency, fulness and force; if the dose is rather larger, this is accompanied with some degree of exhilaration, the different functions both of body and mind are performed with more vigour, and this state may rise even to intoxication and delirium. These effects, however, are transient; the pulse returns to its former standard, and it continues to fall both in frequency and force, but usually remains soft and full; a degree of lassitude and drowsiness is produced, sensibility to external impressions is impaired, so that pain, if present, is less severely felt, and after some time sleep is induced; or if this does not happen, a state of languor and calmness comes on, and continues usually for some hours; the skin is warm and moist, the secretions are diminished, and there is generally some thirst. This stage of the operation is usually succeeded by more or less nausea or headach, and sometimes by tremors of the vo-

luntary muscles; the peristaltic motion of the intestines is diminished, so that costiveness follows; the appetite and digestion are also impaired. The exciting operation of opium may continue nearly an hour, the sedative effect usually six or eight hours.

From a larger dose all these effects are produced in a more marked degree. In those particularly who are accustomed to its use, the exhilarating operation from such a dose is equal to, or exceeds that from wine, as is proved by the vestriking effects it produces on those who indulge in it habitually to excess among Mahommedan nations, where the established religion prohibits the use of wine; in those not accustomed to it, it is less evident, probably from the system, not habituated to it, being unable to bear the necessary dose: in both, however, the state of diminished sensibility and action quickly succeeds, the dulness and languor are greater, and sleep, sometimes approaching to stupor, is induced; when this terminates, thirst, headach, and nausea are urgent, vomiting frequently occurs, with tremors and general debility. If the quantity is still larger, the consequences are delirium, stupor, flushing of the countenance, slow and stertorous breathing, an oppressed pulse, convulsions, and death.

From the topical application of opium to sensible and irritable parts, pain, increased muscular action, augmented heat, and even inflammation, are first induced, but are ultimately succeeded by a greater insensibility to impressions, and a greater difficulty of being excited to contraction by the application of other stimulants. The latter state is also immediately produced by its application in a large quantity and concentrated state to the muscular fibre.

With regard to the nature of the action of opium on the living system, opinions have been maintained diametrically

opposite. It was usually considered as a sedative, or substance, the immediate operation of which is to depress the functions, and exhaust the powers of life. The theory was afterwards advanced by Brown, that its primary operation is stimulant, and that its apparent sedative effects are the consequences of the exhaustion of vital power, produced by the excess of stimulant action. The primary effects from its exhibition, so far as they can be accurately ascertained, undoubtedly lead, by the least hypothetical induction, to the latter opinion. They are those of excitement, both of the vascular and nervous systems; and the state of diminished susceptibility and action which follows, ought in strict reasoning to be considered as the effect of this, conformable to the general law of the animal œconomy, that excitement suddenly raised is followed by exhaustion of power. In its effects in a large dose, the analogy of opium to other diffusible stimulants is also sufficiently strict. And its action on the system in a diseased state, appears to prove not less clearly its stimulant operation. In typhus and other diseases of debility, its exhibition in a moderate dose produces the salutary effects resulting from the administration of wine and other powerful stimulants, while in diseases of an opposite nature, where there is 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. It is principally with the latter views that it is employed in medicine; and in its usual

medium dose, that of one grain to an adult, any stimulating effect from it is scarcely apparent, while its power of diminishing action, lessening sensibility, and inducing sleep, is sufficiently exerted. Nor can it, in any case, be given with much advantage as a stimulant. Its stimulant operation is even frequently prejudicial; and hence the general rule established with respect to the administration of opium, 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 has been administered sometimes as a general stimulant; but its operation being less permanent than that of wine, and not so easily regulated, 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 restlessness, 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 inflammatory action, or to determination to the head. It then fails in lessening irritation or procuring sleep, and rather aggravates the inflammatory state, or gives rise to local inflammation. If it increase delirium, it is obviously injurious. Dr Currie has also remarked, that it is rather injurious than otherwise, when the heat of the surface is above the natural standard, and the skin is at the same time dry. But if the skin is be-

coming moist, it accelerates the change, and produces its other beneficial effects. Hence it is often used with advantage after this change on the surface has been obtained by the cold infusion, or by partial fomentation: it is also often useful to delay its administration in the evening, until the febrile exacerbation at that period begins to subside, and to give it therefore at a later hour. When it is repeatedly administered, it is necessary to guard against the constipation it is liable to produce.

In intermittent fever, the administration of an opiate, previous to the expected approach of the paroxysm, renders it milder, or sometimes 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 propriety of the employment of opium is from its stimulant operation more doubtful, and in any pure inflammatory affection, attended with highly increased vascular action, it 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; it is also useful in promoting the maturation of the pustules, and relieving the irritation on

the surface. In measles, the state of the system being more purely inflammatory, its use is rather contraindicated.

In hæmorrhagies, not connected with a state of plethora, or 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 profluvia, opium is employed with a similar intention. In dysentery, the propriety of its administration has been questioned, but evident advantage is derived from it when it is given in such doses as to relieve the pain and irritation which prevail; the constipation it might produce being obviated by the exhibition of mild purgatives, usually employed in the treatment of the disease. The combination of it with calomel is more peculiarly useful.

In catarh it proves of the highest utility, by obviating the irritation whence the cough arises; it requires, however, to be administered with some caution, where the disease is in its acute stage, and accompanied with an inflammatory state; it can then be given with more safety and advantage when combined with an antimonial, by which its direct stimulant action on the vascular system is obviated, and its operation is determined to the surface of the body. In phythisis it is given as a palliative and anodyne.

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; but as this disease so often depends on change of organic structure, the effects of opium can be those only of a palliative; where plethora is present it may be hurtful. 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, especially when combined with calomel. 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 it aggravates the restlessness and agitation of the patient; and when a plethoric or inflammatory state exists, its use must be hazardous. In the hysteric paroxysm, opium is often employed with advantage, either introduced into the stomach, or given under the form of enema. Its frequent employment to relieve the less urgent symptoms of hysteria is improper, as tending to the injurious consequences from its habitual use; and the same remark applies to its employment in hypochondriasis and melancholia. In purely spasmodic asthma, the paroxysm is shortened, and even sometimes cut short by a full dose of an opiate; and in all the varieties of dyspnoea, opium affords more or less relief. In cholice, 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, and is given in moderately large and repeated doses, until the symptoms are subdued. In diarrhoea it speedily checks the evacuations, and the precaution is hence necessary, not to use it too freely, until any acrid matter, or substance exciting irritation, has been discharged. 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.

Opium is given to relieve the pain of gastrodynia, and that attending icterus; and in that form of the latter disease depending on calculus of the biliary ducts, by lessening irritation and relieving spasm, it promotes the discharge. It is given on the same principle to relieve the pain, and promote the discharge of urinary calculus. In syphilis, it 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, that it is possessed of real anti-syphilitic power. 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 as a stimulant to check the progress of gangrene, and frequently with marked advantage, as well as to relieve those spasmodic symptoms, and that state of irritation, which often accompany gangrene, or the injuries from which it arises.

In many other cases of morbid affection, opium is had recourse to merely to lessen irritation, relieve pain, or induce sleep. As a palliative and anodyne, it is indeed the most valuable article of the *Materia Medica*, and its place could scarcely be supplied by any other.

Externally applied, opium alleviates pain and spasmodic action. Applied by friction, it was known to relieve the

pain of cramp, and even of tetanus; and rubbed over the abdomen, to alleviate spasmodic pain of the stomach and intestines. From recent observations by some of the continental physicians, which have been confirmed in this country, it appears that this mode of employing it admits of more extensive application, and even in general affections of the system. It has succeeded in reducing the violence of the paroxysm of mania, and in relieving the delirium of typhoid fever, removing irritation and inducing sleep; and much advantage has been derived from this application of it in some forms of dysuria, in cholera and hysteria. In trismus, either hysterical or arising from other causes, relaxation of the spasm has been obtained from opiate friction. Dr Percival employed for this purpose a liniment, in which opium is triturated with half its weight of camphor, to render it smooth, and this is mixed with a little lard; a quantity requires to be rubbed in, containing from 6 to 9 grains of opium, to obtain its action on the general system. According to Mr Ward's observations, the tincture of opium is preferable as producing more speedy and certain effects; from 3 to 6 drachms of it being employed, according to the severity of the symptoms, and being rubbed on the sides of the arms, until the whole is absorbed. This mode of application has the advantage of avoiding the action of opium on the stomach and intestinal canal.

By local application, opium relieves the pain of toothach, a little of it being introduced into the cavity of the affected tooth, or the gums being rubbed with laudanum; sometimes even it succeeds when applied to the temple or cheek. 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 irri-

table 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. A very dilute watery solution of it injected into the urethra, has been used to relieve *ardor urinæ* in gonorrhœa; and a few drops of the vinous infusion introduced beneath the eyelids, is of much efficacy in some forms of ophthalmia, where the active inflammation has ceased.

The dose of this narcotic is very various, according to the state of disease, and the intention with which it is administered. One grain is the medium quantity to a person unaccustomed to its use, but to remove the symptoms from irritation, or relieve pain, it often requires to be given in a larger quantity. Its stimulating operation is principally obtained by frequent repetition of small doses; its sedative effect by a larger dose, repeated, if necessary, at greater intervals. 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 idiosyncrasy, the same dose producing very different effects on different individuals. Too small a dose of opium is liable to produce restlessness or disturbed sleep. The latter effect, with sickness and thirst, and sometimes delirium, are the consequences of a dose rather too large.

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 which usually occur are, insensibility, so that the patient cannot be roused by any exertion; a pulse usually slow and full; deep and difficult breathing, with 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. The sulphate of copper is by far the most powerful, and if the other has failed, ought to be immediately given. In using either of them, if vomiting is not soon induced, the dose ought to be 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 kept awake, and, if possible, in a state of gentle motion, at least for some hours. Analogy, from the operation of other narcotics, points out the necessity of exciting artificial respiration, if necessary, in the state of extreme stupor, as has been already explained, (page 119.).

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, few of which, however, are of much importance. The officinal opiate electuary powder and pill, merely afford convenient forms for its exhibition. The powder of opium and ipecacuan is the composition under which opium is usually employed as a sudorific. The Ammoniated and Camphorated Tinctures of Opium, are the Paregoric Elixirs of the older pharmacopœias, forms under which opium has been principally used in catarh. The troches of liquorice and opium are likewise designed to allay the cough in catarh, by being allowed to dissolve slowly in the mouth. The Tincture of Opium and Soap, and the Plaster of Opium, are intended for external application. The Opium wine, besides its internal administration, is employed as a topical application to the eye in chronic ophthalmia. The Syrup is designed for administration to children.

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, *Ed.*—Pil. Opii cum Sapon. Pulv. Cornu Usti cum opio. Tinct. Opii Camph. Vin. Opii. Extr. Opii. Emplast. Opii. *Lond.*—Opium Purification. Ext. 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 it is made into a syrup, by boiling with sugar, which 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 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. But it is somewhat doubtful if the dissolved matter remains permanently diffused in this syrup. An infusion of the capsule is used as an anodyne fomentation.

Offic. Prep.—Extr. Papav. alb. Syr. Papav. somnif.
Ed.—Decoct. Papav. Somm. *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 it is liable to be more variable in strength. The seeds also are narcotic. The leaves only are medicinally employed; they afford a juice which possesses their narcotic power, and which inspissated forms an officinal preparation; they also yield their active matter to diluted alcohol.

Henbane has a greater analogy to opium in its action than any other narcotic has, 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, or vinegar.

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. It had, however, fallen into disuse, until Dr Störk of Vienna introduced it, with 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, or where it is more peculiarly of importance to avoid its constipating effect: the henbane is also used in preference to opium as a sedative in some forms of mania, more especially puerperal mania, either alone or in combination with camphor. 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 or forty drops.

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

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

THIS is an indigenous herb, often growing in wastes and shady situations. Its leaves have scarcely any smell, and only a slightly nauseous, sub-acrid taste. The berries, which are purple, are sweetish. Both are highly narcotic, as is also the root, but the leaves are preferred for medicinal use, as being more uniform in strength. In a moderate dose, belladonna occasions a sense of warmth, followed by diaphoresis, and a disposition to sleep, frequently with nausea and headach; in a larger dose, symptoms of intoxication, vertigo, sickness and thirst: the pulse becomes low and feeble, the pupils are dilated, the face becomes swelled, 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 vegetable acids.

Belladonna 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 not often 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 ^{or 2} 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 aconite which has been medicinally employed, is regarded by Wildenow, not as the aconitum napellus, but the aconitum neomontanum; and this has been admitted, on his authority, by the Dublin College, while the other is retained by the London College. The smell of its leaves, 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: when it is dried, its strength is liable to considerable variation.

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 in-

this is incorrect -

not always

creased: it is chiefly in obstinate chronic rheumatism, that a trial is sometimes made of it in modern practice.

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

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

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 still fainter odour, and are inferior in power. The root has similar powers, but varies in strength at different seasons. The leaves are, therefore, preferred for medicinal use.

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 Störk 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 of the former necessary.

Benefit is derived frequently from cicuta in other cases of extensive ulceration; particularly in those connected with a serofulous taint; it promotes too the operation of mercury in healing venereal ulcers, and is useful in those forms of ulceration which arise under the action of mercury, and which are aggravated instead of being removed by its protracted use; 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 operation 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 pow-

der 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. Præp.—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 the parts of it 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. Both water and alcohol extract their active matter by infusion.

The operation of digitalis on the system is extremely peculiar, and there is even considerable difficulty in ascertaining its real effects. From a small dose there is no very sensible effect, until after its continued administration. In a full dose, it produces exhaustion of power, marked by a great and sudden reduction in the force of 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, tremulous, and often intermitting. This is accompanied with sickness, anxiety, a sense of faintness, 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: the pulse is sometimes rendered slower, without being diminished in fulness; at other times it is rendered irregular, and under the operation of foxglove it appears to be peculiarly liable to be affected by slight muscular exertion, or by trivial causes of irritation. The sickness does not 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 it 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 successful, 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 apparent 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 the dose is too large, or when it is accumulated by repetition, that reduction of the force of the circulation and other symptoms of diminished power are produced; and

hence, according to this view, it is analogous in its operation to other narcotics.

It must be admitted, however, that it is more difficult to regulate its administration 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 most 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 were at one period 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 ope-

ration of any remedy ; and in the earlier stages, where some degree of inflammatory action exists, it is difficult 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. When it is given in substance, there is supposed to be rather more risk of its effects

accumulating from repetition 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 is too quickly increased, 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. If the dose given at first is small, the augmentation may proceed at the rate of from one-eighth to 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 administration of the remedy is continued until the effect intended to be obtained is produced, or until its operation is apparent on the system; 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 must be suspended, and, only after a sufficient interval, cautiously renewed. This is more especially necessary when the pulse becomes intermitting, or when nausea is induced, with 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 alcohol; by decoction its activity is much impaired. The essential oil obtained from them by distillation is very highly narcotic, so that when introduced into an wound, or injected into the rectum, it occasions instant death. According to Vanquelin, a peculiar acrid principle exists in tobacco, volatile, and soluble both in water and in alcohol.

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 de-

bility, with insensibility, cold sweats, and convulsions. The singularity has already been remarked, that the infusion of tobacco not only affects the nervous system, like other narcotics, but acts powerfully on the heart, causing its contractions to cease, while the essential oil has no such effect.

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 proved experimentally to be prejudicial, 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. It sometimes too, by its action on the lungs, relieves the paroxysm of spasmodic asthma. 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. In small doses, tobacco excites the urinary secretion, probably by promoting absorption. 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 fomentation or cataplasm, in tinea capitis, and in various cutaneous eruptions; incautiously applied, they have sometimes occasioned the violent effects which arise from the internal administration of tobacco in too large a dose.

Off. Prep.—*Vim. Nicot. Tab. Ph. Ed.*—*Infus. Nicot. Tab. Lond.*

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

THE leaves of this plant have a strong fœtid smell, similar to that of opium, and yield a white juice, in which their activity resides. Their taste is bitter and acrid. Though narcotic, they have been used principally from their diuretic power in the treatment of 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.*

THORN-APPLE is an indigenous herb, the leaves of which 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 Störk; and it was recommended by him as a remedy in convulsive diseases, especially in epilepsy, and 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. The herb, or the root smoked like tobacco, has been found to afford relief in the paroxysm of spasmodic asthma. The smoke is drawn into the lungs as fully as possible, from a common tobacco pipe, continuing the smoking until the quantity is consumed, and repeating this occasionally and even frequently if necessary. It often excites some degree of vertigo, usually promotes expectoration, and relieves the cough, dyspnea, and spasmodic irritation.

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

THE flowers of this plant have a smell slightly fœtid, and a penetrating bitter taste; both taste and smell are extracted by maceration in water. 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. 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 shrub are destitute of smell, but have a bitter, rough and subacid 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 application in the former disease having been derived from the practice of the natives of Siberia. Their power is said to be marked by a sensation of creeping in the skin, and by 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; if taken internally, nausea, vertigo, and pain in the head are produced. 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. Indigenus.*

THIS plant is cultivated in England, its strobiles being used to give bitterness to fermented malt liquors. They are picked off when ripe, and are dried by artificial heat. They have an odour somewhat fragrant and aromatic, and a taste very bitter, with some astringency; these are extracted by water by infusion; by decoction the aromatic flavour is lost: by distillation with water, a portion of essential oil is obtained. Hop, along with its bitterness, 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, principally in rheumatism and in the paroxysm of gout, either in substance, in the dose of three grains, or under the form of infusion or tincture, the latter being given in the dose of from half a drachm to a drachm, once or twice a-day. An extract prepared by inspissation of its decoction, is also given in a dose of five or seven grains. An over dose occasions headach and vertigo. A cataplasm or ointment, prepared from it, has been used as an anodyne application to cancerous sores; and a fomentation of the strobiles has been used in the same case, and as an application to painful tumours. It has now a place in the London Pharmacopœia, and officinal preparations of it are inserted.

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 been recommended in mania, epilepsy, and hysteria, but it has scarcely been employed. 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 alcohol or water, and is even brought over by distillation; the distilled water is narcotic, and a small quantity of essential oil may likewise be procured, possessed of the same property. 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. Behn found, that the distilled water of the bitter almond contains 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. They afford a curious example of the existence in the vegetable kingdom, of a substance which had before been regarded as a product only of an artificial process, and which, formed by the decomposition of animal substances, resembles them in chemical constitution; and the volatility of this acid not less explains the singular fact of a high degree of narcotic power belonging to a distilled water of plants, or an essential oil.

The distilled water of the cherry laurel has long been known as a poison; it speedily kills small animals, and its effects are those of a pure narcotic. The noxious operation of the plant is also sometimes displayed in the effects of those spirituous cordials to which it has been added to communicate flavour. 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.