

citement, with noises in the ears, and closely contracted pupils. The ideas are confused and extravagant, and decided delirium may occur; the head feels heavy and full, the senses are blunted, and sleep soon follows, which is often heavy, even stertorous, and harassed by disagreeable dreams. The pulse, at first full and frequent, soon becomes slow.

The susceptibility to the action of opium, and the symptoms it produces, vary greatly in different persons. Some are so easily affected by opium, that even a small quantity endangers life; a susceptibility so extreme is, however, not common. In some it produces only agreeable feelings and ideas, in others just the reverse; in some the stimulant effects predominate, in others the narcotic.

The primary stage of excitement is very brief after a poisonous dose, and narcotism rapidly supervenes. Great giddiness and a sensation of oppression comes on, with an irresistible craving for sleep. There may be both nausea and sickness. The sleep soon passes into profound insensibility; the breathing grows slower and slower, more and more shallow, till it ceases. The face is pale, or livid and bloated, and the veins swollen. The pulse, at first full and strong, becomes small, feeble, and thready. The pupils are very greatly contracted. The power of swallowing is gradually lost, the pupils become insensible to light, the muscles relax, and the patient cannot be roused from his state of profound insensibility. Mucus collects in the throat, and at last, the breathing ceasing, death takes place. Patients may die in a state of collapse, and not from asphyxia, though death usually happens from paralysis of the respiratory muscles.

In opium poisoning a variety of other symptoms occasionally occur, as diarrhœa, diuresis, convulsions (most common in children), lock-jaw, dilated pupils, one is dilated while the other is contracted, and itching and dryness of the skin.

In some respects opium poisoning simulates apoplexy, drunkenness and uræmic coma.

Opium poisoning may be generally discriminated from apoplexy by attention to the following points:—history of the

attack, odour of breath and vomited matters, the patient's age, and the state of the pupils, which in apoplexy are very generally dilated, and are often unequal.

Only cases of profound intoxication put on a superficial semblance of opium poisoning. In each case there is great insensibility; but if the drunkard can be roused, he answers questions incoherently; but if poisoned by opium, although he is slow to speak, yet his answers are rational and to the point. The breath and vomited matters will very often tell if alcoholic drinks have been taken; but it must be recollected that suicides by laudanum not uncommonly take it in beer or other drinks, but even then the odour of the laudanum may generally be detected. In opium poisoning the pupils are much contracted; but in profound drunkenness the pupils are widely dilated. Moreover, the early symptoms of the attack are sufficient to enable us to decide between opium and alcoholic poisoning.

Uræmic coma may occur very suddenly, and without any, or scarcely any, dropsy. To distinguish such a case from opium poisoning, the history of the attack should be ascertained. A patient in uræmic coma can generally be roused partially, when some information may be extracted from him. An analysis of the urine, moreover, may throw much light on the case, while the state of the pupils precludes suspicion of poisoning by opium.

Effusion of blood into the pons varolii will produce symptoms almost identical with those of opium poisoning; thus in both cases there is profound insensibility, with closely contracted pupils, and slow stertorous breathing. It may be impossible to discriminate between these two conditions till a *post-mortem* examination reveals the real cause of death.

In poisoning by opium, *use the stomach pump, rouse the patient, and keep him constantly moving to prevent sleep; give strong coffee, apply cold affusion to the head, and, if necessary, adopt artificial respiration.*

It is not an uncommon practice to give brandy or wine to a patient recovering from the effects of a poisonous dose of

opium, with the view of over-coming drowsiness; but the author having watched the action of alcohol under these circumstances, always found that it greatly increased the sleepiness, and in fact did harm.

In this country the habit of opium-eating is not so largely indulged in as among Asiatics; but it is practised here in some localities to a startling extent. It is taken for its primary stimulating effect, but after a time increasing doses are needed to produce this result. Though carried to a very great pitch, this practice in some individuals induces neither physical nor mental weakness, while others waste, and grow physically and mentally weak, irritable, fretful, and desponding, especially when the opium is withheld; the memory is much impaired; the skin becomes sallow; but, strange to say, in many cases the bowels are not constipated.

The horrors which opium-eaters suffer when the drug is withheld are well known, and need not be dwelt on here; so great indeed is the suffering, that few have sufficient resolution to relinquish the habit. The amount of opium taken is often enormous. De Quincey took 320 grains daily! The moderate indulgence of the habit is perhaps not more prejudicial to health than tobacco smoking. The Chinese are almost universally addicted to the habit of opium-eating, and yet they are an intelligent and industrious race.

Bernard's experiments lead him to conclude that opium depresses the functional activity of the sympathetic system, and notably that part supplying the submaxillary gland. Gscheidlen considers that opium affects the terminations of the motor nerves; small doses at first heightening, but afterwards depressing their function, whilst large doses depress it from the first. Opium is said to lessen the conductivity of sensory nerves, though this blunted sensibility must be due in some measure to the effect of opium on the grey matter of the brain, depressing the power of perception.

In fevers, whether inflammatory or specific, sleeplessness, quickly wearing out the strength, is often one of the most dangerous symptoms. Want of sleep produces either noisy

and furious delirium, as is frequently seen in typhus fever, or wandering and muttering, with picking of the bed-clothes, twitching of the muscles, and great prostration. In either case, opium, judiciously given, may save an almost hopeless life. In delirium of the furious kind, it is well to combine, the opium with tartar emetic, as this combination calms the excitement, and produces sleep more speedily and effectually than opium given alone. Graves gave three or four drops of laudanum and one-sixth to one-eighth of a grain of tartar-emetic every two hours till tranquility and sleep were insured. In very boisterous delirium he increased the dose of tartar-emetic. Now-a-days, however, morphia hypodermically administered is found to act more certainly and speedily, without deranging the stomach or intestines.

Laudanum may be given alone with signal benefit in muttering delirium, with muscular tremors, dry skin, and prostration. A grain of morphia or a drachm of laudanum is mixed with four ounces of water, and a tea-spoonful is given every five or ten minutes, till three or four doses have been administered. If by that time the patient is not asleep, the medicine should be intermitted for half an hour, then if sleep does not come on, a few more doses should be given in the same way. This method often insures calm, refreshing, invigorating sleep, lasting several hours, out of which the patient wakes free from wandering, refreshed, the tongue moister, the appetite and digestion improved, and the skin comfortably moist. Sometimes, however, it answers better to give a single moderate dose.

Any one who has watched the action of opium on a patient in extreme weakness, with sleeplessness, twitching and tremor of the muscles, quivering dry brown tongue, and parched skin, must have been struck by the fact that the administration of laudanum, by producing refreshing sleep, helps a patient over this critical stage with far less consumption of alcoholic stimulant than would otherwise have been required. It need scarcely be said that in many cases brandy or wine must be freely given with the laudanum.

In delirium tremens, opium does great service by producing sleep, and it answers best when employed hypodermically. If the patient is strong, the delirium boisterous, the pulse full, then tartar-emetic or tincture of aconite may be added to the opium. It is convenient to administer the opiate with porter or spirits, this combination apparently heightening its action, while it is more readily taken by the delirious patient. It has been already mentioned that opium in delirium tremens sometimes acts more efficiently when given by the rectum.

Many cases of acute mania may likewise be treated satisfactorily by opium and tartar-emetic. (See Chloral).

Dr. Graves has well pointed out that when an opiate is given as an hypnotic, attention should be paid to the time of its administration. It should be given at the usual time for sleep, or when the patient feels inclined to doze, so that the medicine may come in aid of nature, herself tending to the same end; smaller doses are then more effectual than if given at a less seasonable time. For example, in chronic wasting disease, accompanied by hectic, the opiate should be given very late at night; for then there is no inclination to sleep till the early morning hours. Opium ordinarily requires about one or two hours to produce its narcotic effects. The chronic sleeplessness independent of any very notable disease should not be treated with opium, if it is possible to avoid it. Dyspepsia and uterine derangements are constant causes of sleeplessness, and chloral and bromide of potassium are much better agents than opium.

Opium will of course relieve or abolish pain; yet in the treatment of chronic cases it is right to exhaust all other methods of easing pain; for the opiate soon loses its influence, and must be given in increasing quantities, until the patient becomes accustomed to it and is unable to discontinue it without great discomfort, even after permanent removal of the pain.

Opium, especially when employed hypodermically, is often of great service in acute rheumatism to relieve pain and to ensure sleep.

Opium is often of signal use as an antispasmodic. Its action in this respect, as well as its narcotic power, is much enhanced if given with a stimulant, as alcohol, ether or chloroform.

Laudanum or morphia is of marked service in the convulsive stage of whooping-cough. A sufficient dose should be given to the child to produce very slight heaviness, which state should be maintained by giving one-fiftieth of a grain of morphia every three or four hours, or a proportionate dose every hour. A quarter of a drop or two drops of laudanum, according to the age of the child, must be given every hour. This treatment often quickly removes the whoop, and reduces the severity and frequency of the cough; but in the case of any irritation, as of teething or of worms, tuberculosis or much bronchitis, then this remedy, like most others, is of little or no use. (See Belladonna, Lobelia, Bromide of Potassium).

Opium and its preparations are beneficial in renal and biliary colic. Morphia answers best when employed hypodermically. If administered by the mouth, small doses of the opiate chosen, combined with spirits of chloroform, should be administered every five or ten minutes, till the pain gives way.

Opiates are also beneficial in some cases of asthma; yet morphia, with some asthmatics, will induce a paroxysm of dyspnoea.

Opium is very useful in diabetes to control inordinate appetite; the diminution of quantity of ingested food, reduces the kidney excretion, and abates the troublesome thirst. It was at one time thought, that this was the only way opium proved useful in diabetes, but it has been shown lately that large doses frequently repeated, will greatly lessen and indeed remove the sugar from the urine, the diet and the appetite remaining unchanged.

Opiates are also used in spasmodic stricture.

Opium and its preparations are reputed to check the secretion from all the mucous membranes of the body, and on this

account are given in bronchitis to check excessive secretion of mucus and pus.

Opiates are employed as diaphoretics.

It is well known that opium, in a small dose taken at night, will, if resorted to at the commencement of the attack, cut short a cold in the head. Some attribute its efficacy to its influence on the skin, and Dover's powder is very generally employed. Two or three drops of laudanum, taken at bedtime, is often sufficient to abolish at once a threatening attack of cold in the head. A glass of hot grog assists the action of the opium.

Laudanum, especially when mixed with tincture of nux vomica, is very serviceable in some of the distressing symptoms which afflict hysterical women, or nervous, over-worked, anxious men. Both men and women, but chiefly women, about forty or fifty years of age, are apt to complain of a sensation of great weight and heat on the top of the head, with frequent flushings of the face, suffusion of the eyes, hot and cold perspirations, and sometimes shooting pains passing up the back of the head, occasionally centring in one brow, with much heaviness and torpor after meals, and now and then the sensations as of a tight cap on the vertex, or dull aching pain in the same part, with inability to fix the attention, and much depression of spirits. These symptoms may generally be traced to a variety of causes, as dyspepsia, especially the flatulent form, heart-burn, uterine derangements of various kinds, or unhygienic conditions. In any case, however, a drop of laudanum, with two of the tincture of nux vomica, repeated three or four times a day, will generally dissociate the foregoing symptoms from the disease with which they are connected, to the great relief of the patient.

Morphia occasionally produces an eruption, sometimes like that of measles, at other times like that of nettle rash: it may be accompanied by distressing itching, sufficient often to counteract the anodyne properties of the medicine.

Tincture of opium in a large dose (3j) mixed with brandy

is recommended in profuse flooding after parturition, accompanied with much exhaustion of the uterus.

The influence of opiates on the urine of diabetes has been already pointed out.

The preparations of opium diminish the water and urea of healthy urine, probably by lessening the appetite, and hindering digestion. Morphia passes out in part by the urine.

Under the influence of opium, the urine is sometimes retained in the bladder for several days.

It is important to bear in mind that the active principles of opium pass out with the milk, so that a child at the breast, may be dangerously affected by opium given to its mother.

Individual peculiarities, disease, age, and custom, modify the action of opium.

Of individual peculiarity we have already spoken. Mr. J. Brownè has shown that there is sometimes hereditary susceptibility to some drugs, as opium and mercury. As is well known, very large doses of opium are tolerated in some diseases, especially in the case of severe pain.

Age influences the action of all medicines, but in an especial degree that of opium.

That medicines in the same dose should act far more powerfully on the young than the old, is only natural, for after their absorption, medicines are mixed and diluted with the blood; and as the mass of blood is far greater in adults, this dilution is, of course, greater in them than in children. Other things being equal, the dose of a medicine must, as a general rule, be proportioned to the weight of the individual, provided there is not an undue development of fat; opium, however, is a notable exception, the relative susceptibility of young children to its action being far greater than in adults. So great is the power of opium over persons of tender years, that great care must be taken in its administration.

The influence of custom on the action of opium has already been mentioned.

Morphia is said to be less stimulating, less constipating, less diaphoretic, and less liable than opium to produce headache and nausea.

Some writers extol the narcotic virtues of codeia, asserting that, unlike opium, it produces calm sleep without disordering digestion, exciting nausea, constipating, or producing headache. Other observers consider it useless as a narcotic.

Narcein has been much recommended as more efficacious than morphia, as a hypnotic and sedative. It is said to produce no headache, to induce less perspiration than morphia, not to constipate, nay, in large doses to purge, rarely exciting vomiting, but often nausea and loss of appetite. One observer computes that narcein is four times weaker than morphia. It is stated this is the only alkaloid of opium which does not produce convulsive movements.

Dr. J. Harley considers narcein a pure hypnotic much feebler than morphia and of very little use in medicine, its insolubility rendering it unfit for subcutaneous injection. On the other hand, Dr. Fronmüller, having tested it by mouth and hypodermically, asserts that narcein possesses no narcotic properties: 20 grains by the stomach produced no sleepiness or any effect on the respiration, pulse, heat of skin, urine or pupils.

Narcotine, in doses of one to three grains, is asserted to possess antiperiodic properties. Some consider it even superior to quinia in ague.

Very conflicting statements are made regarding other properties of narcotine. Eulenberg, Charvet, Fronmüller, and others, assert that small doses increase the frequency and the strength of the pulse, making it irregular after a time; and that it increases the frequency of the respirations and exalts the temperature. Small doses they say are not narcotic. Schroff says, doses of 0.06 to 0.12 grms. produce symptoms like the first stage after a usual dose of opium, but without affecting the pupil or producing nausea. Fronmüller asserts that 15 to 30 grains produce sleep; but, on the other hand, Bailley gave 60 to 120 grains without inducing sleep.

Papaverine is said to possess strong narcotic properties without inducing the previous stages of excitement, and is not followed by headache and giddiness. It contracts the pupil,

and when it causes sleep reduces considerably the frequency of the pulse to the extent even of from 20 to 30 beats. Fronmüller also finds that it is a narcotic, and that it dilates the pupil—the pulse, respiration, and temperature remaining unaltered. Hoffmann, in some experiments on himself, could not obtain these results.

The statements concerning the action of the opium alkaloids is most contradictory, due probably in part to the employment of a mixture of the alkaloids, or to impure preparations, and in part to the fact that the effect of these substances on animals is different to their effect on man. Thus, as regards man, morphia is the most powerful alkaloid; but according to Bernard, it ranks fourth as regards animals. Thebaia is to animals the most poisonous alkaloid; but its effect on man is much less marked. Again, it is said that, with respect to animals, narceine is the most soporific of the alkaloids; but its action on man is far less than morphia.

The investigations of Claude Bernard have led him to arrange the constituents of opium into three classes; namely, the soporific, the convulsant, and the toxic. He thus arranges the constituents in the order of their activity:—

<i>Soporifics.</i>	<i>Convulsants.</i>	<i>Toxics.</i>
Narcein	Thebaia	Thebaia
Morphia	Papaverine	Codeia
Codeia	Narcotine	Papaverine
	Codeia	Narcein
	Morphia	Morphia
	Narcein	Narcotine.

For further remarks on the action of thebaia, codeia, narcotine, and morphia, see Strychnia.