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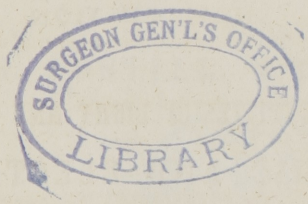
A PRACTICAL

TREATISE ON POISONS.



A PRACTICAL TREATISE

ON

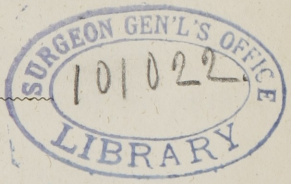
POISONS:

THEIR

SYMPTOMS, ANTIDOTES, AND MODE OF TREATMENT.

BY

O. H. COSTILL, M.D.



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TO

SAMUEL GEORGE MORTON, M. D.,

WHOSE CONTRIBUTIONS

TO

MEDICAL SCIENCE

HAVE PLACED HIM HIGH

IN HIS PROFESSION,

AND WHOSE MANY VIRTUES ENDEAR HIM TO HIS FRIENDS,

THIS LITTLE WORK IS

RESPECTFULLY INSCRIBED

BY THE AUTHOR.

PREFACE.

Toxicology has become a distinct branch of medical science. The numerous facts relative to it which have been collected within a few years—the attention which it has received from writers of eminence—and its connection with medical jurisprudence, all conspire to give to it great and deserved importance.

The very valuable works, however, which have been written on poisons, have reference more particularly to medical jurisprudence; and although the *treatment* of poisoning has not been overlooked by their authors, yet it necessarily forms so small a portion of their contents, as to render them somewhat inconvenient as books of reference for practical purposes.

Cases of poisoning are happily not of very frequent occurrence in the practice of any one physician, nor can the antidotal or general treatment of such cases be as familiar to him as the management of diseases with which he is daily called to contend. Yet when such cases do occur, he is summoned in haste, and expected to act with promptness.

Under these circumstances I have long believed

that a small manual containing the symptoms and treatment of poisoning, which might be referred to in a few minutes, would be found useful, and this conviction must be my apology for offering to the profession the following little work. I claim for it no originality except in design. In it I have endeavoured to collect and arrange the symptoms, post-mortem appearances, and treatment of poisoning, from the best writers on the subject. Of these the works of Christison, Beck, and Taylor, have been principally consulted, as also the various periodicals. I have abstracted largely from these works, as will be seen by marginal references, and in many instances have transcribed the very language of their authors, as most appropriate to express their meaning. I have also occasionally introduced cases illustrative of treatment. In short I have endeavoured to render the work practically useful, and if I have succeeded, my highest wish with regard to it will be gratified.

O. H. C.

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A PRACTICAL

TREATISE ON POISONS.

CLASSIFICATION OF POISONS.

Toxicologists usually divide poisons into three classes, namely, Irritants, Narcotics, and Narcotico-Irritants.

Irritant Poisons are those which, as their name implies, irritate and inflame the stomach when taken into it; and produce violent vomiting, purging, and pain in the abdomen. Some of these poisons also possess corrosive qualities. The concentrated mineral acids, caustic alkalies and corrosive sublimate are examples of these. In cases of poisoning by these substances, the symptoms manifest themselves more quickly than where the poison is simply irritant—frequently in the very act of swallowing, as the mere contact of the poison sometimes produces dis-

organization. When the poison swallowed is purely irritant, the symptoms it produces seldom show themselves until at least half an hour has elapsed from the time of its being taken. The writers on medical jurisprudence mention this fact as of importance in a case of poisoning from an unknown substance.* From a knowledge of this circumstance, it would not be difficult to distinguish between the poisoning from arsenic and corrosive sublimate, the former being simply irritant.

Narcotic Poisons.—The action of these poisons is confined to the brain and spinal marrow.

Immediately or very shortly after being swallowed, they produce giddiness, paralysis, coma, and in some instances, tetanus and convulsions. They have no burning taste, like the irritants, and do not often give rise to vomiting or diarrhœa, nor do they influence the viscera.

Narcotic Irritants.—These poisons have a compound action. They occasion vomiting and purging like the irritants, and these symptoms are sooner or later followed by coma, paralysis and convulsions. Like irritants, they may inflame the stomach and intestines. This class of poisons is very numerous, and

* Taylor's Med. Jurisp., p. 30.

is derived from the vegetable kingdom entirely. Nux vomica, monkshood and poisonous mushrooms are familiar examples. Some poisons of this class have an acrid taste.*

* Taylor's Med. Jurisp.

IRRITANT POISONS.

It has been found convenient to divide irritant poisons into three groups—the non-metallic, the metallic, and the organic, or those derived from the vegetable kingdom.

NON-METALLIC IRRITANT POISONS.

Sulphuric acid (oil of vitriol)—nitric acid (aqua fortis)—muriatic acid (spirit of salt)—binoxalate of potash (salt of sorrel)—oxalic acid, acetic acid (vinegar)—tartaric acid, potash, soda, and their carbonates—iodide of potassium—sulphuret of potash (silver of sulphur)—ammonia and its salts—nitrate of potash—barytes.

Of Poisoning with Sulphuric Acid, (*Oil of Vitriol.*)—This substance is found either concentrated or diluted. "The concentrated sulphuric acid, or oil of vitriol, is a heavy oily-looking liquid, often of a brown colour. It has a strong, sharp, acrid taste—it powerfully reddens vegetable colours, and corrodes most kinds of organic matter."*

Symptoms.—The symptoms produced by this

* Taylor on Poisons, p. 159.

poison, when swallowed in a concentrated form, are of a very violent character—and commence during the act of swallowing, as it is powerfully corrosive. "There is a violent burning pain, extending through the fauces and œsophagus; the pain is often so severe that the body is bent. There is an escape of gaseous and frothy matter, followed by retching and vomiting; the latter accompanied by the discharge of shreds of tough mucus, and of a liquid of a dark coffee-ground colour, mixed with blood. The mouth is excoriated, the lining membrane and surface of the tongue white, or resembling soaked parchment. After a time the membranes acquire a gray or brownish colour; the cavity is filled with thick viscid sputa, which renders speaking or swallowing very difficult. The breathing is also laborious, owing to the swelling and excoriation of the larynx and fauces, and every motion of the abdominal muscles is attended with great pain. The stomach is so irritable that whatever is swallowed, is immediately ejected, and the vomiting is often violent and incessant. The matters *first* vomited, generally contain the poison; they are acid, and if they fall on a limestone pavement, there is effervescence. After a time great exhaustion takes place; the pulse is quick and small; the skin cold, and covered with a clammy sweat. There are great thirst and obstinate constipation of the bowels; if evacuations take place, they

are of a dark-brown colour, owing to the admixture of altered blood. In some instances, convulsive motions of the muscles attend, especially those of the face and lips. The countenance is expressive of great suffering; the faculties clear; and death usually takes place (when it does occur) in from eighteen to twenty-four hours after the poison has been taken."—*Taylor's Med. Jurisp.*, page 78.

When the acid is diluted, the symptoms are of the same character, but not so violent. The concentrated sulphuric acid is very destructive to the fauces and œsophagus, so much so, that death has sometimes occurred from injury to these, when the poison has not entered the stomach. In some instances, the whole lining membrane of the mouth and fauces has come away in one mass. On the other hand, it has sometimes happened that, in cases of death by the mineral acids, the larynx has escaped injury; these have been cases of suicide.

Post-mortem Appearances.—When the case terminates within the usual period, the lining membrane of the mouth is more or less disorganized, and is of a whitish colour. The mucous membrane of the fauces and œsophagus will be found in the same state; sometimes brownish or ash-colour. The stomach is sometimes perforated; if not, it is generally collapsed and contracted. Its contents are commonly of a dark brown or black colour; being formed

principally of mucus and altered blood. The small intestines are found inflamed, and their contents of the same nature as those met with in the stomach.

Treatment.—The antidotes to this poison are, calcined magnesia, or the carbonate of magnesia, finely powdered, and mixed with milk or water. These should be administered as speedily as possible, as the destructive effect of this poison commences upon contact. If these substances should not be at hand, chalk or whiting may be used, or plaster from the walls of the apartment may be beaten down and made into thin paste with water, and used as a substitute.* Soap is also a good remedy; it should be mixed with water. Dr. Christison thinks the carbonates of the alkalies are not safe remedies, as they possess corrosive properties, and refers to a paper written on poisoning with the mineral acids, by Dr. Lunding, of Copenhagen, in which the author ascribes the large number of deaths which take place in the Royal Infirmary, to the system pursued in that institution of administering carbonate of potash as an antidote daily for weeks together.† Mr. Taylor, on the other hand, believes that a solution of carbonate of soda or potash, properly diluted, would act more effectually and speedily in neutralizing the poison than magnesia or

* Christison, p. 165. † Ibid.

chalk;* and Sobernheim and Simon relate cases in which the free use of these alkaline diluents appears to have been of the utmost benefit. While the antidote is being prepared, the acid should be diluted by the free use of milk, oil or mucilage. Several recoveries have taken place where no chemical antidote was given, by the use of large quantities of gruel and milk.† Water should not be drunk, on account of the heat produced by the mixture. The throat is frequently so swollen and filled with mucus, as to render swallowing very difficult; to remedy this, the stomach-pump has been recommended for the purpose of injecting fluids into the stomach. The softened and tender condition of structures, however, is such as to render it very difficult to employ this instrument without doing much injury; both Taylor and Christison advise that its use be avoided if possible. Where suffocation is threatened from an affection of the larynx, tracheotomy should be immediately resorted to.‡ Should the patient survive the first stage of the poisoning, the inflammatory symptoms which subsequently ensue are to be treated upon general antiphlogistic principles. Bleeding may sometimes be required, leeches, emollient external applications, and in protracted cases, blisters will be found

* Taylor on Poisons, 169.

† Ibid. ‡ Ibid.

useful. Diluents and mucilaginous drinks should be continued. Though the antidotal treatment of cases of poisoning by sulphuric acid, is not always successful, owing to the extreme rapidity of the poison, yet recoveries do frequently occur. The following cases are from the late work of Mr. Taylor on poisons.—"A man, aged forty, swallowed by mistake a quantity of the oil of vitriol, and was brought to the hospital of Santa Marie Nuova. He was suffering from intense burning pain in the throat and abdomen, as well as from other severe symptoms; calcined magnesia in water was given to him at short intervals, until it was supposed enough had been given to neutralize the acid. A quantity of tepid water was then given to promote vomiting, and on examining the vomited matters, it was found that the sulphuric acid was neutralized by magnesia. The patient was then bled; leeches and fomentations were applied to the epigastrium, and demulcents exhibited. The man slowly recovered, suffering from difficulty of swallowing and severe cough. In one fit of coughing, he expelled a mass of false membrane of the size and form of the œsophagus. The abdomen and throat were tender at the time of his discharge."—*Questioni di Médicini Legali*, ii. p. 307.

The following case is reported by Mr. Gardner, *Lancet*, August 25th, 1838:—"A young man swal-

lowed half an ounce of strong sulphuric acid; the usual symptoms appeared; milk and carbonate of magnesia were freely given; the patient recovered in twelve days. One of the secondary symptoms was profuse salivation."

Sulphate of Indigo.—This substance is a solution of indigo in sulphuric acid. It is used as a dye, and is sometimes called liquid blue. Some cases of accidental poisoning by it have occurred. Mr. Taylor relates the case of a young woman, aged 18, who was supposed to have swallowed about an ounce of sulphate of indigo. The usual symptoms of poisoning from sulphuric acid followed. Oil and milk were immediately given, and in three hours after, when at the hospital, four drachms of calcined magnesia were administered in a pint of water. A part of this was ejected. She became worse, and died in about eleven hours after taking the poison.* Another case is reported by Dr. Galtier, in which more than an ounce of the sulphate of indigo was taken; this person recovered in eight days. Calcined magnesia and milk were used.†

Aromatic Sulphuric Acid, (*Elixir Vitriol.*)—This preparation is a mixture of sulphuric acid with alcohol, to which some aromatics are added. The

* Taylor on Poisons, p. 182. † Toxicologie, i. p. 206.

proportion of acid is about one-tenth, by measure, according to the Dublin College.* A case of poisoning by this preparation is recorded by Mr. Blythe, in which a woman swallowed ten drachms of the acid by mistake. This person recovered by the free use of magnesia and water. Bloody discharges from the rectum followed; there was also irritability of the stomach, with thirst and copious discharge of saliva. She recovered, however, in two days.†

The *treatment* of poisoning by the two substances last named, is of course the same as that by the sulphuric acid itself.

Of Poisoning with Nitric Acid, (*Aqua Fortis.*)—Nitric acid is known by the more common name of aqua fortis or red spirit of nitre. It is considerably used in the arts, and is equally corrosive with the sulphuric acid.

Symptoms.—These are much the same as those produced by the sulphuric acid. Burning pain in the fauces, œsophagus and stomach, coming on immediately upon the poison being swallowed; gaseous eructations, tenderness of the abdomen, vomiting the contents of the stomach mixed with altered blood and shreds of mucus; the membrane of the mouth is commonly white and soft, becoming yellowish or

* Taylor on Poisons, p. 182.

† Medical Gazette, xxv. p. 944.

brown as the case advances. The enamel of the teeth is frequently destroyed by the acid. The difficulty of speaking and swallowing is very great; the tongue is much swollen, and is of a citron colour. In some cases, the difficulty of respiration is so great as to render tracheotomy necessary. Finally, in fatal cases, the pulse becomes weak, the skin cool, and the patient sinks generally in from eighteen to twenty-four hours. Death may occur from the effect of this acid on the larynx alone, as in case of the sulphuric acid.—*Taylor's Med. Jurisp.*, p. 88.

Post-mortem Appearances.—When death takes place within the usual time, the mouth and lips will vary in colour from an orange-yellow to a brown, having the appearance of the skin after a blister or burn, and may easily be detached from the surrounding parts. Yellow frothy liquid escapes from the nose and mouth; the abdomen is much distended; the lining membrane of the mouth is of a white or citron colour; the pharynx and larynx are much inflamed; the membranous lining of the œsophagus is softened, and easily detached; the trachea is more or less vascular, and the lungs are congested. The stomach, when not perforated, is distended with gas; its mucous membrane inflamed. There is occasionally inflammation of the peritoneum, and the stomach is glued to the surrounding parts. The

duodenum sometimes presents appearances similar to the stomach.—*Taylor's Med. Jurisp.*

Treatment.—The treatment in cases of this poisoning is much the same as that recommended for the poisoning of sulphuric acid. Mr. Taylor recommends, in addition to what is there directed, a diluted solution of carbonate of soda in barley-water, and other demulcents. In many cases, there is great difficulty in swallowing even the smallest quantity of liquids; and the attempt to introduce anything through the stomach-tube, is attended with great risk of perforating, or otherwise injuring, the softened and swollen pharynx, larynx or œsophagus. Should suffocation be threatened, tracheotomy must be performed. According to Tartra, the proportion of recoveries from *accidental* poisoning by this acid, far exceeds that in which it has been used for the purpose of suicide.

Of Poisoning with Muriatic or Hydrochloric Acid.—The symptoms and treatment, so far as known, are the same as in the preceding cases.

Of Poisoning with Oxalic Acid.—Oxalic acid is one of the most deadly and rapid of the common poisons. Dr. Christison refers to two cases, one of a young man, recorded in the *London Courier*, Feb. 1st, 1823; the other of a young lady, (*St. James'*

Chronicle, Aug. 17th, 1826,) who poisoned herself. In both these cases, death took place in ten minutes after the poison had been swallowed; and few of those who have died survived an hour.* A case, however, is described by Hebb, in which death did not take place for thirteen hours.† Among the fatal cases, the smallest dose was half an ounce; but there is no doubt that less would be sufficient to cause death.‡

Symptoms.—In many cases of poisoning by this substance, death has taken place so speedily that the symptoms could scarcely be noted. "If the poison is taken in a large dose, *i. e.*, from half an ounce to an ounce of the crystals dissolved in water, a hot burning taste is experienced in the act of swallowing, and vomiting occurs either immediately or within a few minutes. Should the poison be diluted, there is merely a sensation of strong acidity, and vomiting does not occur for a quarter of an hour or twenty minutes. In some instances, there has been little or no vomiting; while in others, this symptom has been incessant till death. The vomited matters have a greenish-brown or almost black colour, and are highly acid; they consist chiefly of mucus and altered blood. There are, at the same time, great pain

* Christison on Poisons, p. 196.

† London Med. Repos., xxii. p. 476.

‡ Christison, p. 196.

and tenderness in the epigastrium, followed by cold clammy perspiration and convulsions, with entire prostration of strength. The pulse is small, irregular, and scarcely perceptible. There is a sensation of numbness in the extremities, and respiration shortly before death becomes spasmodic. The inspirations are deep, and long intervals elapse between them. Should the person survive the effects of the poison, there are soreness of the mouth, constriction in the throat, with painful deglutition, tenderness of the abdomen, irritability of the stomach, and diarrhœa; the tongue is swollen, and there is great thirst."—*Taylor's Med. Jurisp.*, p. 103.

Post-mortem Appearances.—Violent marks of irritation have commonly been found in the stomach, and sometimes that organ has been perforated.* Dr. Christison thinks it probable that the extensive destruction of the coats noticed by some authors, has taken place after death from the action of the acid on dead tissues.† In the account of the morbid appearances in a case given by Mr. Hebb, the mucous coat of the throat and gullet looked as if it had been scalded, and that of the gullet could easily be scratched off. The stomach contained a pint of thick fluid; this is commonly like coffee-grounds, as it contains a good deal of blood. The inner coat

* London Med. Repos., vi. p. 474.

† Christison, p. 199.

of the stomach was pulpy, in many points black, and in others red. The inner membrane of the intestines was similarly, but less violently, affected. The outer coat of both stomach and intestines was inflamed. The lining membrane of the windpipe was also very red. Some cases have, however, occurred in which the stomach and intestines were quite healthy. In the girl, who died in about thirty minutes after swallowing an ounce of the acid, no morbid appearance whatever was to be seen in the alimentary canal.—*London Medical Repository*, iii. p. 330.

Treatment.—On account of the dreadful rapidity of this poison, remedies can scarcely be of use unless administered immediately after the poison has been swallowed. Emetics may be resorted to, if vomiting is not already free, but no time should be lost in giving them, if an antidote is at hand. It is necessary to avoid giving warm water to promote vomiting, for dilution will promote the entrance of the poison into the circulation if it does not immediately expel it.* Chalk and magnesia are the antidotes to this poison, and should be given in large doses suspended in water. Chalk has been given with great advantage in several cases.† Magnesia has also been found very useful.‡ As no time

* Christison on Poisons, p. 200.

† London Med. Repos., xii. p. 18.

‡ Edinburgh Med. and Surg. Journ., xiv. p. 607.

should be lost, the plaster of the apartment should be resorted to when chalk or magnesia are not at hand. A mixture of lime water and oil might be advantageously employed,* and if much fluid has been swallowed the stomach-pump may be used. The alkalies or their carbonates must in all cases be avoided. Drs. Coindet and Christison found that the salts they formed with oxalic acid were scarcely less poisonous than the acid itself. Mr. Taylor gives the following interesting abstract of cases of recovery from this poisoning:—A man swallowed, as near as could be ascertained, three drachms of the crystals; there was immediate vomiting, but no other urgent symptoms, and he recovered in a few hours. In the second instance, a woman took nearly half an ounce of the acid; the usual symptoms appeared; she recovered in six days, and was able to leave the hospital. A girl swallowed about two drachms dissolved in water; vomiting occurred immediately, and in about twelve hours the more urgent symptoms had subsided, but there was still tenderness of the epigastrium with irritability of the stomach; in the course of a few days, the patient was quite well. In February, 1842, a case occurred at King's College Hospital, where a girl swallowed two drachms of oxalic acid dissolved in beer. She only

* Taylor's Med. Jurisp., p. 105.

complained of pain, and was entirely well the next day. A case is reported (*Medical Gazette*, xxvii. p. 870), of a girl who took by mistake two scruples of the acid; severe symptoms followed, chiefly marked by gastric irritation. It was a considerable time before this girl recovered. In all these cases, active medical treatment was resorted to.—*Medical Jurisp.*, p. 104.

The Binoxalate of Potash, (*Salt of Sorrel.*)—This substance is sold under the name of the essential salt of lemons. Its poisonous quality depends entirely on the oxalic acid it contains. It is said to be much used for bleaching straw and removing ink-stains. Three cases of poisoning by this substance are mentioned by Mr. Taylor, (*Med. Jurisp.*, p. 109,) two of which were fatal. In the case which recovered, an ounce was taken. The usual symptoms produced by oxalic acid, followed. Proper medical treatment, however, was adopted, and the patient recovered, still suffering from debility and great irritability of the stomach. One of the fatal cases was that of a lady recently confined, who took by mistake half an ounce of the binoxalate for cream of tartar. She was seized with pain in the abdomen and convulsions, and died in *eight minutes*. On inspection, the mucous coat of the stomach and small intestines was found inflamed. In the third case,

a teaspoonful of the salt was taken three mornings in succession. It occasioned severe vomiting, and death occurred in an hour after the third dose. From these cases, it appears that this salt is nearly as poisonous as the oxalic acid itself: indeed, in the second case it destroyed life more speedily than the oxalic has been known to do, to wit, in eight minutes; though in that case the condition of the patient, at the time it was taken, might have accelerated its fatal effects.

Treatment.—This would be the same as in cases where the pure oxalic acid had been taken.

Acetic Acid, (*Vinegar.*)—This can scarcely be called a poison in its common form. It exists most commonly in two forms, common vinegar, and pyroligneous acid or pyroligneous vinegar. Dr. Christison relates the case of a gentleman, who, during dinner, drank about eight ounces of vinegar by mistaking it for beer, but sustained no injury, though he retained it all. The pyroligneous acid, when pure, is nearly colourless, and is much stronger than common vinegar. Orfila has reported one case of death by acetic acid, and from some experiments which he made upon dogs, demonstrates that, in a concentrated form, it is capable of producing death.*

* Ann. D'Hyg., vi. 160.

Symptoms.—In the fatal case reported by Orfila, the symptoms were violent, pain in the stomach and convulsions. The *post-mortem* appearances were, brownish tongue, the inner membrane of the gullet a blackish-brown, intersected by a fine net-work of vessels. The stomach presented internally several large black firm elevations. Elsewhere it had a grayish-white tint, and here and there a reddish colour. But the mucous membrane was perfectly entire.*

Treatment.—The treatment best adapted to cases where a quantity of acetic acid in any form had been taken in sufficient quantity to produce alarming symptoms, would probably be the exhibition of emetics, followed by magnesia, chalk or charcoal.

The **Tartaric** and **Citric Acids** are not poisonous. Drs. Coindet and Christison gave a drachm of each to cats, without the animals being at all affected by it. And Dr. C. relates a case, in which a patient took, in the course of twenty-four hours, six drachms of tartaric acid, having by mistake omitted the carbonate of potassa sent with it to make the effervescing draught, and yet suffered no inconvenience.†

Of Poisoning by the Alkalies and their Salts—*Potash, Soda and their Carbonates.*—Poisoning with these

* Christison, p. 185. † Ibid., p. 201.

substances is extremely rare, and is generally the result of accident. The symptoms produced by each are similar—an acrid, burning taste is experienced during the act of swallowing; this burning sensation extends down the œsophagus to the stomach; vomiting occurs sometimes, but not always; when it does occur, the vomited matters are mixed with dark blood and detached portions of membrane. The surface is cold and clammy, and there is diarrhœa with severe pain in the stomach, resembling colic. The pulse soon becomes feeble and quick, and the lips, tongue and fauces are swollen and red.*

Post-mortem Appearances.—Strong marks of the local action of the poison will be found on the mucous membrane of the mouth, fauces and œsophagus; it has been found softened, detached and inflamed, of a deep chocolate colour, and sometimes almost black. The mucous membrane of the larynx and trachea presents the same appearance; and that of the stomach has been found eroded in patches, and partially inflamed. Mr. Taylor relates two cases of death from this poison; one of a boy, who took three ounces of a strong solution of the carbonate of potash, and died in twelve hours; in another instance, a child three years old took a small quantity

* Taylor's Med. Jurisp., p. 110.

of pearlash, which had deliquesced, and died in twenty-four hours; death was caused in this instance by inflammation in the larynx, obstructing respiration. In this way the caustic alkalies may destroy life, as the mineral acids do. But in some instances, death does not occur for a considerable time after the poison is swallowed. Mr. Taylor mentions a case of a lady who swallowed by mistake an ounce and a half of the common solution of potash. She recovered from the first symptoms of irritation, but died in seven weeks afterwards from exhaustion, becoming greatly emaciated. Mr. Dewar has related a striking example of this form of poisoning by the alkalies.* In his patient, the first violent symptoms passed off in sixteen or eighteen hours, and she suffered but little for four or five days, when the sloughs began to separate from the lining membrane of the mouth and gullet. The affection of the gullet then became the prominent symptom, and finally terminated in stricture. She died of starvation in about four months. The secondary effects in these fatal cases appear to arise from diarrhœa, great irritability of the stomach, loss of function of that organ from the destruction of its lining membrane, and stricture of the œsophagus,† any of which causes may prove fatal.

* Edinburgh Med. and Surg. Journal, xxx. p. 310.

† Taylor's Med. Jurisp., p. 110.

Treatment.—In the treatment of poisoning with the alkalies, the first object is to neutralize the poison. In order to do this, we may give acetic acid diluted, in the form of vinegar, lemon-juice, or citric acid dissolved. Oil has been employed with great benefit in some instances. A French physician (M. Chereau) has stated two cases of poisoning with large doses of carbonate of potash, in which the free employment of almond-oil prevented the usual fatal symptoms. It acts partly by rendering the vomiting free, and partly by converting the alkali into a soap; it must be given in large quantities, several pounds being commonly required.* Subsequent treatment antiphlogistic.

Of Poisoning with Iodide of Potassium, (*Hydriodate of Potash.*)—This substance is extensively prescribed in medical practice, yet in large doses it is said to have occasioned alarming symptoms, and even death. Mr. Taylor gives the following case: "A gentleman was ordered by his physician three grains of the iodide in a draught of peppermint-water three times a day. An hour after taking the fourth dose, he was attacked with a violent shivering fit, followed by headache, hot skin, intense thirst, quick and full pulse, vomiting and purging. These symp-

* Christison, p. 209.

toms were succeeded by great prostration of strength. In spite of treatment, the purging continued several days, and there is little doubt if the patient had taken another dose, he would have been killed."—*Medical Gazette*, Sept. 3, 1841.

Treatment.—There is no antidote to this poison. It should be removed as speedily as possible by the stomach-pump.*

Of Poisoning with the Sulphuret of Potash, (*Liver of Sulphur.*)—The liver of sulphur has been a good deal used in France for the manufacture of artificial sulphurous waters. It has also been much employed as an antidote to some of the metallic poisons, though very improperly, as we shall show hereafter. According to Orfila, six drachms and a half retained in the stomach of a dog, occasioned death in seven minutes by tetanus, without leaving any particular morbid appearance in the body. Inferior doses occasioned death in the same manner, but in longer time, with symptoms of irritation of the alimentary canal.—*Toxic. Gén.*, i. p. 177.

Orfila also relates three cases of poisoning in the human subject by this substance. Two of them proved fatal in less than fifteen minutes. The dose in one case was about three drachms.

* Taylor's Med. Jurisp., p. 119.

Symptoms.—These in the two fatal cases were acrid taste, slight vomiting, faintiness and convulsions. In the cases which recovered, the symptoms were burning pain and constriction in the throat, gullet and stomach, frequent vomiting, at first sulphurous and afterwards sanguinolent, sulphurous purging and sulphurous exhalations from the mouth, tainting the air of the apartment with the odour of sulphuretted hydrogen. Pulse at first quick and strong, afterwards feeble and fluttering. Finally, severe inflammation of the gullet, stomach, and intestines, which abated in three days.*

Post-mortem Appearances.—The morbid appearances in the two fatal cases above alluded to, were great lividity of the face and extremities, and exhaustion of muscular contractility immediately after death. The stomach was red internally, and lined with a crust of sulphur; the duodenum was also red, the lungs soft, and gorged with black fetid blood —not crepitating.†

Treatment.—The treatment recommended by Dr. Christison, is the instant administration of any diluent which is at hand, and subsequently the chloride of soda in frequent doses; the inflammatory symptoms ensuing to be combated upon general principles. He says the chloride of soda or lime may be considered

* Christison, p. 222. † Ibid.

the antidote for this poison, as it decomposes the sulphuretted hydrogen which is evolved, and the rapid disengagement of which he thinks is probably the cause of death in fatal cases.*

A recent French writer (M. Bouchardat) recommends that vomiting be immediately induced, by giving freely tepid water and warm mucilaginous drinks; and if these means fail to produce emesis, that the stomach-pump be used. He says, "Neither the tartar emetic nor the sulphates of copper or zinc can be used, because they are decomposed by the alkaline sulphates. We administer afterwards, so long as the matter ejected has the odour of putrid eggs, a solution of the proto, (or what is better,) the persulphate of iron in proportion of ten grammes to one litre of water with two hundred grammes of sugar, in divided doses."†

Instead of the sulphuret of potassium, which is poisonous, we will have the sulphate of potassa formed, which is purgative, and the sulphuret of iron, which is insoluble. "I have lately," he continues, "discovered and proved the efficacy of this antidote, which is very valuable; for the double decomposition which takes place is instantaneous, and the two compounds which result are innocuous. But as the sulphate of iron is poisonous of itself, we

* Christison, p. 222.

† *Gramme*—15.444 grains, Troy. *Litre*—2.1135 pints.

must watch its employment and stop giving it as soon as the vomited matters contain no alkaline sulphuret."—*Medical Examiner*, No. xxxiii. p. 569.

Of Poisoning with Ammonia and its Salts.—Ammonia is a powerful irritant, and acts also upon the nervous system through the medium of the blood. Its remote effect in this way is sometimes more dangerous than its local action. The symptoms produced by ammonia and the sulphuret of potash closely resemble tetanus, and therefore probably depend on irritation of the spinal column.* Orfila injected sixty grains of the pure solution into the jugular vein of a dog, and death occurred therefrom in ten minutes, preceded by spasms of the limbs and convulsions. Another dog, to which two drachms and a half of the powdered carbonate were given, died in twelve minutes. It first vomited, then became convulsed, and died apparently suffocated in a fit of tetanus.†

Cases of poisoning with ammonia and its carbonates have occurred in the human subject. Plenk has recorded a case which proved fatal in four minutes, and which was caused by the contents of a little bottle of ammonia being poured into the mouth of a man who had been bitten by a mad dog.‡

* Christison, p. 217.

† Orfila's Toxic. Gén., i. p. 220.

‡ Plenk's Toxic., p. 226.

From the rapidity of this case, the effect must have been produced on the nervous system.* The effects of this poison are, however, in general simply irritant; and the seat of irritation will vary with the mode in which the poison is applied. If swallowed, the stomach and intestines will suffer; and if inhaled too freely, the lining membrane of the nostrils and air-passages will be inflamed. A case illustrative of the former affection is related by Huxam in his Essay on Fevers, page 308—"of a young man who had acquired a habit of chewing the solid carbonate of ammonia. He was seized with hemorrhage from the nose, gums and intestines; his teeth dropped out; wasting and hectic fever ensued; and although he was at length prevailed on to abandon the pernicious habit, he died of extreme exhaustion after lingering several months."

M. Nysten relates a case of bronchial inflammation induced by the imprudent use of ammonia as a stimulant to the nostrils:—"A medical man, liable to epilepsy, was found in a fit by his servant, who ignorantly tried to rouse him by holding to his nose a handkerchief dipped in ammonia. In this way about two drachms appear to have been consumed. On recovering his senses, the patient complained of burning pain from the mouth downwards to the

* Christison, p. 218.

stomach; great difficulty of swallowing, difficult breathing, hard cough and copious expectoration; profuse mucous discharge from the nostrils, and excoriation of the tongue. The bronchitis steadily increased and carried him off in the course of the third day, without convulsions or any mental disorder having supervened."* Two other cases are related by Dr. Christison,† (one of which proved fatal,) showing the dangerous effects of ammonia applied to the nostrils in an incautious manner. Both of these cases were followed by severe bronchitis.

Post-mortem Appearances.—Nysten's case, noted above, is the only one in which the morbid appearances have been ascertained. The nostrils were blocked up with albuminous membrane. The whole mucous membrane of the larynx, trachea, bronchi, and of some of the bronchial ramifications, were mottled with patches of lymph. The gullet and stomach showed red streaks, here and there; and there was a black eschar on the tongue, and another on the lower lip.

Treatment.—The vegetable acids—as vinegar, lemon-juice, or citric acid—are the antidotes to this substance, when taken into the stomach. The oils, also—as castor oil, olive oil, or linseed oil—may be

* Bulletin de la Soc. de Méd., 1845. No. viii. t. iv. p. 352.
† P. 219.

used with advantage,* and the subsequent inflammatory symptoms treated in the usual way. In cases where the ammoniacal gas has been applied to the nostrils, producing violent inflammation of the throat, lungs and stomach, as detailed in the above cases, strong antiphlogistic measures would appear to be indicated.

Of Poisoning with Nitrate of Potash, (*Saltpetre.*)—This substance may be taken in considerable quantities without danger. Many physicians are in the habit of prescribing from 10 to 30 grains at a dose. It is sometimes taken by mistake for other salts, and in doses of an ounce and an ounce and a half has proved fatal in several cases.

Symptoms.—In an instance related by Orfila, a lady took an ounce of nitrate of potash by mistake. In a quarter of an hour she suffered from nausea, vomiting and purging, and the muscles of the face were convulsed. The pulse was weak, the respiration laborious, and the extremities cold; but there was a sense of burning heat and severe pain in the stomach. She died in three hours after taking the dose.

Two fatal cases are recorded in the *Journal de Médecine* for 1787, one caused by one ounce, the

* Dunglison's Med. Dict.

other by an ounce and a half of this salt. In the latter, the symptoms were those of violent cholera, and the patient died in two days and a half.* In the former, death occurred in three hours, and in addition to the symptoms above described, there were convulsions and twisting of the mouth.

Dr. Alexander relates a case of recovery after a handfull had been taken.† The patient was a woman in the second month of pregnancy. Immediately after taking the salt (in solution) she was attacked with pain in the stomach, and swelling of the whole body. She miscarried, and afterwards had the usual symptoms of gastritis and dysentery, with giddiness, ringing in the ears, tremors and chilliness. The discharges by stool were profuse, and composed mostly of blood and membranous flakes.

Dr. Falconer relates a case where the quantity taken was two ounces, and it was swallowed in half a pint of warm water by mistake for laxative salts. Violent pain in the epigastrium immediately ensued; in half an hour, vomiting occurred, and in three hours, about a quart of blood was discharged from the stomach. Gruel and butter were given, and the symptoms slowly subsided. Even after six months

* Souville in Journ. de Médecine, lxxiii. p. 19.

† Alexander's Exp. Essays, p. 109.

the man, though otherwise in good health, was subject to attacks of pain in the stomach.

Dr. Geisler* describes the case of a woman, who, after swallowing an ounce of nitre instead of Glauber's salts, lost the use of speech and the power of voluntary motion; then became insensible, and was attacked by tetanic spasms. This state continued till next day, when some relief was obtained by copious sweating. She did not, however, recover her speech, or the entire use of her mental faculties, for eight days, and the palsy of the limbs continued for two months.—*Journal der Praktischen Heilkunde*, lvii. p. 124.

Post-mortem Appearances.—These are such as characterize violent inflammation of the stomach and intestines. The contents of the stomach have been found deeply tinged with blood. Its peritoneal coat of a dark red colour, mottled with black spots.†

Treatment.—There is no antidote to this poison. The treatment must be conducted upon general principles. The contents of the stomach should be evacuated as speedily as possible. This may sometimes be done by causing the patient to drink large quantities of mucilaginous liquids, as the decoction of barley, linseed or mallows. If these means should

* Memoirs Lond. Med. Society, iii. p. 527.

† Christison, p. 215.

not succeed, the stomach-pump must be employed. After the poison is ejected, bleeding, leeching, and external counter-irritants must be resorted to for the purpose of subduing inflammatory symptoms, should they occur—and copious draughts of mucilaginous drinks must be freely given. Should dysenteric symptoms set in, opium in small doses, or combined with ipecacuanha in the form of Dover's powder, may be used

Of Poisoning with Baryta.—Dr. Christison treats of three compounds of baryta, to wit, the pure earth or oxide, the muriate or hydrochlorate, and the carbonate. The oxide or pure earth is seldom met with. The *carbonate of baryta* is met with either in its native state, in radiated crystaline masses of different degrees of coarseness, nearly colourless, and very heavy, in which state it effervesces with diluted muriatic acid; or in the form of a fine white powder, prepared artificially by precipitating a soluble salt of baryta with an alkaline carbonate.*

The *muriate or hydrochlorate* is the most common of the compounds of this earth, having been used in medicine for scrofula and other constitutional diseases. It has, like most others of the metallic poisons, a twofold effect on the human system,

* Christison, p. 508.

first irritant and local, and subsequently narcotic; and its narcotic effect is more decided than that of most other poisons of the same class.*

Symptoms.—In an instance noticed in the *Journal of Science*, iv. p. 382, where an ounce of the hydrochlorate was taken by mistake for Glauber salts, and proved fatal, the patient felt immediately after swallowing it, a burning in the stomach; vomiting, convulsions, headache and deafness ensued, and death took place within an hour.† Violent vomiting, griping and diarrhœa are sometimes produced by a quantity but little greater than a common medicinal dose. Mr. Taylor, however, relates a case which occurred to Dr. Wilson, in which a large quantity was taken without being followed by fatal results. "A young woman swallowed half a teacupful of the powdered carbonate, mixed with water, at a time when she had been fasting for twenty-four hours; there was no particular taste; in two hours she experienced dimness, double vision, ringing in the ears, pain in the head and throbbing in the temples, with a sensation of distension and weight at the epigastrium. There was also palpitation at the heart. After a time she complained of pain in the legs and knees, and cramps in the calves; she vomited twice a fluid like chalk and water. The skin was hot and

* Christison, p. 510. † Ibid., p. 511.

dry, the pulse full and hard. These symptoms gradually abated, and she recovered; although the pain in the head and epigastrium continued for a long time."*

Post-mortem Appearances.—No account is given of the morbid appearances, as they occur in the human subject. In animals, the mucous membrane of the stomach is usually found of a deep red colour, unless death has taken place very rapidly, in which case the alimentary canal is healthy.†

Treatment.—The alkaline or earthy sulphates, as the sulphate of soda or the sulphate of magnesia, should be administered as quickly as possible in water. The poison is thus converted into the sulphate of baryta, which is inert.‡ Orfila injected two drachms of the muriate of baryta into the stomach of a dog, and in eight minutes after two drachms of the sulphate of soda were also introduced. The gullet was then secured by ligature. At first efforts were made to vomit, and in an hour sulphate of baryta was discharged by the alvine evacuations. There was neither insensibility nor convulsions, and the next morning the animal suffered only from the ligature on the gullet.§

"The alkaline sulphates, however, will not be of

* Med. Gazette, xiv. p. 448.
† Christison, p. 512.
‡ Ibid.
§ Toxicol. Gén., i. p. 216.

much service where the carbonates have been taken. In this case, emetics and the stomach-pump must be used. As a chemical antidote to the carbonate, a mixture of vinegar with an alkaline sulphate may be employed. It would of course be improper to give diluted sulphuric acid, and any other acid would render the poison more soluble."*

OF POISONING BY METALLIC IRRITANTS.

ARSENIC.

Preparations.—Arsenious acid, or white arsenic—orpiment, or yellow sulphuret of arsenic—king's yellow—red sulphuret of arsenic—fly powder—Fowler's solution—arsenite of copper, Sheel's green.

Symptoms.—The average period of time required for the symptoms of this poison to develop themselves, is from half an hour to an hour. Mr. Taylor, however, has known them to appear in a quarter of an hour, and Dr. Christison relates a case where they commenced in eight minutes. On the other hand, Orfila reports a case where the symptoms did not show themselves for five hours. Christison thinks they may be retarded by sleep. In general, the symptoms commence with faintness, nausea and sickness, with an intense burning pain in the region

* Taylor's Med. Jurisp., p. 116.

of the stomach, increased by pressure. The pain in the abdomen becomes more and more severe; and there is violent vomiting of a brown turbid matter, mixed with mucus, and sometimes streaked with blood. These symptoms are followed by a diarrhœa, which is more or less violent. There is a sense of constriction, with a feeling of burning heat in the throat, often accompanied with intense thirst. The pulse is small, very frequent and irregular, sometimes wholly imperceptible. The skin is cold and clammy in the stage of collapse, at other times it is very hot. The respiration is painful from the tender state of the abdominal parietes. Before death, coma sometimes supervenes, with tetanic convulsions, and spasms in the muscles of the extremities.—*Taylor's Med. Jurisp.*, p. 119.

Post-mortem Appearances.—The morbid appearances met with, are those which indicate inflammation of the alimentary canal, viz., "redness of the throat and gullet, redness of the villous and peritoneal coats of the stomach, blackness of its villous coat from extravasation of blood into it, softness of the villous coat, ulceration of that as well as other coats; effusion of coagulable lymph on the inner surface of the stomach, extravasation of blood among its contents; finally, redness and ulceration of the duodenum on other parts of the intestinal canal, and more particularly of the rectum."*

* Christison, p. 301.

Mr. Taylor observes that arsenic seems to have a specific effect on the stomach, for whether it enters the system by an ulcerated surface or wound, or by being swallowed, in either case the stomach is inflamed;* and he mentions a case reported in a late number of Rust's Magazine, of a man who covered his head with powdered arsenic to act as a depilatory. He was affected with the usual symptoms of poisoning by arsenic (except diarrhœa), and died on the twentieth day: the interior of the stomach and lower part of the œsophagus were inflamed generally.

Treatment.—If vomiting be not present, an emetic of sulphate of zinc should be given with the view of withdrawing the poison in mass from the stomach, before it is diffused over it; the effects of the emetic may be promoted by mucilaginous drinks: when the sulphate of zinc is not at hand, Mr. Taylor directs, as a substitute, powdered mustard in proportion of one or two teaspoonsful to a glass of water administered at intervals. He also recommends a liquid made of equal parts of oil and lime-water, and thinks that lime may have some effect as an antidote, although he places but little confidence in chemical antidotes when the poison has been taken in the form of a coarse powder, as is usually the case. The stomach-pump may also be used.† Dr. Christison directs

* Taylor's Med. Jurisp., 120. † Ibid., p. 124.

that milk be freely drank both before and after the vomiting has begun, as it appears to be the best substance for enveloping the powder, and so procuring its discharge.* A mixture of milk, lime-water and albumen, is highly recommended by Mr. Tubbs.

The antidotes formerly recommended for this poison, are now generally abandoned as useless. The sulphuret of potash, or liver of sulphur, retained its place as an antidote for some time, but the late researches of Orfila have shown that the arsenical sulphuret, formed by solutions of the liver of sulphur, is nearly as dangerous as the oxide of arsenic itself.† The hydrated peroxide of iron is the antidote now most relied on for this poison, and much evidence is brought forward in favour of its efficacy; it should be given in doses of a tablespoonful to an adult and a dessertspoonful to a child, every five minutes, mixed with water.‡ If the hydrated oxide should not be at hand, the precipitated carbonate, or the rubigo ferri in very fine powder, may be given every five or ten minutes until some relief is afforded. If the arsenic has been taken in the form of Fowler's solution, lime-water in copious draughts may be given.§ Magnesia, in large doses, is said to have been very efficacious,‖

* Christison, p. 322. † Ibid., p. 320.

‡ American Journal of Med. Sciences, July 1841, p. 90. T. R. Beck. § Dunglison's Dict. Med. Science.

‖ London Med. and Physical Journal, xlvi. pp. 466, 545.

and may be given conjointly with the preparations of iron above mentioned. When the poison has been evacuated or neutralized, two indications remain to be fulfilled, namely, to subdue the inflammation of the alimentary canal, and at the same time to sustain the system by mild nutriment. To meet the first indication, blood-letting has been practised in some instances with success, but can scarcely be carried to the same extent as in ordinary gastritis: and on account of its favouring absorption, should not be practised while the poison remains in the stomach. Leeches may be applied to the epigastrium. Mucilaginous drinks should be freely given. Blisters are said to be useful in the more advanced stage. And opiates, when the inflammation has subsided, will be found useful in allaying irritation.

A summary of the treatment in these important and not unfrequent cases, as collected from the most approved authors, appears to be, 1st. To evacuate the poison from the stomach as promptly as possible. If vomiting occurs as a direct effect of the poison, it should be encouraged by mucilaginous drinks, and milk should be freely given.* If the vomiting thus induced be copious, other means may not be required; if it be not, the sulphate of zinc must be given to produce emesis, or the stomach pump may be resorted to,

* London Med. Repos., ix. 456.

as the case may require. 2d. While these means are being employed, the hydrated peroxide of iron (having so much testimony in its favour as an antidote), should be procured and given as above directed. It should be remembered that this substance requires to be given in very large quantity. Dr. Maclagan states that it requires twelve parts of it to neutralize one of arsenic. 3d. If the patient survive the first stage, then the gastric and intestinal inflammation which follows, is to be treated upon general antiphlogistic principles, and the strength carefully supported by a mild nutritive diet.

The following is the direction given for preparing the hydrated peroxide of iron.—*Dunglison's New Remedies*, p. 240.

℞.—Sulphuric acid, 67° (Baume), 8 oz. 16 parts.
Iron wire, 8 oz. 16 do.
Nitric acid, 49° (Baume), 5½ oz. 11 do.
Water of ammonia, qs.
Water, 1½ gals. 384 parts.

Mix the sulphuric acid with the water in a glass vessel, then add the iron, and after the effervescence has ceased, filter; add the nitric acid in divided portions, and apply heat so long as orange-coloured fumes are given off. To the heated solution, pour in the water of ammonia until a decided excess has been added, then wash the precipitate by decantation until the washings give no precipitate with nitrate baryta;

the water is then to be drawn off until just enough remains to give the consistence of thick cream. It should then be put up in half pint bottles; to each bottle add two ounces of uncrystalizable sugar or honey, to prevent the oxide from separating from the water; the bottle must be shaken before each dose.

OF POISONING WITH MERCURY AND ITS COMPOUNDS.

Preparations.—Corrosive sublimate, (bichloride of mercury,) calomel, (protochloride of mercury,) red precipitate, (red oxide of mercury,) turbith mineral, (sub-sulphate or peroxide of mercury,) cinnabar vermilion, (per-sulphuret of mercury,) nitrate of mercury.—*Taylor's Med. Jurisp.*

Corrosive Sublimate is the most important of the mercurial poisons, and is, as its name imports, a corrosive poison. It is commonly met with in the form of heavy crystaline masses, or of a white powder. If it be much diluted with water, its corrosive properties are greatly lessened, but it may still act as a powerful irritant.*

Symptoms.—The symptoms of poisoning from corrosive sublimate very much resemble those produced by arsenic; namely, vomiting, pain in the stomach as well as over the whole belly, and pro-

* Taylor's Med. Jurisp., p. 139.

fuse diarrhœa.* These symptoms, however, come on sooner in cases of poisoning by corrosive sublimate, than from arsenic; generally in a few minutes after the poison has been swallowed, there is perceived a strong metallic taste in the mouth, and during the act of swallowing, a sense of constriction and heat in the throat; pain in the abdomen soon comes on, accompanied with nausea, and frequent vomiting of long stringy masses of white mucus mixed with blood. The countenance is sometimes swollen and flushed; at other times it is pale and anxious. The pulse is small and frequent, becoming irregular and scarcely perceptible as the symptoms advance; the tongue is white and shriveled, the skin cold and clammy, the respiration difficult, and death is commonly preceded by syncope or convulsions. Suppression of urine often occurs,† and if the patient survives, severe salivation sometimes succeeds. It is not easy to determine the quantity of this poison required to destroy life. Mr. Taylor cites the case of a child which died in twenty-three days from a dose of twelve grains; and mentions as the smallest fatal dose known, three grains. This was also taken by a child. He thinks it probable that from three to five grains would destroy an adult; though recoveries have taken place after very large doses, where

* Christison, p. 357. † Taylor's Med. Jurisp., p. 140.

remedies were administered or vomiting induced. In a case recorded in the *Journal de Pharmacie*, a man recovered in three days who had taken one drachm of the poison; and in the *Medical Gazette*, xiv. 63, Dr. Booth mentions a case where an ounce of corrosive sublimate had been swallowed after a full meal; and by timely vomiting, the patient escaped with comparative impunity. When death takes place from this poison, it generally occurs in from one to five days, though the period may be earlier or much later.*

Post-mortem Appearances.—These are much the same as in cases of poisoning from arsenic, and of irritants in general. Dr. Christison, however, mentions that the mouth and throat are more frequently affected than from arsenic, and that there is a shriveled condition of the tongue, with great enlargement of the papillæ at its root;† as in Devergie's case (*Arch. Gén.*, ix. 468), in which the papillæ were as large as peas.

Treatment.—If vomiting does not already exist, it must be induced by emetics in the same way as in cases of poisoning from arsenic. The antidote for this poison is albumen, which should be given without delay in the form of white of eggs beat up with water. This antidote was discovered by Orfila, and

* Taylor's Med. Jurisp., p. 144. † Christison, p. 387.

its value tested by many experiments. It is found to impair or destroy the corrosive property of the bichloride of mercury, by converting it into a protochloride of mercury and albumen.* The white of one egg is said to render four grains of the poison innocuous.

The celebrated chemist Thénard, while at lecture, swallowed a mouthful of a concentrated solution of corrosive sublimate, mistaking it for water. Perceiving the mistake immediately, he procured the white of eggs in five minutes, and although at the time he had not vomited, he suffered no material injury. Without the prompt use of albumen, he would probably have died from the accident.†

Doctor Lendrich relates the case of a patient of his who took half a drachm of corrosive sublimate, and was attacked with most of the usual symptoms except vomiting. The white of eggs was administered a considerable time afterwards, and the patient recovered.

According to Professor Taddie, the gluten of wheat is an effectual antidote for this poison; it may be beaten up with water; but he proposes to give it in the form of an emulsion with soft soap. "This is made by mixing partly in a mortar, and partly by the hand, five or six parts of fresh gluten with fifty parts

* Orfila, Toxicol. Gén., i. 313.

† Journ. de Chim. Méd., 1825.

of a solution of soft soap. And in order to have it always at hand, this emulsion, after standing and being frequently stirred for twenty-four hours, is to be evaporated to dryness in shallow vessels, and reduced to powder. This powder may be converted into a frothy emulsion in a few minutes."* Taddie made use of these powders with complete success, in the case of a man who took seven grains of corrosive sublimate by mistake for calomel; violent symptoms followed, but they were immediately relieved, and the person recovered.†

When neither albumen nor gluten is at hand, milk should be freely given. Flour made into a paste with water, may be also used.

According to the experiments of MM. Mylne-Edwards and Dumas, iron-filings appear to be entitled to some consideration as an antidote to corrosive sublimate; the iron would appear to act by reducing the corrosive sublimate to the metallic state.‡

The secondary symptoms arising from inflammation and irritation consequent to this poison, require much the same general treatment as in cases of poisoning from arsenic, which have been detailed.

Mercurial Salivation.—This may arise as secondary to poisoning with corrosive sublimate, or as a consequent to the use of calomel. The latter article is

* Christison, p. 395. † Ibid.

‡ London Med. Chirurg. Review, v. p. 612.

universally prescribed, and is considered a mild and safe remedy; and yet, in some instances, it has produced the most disastrous effects even in small doses. Mr. Taylor mentions cases where death has resulted from the medicinal dose of a few grains. In these cases, inflammation, ulceration, and gangrene of the mouth and fauces have generally occurred.

Treatment.—When mercurial salivation is so severe as to require treatment, the patient should be allowed fresh pure air, nourishing diet, and laxatives when the alimentary canal is not already in a state of irritation;* when swelling of the parotid glands, and great soreness, attend, leeches may be applied underneath the jaws.

Dr. Finlay proposes to check mercurial salivation by small doses of tartar emetic, frequently repeated, so as to act on the skin.† The acetate of lead has been successfully used for the same purpose. Dr. Christison relates a case which occurred to him, in which large doses of the sugar of lead were particularly useful. Opium is a valuable remedy in severe salivation, and might be advantageously combined with the lead. Sulphur is also highly serviceable, and may be given in doses of from one to two teaspoonsful two or three times daily.

Dr. Robertson has lately discovered that the am-

* Christison, p. 296.

† Edin. Med. and Surg. Journal, xxix. 218.

brosia trifida, or common horsemint, acts most promptly in arresting salivation. His patients are described as being relieved of the more urgent symptoms in a few hours, and completely ceased in two days. The preparation employed is an infusion of the green leaves, used as a gargle.*

White Precipitate. (*Ammonia, Chloride of Mercury.*)—One case of poisoning with this substance, is related by Mr. Taylor, page 154.—"In January, 1840, a young woman was received into St. Thomas hospital, who had swallowed white precipitate, mixed with water: the quantity could not be ascertained. The stomach pump was employed, mucilaginous drinks and olive oil were administered, and in a few days, she perfectly recovered. The symptoms under which she suffered, were those of gastric irritation."

Red Precipitate. (*Red Oxide of Mercury.*)—This substance is met with in crystaline scales, varying in colour from a dusky to a bright red. It is poisonous. The following case occurred in Guy's hospital in 1833. "A woman aged twenty-two, who had swallowed a quantity of red precipitate, was brought in, labouring under the following symptoms.—The surface was cold and clammy; there was stupor ap-

* Braithwaite's Retrospect, p. 252. No. 15.

proaching to narcotism, frothy discharge from the mouth, and occasional vomiting; the vomited matters containing some red powder, which was proved to be red precipitate. There was considerable pain in the abdomen, increased by pressure, and there were cramps in the lower extremities. On the following day, the fauces and mouth became painful, and the woman complained of a coppery taste.

"The *treatment* consisted of the use of the stomach pump, and the administration of albumen and gluten. She left the hospital in four days afterwards, still under the influence of mercury; the quantity taken was not known."*

Another case is mentioned of a young woman who swallowed thirty grains of red precipitate with a suicidal intention. Almost immediately afterwards, emetics of ipecacuanha and the sulphate of zinc were administered, and the stomach pump used repeatedly, but none of the red powder was brought up. She suffered from pain in the abdomen and general weakness, but recovered in a few days.—(*Med. Leg.*, ii. p. 705.)

Turbith Mineral. (*Sulphate of Peroxide of Mercury.*)—This is an irritant poison, and is said to have caused death; but the cases have not been reported.

* Taylor's Med. Jurisp., p. 155.

Cinnabar Vermilion. (*Persulphuret of Mercury.*)—Cinnabar is a dark red compound of sulphur and mercury. Vermilion is the same substance reduced to a powder. It is employed in colouring, confectionery, wafers, &c. It has proved fatal to animals in quantities of from thirty to seventy grains, even when applied to wounds, but no cases of its fatal effects in man are recorded.*

OF POISONING WITH LEAD.

The preparations of lead which are commonly reckoned poisonous, are the acetate or sugar of lead, the sub-acetate or Goulard's extract of lead, the chloride of lead, the carbonate or white lead, and the oxides.

The poisonous effects of the salts of lead differ according to the manner in which they are introduced into the system. Swallowed in large doses, most of the above preparations produce the usual symptoms of irritant poisoning, while their gradual introduction in minute quantities gives rise to a peculiar colic, partial palsy, and in some instances, apoplexy.

Sugar of Lead. (*Acetate of Lead.*)—Poisoning from this preparation of lead is more common than from

* Taylor's Med. Jurisp., p. 155.

any other. The acetate is commonly met with in solid crystaline masses, white or of a brownish white colour. It has a sweetish taste, which is succeeded by an astringent metallic taste. It resembles loaf sugar in appearance, and has often been mistaken for it.

Symptoms.—The sugar of lead is not a very active poison. It has often been given in considerable doses in medical practice, without serious results. Mr. Daniel gave it as a remedy for mercurial salivation in doses of ten grains, three times a day, without occasioning any other unpleasant symptoms than slight colic.* When, however, it is taken in large doses, as one or two ounces, or even in less quantities, it causes a burning pricking sensation in the throat, with dryness and thirst, vomiting, uneasiness in the epigastrium, and sometimes violent colic. The abdomen is tense, and the parietes sometimes drawn in. The pain is relieved by pressure, and has intermissions; the bowels are constipated, the skin is cold, and there is great prostration of strength. When the case is protracted, the patient suffers from cramps in the calves of the legs, pain in the inside of the thighs, numbness, and sometimes paralysis, of the extremities; giddiness, torpor and even coma occasionally attend.†

* London Med. Repos., N. S., vi. 368.

† Taylor's Med. Jurisp., p. 158.

Post-mortem Appearances.—Opportunities have very rarely occurred of ascertaining the morbid appearances after death; but Dr. R. E. Griffith, in his edition of Taylor, p. 158, cites a case related by Dr. Kerchhoffs, in which the mucous membrane of the stomach was abraded in several places, especially near the pylorus; and most of the abdominal viscera in a state of high inflammation.

Treatment.—The treatment in this poisoning consists in giving freely the alkaline or earthy sulphate of soda, or magnesia, in solution. An emetic of the sulphate of zinc may be also given, if vomiting be not present, and the stomach pump may be occasionally used with advantage; milk or albumen should be given in large quantities. Mitscheilich has found that the albuminous principle of milk is a very effectual precipitant of the oxide of lead, a compound which, though not entirely inert, is far less active than the acetate, and tends to prevent the action of the poison as a corrosive on the stomach.* Several cases of this poisoning are related by Mr. Taylor; in one case an ounce of the acetate was swallowed. Sulphate of magnesia was freely given, and the stomach pump was used. On the following morning, the gums were white and slightly excoriated, and there was a sensation of heat in the throat; the bowels

* Taylor's Med. Jurisp., p. 158.

were relaxed, probably from the medicine. The day following, there were pains in the calves of the legs and thighs, with restlessness and thirst. In a week, the woman perfectly recovered.

In another case, in October, 1835, a girl, aged nineteen, dissolved an ounce of the acetate of lead in a cupful of water, and swallowed it. In a quarter of an hour, violent vomiting came on, and she was taken to the North London Hospital. Sulphate of magnesia and dilute sulphuric acid were given her. There were slight pain in the abdomen, weight in the head, dimness of sight, and pains in the eyeballs. The abdomen was tender on pressure for several days; but in five days the patient was discharged cured.*

Goulard's Extract, (*Subacetate of Lead.*)—This is generally found in the form of a yellowish liquid. It has caused death in several instances, and is more powerful as a poison than the acetate, owing (as Mr. Taylor thinks), to its containing a larger portion of the oxide of lead.

The symptoms and treatment are the same as in cases where the acetate has been the poison taken.

Chloride of Lead.—One case of poisoning from this substance is recorded. The quantity taken could not

* Taylor's Med. Jurisp., p. 159.

be ascertained. There were no very urgent symptoms, and recovery took place under the use of the alkaline sulphates.*

Carbonate of Lead, (*White Lead.*)—This preparation of lead is found in white heavy masses, which resemble chalk. It has not often caused immediate death by its irritant qualities, but there are many instances in which it has proved insidiously fatal by inducing colica pictonum.† Mr. Cross relates the following case of recovery, after a large dose of the carbonate of lead had been taken by mistake for magnesia; the quantity was from six to eight drachms. Five hours afterwards the woman was seen by her medical attendant. She was in a cold perspiration, and vomiting constantly; her pulse was hard, small and quick; her throat was dry, and her countenance anxious. A sense of heat in the stomach, with very painful colic. The treatment of this case consisted in giving castor oil and sulphate of magnesia, with dilute sulphuric acid; the last at frequent intervals. The colics were so severe that the patient generally fainted after each paroxysm. The symptoms, however, abated, and in four days she was convalescent.

Treatment.—Mr. Taylor says, "In regard to the

* Taylor's Med. Jurisp., p. 159. † Ibid.

treatment, it is obvious that the alkaline sulphates could not here be employed as antidotes, since it requires long digestion at a high temperature for these salts to react on the carbonate of lead; and even then the decomposition is only partial. I would suggest, in a case of this kind, the expediency of administering an alkaline sulphate mixed with vinegar, or some weak vegetable acid, such as lemon-juice. Emetics and the stomach-pump should also be employed."—*Medical Jurisp.*, p. 162.

Colica Pictonum.—This disease received its name from its great prevalence among the Pictones, or inhabitants of Poictou; and is caused by the slow introduction of lead into the system. This may occur through the stomach, the lungs or the skin of those employed in its manufacture or use.

Symptoms.—These sometimes commence with pain in the stomach, which resembles that arising from dyspepsia, and is at first not so severe as to cause alarm. After a little time, however, the pain, which was at first confined to the stomach, extends itself through the whole abdomen. The stomach becomes irritable, and vomiting commences; cramps succeed, and at length the complete colic paroxysm is formed. The pain is sometimes constant, sometimes intermitting, but most commonly there are remissions; and it is remarked that both the remis-

sions and paroxysms are much longer than in ordinary colic. The pain is generally relieved by pressure; even strong pressure seldom gives uneasiness, unless it be made on the epigastrium. The belly is hard, the muscles being contracted; the navel is drawn back, and the bowels are obstinately costive. The urine is diminished in quantity, but the saliva is increased, and is of a bluish colour. The pulse, according to Mécat, is seldom increased in frequency, but, on the contrary, is slow.*

Treatment.—In the treatment of this disease, the principal object of the practitioner in the beginning, is to get the bowels to act. This will generally be best accomplished by a combination of purgatives with anodynes. Ten grains of calomel, with one or two of opium, may be given, and followed by the neutral salts or castor oil. The effect of these remedies may be much assisted by blood-letting, which should always be practised where the pulse is full and the face flushed. Dr. Watson observes of blood-letting, (p. 712,) "It is a measure of safety as regards the possible existence of inflammation; and if there be no inflammation existing or impending, it will tend to remove the spasmodic state of the muscles which goes along with, and perhaps chiefly constitutes, the disease." Warmth should be promoted

* Christison, p. 502.

externally by the application of mustard poultices to the abdomen and the feet. The warm bath has been found highly beneficial. It is sometimes necessary to repeat the purgative and anodyne practice above alluded to, and to assist its effect by laxative injections; but when once the bowels have been freely opened, the disease generally becomes very manageable. Where it is obstinate and protracted, salivation has been recommended for its cure.

Dr. S. G. Morton, of Philadelphia, who has seen much of colica pictonum, and whose practice has been marked with great success, depends mainly upon free blood-letting and mercury. I cannot do better than to give the outline of his practice in his own words. He says, "Free bleeding from the arm can seldom be dispensed with in the first stage of this malady, after which the main object is to touch the gums with mercury, in order to relieve the bowels. Without this precaution, the disease will often prove fatal; and even when the patient survives, paralysis and a crippled constitution are sure to follow. To bring on the mercurial impression, and at the same time to relieve pain, I give ten grains of calomel and two of opium, repeating this dose every hour or two, according to the violence of the attack. Simultaneously a blister should be applied over the abdomen, which should be dressed as soon as drawn, with mercurial ointment; it may

be necessary to rub in the ointment on the thighs and arms. After the patient has taken four or five doses of the calomel and opium, his stomach, if retentive, should be plied with castor oil at such intervals as it will bear. If the stomach rejects all medicine, very large injections must be resorted to. These should consist of the usual drastic cathartics; but I have, in several cases, found copious injections of cold water to induce the peristaltic motion, when everything else had failed. The bowels, however, will seldom yield in any considerable degree till the mercury takes effect, when the purging becomes at once profuse, to the great relief of all the symptoms." —*Morton's Edition of Mackintosh*, p. 219.

The treatment of the more advanced stage of the disease, when palsy is the chief symptom, consists principally in frictions, blisters, and electricity, or electro-magnetism. The hands, being the parts generally affected, should be supported by splints extending from the elbows to the fingers. Exercise in the open air and a generous diet are recommended.* According to Andral, this form of palsy is more likely to be benefited by strychnine than any other.†

It is of great importance to those whose occupation brings them much in contact with lead, to use such precautions and observe such regulations as are

* Christison, p. 503. † Watson's Practice, p. 713.

calculated to guard them against its poisonous effects. Mérat, who has written on this subject, makes some suggestions which are highly important:

1st. He recommends that great attention be paid to cleanliness; the face and hands should be well washed, the hair combed, and the mouth rinsed before going to meals.

2d. Workmen should never take their meals in workshops, and it is of some importance that they breakfast before going to work in the morning. The clothes should be made of strong compact linen, and not of woolen. They should be changed and washed twice a week, and should be worn as little as possible out of the shop. A cap of some light impervious material should be worn by the workmen while engaged in their occupation.

3d. Any derangement of the digestive organs should be immediately attended to; in such case, the individual should leave off work with the first symptom, and take a laxative.

4th. In regard to diet, Dr. Christison remarks, "There is some reason to believe that the use of fat and fatty articles of food is a preservative." P. 305. The proprietor of a lead mine, who was a physician, stated to Dehaen, that the workmen were once very subject to colic and palsy; but that after they were told by a quack doctor to eat a good deal of fat, especially at breakfast, they were exempt from these

diseases for three years.—*Ratio Medendi*, P. I. c. ix. *De Variis.*

A similar fact was communicated to Sir George Baker by a physician at Osterhout, near Breda. The village was once the residence of a great number of potters, among whom he did not see a case of lead colic in fifteen years. And he attributes their immunity to their having lived much on cheese, butter, bacon, and other fatty kinds of food.—*Trans. of London College of Phys.*, ii. p. 457.

As illustrative of the beneficial effects of cleanliness, Mérat relates the case of a potter whom he knew, and who contracted the lead colic early in life, when he was not in the habit of paying attention to cleanliness, but for thirty years had been exempt from it, owing to a scrupulous regard to that subject.

Sulphuric acid has been recommended as a prophylactic against the poison of lead. The acid is to be used in the form of lemonade, and is said to be eminently useful in the Parisian laboratories. Dr. Benson, of Birmingham, has published the following formula for preparing what he calls the sulphuric beer:—Take of treacle 15 lbs., bruised ginger ½ lb., water 12 gallons; yeast 1 quart; bicarbonate of soda ½ oz.; sulphuric acid (oil of vitriol) 1½ ounces by weight. Boil the ginger in two gallons of water; add the treacle and the remainder of the water, hot. When nearly cold, transfer it to a cask, and add the

yeast to cause fermentation. When this has nearly ceased, add the sulphuric acid, previously diluted with eight times its quantity of water, and then add the bicarbonate of soda dissolved in one quart of water. Close up the cask, and in three or four days the beer will be fit for use. As acetous fermentation speedily takes place, particularly in hot weather, new supplies should be prepared as required.—*Morton's Ed. of Mackintosh*, p. 219.

OF POISONING WITH SALTS OF COPPER.

Copper itself is said not to be poisonous; but all its salts are poisonous. The two most commonly met with are the sulphate (or blue vitriol), and the subacetate (or verdigris).

Sulphate of Copper is found in the form of large crystals of a deep blue colour, and an acrid, astringent and metallic taste; and in common language, is called blue stone, blue vitriol, or blue copperas.

Symptoms.—The symptoms of poisoning by this substance are much the same as those occasioned by arsenic and corrosive sublimate. In doses of half an ounce and upwards, it is a powerful irritant. It induces violent vomiting, and the vomited matters are remarkable for being of a blue or green colour. The violence of the vomiting sometimes effectually

expels the poison, and the person recovers.* In the cases related by Orfila, the first symptom was violent headache, then vomiting, pain in the bowels, and cramps. Jaundice also occasionally occurs in poisoning with this substance.†

Subacetate of Copper (*Verdigris*), is a common pigment, met with in the form of a light powder of a greenish blue colour; of a peculiarly disagreeable smell, approaching to that of vinegar.‡ "This is the preparation of copper which most frequently produces deleterious effects."§ The symptoms produced by this substance, resemble those arising from sulphate of copper in general. A case is reported by Pyl, of a woman who took two ounces of verdigris, and died in three days. In addition to the symptoms above described, there were convulsions and paralysis before death.

Post-mortem Appearances. — In experiments made on animals with this poison, when death has occurred very rapidly, no morbid appearance has been perceptible. Where death ensues more slowly, the appearances are such as arise from inflammation. In Pyl's case, just alluded to, "the skin was yellow, the intestines, particularly the lesser intestines, were

* Taylor's Med. Jurisp., p. 166.
† Christison, p. 419.
‡ Ibid., p. 403.
§ Beck's Elem., p. 292.

of an unusual green colour, inflamed, and here and there gangrenous. The stomach was green, its inner coat was excessively inflamed, and near the pylorus, there was a spot as big as a crown-piece, where the villous coat was thick, hard, and covered with firmly adhering verdigris. The lungs were likewise said to have been inflamed.*

Treatment.—The salts of copper generally act violently as an emetic; this vomiting should be encouraged, and made easy by the free administration of warm water, milk or any mucilaginous drink, and the use of the stomach-pump. Where, however, the poison has been taken in coarse powder, the latter instrument can be of little use. Sugar has formerly had some repute as an antidote; but the late experiments of Orfila have satisfied him that it only acts as an emollient,† when the poison is removed from the stomach. He has ascertained that albumen, in the form of white of eggs, is the best antidote for the poisonous preparations of copper. The ferrocyanate of potash he has also found to be a good antidote.‡

According to the experiments of Drs. Edwards and Dumas, iron filings have proved valuable as an antidote. They found that when from 15 to 30

* Christison, p. 422.

† Orfila's Toxicol., p. 539.

‡ Ibid., p. 541.

grains of sulphate or acetate of copper were given to animals, and an ounce of iron filings given immediately before or immediately afterwards, the gullet being tied to prevent the discharge of the poison, death did not take place for several days, and consequently proceeded from the operation on the gullet; and that, on one occasion, the ligature being removed from the gullet, the opening healed, and recovery took place.*

The hydrated oxide of iron has been used in Germany, in poisoning with arsenite of copper. A child swallowed a small quantity of green paint, containing arsenite of copper. Violent vomiting ensued, with coldness of the surface. Milk was given, and afterwards the hydrated oxide of iron. In five hours the vomiting abated, and the child recovered.† Mr. Taylor, however, thinks that in this case the recovery could not be ascribed to the effect of the supposed antidote, and states that the arsenite of iron has been proved to be as poisonous as that of copper—(p. 168.) The evacuation of the stomach and the free use of albumen, with mucilaginous drinks, must be principally depended on in these cases of poisoning. The inflammatory symptoms which follow, must be treated upon the general principles heretofore laid down.

* London Medico-Chirurg. Review, v. p. 611.

† Med. Gazette, xxxi. p. 276.

German Silver is an alloy of copper and zinc with nickel. In some instances, it is found to contain fifty per cent., by weight, of copper. Some cases of poisoning have occurred from its use. Mr. Taylor mentions the case of a lady in Paris, who, having eaten eels for dinner, was seized in the night with headache, vomiting and colic, which subsided under proper treatment. Her physician ascertained that the eels had been cooked in an earthen vessel, with butter and vinegar, and that the metal spoon, which was of German silver, presented some greenish spots on different parts. The spoon was then polished, and placed in a hot mixture of bread, butter and vinegar. In a few hours after the mixture had cooled, it was found quite green—a poisonous salt of copper having been formed.—*Med. Jurisp.*, p. 173.

OF POISONING WITH ZINC.

The only important compound of this metal is the sulphate (or white vitriol). It is usually met with in the form of small prismatic crystals, transparent, colourless, of a very styptic metallic taste, and soluble in water.* This substance is ranked among the irritant poisons, though not very active as such. In doses of from 20 to 30 grains, it is given as an

* Christison, p. 446.

emetic, and is one of the most prompt and active articles of that class of medicines. In very large doses, it has produced dangerous symptoms, and even death. Parmentier, the chemist, relates an instance of about two ounces of white vitriol in solution being swallowed by mistake. The countenance became immediately pale, the extremities cold, the eyes dull, and the pulse fluttering. The patient complained of burning pain in the stomach, and vomited freely; potash being given in syrup, the symptoms gradually ceased, and the young lady recovered.*

Symptoms.—These are pain in the stomach, vomiting and diarrhœa; and after death, the appearances are those of inflammation. The sulphate of zinc acts purely as an irritant—it has no corrosive properties.†

Treatment.—Warm water with milk should be freely given. It has been proposed to give albumen as an antidote; but a very large quantity of this substance is required to precipitate the oxide of zinc. Infusions containing tannin may be used with benefit, as oak bark or Peruvian bark—or these substances may be given in powder. A strong decoction of tea may also be used. If the poison should have passed into the intestines, enemata should be administered.‡

* Orfila's Toxicol., i. p. 573. † Taylor, p. 179. ‡ Ibid.

OF POISONING WITH ANTIMONY.

The preparations of antimony which it will be necessary to notice here, are tartarized antimony (tartar emetic), and the chloride (or butter of antimony). The former of these substances is much prescribed in medical practice, and has been given in large doses without injurious effects. Beyond a certain amount, however, it undoubtedly proves poisonous. "A Jew took by mistake about twenty grains of tartar emetic in the morning fasting. In a few moments after swallowing it he experienced pain in the region of the stomach, which increased, and even brought on syncope. After this excessive vomiting of bilious matter came on with alarming rapidity. Aqueous stools occurred incessantly; the pulse was small, and the face pale; there was great prostration of strength, and the patient complained of painful cramps in the legs. By the use of proper remedies, the symptoms subsided after an illness of six hours, and debility and painful digestion alone remained."*

Symptoms.—A rough metallic taste may be perceived in the act of swallowing; nausea, vomiting, heat in the stomach accompanied with pain, colic, copious stools and syncope, are among the promi-

* Beck's Elements of Med. Jurisp, p. 280.

nent symptoms. There is also a small, quick pulse, and cold skin. Sometimes intense heat, difficult breathing, vertigo, loss of sense, convulsive motions, cramps in the legs, great prostration of strength, and death. Occasionally great difficulty of swallowing attends. The vomiting and alvine evacuations do not always take place, and the consequence of this is an increase in the violence of the other symptoms.* Tartar emetic is said to produce the symptoms of irritant poisoning when applied externally, and no doubt when extensively used in this way it is capable of doing injury, though in the *usual* manner of its application to the skin we do not hear of any poisonous effects from its use.

Post-mortem Appearances.—The mucous membrane of the stomach is generally inflamed, and covered with mucus. The duodenum is also red and inflamed, and occasionally the small intestines. The lungs are often found more or less inflamed, and in some instances the brain has been found in a like condition, and containing serous fluid.†

Treatment.—The treatment consists in promoting free vomiting, by giving warm water, milk, or other diluents, and by tickling the fauces. The stomach-pump may also be used with advantage where the vomiting is not free. Some vegetable infusion con-

* Beck's Elements of Med. Jurisp., p. 282. † Ibid., p. 283.

taining tannin should be prepared without delay and given. Peruvian bark, oak bark, or tea, may be used for this purpose, and while the decoction is being prepared the bark may be given in powder or tincture. Tannin is said to combine with oxide of antimony to form a compound insoluble in water; and at all events it suspends the operation of the poison. The tannate of antimony is said to be inert.* When there is reason to believe the patient has vomited sufficiently, and enough of the antidote has been given, opium is clearly indicated, and has been found useful.† The antiphlogistic treatment is generally necessary to remove the secondary symptoms. The following case, related by M. Serres, Dr. Christison thinks was probably cured by Peruvian bark:

A man purchased half a drachm of tartar emetic in divided portions at different shops, and swallowed the whole in a cup of coffee. He was soon afterwards attacked with burning pain in the stomach, convulsive tremors, and impaired sensibility; coldness of the skin, hiccup, and some swelling of the epigastrium; but there was no vomiting. Decoction of cinchona was given freely; from the first moment almost of its administration he felt relief, and began to sweat and purge. Next morning, however, he

* Taylor's Med. Jurisp., p. 174. † Christison, p. 437.

vomited, and gave signs of slight inflammation in the stomach for several days, and for a month afterwards had occasionally some pain in that region, but finally recovered.* Dr. Christison reports another case of a lady, who swallowed by mistake a solution of sixty grains of tartar emetic. In ten minutes she was seen by her physician. Vomiting had commenced. Tincture of bark was immediately given in large doses; no unpleasant symptom occurred except nausea and slight colic.†

Chloride of Antimony, (*Butter of Antimony.*)—This is a highly corrosive liquid, varying from a light yellow to a dark red color—in the latter state generally containing a large quantity of iron. Mr. Taylor records a case related to him by one of his pupils, in which a boy aged twelve years swallowed by mistake five drachms of a solution of butter of antimony. In half an hour vomiting commenced, and continued at intervals for two hours, accompanied with great prostration of strength. Remedies were used, and the symptoms abated; the next day he complained of heat and uneasiness in the mouth and throat, with difficulty of swallowing. The mucous membrane of the mouth and fauces was

* Orfila's Toxicol. Gén., i. p. 475.

† Bulletin des Sciences Médicale, vi. p. 259.

abraded, and slight fever attended, but he recovered in eight days.*

Symptoms.—The symptoms in this poisoning may be supposd to be much the same as those which arise from tartar emetic. As collected from the cases recorded, they are, violent vomiting, cold skin, shrunk features, dilated pupils, small pulse and heavy breathing, griping pain in the abdomen, with frequent desire to evacuate the bowels.

Morbid Appearances.—In a fatal case related by Mr. Taylor the interior of the alimentary canal from the mouth downward to the jejunum presented a black appearance as if the parts had been charred. There was no mucous membrane remaining, and the sub-mucous tissues were so soft as to be easily torn by the fingers.†

Treatment.—No particular directions are given for the treatment of poisoning by this substance, other than those under the head of tartar emetic.

OF POISONING WITH TIN.

Tin in its purely metallic state is not poisonous, but a preparation of it much used in the arts is a poison of considerable activity, viz.

Muriate of Tin, (*Dyers' Spirit.*)—The muriate of tin is used extensively in the art of dyeing; and the

* Taylor's Med. Jurisp., p. 178. † Ibid.

oxide of tin forms part of the putty powder used in staining glass and polishing silver plate.* The salts may be found in the form of whitish yellow crystals, but are more commonly met with in a strongly acid solution in water. Orfila found that six grains injected into the jugular vein of a dog, killed the animal in one minute. Its effects when taken into the stomach, do not seem to be proportionably poisonous. In doses of from eighteen to forty grains, it produced death in dogs in one, two, and three days, efforts to vomit and great depression being the only symptoms.† Orfila relates a case where a small quantity was taken by several persons in a family, owing to its being mistaken by the cook for salt; they all had colic, and some diarrhœa, but all recovered.‡ The post-mortem appearances in the animals killed by this substance, were those indicating inflammation, and Orfila remarked a peculiarly tanned appearance of the villous coat of the stomach.

Treatment.—"Milk acts as an antidote to this poison. It is completely coagulated, and the coagulum contains muriatic acid and the oxide of tin, and is not deleterious. The antiphlogistic treatment may be subsequently necessary, if symptoms of inflammation supervene."—*Beck's Elements of Med. Jurisp.*, p. 303.

* Christison, p. 439. † Ibid.

‡ Toxicol. Gén., i. p. 559.

OF POISONING WITH NITRATE OF SILVER.

Lunar Caustic.—This substance is found in small sticks of a grayish colour. It is soluble in distilled water, and is powerfully corrosive, destroying all organic tissues with which it comes in contact.

Symptoms.—When twelve grains of the nitrate of silver were introduced into the stomach of a dog, in powder, and the gullet tied, but little effect was produced; when, however, a larger quantity (36 grains) was used in solution, death ensued in thirty-six hours, without any very marked symptoms. The villous coat of the stomach was found softened, and corroded near the pylorus, by little grayish eschars, resembling those formed by this substance on the skin.*

Treatment.—This consists in giving the muriate of soda (common salt), which, by decomposing it, acts as an antidote. Salt water and mucilaginous drinks should be freely administered.

OF POISONING WITH IRON.

The oxide and carbonate of iron may be given in large doses without producing injury. Yet some of its preparations act as irritants.

Sulphate of Iron, (*Copperas, Green Vitriol.*)—This

* Toxicol. Gén., i. p. 581.

is by no means an active poison, though, according to Dr. Smith, two drachms will sometimes prove fatal to dogs. A case, however, is related by Dr. Christison as contained in *Rust's Magazine*, of a girl who took an ounce of green vitriol dissolved in beer, as an emmenagogue; she was attacked by colic pains, vomiting and purging, which continued for several hours; but recovered by the use of mucilaginous and oily drinks.*

Muriate of Iron, (*Tincture of Sesqui-chloride of Iron.*)—This is an acid solution of peroxide of iron in alcohol, and is much used in medicine. A case is related by Dr. Christison,† of a gardener who took an ounce and a half of the muriatic tincture of iron, by mistake; the symptoms which followed were, violent pain in the throat and stomach, contraction of the epigastrium, nausea, and vomiting of an inky fluid, and of mucus and blood; he also had bloody stools. The skin was cold, and the pulse feeble; although he partially recovered, he became worse, and died in a little more than five weeks from the time of swallowing the poison. After death, the stomach was found greatly thickened near the pylorus, a cicatrized patch, and other traces of inflammation. The activity of the muriatic tincture ferri is probably owing to its excess of acid.

* Christison, p. 573. † Ibid.

Treatment.—The carbonate of soda is recommended as an excellent antidote to either of these substances; mucilaginous drinks should also be freely given.—*Dunglison's Dict. Med. Sciences.*

OF POISONING BY CHROME.

Bichromate of Potash is the only compound of this metal which requires notice; it is extensively used in the art of dyeing. It is an irritant poison, and affects also the nervous system; it has proved fatal to animals when given in small doses, death being preceded by diarrhœa and paralysis. In concentrated solution, it has been observed to produce troublesome sores on the hands of those who use it in dyeing. Dr. R. E. Griffith states that several fatal cases of accidental poisoning from this substance have occurred at Baltimore, where the article is manufactured extensively. The treatment consists in giving the carbonate of potash or soda to neutralize the excess of chromic acid.*

OF POISONING WITH THE VEGETABLE IRRITANTS.

Veratrum Album, (*White-Hellebore, Indian Poke.*) —The root of this plant is poisonous; when applied to the abdomen, or when used as a suppository, it is said to produce violent vomiting. Given internally,

* Taylor's Med. Jurisp., p. 183.

it causes spasms, suffocation, loss of voice, and coldness over the body.* A case is related by Vicat, of a family who took some soup in which white hellebore had been used instead of pepper. They were seized with general coldness, and their bodies were covered with an icy sweat; extreme prostration, with a very feeble pulse, succeeded. They were not relieved till vomiting came on. The powdered root is a powerful errhine.†

Helleborus Niger, (*Black Hellebore.*)—The plant which furnishes this article is indigenous to the Alps, the Apennines, and the Pyrenees. The root is the only part employed in medicine. It is black and fibrous, of an acrid, bitter, and nauseous taste, and when chewed, imparts a benumbed feeling to the tongue.‡ A case of poisoning from this substance is related, in which the patient took about half a drachm of an extract made with water, from the roots. He was seized in consequence with pain and vomiting, and died in eight hours.§ Upon examination after death, the stomach and bowels were found inflamed, the large intestines more so than the smaller. Other cases of poisoning from the black hellebore are recorded.

* Beck's Manual Med. Jurisp., p. 371. † Ibid

‡ Eberle's Mat. Med., i. p. 408.

§ Morgagni, vol. i. epist. 59, p. 392.

Bryonia Dioica, (*Bryony.*)—This plant is a native of Britain; it usually grows among hedges, and is known by the name of wild vine; the flowers are greenish, and are succeeded by small red berries.* The root is the most active part of the plant. The administration of bryony causes vomiting, fainting, violent pain, and profuse alvine evacuations.

Momordica Elaterium, (*Wild or Squirting Cucumber.*)—A deposit from the expressed juice of the fruit of this plant, when dried, forms the elaterium of the shops. The active properties of this substance reside in a peculiar crystaline principle, discovered by Dr. Morris, and named by him elaterine. It is intensely bitter, and is a poison of great activity; the tenth of a grain will frequently cause purging in man.†

Colocynth, (*or Bitter Apple.*)—The part of this plant used in medicine is the dried, spongy or medullary part of the fruit. It is an active cathartic, and has been known to produce the excruciating pains in the abdomen, bloody evacuations, and violent spasms. In one instance, death was caused by an enema in which not more than a drachm of colocynth had been infused.‡ Dr. Beck records another case of an indi-

* Christison, p. 522. † Ibid., p. 525.
‡ Beck's Elements, p. 375.

vidual labouring under hemorrhoids and indigestion, who took two glasses of what proves to be a decoction of colocynth. It produced frequent alvine evacuation, accompanied with colic, great heat in the bowels, dryness of the fauces, unquenchable thirst, small rapid pulse red tongue, tenderness of the abdomen, and finally, death. On dissection, the abdominal viscera exhibited marks of violent inflammation. Aloes and colocynth are said to be the basis of a certain quack medicine sold under the name of Morrison's Pills. These pills have proved fatal in several instances.*

Daphne Mezereum, (*Mezereon.*)—This plant produces violent vomiting and inflammation of the stomach. A case is related by Linnæus, of fatal hæmoptysis, occasioned by taking twelve berries of this plant.

Ricinus Communis, (*Palma Christi, Castor Oil Plant.*)—The castor oil used in medicine is expressed from the seeds of this plant. The seeds act powerfully on the system, producing violent vomiting and purging. Thirty grains produced death in a small dog. Inflammation and ulceration of the stomach were found after death.†

* Taylor's Med. Jurisp., p. 188.

† Orfila, vol. ii. p. 29.

Euphorbia Officinarum.—This plant is found at the Cape of Good Hope; the stalk yields a milky juice, which, on being dried, is called euphorbium; it is a gum-resin. In medicine, it is used only as an errhine; and by farriers it is employed for blistering horses. A case is related of a female in Lincoln, England, who took by mistake two ounces of the tincture of euphorbium, prepared with camphor and alcohol. Suffocation, and burning pain in the throat and stomach, were the immediate consequence. Warm water was given, and copious vomiting induced, but the pain continued for some time, and required the repeated application of suitable remedies.* In another case, a teaspoonful was given by mistake for rhubarb; symptoms of violent irritation followed immediately in the throat and stomach. Emetics, anodynes, and mucilages were resorted to in vain: the patient died in three days. Upon examination, gangrenous spots were found in the stomach, and other traces of violent inflammation.†

Juniperus Sabina, (*Savin.*)—The powdered leaves and the essential oil of this plant are poisonous, and have frequently been used with the intent to procure abortion. It has, however, no abortive quality other than that of a violent irritant; death has resulted from

* Beck's Elements, p. 377. † Ibid.

its use without abortion taking place,* and Dr. Christison relates a case of a woman who took one hundred drops of the oil daily for more than twenty days, and yet carried her child to the full time.† In animals killed by savin, the rectum was invariably found inflamed.

Rhus Vernix, (*Poison Sumac.*)—This plant produces on the skin, by contact, severe pain and itching which continues for several days, the parts swell, and vesicles form, filled with a transparent humour. Blindness has been caused by merely handling it;‡ and Dr. Bigelow has known poisoning induced in winter by the wood of the rhus vernix, accidentally burnt on the fire.—*Med. Botany.*

Anemone Pulsatilla, (*Wind Flower.*)—The bruised root of this plant is a violent irritant when applied to the skin, causing great suffering, and in one instance gangrene. The dried powder, on being pounded, has excited irritation of the eyes, and vomiting; and animals to whom the extract or the juice of the leaves has been given, have died, the stomach and rectum exhibiting marks of inflammation. The dried powder did not affect them.§

* Taylor's Med. Jurisp., p. 189.
† Ibid., p. 501.
‡ Phil. Trans., vol. xxxi. p. 145.
§ Orfila, vol. ii. p. 43.

Aconitum Napellus, (*Wolf's-Bane, Monks'-Hood, Aconite.*)—Dr. Beck relates cases which prove aconite to be a most violent irritant. In one instance, it was taken by mistake with salad, and occasioned a burning heat in the tongue and gums, and irritation in the cheek; a tingling sensation extended over the whole body, with twitchings; the eyes and teeth were fixed, the hands, feet, and forehead covered with a cold sweat; no pulse could be perceived, and the breath was so short as scarcely to be distinguishable. The patient gradually recovered by vomiting and the exhibition of ammonia, which brought on vomiting and purging. Two fatal cases are also recorded.—*Beck's Elements*, p. 380.

Ranunculus Acris, (*Butter Cups.*)—The external application of this plant is said to produce inflammation and ulcers. Internally given, the juice of its leaves gives rise to inflammation of the mucous membrane of the stomach.

Ranunculus Sceleratus, (*Water Crow-Foot.*)—The leaves and juice of this plant excoriate the tongue and mouth, and produce burning pain in the œsophagus. In animals destroyed by it, the stomach has been found inflamed. Externally applied, it produces extensive ulcers.*

* Beck's Elements, p. 384.

Colchicum Autumnale, (*Meadow Saffron.*)—The root and seeds of this plant are very poisonous. In an over dose, it causes burning pain in the throat, violent vomiting, purging, and death in a few hours. According to Dr. Beck, the seeds have proved fatal to children in several instances, and cattle also suffer from them in the spring, when the seed vessel is fully matured. In cases of death produced by them, the seeds are found adherent to the coats of the stomach, and produce inflammation at the several points of adhesion, which causes death. "In November, 1839, a gentleman swallowed by mistake an ounce and a half of the wine of colchicum; he was immediately seized with severe pain in the abdomen; other symptoms of irritation came on, and he died in seven hours."*

Delphinium Staphisagria, (*Stavesacre.*)—The active properties of this plant have been traced to a peculiar alkaloid obtained from the seeds. This alkaloid is a solid, white crystaline substance, very bitter and acrid; it has been named delphinia.† Orfila found that six grains of it diffused through water, and introduced into the stomach of a dog, the gullet being tied, brought on efforts to vomit, giddiness, convulsions, and death in two or three hours.‡ An ounce

* Taylor's Med. Jurisp., p. 223. † Christison, p. 527.
‡ Toxicol. Gén., i. 739

of the bruised seeds killed a dog in fifty-four hours, when taken into the stomach, producing a crimson redness in a part of that organ.

Sedum Acre, (*Houseleek, Wall-pepper.*)—This plant has occasioned death when given internally. The mucous membrane of the stomach was of a fiery red colour.

Plumbago Europæa.—This plant has been used for obtaining a yellow dye, and is said to produce a severe headache in those employed in its use.

Lobelia Inflata, (*Indian Tobacco—Emetic Weed—Eyebright.*)—This is a powerful emetic, producing distressing and long-continued sickness. It is much used in irregular practice, and has caused death by its violent action, in the hands of quacks.

Phytolacca Decandra, (*Poke.*)—The juice of this plant is acrid, and is a violent emetic and purgative. Great prostration and convulsions have been occasioned by it. It has been sometimes eaten by mistake for horseradish.

Croton Tiglium.—The seeds of this plant have an acid, nauseous and burning taste. They were formerly used as purgatives, but have been laid aside

on account of the violence of their action. Of late years, the expressed oil of the plant has become a very common purgative. It is very active, however, from one to three drops being a dose, and often acting with considerable violence.

Convolvulus Jalapa, (*Jalap.*)—The powdered root of this plant is one of our most common purgatives. Yet in large doses, it is a very active poison, and severe and even dangerous effects have followed its incautious use. Its active properties reside in a peculiar resinous principle. Two drachms of jalap given by the mouth, have proved fatal to dogs, by profuse purging; the stomach and bowels being found inflamed, and in some instances ulcerated.*

The symptoms occasioned by the vegetable irritant poisons generally, may be inferred from what has been said under the head of each particular article, as also the post-mortem appearances; they are mainly such as indicate inflammation of the villous coat of the stomach and intestines.

Treatment of Poisoning by the Vegetable Irritants.—In the treatment of these cases of poisoning, the primary object of the practitioner should be to dislodge the poison from the stomach and bowels with as little delay as possible. It most

* Christison, p. 530.

frequently happens that vomiting is among the first symptoms which occur, and by it the patient's life is often saved; when present, it should be promoted by large draughts of warm water or thin gruel. Sometimes, however, vomiting does not occur as an immediate effect of the poison. In such cases, it should be induced as speedily as possible, by tickling the fauces with a feather, by giving the sulphate of zinc in doses of 20 or 30 grains, or the stomach should be evacuated by the stomach-pump. Such of these measures may be employed as is best adapted to the particular case. After the stomach has been freely evacuated, an active purge should be given, and its effect may be promoted by enema, if necessary. After as much as possible of the poison has been got rid of in this way, strong coffee, diluted vinegar, or camphor mixture, may be given with advantage. If the patient be insensible, warmth, frictions and blisters may be employed;* and if subsequently inflammatory symptoms should arise, local or general blood-letting, and other means usually employed in such cases, must be had recourse to, with opiates to allay irritation. Bromine, chlorine, and iodine, are said to possess some virtues as antidotes to the alkaloids generally.†

* Dunglison's Dict. Med. Sciences. † Ibid.

OF POISONING WITH CANTHARIDES.

Cantharides is an active poison, either in powder or tincture. It has frequently been used for the purpose of procuring abortion, or exciting venereal propensity. It is very doubtful, however, whether this substance has any direct or specific action on the uterus, and for the latter purpose Mr. Taylor thinks it can scarcely be effectual, unless used in quantities sufficient to endanger life.

Symptoms.—When cantharides is taken either in powder or tincture, in quantities of one or more drachms of the former, or from half an ounce to an ounce of the latter, a burning sensation in the throat, with great difficulty of swallowing, is produced. Pain in the abdomen, nausea, vomiting of mucus, sometimes bloody. In general, there is great thirst with dryness of the fauces, though, in some instances, there has been salivation. Pain also occurs in the back, with constant desire to void urine, a small quantity of which only can be passed, mixed with blood. As the case advances, the genital organs become swollen and inflamed, both in the male and female, and on the former, severe priapism attends. In fatal cases, death is usually preceded by convulsions.*

Post-mortem Appearances.—In a case referred to

* Taylor's Med. Jurisp., p. 191.

by Mr. Taylor, of fatal poisoning by cantharides, the whole alimentary canal, from the mouth downwards, was in a state of inflammation, as were also the kidneys, ureters, and internal organs of generation. In some instances, the brain has been found congested, and the bladder ulcerated. The medicinal dose of the powdered cantharides is from one to three grains, and of the tincture ten minims, gradually increased to one fluidrachm. Doses beyond these are liable to give rise to symptoms of poisoning.*

Treatment.—When vomiting is present, it should be encouraged by the free use of demulcent drinks; when it is not, an emetic should be given, and its effect promoted as above. The condition of the throat is such, in the generality of cases, as precludes the use of the stomach-pump. Oil was formerly used in these cases, but of late it has been found injurious, being a solvent of the active principle of the poison.

Oleaginous and mucilaginous injections are very useful in relieving the strangury,† and the warm bath has also been found serviceable. Blood-letting, leeches and fomentations will generally be required. Dr. Christison cites a case from M. Biett, of Paris, of a young man who took a drachm of the powdered

* Taylor's Med. Jurisp., p. 191.

† Christison, p. 536.

cantharides. The usual symptoms followed, and, in addition to those above mentioned, his voice was feeble and breathing laborious, and pulse contracted. The strangury was extremely severe, and often violent; he only succeeded in passing a few drops of blood. By the use of oily injections into the anus and bladder, and other means calculated to allay irritation of the mucous membrane, he was somewhat relieved in two days; but continued to complain of great heat along the whole course of the alimentary canal, occasional priapism, and difficulty in urinating, and for some months had difficulty of swallowing. Another is related in which there was salivation, and on the second day, a large cylindrical mass, the inner membrane of the gullet, was discharged by vomiting.*

* Annales de la Méd. Physiologique, Oct., 1829.

NARCOTIC POISONS.

The action of the narcotic poisons is confined to the brain and spinal marrow. They are few in number, and belong to the vegetable kingdom. Orfila enumerates four: to wit, opium, hyoscyamus, prussic acid, lactuca and solanum. Opium and prussic acid are the most important of the class.

Of Poisoning with Opium.—Opium is the inspissated juice of the papaver somniferum, or white poppy. According to chemical analysis, it consists of narcotine, morphia, and meconic acid, with a portion of resin. It is, as every one knows, a deadly poison when taken in considerable quantity. It is often resorted to for the purposes of suicide and murder, and is not unfrequently the cause of accidental poisoning.

Symptoms.—These are giddiness, stupor, and insensibility to external impressions. The individual lies as if in a sound sleep. In the early stage, he may be roused by being spoken to loudly, and made to answer questions, but soon relapses into insensibility; in this respect, the patient differs from one in a state of coma, in which he cannot be roused

at all. Coma, however, after a time, supervenes. The pulse is at first quick and irregular, and the breathing hurried, but as coma approaches, the pulse becomes slow and full, and the breathing stertorous. The countenance becomes pale and ghastly; the pupils are either contracted or dilated; sometimes there is vomiting or diarrhœa, which, if it occur before stupor comes on, affords a favourable prognosis. In fatal cases, however, the symptoms above enumerated increase in intensity until death occurs. Convulsions sometimes, but not always, precede death.*

The time which intervenes between taking the poison and the commencement of the symptoms above enumerated, varies according to circumstances. If taken in a liquid form and on an empty stomach, its effects will be developed much sooner, for obvious reasons, than if solid opium had been taken, or the stomach full.† Sometimes the effects are apparent in a few minutes; at other times, from half an hour to an hour, or even more, has passed before the symptoms occur. In one very remarkable case, given in the *American Medical Recorder*, xiii. p. 418. Eight ounces of solid opium were taken, and yet at the end of an hour, the individual recounted distinctly all she had done, and recovered. Another

* Taylor's Med. Jurisp., p. 619. † Christison, p. 616.

case is reported by Mr. Semple, May, 1841, of a girl, aged nineteen, who took an ounce and a half of laudanum; the symptoms did not occur till an hour and a half afterwards. The patient was drowsy, but rational. The pupils were much contracted, and did not dilate when light was removed. The girl recovered by treatment.* Young children are easily affected by opium in any form. A case within my own knowledge occurred some years since, of an infant who was killed by being bathed with laudanum to relieve colic. The quantity of opium necessary to produce fatal effects varies much in different individuals and under different circumstances. In the above instances, we see recoveries have taken place after very large quantities were taken, and yet cases are recorded where death has resulted from little more than half an ounce of laudanum; and some in which four grains of opium were fatal.† According to Christison, the ordinary duration of a fatal case of poisoning with opium is from seven to twelve hours; those who live beyond twelve hours, generally recover.

Post-mortem Appearances.—According to Christison the vessels of the brain are generally in a state of turgescence. Watery effusion into the ventricles and on the surface of the brain are also common;

* Taylor's Med. Jurisp., p. 198. † Christison, p. 624.

the lungs are sometimes found gorged with blood; the blood itself is almost always in a fluid state in cases of poisoning with opium; the stomach has sometimes been found red, but redness is rare, and Dr. Christison thinks that decided inflammation probably never occurs. In four cases which he examined, the villous coat of the stomach was quite healthy.*

Treatment.—The first object of the practitioner in a case of poisoning by opium, should be to expel the poison from the stomach with as little delay as possible. This may sometimes be accomplished by sulphate of zinc in doses of thirty grains, repeated at an interval of fifteen or twenty minutes if the first does not take effect. Tartar emetic, owing to the uncertainty of its action, is not well adapted to such cases. If the insensibility of the stomach is such that the emetic does not act promptly, the stomach pump should be used without delay—when this instrument cannot be procured, it has been recommended to employ a long tube with a bladder attached. After the stomach has been filled with warm water from the bladder, the tube is to be turned down so as to act upon the contents of the stomach as a syphon; Dr. Christison refers to a case cured in this way. The injection of tartar emetic into the rectum has been successful in a case related by Dr. Roe of New

* Christison, p. 637.

York, and this plan may be had recourse to when the patient will not submit to other means. In the case above alluded to, fifteen grains of tartar emetic in half a gallon of warm water, were thrown into the rectum and excited free vomiting. It was necessary to repeat the enema with ten grains, and a laxative injection was used subsequently in order to insure the discharge of the tartar emetic.

Where other means of exciting vomiting have failed, it has been recommended to inject emetics into the veins; tartar emetic is the most suitable for this purpose. Dr. Christison says "its effect is almost certain." He recommends that great care be taken during the operation, to avoid introducing air into the veins. The dose is one grain.*

The next object to the evacuation of the stomach is to keep the patient constantly roused; this is a very important part of the treatment. He should be kept in constant motion, sustained by a person on each side of him who should resist his entreaties and struggles to get free and rest himself.† The duration of the exercise should vary according to circumstances, from three or six to twelve hours.‡ And when he is allowed to sleep, he should be carefully watched and roused occasionally; if this should be difficult he should be put again in motion.

* Christison, p. 643. † Ibid. ‡ Ibid.

Dashing cold water over the head and breast for the purpose of rousing the patient has been practised with much success.* He is almost completely restored to consciousness for a short time by it, and during this interval the emetic previously given frequently takes effect. In this way it assists the operation of emetics, and should be repeated according to circumstances. In some cases internal stimulants, as ammonia, camphor, and musk, are said to have been useful. It is always proper to stimulate the nostrils from time to time, tickling them, or by the application of ammonia to the nose; but the use of the latter article should not be too frequent or long continued, as the inhalation of it for any length of time would be injurious.

Venesection has been successfully practised in some cases. In relation to this remedy Dr. Christison observes, "If the stomach be emptied and the patient kept roused, which may almost always be done when means are resorted to in time, venesection will be unnecessary. Sometimes, however, when the pulse is full and strong it will be prudent to draw blood; and it certainly appears that in most cases when this remedy has been employed, sensibility began to return almost immediately after." On account of its favouring absorption it should not be re-

* London Med. Repos., xviii. 26.

sorted to until there is reason to believe the poison has been entirely removed from the stomach.

Artificial respiration has been employed with success in some cases apparently desperate. In these instances the heart continued to act for a time after the breathing had apparently ceased: at this juncture the renewal of respiration by artificial means sustained the heart's action, and recovery gradually took place. The following interesting case of Mr. Whateley is given by Christison: "A middle aged man swallowed half an ounce of crude opium, and soon became lethargic; he was roused from this state by appropriate remedies, and his surgeon left him; but the poison not having been sufficiently discharged he fell again into a state of stupor, and when the surgeon again returned he found the face pale, cold and deadly, the lips black, the eyelids motionless, so as to remain in any position in which they were placed, the pulse small and irregular, and the breathing quite extinct. The chest was immediately inflated by artificial means, and when this had been persevered in for seven minutes, expiration became accompanied with a croak which gradually increased in strength till natural breathing was established. Emetics were then given and the patient eventually recovered."*

Orfila has examined most of the reputed antidotes

* London Med. Observ. and Inq., vi. 331.

for poisoning with opium, as vinegar, lemon juice, tartaric acid, infusion of coffee, decoction of galls, chlorine, camphor, &c., and has found them of no use until the poison has been expelled from the stomach, with the exception of the decoction of galls, which he thinks may be considered as an imperfect antidote, and used till the poison can be expelled; it possesses, however, but little activity as a remedy. To expel the opium and to keep the patient roused by the most assiduous efforts, are the leading indications; when this has been accomplished, the vegetable acids and coffee are useful, subduing sickness, relieving headache, and restoring the patient. But acids should not be given till the poison is completely removed, particularly if it has been taken in the solid form, as they accelerate its solution.

Electro magnetism has been found very beneficial when the patient was in a lethargic condition, and recoveries have taken place by its use under circumstances apparently hopeless. The shock should be directed to the head and spine. Mr. Taylor, in his late valuable work on poisons, reports a case successfully treated in this way by Dr. Colohan.—*Dub. Med. Press*, April 22, 1846, p. 244.

Poisoning by Poppies.—The heads of the white poppy contain meconate of morphia, and an extract is obtained from them called English opium, which,

according to Hennell, contains five per cent. of morphia. The syrup of poppies is a decoction of the poppy heads made into a syrup by being sweetened. Many children are said to have been poisoned by its use. According to Thompson, it contains one grain of opium to the ounce, but is probably of variable strength. It is to be feared that what is sold under the name of syrup of poppies is sometimes a mixture of the tincture or infusion of opium with simple syrup. This was probably the case in the instance mentioned by Mr. Taylor, of a child which was killed by less than half a teaspoonful of syrup of poppies, bought at a drug store. The child was six months old. Seven children died of poisoning by this syrup in 1837-8.—*Taylor's Medical Jurisp.*, p. 202.

The following are cases of poisoning by the decoction:—"A woman boiled two poppy heads in a quarter of a pint of milk and gave two small spoonsful to her child. In an hour the child fell into a deep lethargic sleep; the respiration became stertorous, and in ten hours it died. On inspection the brain and its membranes were found congested." In a second case, a maid servant, in order to quiet a child, gave it two teaspoonfuls of a decoction made by boiling one poppy head in a small pot of water; the child was found dead in the morning. The brain and its membranes were much congested, and

the ventricles contained bloody serum. The seeds of the poppy were found in the stomach.—*Taylor's Med. Jurisp.*, p. 202.

Godfrey's Cordial.—According to Mr. Taylor, this is a mixture chiefly composed of infusion of sassafras, treacle and laudanum. Dr. Paris states the proportion of the tincture of opium to be about one drachm to six ounces of the mixture. In 1837–8 twelve children were killed by this preparation.* Mr. Taylor explains this by supposing that the medicine may have been given in too large doses by ignorant persons. May it not be that it is sometimes prepared from powdered opium instead of filtered laudanum? The following case, which occurred to me some years ago, induced me to form such an opinion. I was requested to call as quickly as possible to see a child, said to be dying from a dose of Godfrey's cordial. In a very short time, say fifteen or twenty minutes, I saw the patient, an infant some months old. It lay upon the lap of a female, the mother and several others sitting by; it had *apparently* just ceased to breathe; its face was pale, eyes half shut, and its whole appearance cadaverous. The mother stated that she had given it, a few hours before, its usual dose of the medicine, and no more,

* Taylor's Med. Jurisp., p. 202.

but that it was the last in the bottle, and that it was rather thick. Supposing her child was sleeping as usual, she had not looked to it until a little time before, when she found it impossible to awaken it, and just before I entered the room its breathing was suspended. Upon examining the chest I found there was still a feeble action of the heart, and as I pressed with my hands upon the sides of the thorax a sudden sob or deep inspiration took place; by a continuance of this means, respiration was gradually renewed; frictions were diligently employed; vomiting was brought on by powdered ipecac., aided by warm water, and the child recovered.

I believe in this case respiration was re-established by artificial means.

Morphia and its Salts.—These act as poisons much in the same manner as opium, but with more energy. According to Orfila, one part of morphia is equal to four parts of crude opium. The medicinal dose of morphia or its salts is stated to be from one-eighth of a grain to two grains. The symptoms and post-mortem appearances from poisoning with this article are much the same as those from opium; as is also the treatment.

Christison records a case of a Parisian graduate, who swallowed twenty-two grains of morphia. The symptoms were heat of the stomach and head, with

excessive itchiness, pricking sensation in the eyes, and dimness of vision, but in his case stupor did not come on for five hours. In thirteen hours he was seen by Orfila. At this time he was cold, comatose, and had locked-jaw. The breathing was stertorous, pulse 120, the belly tympanitic; there were convulsions with itching of the skin. This patient recovered. The treatment employed was "copious bleeding, sinapisms, ammoniated friction, stimulant clysters, ice to the head and acidulous drinks."—*Christison*, p. 632.

A very interesting case is related in *Ranking's Abstract*, December, 1845, of an apothecary's assistant who took fifty-five grains of the acetate of morphia. At the end of an hour and a half he complained of giddiness, weight in the limbs and a slight tendency to sleep. In two hours after taking the poison he was taken to the hospital, and three grains of tartar emetic with twenty-four grains of ipecacuanha were given in two doses at an interval of half an hour. Vomiting, however, did not occur, and the stomach-tube was used without effect, and at the end of two hours and a half he gradually fell into a profound sleep. The breathing was natural. A pound of blood was now taken from his arm, after which the patient rallied slightly, and complained of not being able to swallow. The pulse, which had been soft and rather frequent, became full, hard

and slow. There was a troublesome itching of the forehead, nose and lips. The further treatment consisted in ammoniacal frictions to the belly and extremities, moxas to the legs, and repeated shakings of the body. The symptoms, however, continued to increase, and the body became icy cold. At the end of three hours a drachm of tincture of iodine and the same quantity of hydriodate of potash in three ounces of water were given in two doses at an interval of a quarter of an hour. After the second dose the patient rejected the medicine, but slept while he vomited. The symptoms continued to increase in intensity for five hours and a half, during which time the patient was bled three times. After this period he began to improve, and slowly recovered.

Of Poisoning with Prussic Acid.—The hydrocyanic or prussic acid is one of the most rapid and deadly poisons with which we are acquainted. According to Magendie, one drop of the pure acid put into the throat of a dog, caused death almost instantaneously, and its effects are nearly the same when dropped under the eyelid.* The diluted acid as prepared by Scheel is that which is kept in the shops, and used for medicinal purposes; the dose is from one quarter of a drop to two drops. The substances in which

* Ann. de Chim. et de Phys., vi. 347.

this acid exists are the bitter almond, cherry laurel, peach blossom, cluster cherry, and the mountain ash.*

Symptoms.—In fatal cases death generally takes place so rapidly that the symptoms have scarcely been noted, especially when a large quantity has been taken. As far as they can be ascertained they are, excessive prostration, convulsive respiration at long intervals, insensibility, convulsions, and in some instances tetanic spasms; where a large quantity has been taken death generally takes place within a few minutes, and when inhaled in vapour it is still more rapid. In cases where a sufficient quantity has not been taken to occasion immediate death, salivation frequently occurs. In one of the Parisian hospitals where an over dose was given by mistake to seven patients and proved fatal in all, death did not occur till the lapse of from thirty to forty-five minutes. The dose in this case to each patient was 0.7 grains of the pure acid, which is the smallest fatal dose on record.† In these cases the symptoms did not commence for ten minutes after the medicine was taken; they were convulsions followed by coma.

A case is related of a physician at Rennes who took what was equal to one drachm and a half of Scheel's; in a few minutes he fell senseless and was seized with convulsions and tetanic spasms, but

* Christison, p. 652. † Taylor's Med. Jurisp.

finally recovered; this is the largest dose which has been taken without destroying life.*

Post-mortem Appearances.—If the body has not been long exposed to the air, it exhales a strong odour of prussic acid; the eyes are very prominent and glistening, the venous system is gorged, the blood in a fluid state, the stomach and cavities of the body generally upon being opened emit the odour of the acid; the alimentary canal is generally in a healthy condition, though in some instances it is said to have been inflamed.†

Treatment.—Cold affusion to the head has been found eminently useful in this poisoning, and as the means for its employment are always at hand, it should be resorted to without delay. This remedy was first recommended by Dr. Herbst, a physician at Gottingen, who, from numerous experiments on animals, considered it the best remedy yet proposed. When the quantity taken was not quite sufficient to occasion death, one or two affusions removed the symptoms; when the dose was larger it was necessary to repeat the affusion more frequently. It was most successful when applied before the convulsive stage had passed, yet even in that of insensibility and paralysis this remedy often succeeded; in the latter instances the renewal of the spasms may be regarded as fa-

* Taylor's Med. Jurisp., 212. † Ibid., 210.

vourable. In applying this remedy the head of the patient should be so placed as to receive the water poured from some height on the occiput and spine.

The diffusible stimulants have been used with much advantage in this poisoning. Ammonia in particular is considered as possessing strong antidotal powers. Mr. John Murry, of London, was the first who employed this article as an antidote, in these cases, and from some experiments on animals his confidence in its powers were such that he expressed himself willing to swallow a dose of the acid sufficient to destroy life provided some skillful person was present to administer the antidote.* Subsequent experiments confirmed the opinion of Mr. Murry. The efficacy of ammonia, however, was afterwards called in question, and Orfila made some experiments the result of which induced him to doubt its utility. Continued observation, however, has led him to modify his statement, and he now admits that though liquid ammonia is of no use when introduced into the stomach, yet the inhalation of the vapour of it may sometimes preserve life if the quantity taken be not large enough to act with great rapidity.† In the use of ammonia Orfila cautions against employing too strong a preparation, as by so doing inflammation of

* Edin. Philosoph. Journal, vii. 124.

† Annals d'Hyg. Pub. et de Med. Leg, i. 511.

the air passages, and even of the stomach might be produced. He advises that the strong aqua ammonia be diluted with twelve parts of water.

Chlorine is another remedy which, from experiments on animals, made by Riouz, Bashner and others, has strong claims to confidence. Orfila has examined the merits of this remedy very carefully, and believes it to be the best antidote of all which have been proposed for this poisoning. According to his experiments animals which have taken a dose of this poison sufficient to destroy life in fifteen or eighteen minutes, will be saved by inspiring water impregnated with a fourth part of its volume of chlorine. In some of his experiments he delayed the remedy till the convulsive stage of the poisoning was passed and that of insensibility had supervened, yet the animal was out of danger in ten minutes after the chlorine was first applied.* The inhalation of chloroform, as is now practised, promises to be a valuable remedy in cases of poisoning by prussic acid.

It appears then, that the proper treatment of a case of poisoning by prussic acid consists in the prompt and efficient use of the cold affusion, and the inhalation of ammonia, chlorine† or chloroform. These remedies may be aided by sinapisms, and other external stimulants. Mr. Taylor records a case reported by Dr. Banks of a "girl who took by mistake

* Annales d'Hyg. † Christison, p. 676.

thirty drops of prussic acid; immediately afterwards she sprang up convulsively from her seat and became senseless. Her teeth were firmly set and her eyes staring and wild; stimulants failed to rouse her, and the limbs became flaccid, the pupils dilated, and she was wholly insensible; the respiration was slow, and the pulse scarcely perceptible. A stream of cold water from a pitcher was allowed to fall from some height on the region of the spine. In a few minutes she began to move, and became convulsed; her symptoms abated, and in a few hours she was quite collected; she recovered in a few days, but there is hardly a doubt that she would have died had she not been thus treated."*

A case of recovery from this poisoning, is related in *Ranking's Abstract*, vol. i., 1845, p. 356, by Mr. Harthill. He was called to a man aged twenty-three years, who, he was informed, had taken poison. He found him insensible, with convulsions: having forced open the mouth, he gave him emetics of mustard and sulphate of zinc; a stomach pump was procured, and used for injecting the stomach; the tube could not be introduced far enough to evacuate the fluid. A stream of cold water was applied to the spine, and turpentine enema administered. The cold affusion produced an immediate effect, and consciousness became apparent; brandy and ammonia were afterwards

* Taylor, p. 214.

administered, sinapisms applied to the thighs, and after four hours eight drops of tincture opii given. The next day he was much recovered, and sent to head-quarters. A phial smelling very strongly of the poison was found, but the quantity taken was not ascertained.

Of Poisoning with Bitter Almonds.—The bitter almond is the kernel of the fruit of the amygdalus communis. Its poisonous quality is entirely owing to prussic acid,* and yet it is said that the acid does not exist ready formed in it, but that it requires the contact of water to produce it. This, however, is furnished by the act of mastication. Confectioners make use of this article for the purpose of flavouring sweetmeats, &c., and some accidents have occurred in this way. The essential oil of bitter almonds is scarcely inferior to prussic acid as a poison. A single drop applied by Mr. Brodie to the tongue of a cat produced death in five minutes, preceded by violent convulsions.† This oil is sold under the name of peach nut oil.

The symptoms and treatment are much the same as from the poisoning with prussic acid. Emetics and the stomach-pump have been used with advantage. The following case is from *Ranking's Ab-*

* Christison, p. 679. † Philosoph. Trans., 1811, p. 184.

stract, vol. ii. No. 1, 1846, p. 291, recorded by Mr. Frederic Hetley, house-surgeon to the Middlesex Hospital. "Harriet L., aged 21, was brought into the hospital in a most excited state, not unlike that of a person who has freely indulged in champagne. She had been found in the street with a broken bottle labeled 'poison,' and smelling strongly of the essential oil of bitter almonds, lying near her. On being questioned, on her arrival at the hospital, as to her feelings, the girl answered slowly, that she felt dreadfully ill; and, passing her hand over her face, she fell back in her chair and became insensible. The countenance at this time was pale, the respiration slow and regular, twelve in the minute; the pulse from 120 to 140, and very small, and the pupils contracted to the size of a pin's head. She continued in this state about three minutes, when the countenance suddenly assumed a pale, livid hue. An attempt was now made to administer an emetic, but all power of swallowing had ceased; the stomach-pump was then applied, and the breathing—which had both before and during the whole operation been slow—became stertorous. The contents of the stomach were first drawn off, consisting of about two ounces of dark-brown fluid, smelling strongly of bitter almonds. The stomach was now four times washed out with water, and a solution of chlorine was injected. Towards the termination of the ope-

ration, there were occasional efforts to vomit, and involuntary discharges of urine and feces. After the operation, the patient was carried to bed, still comatose, and with the pupils unaltered. At the end of a quarter of an hour, she appeared like a person in deep sleep, from which, however, she suddenly roused, and looking wildly about her, inquired where she was. The pupils now suddenly dilated to their fullest extent, and she was unable to see distinctly. She stated that she bought two-pennyworth of oil of bitter almonds, which she swallowed in the street, then threw away the bottle, and almost immediately afterwards fell senseless on the pavement. She now complained of excessive burning heat in the region of the larynx and pharynx, was hoarse; and talking, she said, distressed her. There were some pain and heat in the epigastrium, but no tenderness on pressure. The pulse gradually fell to 100; the extremities were numbed; the arms and hands cold and livid. She was sleepy, but easily roused, and fell into a light sleep, in which she continued, except when roused to take her medicine, till morning, when she was removed by her friends." In certain constitutions, the smallest quantity causes a state resembling intoxication, succeeded by an eruption like nettle-rash.*

* Christison, p. 681.

Of Poisoning with Laurel Water.—This is a very weak solution of prussic acid, containing, according to Mr. Taylor, about one-fourth of a grain per cent. of the concentrated acid. It is a colourless liquid, and possesses, in a strong degree, the odour of bitter almonds. When taken in large doses, it gives rise to the usual symptoms of poisoning with prussic acid.

Mr. Taylor gives a case from the *Medical Gazette*, Jan., 1843, of an infant, to whom was given, by mistake, half a teaspoonful of a mixture containing four-fifths laurel water. The child threw back its head, was convulsed, and died in a few seconds. A case is also recorded of the murder of Sir Theodocious Broughton, by means of this poison; but as the case is interesting chiefly in a medico-legal point of view, it is unnecessary to insert it here. A case of fatal poisoning by cherry-kernels, is related in the *Medical Examiner* of July, 1845. The symptoms in this case were coma, dilated pupils, hot, moist skin, hurried respiration, small pulse, involuntary discharges, and restlessness. The child died in forty hours. There was also vomiting of a greenish fluid. In a case of this kind, the proper treatment would be to free the stomach from the poison as speedily as possible, and subsequently or conjointly to use the means employed in cases of poisoning by prussic acid.

Cyanide of Potassium.—This salt is latterly much used in the art of gilding and plating. It is met with in a solid form, sometimes crystallized, at other times in a white chalky powder. It is without odour until put into water, when it is dissolved, and forms an alkaline solution, from which prussic acid is evolved.* This salt is poisonous. It is used on the continent as medicine, and has occasioned death, in one instance, by the carelessness of a physician in prescribing the dose. The largest medicinal dose of this article is five-sixths of a grain.†

* Taylor's Med. Jurisp., p. 219. † Ibid.

NARCOTICO-IRRITANT POISONS.

The action and general symptoms of this class of poisons have been treated of in our classification of Poisons.

A brief account of each individual of the class will be given, with the particular symptoms to which it gives rise; and the general plan of treatment applicable to the class will be indicated at the conclusion of the chapter, with such reference to each particular article as may be required.

Of Poisoning with the Deadly Night-Shade, (*Atropa Belladonna.*)—The berries, the leaves, and the root of this plant, are all poisonous; according to Buckner, the root is the most active; the leaves are also very energetic; two grains of an extract made from the juice of the leaves, is a dose sufficient to cause very unpleasant sensations in man.* The berries ripen in the latter part of summer, and are of a beautiful black colour; their beauty has sometimes tempted children, and even others, to eat them. "A detachment of French soldiers having halted at a short distance from

* Christison, p. 720.

Dresden, were allured by the inviting appearance of the berries of the atropa, which grew in great abundance in the neighbourhood. They accordingly ate freely of them, and one hundred and eighty men were thus poisoned, many of whom died before professional assistance could be rendered, and the rest were long in recovering. The following symptoms occurred, according to the medical officer in attendance: Dilatation and immobility of the pupils, total insensibility of the eyes to the presence of external objects, or very confused and indistinct vision; the conjunctiva turgid with purple coloured blood; prominence of the eye, which in some appeared dull and heavy, in others bright and furious; great dryness of the lips, tongue, palate, and throat; deglutition difficult, in some cases nearly impossible; nausea, not followed by vomiting; sense of weakness, lypothymia, syncope, inability to stand upright, bending forward of the trunk of the body, continual movement of the hands and fingers, lively delirium, accompanied with a silly laugh, aphonia, or inarticulate sounds uttered with difficulty; ineffectual inclination to intestinal evacuation; very gradual return to health and reason, without any recollection of the previous state."* The effect of this substance in dilating the pupil of the eye when applied to, or near it, is well known; and according to Ray, even the external application

* Orfila, vol. ii. p. 201.—Beck's Elements, p. 227.

of the fresh leaf to the broken skin is not unattended with danger.* The extract of belladonna has been used, in some instances, to dilate the os uteri.

Datura Stramonium, (*Thorn-Apple, Jamestown-Weed.*)—This is a very common plant, and on that account has been the frequent cause of accidental poisoning, by the leaves and seeds being eaten; all its parts are said to be poisonous. The following case of poisoning from this substance is reported by Mr. Marsh of Northampton. "A woman aged thirty-six took two teacupsful of infusion of stramonium by mistake for senna tea. In about ten minutes she was seized with giddiness of the head, dimness of sight, and fainting. In two hours she was quite insensible; the pupils were fixed and dilated; all the muscles of the body convulsed, the countenance flushed, and the pulse full and slow. The stomach pump was applied, and in the course of a few hours, she recovered, suffering, however, from indistinctness of vision and vertigo."—*Med. Gazette*, viii. 605.—(*Taylor.*)

"Dr. Rush saw a child between three and four years old who had swallowed some of the seeds. A violent fever, delirium tremens in the limbs, and a general *eruption on the skin*, were present, accompanied by considerable swelling, itching, and inflam-

* London Med. Phys. Journal, vol. xii. p. 134.

mation. Repeated emetics and purgatives alleviated the disease, and brought away some of the seeds. Dilatation of the pupils and blindness, however, still remained, but were finally obviated by a continuance of the previous remedies, and she recovered."*

Nicotiana Tabacum. (*Tobacco.*)—The poisonous quality of this plant is well known; it contains an alkaloid, nicotia, upon which its deleterious property depends. Tobacco has proved fatal in some instances when given by injection.† The symptoms are, nausea, vomiting, vertigo, convulsions and coma, followed by death. Externally applied, its effects are very striking. Orfila records the case of a man and his wife who used a watery solution of tobacco externally, in order to cure the itch. The symptoms which followed were, giddiness, headache, retching, and vomiting, with diarrhœa, thirst, spasms and great oppression. They gradually recovered.‡

Digitalis Purpurea, (*Fox-Glove.*)—This plant is a well-known poison. It is usually employed medicinally, in the form of powdered leaves, tincture or infusion. Dr. Blackall mentions the case of a patient of his who, while taking two drachms of the infusion

* Beck's Elements, p. 429.

† Taylor, p. 226.

‡ Med. Comment., vol. ii. p. 214.

of the leaves daily, was attacked with pain over the eyes, and confusion, followed by diarrhœa, delirium and convulsions; and, although some relief was afforded by treatment, yet the convulsions continued to recur, and the patient died in three weeks.*

Conium Maculatum, (*Hemlock.*)—Cases of poisoning from this plant have frequently occurred, owing to its resemblance to some vegetables used for culinary purposes, more particularly the parsnip. In this way four convicts were killed at Woolwich, Eng., in 1834, they having mistaken the root for parsnip. The symptoms are dimness of sight, vertigo, delirium, sometimes raving, pain and swelling in the abdomen, vomiting, diarrhœa, convulsions, and death. A case is recorded by M. Haaf, a French surgeon, of a soldier who partook, with several of his comrades, of soup containing hemlock leaves. He appeared to drop asleep not long after, while the others were conversing. In the course of an hour and a half, they became alarmed on being taken ill with giddiness and headache, and the surgeon of the regiment was sent for; he found the soldier who had fallen asleep, in a state of insensibility, from which he could only be roused for a few moments. His countenance was bloated, pulse 30, and extremities cold; he died

* Blackall on Dropsy, p. 173.

in about three hours after eating the soup.* A post-mortem examination of this case showed the vessels of the brain gorged with blood to a remarkable degree. On opening the cranium, there flowed out blood sufficient to fill twice an ordinary chamber-pot.†

Cicuta Aquatica, (*Water-Hemlock.*)—This is a more active poison than the preceding. Dr. Beck gives the following symptoms as produced by it, from Orfila.—"Dazzling, obscurity of light, vertigo, headache, often acute and excruciating; a vacillating walk, anxiety of the præcordia, cardialgia, dryness of the throat, ardent thirst, eructation, vomiting of greenish matter, frequent and interrupted respiration, tetanic contractions of the jaws, sometimes followed by lethargy, with coldness of the extremities; at other times with a furious delirium, or attacks resembling epilepsy. In one or two cases a swelling of the face has been noticed. In a case where death followed, hiccup and fruitless efforts to vomit, were present with tetanic convulsions; the abdomen and face swelled after death, and there flowed a quantity of green froth from the mouth." The cicuta aquatica has been very destructive to cattle early in the spring, before it has acquired a scent sufficiently strong to warn them against eating it.‡

* Christison, p. 734. † Beck's Elements, p. 434.
‡ Linnæus's Tour to Lapland, vol. i. p. 245.

Cicuta Maculata, (*Snake-Weed, Amer. Hemlock.*)—Dr. Beck gives the following account of this plant, which is a native of the United States. "Several cases are on record of death produced by the root of this plant. The following appear to be the symptoms:—vomiting, pain in the bowels, tenesmus, and occasionally purging, convulsions, dilatation of the pupils, feeble pulse, froth at the mouth and nose, mixed with blood. When not convulsed, the patients lay in a deep sleep, the countenance pale, and extremities cold. Several observers have observed an astonishing mobility of the eyeballs and eyelashes, although the pupils are firmly and widely dilated. Death takes place rapidly, particularly with children; two died within an hour after eating the plant. One case was examined after death,—the limbs were flexible, the stomach was inflated, and contained a mucous greenish fluid, on the surface of which was seen a part of the masticated root. There was no appearance of inflammation."*

Cocculus Indicus.—This is the berry of menispermum cocculus, and is imported from the East Indies. According to Mr. Taylor, it contains about two per cent. of a poisonous alkaloid called picrotoxine. The seeds produce vomiting, and a decoction of them in-

* Beck's Elements, p. 436.

toxicate. In India the berries are used for the purpose of intoxicating, and thereby killing fish; this is done by throwing the berries on the surface of the water. No instance of fatal poisoning from this article has been reported. Porter and ale are said to owe their intoxicating qualities, in some instances, to a decoction of these berries.

Aconitum Napellus, (*Monkshood, Wolfsbane.*)—This is a very active poison, and every part of the plant appears to possess this quality. According to Christison, its energy varies in different countries. The extract of the leaves is the preparation most commonly met with. "In 1842, a lady residing at Lambeth was poisoned by having eaten the root in mistake for horseradish, with some roast beef. It is not likely that, under these circumstances, much could have been eaten, but very soon after dinner, slight vomiting came on with severe pain in the abdomen. Emetics and the stomach pump were used, but she died in three hours."—*Taylor's Med. Jurisp.*, p. 225.

The symptoms in the above case are not given, but those detailed by Christison are: a tingling sensation in the jaws, extending over the body; a sensation of swelling in the face, twitching of the muscles, fixing of the eyes, locked-jaw, and failure of the pulse and breathing, but without any aberration of

the mind.* Maniacal delirium occurred in one fatal case.†

The Veratrum Album, or *White Hellebore*, and the Colchicum Autumnale, or *Meadow-Saffron*, both owe their properties as narcotico-irritant poisons, to the same alkaloid, the veratria. This substance is one of the most powerful poisons; a case is mentioned by Mr. Taylor, in which one-sixteenth of a grain of veratria had nearly proved fatal.‡ The roots and seeds of these plants are very poisonous, and fatal cases of poisoning by them are recorded. The symptoms, according to Taylor, were chiefly indicative of irritation of alimentary canal, viz., burning pain in the œsophagus, vomiting, purging, and death in a few hours.§ Christison, however, mentions three cases recorded in *Horn's Archives*,‖ which go to prove clearly the double action of the poison.—In an hour after taking some of the root by mistake, they all had burning in the throat, gullet, and stomach, followed by nausea, dysuria and vomiting, weakness and stiffness of the limbs, giddiness, blindness, and dilated pupils; great faintness, convulsive breathing, and small pulse. In one of the cases, there was stertorous

* Beck's Elements, p. 438.
† De Anima Brutorum, p. 289.
‡ Med. Jurisp., p. 223.
§ Ibid. ‖ Christison.

breathing, and total insensibility even to ammonia applied to the nose; these cases recovered. The principal morbid appearances which have been noted in fatal cases of poisoning by veratria, are patches of redness in the mucous membrane of the stomach, and slight inflammation of the bowels. In one instance where an ounce and a half of the tincture of colchicum was taken, death took place in forty-eight hours, and no morbid appearances whatever were evident.

Strychnia.—With the exception of prussic acid, no poison is perhaps so rapidly and certainly fatal as the strychnia; its pure crystals are elongated octahedrons. It has an intensely bitter taste, which is said to be perceptible when a grain is dissolved in 80 lbs. of water.* Dr. Christison believes that half a grain of this alkaloid thrust into a wound, would occasion death in less than fifteen minutes. Three-eighths of a grain given medicinally, produced violent tetanic convulsions, spasms of the chest and extremities, and other formidable symptoms.†

Nux vomica is the most common form of strychnia met with, and cases of poisoning by it are not very uncommon. It is usually taken in the form of powder; the powder has a dirty greenish-gray colour,

* Christison, p. 751. † Ed. Med. Surg. Journal, xlix. p. 327.

an intensely bitter taste, and an odour like powder of liquorice.*

The symptoms produced by the nux vomica and the pure alkaloid are very much the same, though of course more violent from the latter.

In from five to twenty minutes after taking a poisonous dose of the nux vomica, "the patient is suddenly seized with tetanic spasms affecting the whole of the muscular system; the body becoming rigid, the limbs stretched out, and the jaw so fixed that considerable difficulty is experienced in introducing anything into the mouth; the muscles of the chest are fixed by spasmodic contraction, and the body sometimes assumes the state of opisthotonos; the intellect is clear. This spasmodic state ceases, but after a short time reappears, and the chest is so fixed as to give the sense of impending suffocation; after several such attacks, increasing in severity, the patient dies asphyxiated. Drowsiness and a feeling of general illness have sometimes preceded the attack; vomiting, pain in the abdomen, and other symptoms of irritation, have been occasionally witnessed where the case was protracted, but in general death takes place long before such symptoms are manifested."—*Taylor's Med. Jurisp.*, p. 220. The smallest fatal dose yet recorded, according to Christison, is three grains of the alcoholic extract.

* Christison.

Post-mortem Appearances.—When death takes place very rapidly, these are generally slight, "the vessels of the brain being somewhat congested, the heart flaccid, empty and pale. In other cases, there was inflammation of the stomach, duodenum, and part of the jejunum. In one case, which was quickly fatal, there were found serous effusion on the surface of the cerebellum, and softening of the whole cortical substance of the brain, more especially of the cerebellum."—*Christison*, p. 757.

Case.—A young woman swallowed, purposely, a drachm of nux vomica, mixed in a glass of wine. In fifteen minutes, she was seized with the usual symptoms—milk given after the tetanus began, excited vomiting. She had also redness of the gums, inflammation of the tongue, burning thirst, and pain in the stomach; quick pulse and hot skin. Next day the fits ceased; but there were pain in the stomach, colic, vomiting and diarrhœa; the symptoms gradually abated, and disappeared on the fourth day.* The Strychnos Sancti Ignati, or St. Ignatius's Bean, contains about three times as much strychnia as the nux vomica.

Of Poisoning with Fungi or Poisonous Mushrooms.—There are several species of mushrooms used as food, and considered innocuous. Others are poison-

* Tackeron, London Med. Expos., xix. p. 656.

ous. Orfila and others have given some rules by which the poisonous may be distinguished from the esculent mushroom, but they are subject to some uncertainty, and Dr. Christison thinks that even the most unexceptionable of the fungi, if taken in large quantity, or for a length of time, are decidedly injurious. "It appears that most fungi, which have a warty cap, more especially fragments of membrane adhering to their upper surface, are poisonous. Heavy fungi, which have an unpleasant odour, especially if they emerge from a vulva or bag, are also generally hurtful. Of those which grow in woods and shady places, a few are esculent, but most unwholesome, and if they are moist on the surface, they should be avoided. All those which grow in tufts and clusters, from the trunks or stumps of trees, ought likewise to be shunned. A sure test of a poisonous fungus is an astringent, styptic taste, and perhaps also a disagreeable, but certainly a pungent odour. Those whose substance becomes blue soon after being cut, are invariably poisonous." *Christison*, p. 771.

Drying and cooking are thought to deprive some fungi of their poisonous quality.

The symptoms produced by poisonous mushrooms are sometimes those of pure narcotism, at other times those of irritation only; but most commonly these symptoms are combined. Mr. Taylor believes, from

the cases which he has collected, that when the narcotic symptoms occur, they manifest themselves soon after the meal at which the article is eaten—those of irritation some time afterwards. This, however, is not invariably the case. Dr. Christison thinks it not improbable that even those not belonging to poisonous variety, induce a peculiar depraved state of the system when taken for a long time, giving rise to external suppuration and gangrene, and gives some cases in illustration of the different modes of action of this poison.

The following is an instance of narcotism. "A man gathered, in Hyde Park, a considerable number of the Agaricus Campanulatus, which he mistook for the Agaricus Campestris, stewed them and proceeded to eat them; but before he had concluded his repast, he was suddenly attacked with dimness of vision, giddiness, debility, trembling, and loss of recollection. In a short time he recovered so far as to be able to go in search of assistance, but he had hardly walked two hundred and fifty yards when his memory again failed him, and he lost his way. His countenance expressed anxiety, he reeled about, and could hardly articulate. The pulse was slow and feeble; he soon became so drowsy that he could be kept awake only by being dragged about constantly. Vomiting was then induced by sulphate of zinc; the drowsiness

gradually went off, and the next day he complained merely of weakness."*

The following cases are examples of irritation. "Several French soldiers in Russia ate a large quantity of the Amanita Mascaria, which they had mistaken for the Amanita Cæsarea; some were not taken ill for six hours and upwards. Four of them, who were very powerful men, thought themselves safe, because, while their companions were suffering, they themselves felt perfectly well, and they refused to take emetics. In the evening, however, they began to complain of anxiety, a sense of suffocation, frequent faintings, burning thirst and violent gripes. The pulse became small and irregular, and the body bedewed with cold sweat; the lineaments of the countenance were singularly changed, the nose and lips acquiring a violet tint. They trembled much, the belly swelled, and profuse and fetid diarrhœa supervened. The extremities soon became livid and cold, and the pain of the abdomen intense. Delirium ensued, and all the four died.†" More commonly, however, the general symptoms of poisoning by the fungi, present the usual combination of narcotism and irritation which characterize this class of poisons.

* London Med. and Phys. Journal, xxxvi. p. 451.

† Corvisart's Journal.

Treatment of Poisoning by Narcotico-Irritants.—In the treatment of narcotico-irritant poisoning, the first object should be to evacuate the stomach. For this purpose, the sulphate of zinc, in a dose of thirty or forty grains, may be given, and its effect aided by diluents—or the stomach-pump may be employed, according to circumstances. A thorough and prompt evacuation of the stomach is the remedy most to be relied on. After this is accomplished, the prominent symptoms must be met by appropriate treatment. If there should exist pain and irritation of the bowels, giving evidence that the poison is passing downwards, laxative enema or cathartics will be required. This plan will be found proper in many cases, but, according to Orfila, particularly so when mushrooms have been taken. If the narcotic symptoms predominate, cold effusion should be used, external stimulants applied, and the patient should be kept roused. If cerebral congestion exist, venesection should be employed. According to Christison, this remedy is particularly called for in cases of poisoning by thorn-apple, on account of the great determination of blood to the head.*

There are no antidotes to these poisons, the reputation of which is well established. M. Doune, of Paris, has, however, stated that he has found from

* Christison, p. 727.

some experiments upon animals, that iodine, chlorine and bromine are antidotes for poisoning with the alkaloid of nux vomica and veratria, two grains and a half of iodide, bromide and chloride of strychnia, having produced no effect on a dog; and also that one grain of strychnia, or two grains of veratria, were given to the animal without injury, when followed immediately by tincture of iodine. If the antidote was delayed ten minutes, however, it was found useless.* Mr. W. Ley has recommended as an antidote to poisoning by the nux vomica, the extract of Cannabis Indica. This substance is said to act as a sedative, and produce the most complete muscular relaxation, without endangering the patient's life at all, even when given in large quantities.†

Of Poisoning by Alcohol.—When alcoholic liquors have been taken into the stomach, by persons unaccustomed to their use, or by others in large quantities, fatal effects have frequently ensued. In general, the symptoms come on in a very short time—there are confusion of thought, inability to stand or walk, vertigo and coma, and sometimes death takes place by convulsions.

Treatment.—This consists in evacuating the sto-

* Christison, p. 758.

† Taylor, Prov. Med. Journal, Aug., 1842, and March, 1843.

mach by means of the pump, and the use of cold effusion, if the surface be warm. Dr. Christison recommends the injection of cold water into the ears, for the purpose of rousing the individual. Death may take place even after the stomach has been evacuated; but this affords, commonly, the only chance of saving life. Ammonia may be used where a stimulant is required, or bleeding may be had recourse to where there is great cerebral congestion. Local depletion by cups should generally be preferred; copious draughts of tea or coffee may be taken until the stomach can be thoroughly evacuated. The electro-magnetic apparatus is also recommended, as in cases of poisoning by opium. It must be remembered, however, the keeping the patient roused does not aid recovery so long as the poison remains in the stomach.—*Taylor on Poisons*, p. 587.

RABIES—HYDROPHOBIA.

The animals subject to the spontaneous occurrence of this disease, are the dog, the cat, the fox and the wolf. It occurs most frequently in the dog, but the bite of the rabid cat is said to produce the disease with more certainty and rapidity than that of the dog. There is no evidence of the disease having occurred spontaneously in man, or of its being communicated by the herbivorous animals, as the horse, the ox, the sheep, &c. The inoculation usually occurs by means of the teeth penetrating the cuticle, and carrying with them the saliva or morbid matter, which gives rise to the disease. Of the number of persons bitten by a rabid animal, Professor Colles states, that not more than one in fifteen will receive the disease. This may be in part owing to the tooth in many instances passing through some part of the clothing, by means of which the virus is wiped off. The period of attack after the poison is introduced, is generally from thirty to sixty days. Mr. Taylor gives twenty-one days as the shortest period known in the human subject—in the dog or the cat it is said to be developed earlier. In some rare instances in the human subject, it has occurred after a lapse of twelve or even eighteen months.

Symptoms in Man.—It generally happens that the wound heals without much difficulty, and there is no trace of local or general irritation during the period which intervenes between the introduction of the poison and the occurrence of the disease.—Among the first symptoms is frequently an irritable condition of the wound—a feeling of coldness, numbness or stiffness of the cicatrix, extending to the trunk, if the wound be in an extremity. There is generally some headache, and much increased sensibility. The patient is much disturbed by strong odours or bright light—is irritable, and disposed to shrink from observation, and is often suspicious of those about him. After these symptoms have continued for a time, varying from a few hours to several days, he becomes sensible of a stiffness or stricture about the throat, and in attempting to swallow finds great difficulty, especially with liquids. From this time the sight or sound of fluids is very disturbing to him, and often produces violent spasms. The breathing is hurried. There is great thirst, with inability to drink, and an increase of thick, viscid saliva. It is scarcely necessary to trace this dreadful malady through all its progress. The symptoms go on increasing in intensity until the patient dies either during a spasm, or in a state of exhaustion from frequent spasmodic attacks. The pulse is rather excited—strong at first, but becomes weak as

the disease advances. The mind frequently remains clear to the last—death generally takes place in from two to five days.

Post-mortem Appearances.—The epiglottis, larynx, pharynx and cardiac orifice of the stomach, have been found inflamed. The brain and spinal marrow have not generally been found in a diseased condition.

Treatment.—Blood-letting, emetics, narcotics, stimulants, counter-irritants and counter-poisons have all hitherto failed to cure this dreadful disease. The numerous substances which have been recommended as antidotes, and have been popular for a time, have also, upon repeated trials, been found ineffectual. Happily, however, the disease, which resists the most powerful therapeutic agents when fully developed, may be *prevented* by a very simple prophylactic treatment, and it is to this we must mainly look for the safety of those who are so unfortunate as to be exposed to the danger of its attack. This treatment consists in the complete excision of the bitten part, and the removal thereby of the poison before the absorbents have carried it into the circulation. This course is recommended by all modern writers on the subject, and the strongest testimony adduced in its favour. "Professor Colles states, that three persons were bitten by the same dog at the same time—two of them

suffered the part to be cut out, and they escaped; the third refused to submit to the operation, had hydrophobia, and died."—*Taylor on Poisons*, p. 458. This plan has been found effectual after several days have elapsed, and should be tried even after a much longer time, as it seems evident from the long period of incubation that absorption goes on very slowly. Even when the disease is about to be developed, and the wound becomes irritable, as has been above stated, it may not be too late, though, of course, the earlier it is performed the greater will be the probability of success. The wound should be carefully washed, and allowed to bleed freely—the whole of the bitten part should then be excised, and a stick of lunar caustic afterwards rubbed over the whole of the cut surface—after which, a simple dressing only is required. If from the extent of the laceration, the structure of the parts, or other causes, the knife cannot be freely used, the wound should be washed for a long time, a cupping-glass applied, and subsequently the surface freely cauterized.

Mr. Youatt, who has had much experience in these cases, and has himself been several times bitten by rabid animals, places entire confidence in the use of lunar caustic—which, he says, he has never known to fail in preventing the occurrence of the disease when properly applied. He advises that

the part be first well washed, and the caustic subsequently applied into the very depths of the wound. Where it is necessary to enlarge the wound for the purpose of applying the caustic, he very properly directs that the knife be wiped after each incision, in order to prevent the virus being carried into the fresh cut. When lunar caustic is not at hand, the actual cautery (hot iron) may be used in its stead.—*Youatt on the Dog*, p. 237.

Symptoms of Rabies in the Dog.—"In the first stage of the disease the animal appears sick, dull and peevish, but becomes playful at intervals. He does not appear to know those to whom he has been most attached, and his habits are completely altered. He snaps at the air as at insects, drinks his own urine, and swallows dirt, straw, and all articles within his reach. He roams about, running in an irregular manner, with his back arched, and his tail drooping, though not drawn beneath the body. He runs or swims through water without difficulty. In his progress he avoids other dogs, not going out of his way to bite them; although he will snap at them if they come near him. It is a remarkable fact, that all other dogs avoid him. The voice is altered; the bark is between an ordinary bark and a howl, and ends with a short peculiar howl. The animal does not refuse to drink water even to the last, nor does he froth at the mouth, as

is supposed."—*Taylor on Poisons*, p. 459. It is a remarkable fact, that the symptom which characterizes the disease in the human species, is not present in the inferior animals. Mr. Youatt, who has seen much of the disease, never witnessed the dread of water in them. As there are other diseases to which the dog is subject, which resemble rabies in their commencement, it is proper in doubtful cases to have the dog secured until the nature of the disease is ascertained, particularly if he should have bitten any one.

VENOMOUS SERPENTS.

Naturalists enumerate more than fifty species of venomous serpents. Most of these are found in India and southern Europe—the Cobra di Capello is the most formidable.

The viper (vipera berus) is a native of more northern countries, and is found frequently in England and Scotland. The bite of this animal is seldom fatal to man, or the larger animals, owing, probably, to the small quantity of poison secreted. The sac or poison reservoir of the viper is said not to contain more than one grain and a half of the poison. It is consequently soon exhausted, and when the

animal has bitten several times in quick succession, it becomes innoxious. It is most venomous in the hot season. There are some cases recorded, in which death was produced in the human subject by the bite of the viper.

The Crotalus Horridus, or Rattle-snake, is the most venomous serpent known in this country. Its bite frequently occasions death in a very short time.

The gland which secretes the poison in this and other venomous serpents, is situated immediately behind each eye. This gland communicates with a receptacle or sac, which expands anteriorly and receives the base of the tooth or poison-fang. The tooth is of a curved form, and is perforated by a fine canal, which emits the poison into the wound made by the tooth.

Symptoms.—"When the poison is very active, the effects on the system are so sudden and violent that death soon takes place. When it is less intense, the shock to the general system does not prove fatal. It brings on a slight degree of delirium, and the pain in the bitten part is very severe. In about half an hour, swelling takes place from the effusion of serum in the cellular membrane, which continues to increase with greater or less rapidity for about twelve hours—extending during that period into the neighbourhood of the bite. The blood ceases to flow in the smaller vessels of the

swollen parts; the skin over them becomes quite cold; the action of the heart is so weak that the pulse is scarcely perceptible, and the stomach is so irritable that nothing is retained on it. In about sixty hours these symptoms go off; inflammation and suppuration take place in the injured parts, and when the abscess formed is very great, it proves fatal; when the bite has been on the finger, that part has immediately mortified. When death takes place under such circumstances, the absorbent vessels and their glands have undergone no effects similar to morbid poisons, nor has any part lost its natural appearance, except those immediately connected with the abscess. In those patients who recover, the symptoms go off more readily and more completely than those produced by a morbid poison which has been received into the circulation."—*Sir E. Home, Phil. Trans.*, for 1810.

Dr. Wagner observes, in regard to the bite of the viper, that danger need not be apprehended exce when the bite is inflicted on small organs, such as the fingers or toes, because large parts cannot be fully included between the animal's jaws and fairly pierced by its fangs, but only scratched.—*Christison*, p. 550. May not this be true in regard to the rattlesnake?

Treatment.—The many antidotes formerly recommended for this poison have sunk into disrepute.

"A ligature should be placed immediately between the bitten part and the heart, or a cupping-glass used to prevent absorption. The wound should be enlarged and well washed. If absorption have taken place, and the skin is swollen, the whole of the skin may be bathed with oil, and attention must be paid to the constitutional symptoms. Brandy and ammonia may be given to prevent depression. Strong acetic acid, which coagulates the poison, may be applied if the person is seen soon after the accident."—*Taylor on Poisons*, p. 462.

Dr. Beck recommends that "a ligature be applied above the bitten part, but not too tight or too long continued. Then cauterize the wound with a hot iron or lunar caustic, and afterwards apply compresses to the part. Perspiration and sleep should be encouraged by small doses of ammonia, Madeira wine and ether, and the patient should be kept in bed, well covered. Gangrene is to be combated by antiseptics."—*Orfila's Elements*, p. 462.

Dr. Beck refers to a case of cure by ligature, mentioned in the *Eclectic Repertory*, vol. iv. p. 38, and also to a communication from Dr. Holbrook, of Cayuga Co., N. Y., in which it is stated that "several persons bitten by snakes were remarkably and speedily relieved by the free administration of Peruvian bark in milk."—*Elements*, p. 462.

The *Bee*, the *Humble-Bee*, the *Wasp* and the

Hornet, occasion much local irritation by their sting, and have sometimes produced alarming and dangerous symptoms, such as vomiting, fainting and great difficulty of breathing—even death has resulted from the poison infused by a large number of honey-bees.

Treatment.—Oil and the alkalies are very useful as local applications to relieve pain. Anodyne emollients may also be used. The sting should be extracted if possible; and if general depression exists, the volatile alkali should be given.

ASPHYXIA FROM DROWNING.

It is uncertain how long a person may remain submerged, without the vital principle being entirely extinguished; it is said individuals have been resuscitated after the lapse of half an hour, and one well authenticated case is recorded where recovery took place after fourteen minutes submersion. Where the least probability of success exists, every effort should be made.

1st. The body should be stripped of its wet clothing, wiped dry and carefully wrapped in warm blankets; this should be done on the spot if possible, before the body is removed. 2d. It should be taken to the nearest convenient place for resuscitation; in

removing the body, care must be taken to avoid lifting the body either by its feet or by the shoulder, to prevent the head falling backwards or forwards on the breast, either of which would be injurious. It should be placed on the back with the head and shoulders elevated on a door or board, or in a cart. 3d. When arrived at the place prepared for it, it should be placed in a bed previously warmed, the head and shoulders still elevated, and warm bricks or bottles filled with hot water, should be applied to the feet, the knees, and in the arm-pits, and warm stimulating applications should be made to the epigastrium.

As the great object is to establish respiration, the lungs may be inflated in the following manner: A common bellows should be procured immediately, and the pipe applied to one of the nostrils; one assistant takes charge of the bellows, another should close the opposite nostril and the mouth accurately, a third assistant should press down the upper part of the trachea (in men called the pomum Adamum, or Adam's apple), with one hand, while the other should be spread lightly over the chest and stomach. The bellows should now be opened and immediately closed, the nostril should then be suffered to open, and the hand which is resting on the chest should press firmly down so as to make the lungs collapse, and expel the air as completely as possible; this

operation should be repeated about fifteen times in a minute, imitating thereby the act of respiration. In cases where a bellows cannot be procured immediately, the mouth of the operator may be applied in its place. In using the bellows, care should be taken not to force more than a moderate quantity of air into the lungs, lest their structure may be injured.

These efforts should be continued from one to three hours; warmth should be assiduously kept up, and stimulating embrocations continued over the epigastrium. A weak preparation of ammonia may be applied occasionally to the nostrils, and it has been proposed to introduce a mixture containing ammonia or wine whey into the stomach, through a stomach tube.

The first symptoms of returning life are convulsive twitches of the muscles about the respiratory organs, giving rise to gasping and sighing, and by degrees those spontaneous actions become more regular, till respiration is established, and the circulation returns. Even then the efforts of the operator must be continued, and the patient diligently watched, as some time must elapse before the vivifying effect of the freshly generated arterial blood can be extended over the system generally, and especially before the functions of the brain are restored.* A case is recorded where

* Cyclopedia of Practical Medicine.

death occurred by convulsions after respiration had been established.* It is proper to state here that a difference of opinion exists as to the propriety of artificial inflation of the lungs, in cases of asphyxia from drowning.

Mr. Taylor, in his *Med. Jurisp.*, p. 405, says, "Mr. Wooley, who has had considerable experience in these matters, denies its efficacy, and states that in cases in which he has been successful in resuscitating the drowned, he has not inflated the lungs." And in the case recorded by Dr. Douglass, *Med. Gazette*, xvii. 663, where recovery took place after the patient had been submerged fourteen minutes, inflation of the lungs was tried but not persisted in, it not appearing to be of any use. In this case the treatment consisted in the application of warmth and constant friction, continued for eight hours and a half.

In the treatment of persons apparently dead from hanging or any other mode of strangulation, the same means are to be used and persevered in, as have been recommended for the recovery of the drowned. The posture in which the body should be laid, is the same, except that the head should be raised somewhat higher. The fullness of the vessels in this case may be such as to require bleeding, which will be most effectual if done in the jugular vein; the quan-

* Dr. Paris's Life of Sir H. Davy, 4to ed. p. 69.

tity of blood taken must be merely enough to relieve the vessels, and not so great as to weaken the powers of life. During convalescence, if excessive reaction should occur, it may be necessary to deplete more freely.*

In those cases of strangulation arising from foreign bodies in the trachea, the operation of bronchotomy affords the only chance of relief to the patient.†

Asphyxia from carbonic acid or any other of the irrespirable gases, is to be treated upon the general principles just adverted to. The first thing to be done is to remove the body from the influence of the noxious gas, and expose it to free, pure air. The temperature of the body in these cases is generally above the natural standard, and effusion of cold water is very advantageous; it acts as a powerful stimulant in consequence of the impression made upon the skin. A moderate bleeding has been recommended. The inhalation of oxygen gas has also been used with advantage ‡

* Cyclopedia of Practical Medicine. † Ibid.
‡ Ibid.

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