When a poisonous mushroom is taken internally, it causes extreme muscular weakness, vertigo, mental hallucinations, stupor, and in a few instances violent vomiting and purging. Recovery is not unfrequent, even when large quantities have been eaten.

Treatment.—The stomach and bowels should be acted upon by emetics and cathartics, where vomiting and purging are absent. Castor-oil, however, may be given in all cases. Opiates are recommended by some where there is much delirium without stupor. Ether has been used with benefit. If the prostration is great, the free use of diluted stimulants will be necessary.

YEW-TREES.

The leaves and berries of this tree are extremely poisonous. An infusion of the leaves is often administered in this country to bring on the menstrual flow, or to produce abortion. Its action in this respect is not well understood. Children are often poisoned by the berries.

The symptoms are vomiting, convulsions, dilated pupils, and coma, which usually ends in death.

Stimulants are principally to be relied on in the treatment.

CAMPHOR

Is a concrete substance obtained from the *Camphora officinalis*, an evergreen tree of China and Asia. It rarely produces death. Taylor relates the case of a man who, in twenty minutes after taking the drug, was seized with vertigo, dimness of vision, and convulsions. The pulse became rapid and weak, the extremities cold. The stomach was emptied by a stomach-pump. He suffered for a week

subsequently with exhaustion, and from suppression of urine.

In some cases there are pain in the back, and rapid insensibility.

The breath of a person poisoned by camphor smells strongly of the drug, and thus the diagnosis is readily made.

Treatment.—Free emesis should be procured without delay. Stimulants are always necessary.

ALCOHOL.

Large quantities of alcohol, in the shape of whiskey, brandy, etc., have produced sudden death in young persons unaccustomed to the poison. Convulsions and coma are not unfrequent accompaniments of excessive indulgence in ardent spirits (*Taylor*). (For characteristic appearances and treatment, *see* Convulsions.) Chronic poisoning by alcohol is recognized by the bloated countenance, bloodshot eyes, general tremulousness, and delirium tremens.

The treatment for this condition consists in total abstinence from liquor, and the administration of bromide of potassium.

CHLOROFORM.

This substance is one of the most effective anæsthetics known. Its formula is C_2HCl_3. It is technically known as the terchloride of formyl. It is prepared by the action of chlorinated lime on wood-spirit. When inhaled, it first acts as a stimulant, causing great excitability and intoxication, then mental hallucination and delirium, and finally perfect insensibility and coma.

In the third stage, when the inhalations are carried beyond a certain point, the pulse becomes very small and intermittent, respiration slow, irregular, and difficult; face congested, and lips livid.

If organic disease of the heart exist, very small quantities may produce death. Sometimes respiration is suddenly suspended, and death ensues rapidly. In one instance I have seen it produce convulsions. Chloroform kills by asphyxia, syncope, or coma. After death the lungs are congested and filled with dark blood.

Treatment.—Artificial respiration is the main reliance in the treatment of chloroform-poisoning. Marshall Hall's or Sylvester's method will answer (*see* chapter on Drowning). Inhalation of pure oxygen is always beneficial. In some cases it may be forced into the lungs through an opening in the trachea. Slapping the patient, and pouring cold water on the surface, are also recommended. Galvanism has been successful in restoring life in one or two cases. Some rely solely on electrical stimulus in the treatment.

ETHER (C_4H_5O)

Is manufactured by the action of sulphuric acid upon alcohol. The acid merely removes the water from the alcohol, to form the ether. The action of the vapor of ether is similar to that of chloroform. Its effects are, however, manifested more slowly; the resulting anæsthesia continues longer, and larger quantities of the drug are required to produce the same degree of insensibility.

The symptoms accompanying poisoning by ether are the same as are witnessed in chloroform-poisoning, and a similar treatment must be pursued.

CHLORAL.

This drug has lately come into general use as an anodyne and hypnotic. It is made by the action of chlorine gas on alcohol. It is used in the form of a hydrate. When taken into the system it is changed into chloroform by the action of the soda of the blood.

Its poisonous influences are manifested by laborious and irregular breathing, congestion of the face, rapid and feeble pulse, numbness, and insensibility. In some cases there is considerable disturbance of the mental faculties.

After death the same lesions are found as exist in poisoning from chloroform.

Treatment.—Some recommend hypodermic injections of strychnia as an antidote. Artificial respiration, inhalations of oxygen, and stimulation are mainly to be relied on. Electricity is also beneficial.

HYDROCYANIC ACID.

The common name of this drug is prussic acid. It is obtained from bitter-almonds, peach-kernels, cherry-laurel, prunus Virginiana, and bitter cassava. It is formed in bitter-almonds by the reaction of a peculiar principle called amygdaline, and water. The change is excited by the presence of a nitrogenized body called emulsine.

The essential oil of bitter-almonds is employed as a flavoring extract. Almond-water and laurel-water are used for a similar purpose.

Prussic acid is manufactured by the action of sulphuric acid upon ferrocyanide of potassium, or by the action of muriatic acid upon the cyanide of silver.

The acid obtained by this process is in a dilute form, and contains about two per cent. of the anhydrous variety. It is colorless, and possesses a peculiar odor resembling peach-kernels or almonds.

It is one of the most deadly substances known, killing more rapidly, and affording less opportunity for recovery, than any other poison. Inhalation of its vapor in a concentrated form has in some instances produced almost instant death. Scheele, while pursuing his chemical investigations with this drug, died instantly by inhaling his own preparation of it. A single drop of the anhydrous acid placed on the tongue will kill instantly. A drachm of the dilute acid will destroy life in a few seconds, unless immediate efforts at restoration are made. The poison acts as rapidly if placed in a wound. In some instances life is prolonged for three or four minutes when poisonous quantities are swallowed. In one or two rare cases a fatal termination did not occur for an hour after the administration of the poison.

Tests.—Taylor mentions three principal chemical tests: 1. Nitrate of silver, which gives a white precipitate of the cyanide of silver; 2. On the addition of potash, and a solution of the sulphate of iron, there is a brownish-green precipitate, which changes into blue, upon the addition of diluted muriatic acid. The blue substance thrown down is ferrocyanide of iron, or Prussian blue; 3. Bihydrosulphate of ammonia, when added to the suspected solution and warmed, makes the mixture colorless, and after evaporation leaves sulphocyanate of ammonia, which is recognized by the "blood-red" color produced by adding a solution of the colorless persulphate of iron.

When large doses of the drug are taken, the patient falls unconscious to the ground, the face becomes congested, respiratory movements labored, and diminished in length and frequency; pupils dilated, eyes glassy and prominent, pulse imperceptible, skin clammy and cold. Foam collects on the lips, the jaw drops, and death supervenes. If small quantities are taken, and the symptoms develop more slowly, there are difficult and convulsive efforts at breathing, the movements occurring at long intervals, vertigo, oppression over the precordial region, muscular weakness, and paralysis (*Bacher*). The eyes are prominent, and there are sometimes convulsive movements, and loud cries from the patient.

The *post-mortem* appearances vary. The peculiar almond odor is nearly always exhaled from the body. The lungs, brain, liver, and kidneys, are filled with dark fluid. The eyes are remarkably bright and staring. In some instances the muscles will not respond to galvanic stimulus.

The symptoms appertaining to poisoning by almond-oil, cherry-laurel, or cyanide of potassium, are developed more slowly than the preceding. Their main features and treatment are alike.

Treatment.—Chlorinated lime in solution, chlorine-water, or ammonia in vapor largely diluted, are good antidotes. Another method employed is to change the prussic acid in the stomach into Prussian blue. According to the "United States Dispensatory," this is done in the following manner: Ten grains of sulphate of protoxide of iron and one drachm of Tr. ferri chlor. are added to an ounce of water, and twenty grains of carbonate of potassium to one ounce of water in another vessel. The latter solution is swallowed

first, and immediately followed by the preparation of iron. Cold water poured from a height upon the face, chest, and abdomen, and artificial respiration, are also recommended as efficacious remedies.

WOORARA.

The source of this poison has been the subject of considerable controversy. Schomberg thought it was a product of a plant called *Strychnia toxifera*. Nothing analogous to the action of strychnia has, however, been found in it, and there is no definite account of its origin. Prof. W. A. Hammond, from numerous experiments made with the drug, believed its action to be exerted mainly on the heart, paralyzing that organ. It was also thought to produce a paralysis of the sympathetic and motor nerves. Woorara is employed by the natives of South America to poison the heads of arrows. It exerts its peculiar effects by being introduced through wounds. When taken into the stomach it is often inert. The symptoms attending a wound poisoned with woorara are sudden stupor and insensibility, frothing at the mouth, rapid cessations of the respiratory movements and pulsations of the heart. Some writers say that the heart continues its action some moments after respiration has ceased.

Treatment.—When the poison enters a wound, the part should be sucked and excised, and a ligature placed around the limb between the wound and the heart. Brainard and Green discovered that a solution of iodine and iodide of potassium neutralized the poison, and recommend its application to the wound, and also its internal administration. Chlorine and bromine are also said to have a similar effect.

Artificial respiration has been tried on criminals poisoned by woorara, and has been followed by good results.

CALABAR BEAN.

Calabar bean is a seed of the *Plysostigma venonosum*, a climbing plant of Calabar. It is used by the negroes of Africa as an ordeal-bean—the guilt or innocence of the individual being determined by its action on the system. If a dose is taken without subsequent unfavorable symptoms, the person is declared innocent. If the contrary, a verdict of guilty is announced.

Its action on animals is said to resemble that of woorara. It paralyzes the heart and motor nerves.

Poisonous doses in man produce vertigo, dimness of vision, great weakness, small, intermittent pulse, contraction of the pupil, insensibility, and death.

Treatment.—The stomach should be evacuated, stimulants administered internally, and the surface briskly rubbed. Hypodermic injections of strychnia might be tried. Strychnia exerts an entirely opposite effect on the spinal cord. Electricity is also worthy of a trial.

UPAS-TREE.

This tree grows in various parts of the East Indies. A resinous exudation, obtained by incisions in the bark, acts on the system as a virulent poison. Like woorara, it is principally employed by the natives to poison arrow-heads. The vapor of the tree at certain seasons of the year is said to cause eruptions on the skin.

When applied to a wound, or taken internally, it causes great muscular weakness, syncope, nausea, and vomiting,

relaxed sphincters, thready, irregular pulse, and convulsions.

Treatment.—The remedies employed in poisoning by tobacco, or aconite, are applicable to these cases.

SPINANTS.

NUX-VOMICA (*Strychnia*).

Strychnia is derived from the seed of the *Strychnos nux-vomica* and the *Strychnos ignatia*, large trees of the East Indies and other Eastern countries. The seeds are embedded in the pulp of the fruit. They are circular in shape, three-quarters of an inch wide, about the thickness of a cent-piece, and are covered with delicate, yellowish-gray hairs. Strychnia exists in the seed, together with brucia and igasuria. The nux-vomica and its alkaloids possess the same action on the system, the only difference being in the rapidity with which their characteristic symptoms are manifested. Strychnia, which is the most powerful ingredient of the nut, or seed, is found in the shops in the form of a fine, white, crystalline powder, with an extremely bitter taste. Its bitterness is so marked that one part will give a taste to six hundred thousand parts of water (*U. S. Disp.*). Very small quantities suffice to produce a fatal result; one-tenth of a grain has killed a dog. There are instances recorded where half a grain has proved fatal to human beings. In exceptional cases recovery has taken place after the administration of four or five grains.

Strychnia acts specially on the spinal cord, but there is no good reason for supposing that it does not in a measure

affect the brain. I have seen a certain amount of vertigo and rapid utterance follow its use.

There are several tests of the presence of this drug. In Mararchard's process, five or six drops of concentrated sulphuric acid, and one hundredth part of nitric acid, are mixed with the suspected solution; a little protoxide of lead is then added, and, if the strychnia is present, a blue color appears, which changes to violet, red, and finally to yellow.

If the strychnia is in solution in sulphuric acid, the addition of a bichromate-of-potash solution will give a violet hue. This test will detect the one million five hundred thousandth part of a grain (*U. S. Disp.*).

Poisonous doses of strychnia first produce an inability to remain in one position, and a tendency to perform every motion with great rapidity. The muscles seem to be beyond control of the will, and twitch unceasingly. There are some constriction in the throat, difficult respiration, and feeling of oppression about the chest. Violent muscular spasms then appear; they are tonic or continuous in character, resembling those occurring in tetanus. The muscles of the back are often affected more than those of the extremities, and as a result the body is bent like a bow, and rests on the head and heels (*opisthotonos*). During the paroxysm the jaws are tightly fixed, the face dark and congested from the accumulation of blood in the veins. Contraction of the muscles prevents expansion of the chest, and obstructs the blood going to the thorax, and hence the congestion. Intermissions in the severity of the paroxysms may occur; they last but a moment. Death takes place from the spasm of the muscles of respiration inducing asphyxia.

On *post-mortem* examination there are usually a dark color of the face, congestion of the brain, cord, and their membranes, and congestion of the lungs. The right side of the heart contains a large quantity of dark blood, and the left side is empty.

Treatment.—Chloroform taken in a liquid state or by inhalations should in all cases be tried. A relaxation of the spasms will at least prevent or retard the occurrence of asphyxia. Infusion of tobacco is recommended by some. It may be advantageously combined with chloroform; that is, the tobacco-infusion can be swallowed, or given by enema, while anæsthesia is procured by inhalation of chloroform. Aconite has been used in some cases with benefit. Thoral employs preparations of antimony as an antidote; it is given in emetic doses. Boudecker experimented upon dogs with chlorine-water and tartar-emetic, giving them alternately. He claims to have saved the animals from the poisonous effects of strychnia by this treatment.

It will be well in most instances to commence treatment by an emetic, in order to get rid of the poison remaining in the stomach. The infusion of tobacco, or sulphate of zinc, will answer this purpose. If the patient cannot swallow the medicine, it can be given through the rectum.

CHAPTER XXI.

IRRITANT POISONS.

Cantharides.—Croton-oil.—Veratria.—Hellebore, etc.

A PECULIAR Spanish fly, called the *Cantharis vesicatoria*, has long been employed in medicine as a vesicant and as a stimulant to the genito-urinary apparatus. There are several other varieties of cantharides found in the southern parts of this country, which possess properties analogous to the Spanish fly; they are, however, rarely employed for medicinal purposes.

Large doses of cantharides produce tenesmus at the neck of the bladder, inability to pass water, intense pain and scalding with the few drops of urine which are squeezed through (*strangury*), great pain throughout the alimentary canal, and thirst, with profuse vomiting and purging. The vomited matters and the stools contain blood. The extremities are cold. There are great prostration, a rapid pulse, sighing respiration, and a fetid odor to the breath.

A *post-mortem* examination shows signs of inflammation in the stomach and intestinal canal.

Treatment.—When the stomach and bowels have been emptied of their contents by emetics, cathartics, or the natural efforts of the patient, ten to thirty drops of liquor potassa largely diluted may be given every hour (*Mulack*),