

ified by several factors. In the first place, the younger the child the more serious the outlook. Pneumonia in an infant under one year justifies a very serious prognosis. The condition of the child's health before the attack is another important factor. The better the health of the baby when taken ill with the bronchopneumonia the better the prognosis. The environment of the child also modifies the prognosis. Usually cases do much better under good surroundings, with isolation, quiet, and plenty of air—i.e., under such conditions as may be found among the wealthy classes—than they do in the tenements and hospitals.

Primary bronchopneumonia usually allows a much better prognosis than does that which develops in the course of some severe disease; for the outlook in secondary pneumonia varies with the disease which it complicates. Thus, in many of the cases of pneumonia complicating diphtheria the patients die, and the mortality of the disease, when it develops in the course of whooping-cough, is always very high (fifty to one hundred per cent.). The bronchopneumonia of measles is usually of a severe form, but, notwithstanding this fact, the mortality is somewhat lower than it is in the secondary pneumonias of diphtheria and whooping-cough (thirty-three to one hundred per cent.). In the influenza cases the mortality is more favorable.

**TREATMENT.**—A study of this disease emphasizes the importance of watching very carefully all children who are affected with colds, influenza, bronchitis, and the other primary diseases which bronchopneumonia is apt to complicate. Of still more importance is the careful watching of the digestion of babies and the prompt modification of the diet when necessary.

The direct treatment is entirely symptomatic, and the general hygiene, nursing, and feeding are usually of far more importance than the medicinal treatment. A baby with bronchopneumonia should be placed in a large quiet room with plenty of light and a southern exposure. The room should be ventilated from out of doors and not from other rooms in the house. Some moisture in the room will make the patient more comfortable, and this may be obtained by boiling water in a kettle. But one person should be allowed in the room at a time, and the same care should be observed to avoid disturbing the patient that is exercised in the case of a nervous adult.

The diet should consist of milk or modified milk, or milk with barley water, or oatmeal gruel. If the milk is not well digested, it may be given only after it has first been peptonized. If but little is taken at a time, the feeding may be done at intervals of one or two hours. With the onset three modes of treatment should be actively tried in an effort to abort the disease. These are: purgation, counter-irritation, and stimulation. For the attainment of the first of these objects, calomel is altogether the most satisfactory drug. For a baby under one year of age one-tenth of a grain may be given every half-hour until from four to ten doses shall have been given. If this medication fails to move the bowels, castor oil, in doses of one or two drachms, should be administered. Counter-irritation over the affected area, or, if this cannot be determined, over the whole chest in front and behind, may be made with mustard paste. The operation should be repeated at intervals until a marked redness of the skin is produced. Stimulation with strychnine in fairly large doses (from gr.  $\frac{1}{100}$  to gr.  $\frac{1}{50}$ ) every four to eight hours, according to the age of the child, may be resorted to temporarily. This treatment, which may be kept up until the physiological effects of the drug are obtained, will aid the organism in its effort to overcome the disease. Afterward the remedy may be administered with advantage in smaller doses throughout the entire course of the disease. The counter-irritation may also be repeated with benefit from time to time. Stimulation should be used when needed. Nitroglycerin is of especial value when the extremities become cold, and it should be given in a dose of gr.  $\frac{1}{100}$  every four hours. At the same time hot-water bags should be applied to the feet. The administration of

alcohol internally may usually be reserved for severe cases, since it is a drug that is often badly borne by babies. It may be given in the form of whiskey diluted with from eight to ten parts of water and sweetened; champagne and sweet wine may also be administered. Oxygen is a most valuable aid in the treatment of this disease, and it may be given at frequent intervals or constantly, and should be delivered from the pipe held close to the child's mouth.

The gastro-enteric tract must be carefully watched, as marked tympanites, which interferes with respiration by restricting the descent of the diaphragm, is a frequent and very serious complication in many cases. A mixture of rhubarb and soda, or of rhubarb and soda with bismuth, or an occasional dose of castor oil, will often relieve this symptom, but at times the introduction of a stomach tube or rectal tube is needed for evacuating the gas. Counter-irritation and hot fomentations applied to the abdomen are also useful. The employment of pneumonia jackets and of poultices, as a routine treatment of the bronchopneumonia of children, has been given up. Both of these tend to increase the temperature of a child already suffering from fever, and they limit the expansion of the chest. A woollen shirt provides a sufficient protection to the chest.

Antipyretic treatment is needed in the severe cases, and should be resorted to if the child is bearing the fever badly, even if the latter is not very high. Stupor, delirium, or great restlessness calls for antipyretic treatment. A temperature of over 103° F. is usually an indication for antipyretic treatment. There is no disease in which the thermometer is of so little service as a guide as it is in infantile bronchopneumonia. It is the child's general condition that furnishes the best indications for treatment.

Bathing furnishes the best means at our disposal for reducing temperature. Sponging with equal parts of warm water and alcohol may be used for slight fever and restlessness, but the most efficient and simplest method is to place the infant in a bath. The bath may have a temperature of from 80° to 90° F., and the baby may be kept in it for five or ten minutes. It is usually well to stimulate the baby before putting it in the bath. The bath may be repeated as often as indicated by the temperature.

The coal-tar derivatives should never be used as antipyretics for infants. Expectorants are very rarely needed in the treatment of this disease. Ipecac is probably the most efficient, but, if used, it should be given in small doses. Of sedatives, a warm bath is usually the only one needed. If the cough is constant and interferes with rest, and if it is not relieved by a bath, five-drop doses of paregoric may be given every three or four hours.

In protracted cases and during convalescence, the internal administration of creosote, or guaiacol and cod-liver oil, or of some iron preparation may be of advantage, while counter-irritation may be made by painting the chest with Churchill's tincture of iodine, or by the use of the Paquelin cautery. *William P. Northrup.*

*Rouland Godfrey Freeman.*

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**PNEUMOPERICARDIUM.** See *Pericardium, Diseases of.*

**PODOPHYLLUM.**—U. S. P., *Mandrake, May-apple.* The dried rhizome of *Podophyllum peltatum* L. (fam. *Berberidaceae*).

This striking and beautiful plant is found in the greatest abundance in rich soil throughout the eastern and central portions of North America, except the far north.

The drug is mostly collected in the Ohio valley and the mountains southward. The very long and much branched rhizomes form a network a few inches beneath the surface of the soil, and produce large beds of the

cooling, the remaining, clear aqueous solution having a bitter taste, and turning brown on the addition of ferric chloride T.S.

Resin of podophyllum is also soluble in potassium or sodium hydrate T.S., forming a deep yellow liquid, which gradually becomes darker, and from which the resin is reprecipitated by acids.

It should yield not more than 0.5 per cent. of ash.

Resin of podophyllum has the following composition:

The most of it is resinous *Podophyllin Acid*, which is brown, and soluble in alcohol and chloroform, not in water, ether, or petroleum ether, and is inert. Of *Podophyllotoxin* (C<sub>23</sub>H<sub>2</sub>O<sub>6</sub> + 2H<sub>2</sub>O) there is apparently a very small amount (about one-fourth of one per cent. of the weight of the rhizome), the larger amounts reported by various observers being probably impure. It is best obtained by extracting the drug with pure chloroform, and this extract with pure ether, then precipitating with petroleum benzine. Pure podophyllotoxin usually occurs as a white, amorphous, bitter, slightly acid powder, or in crystals soluble in

ether, chloroform, hot water, and diluted alcohol. This pure substance is very difficult to obtain, being usually contaminated with the isomeric *Picropodophyllin*, which is readily formed from podophyllotoxin by the action of alkalis, and is much less active than the latter. *Picropodophyllin* occurs in bitter crystals, soluble in alcohol, not in water. Podophyllotoxin is also very apt to be contaminated with podophyllin acid, with the yellow coloring matter *podophylloquercetin*, and with fat.

**ACTION AND USE.**—Podophyllum or its resin is locally irritant, the dust occasioned by powdering the drug causing redness and smarting of the skin and inflammation of the conjunctivæ. It has also been known to produce, upon the perspiring skin, ulcers which have been mistaken for chancroids. It is an irritant cathartic, whether introduced into the bowels or stomach, given subcutaneously, or absorbed from a raw surface. It is a very slow-acting medicine, requiring from twelve to fifteen hours before its effects begin, but it is also rather persistent and thorough, and in full doses is followed by numerous watery stools. Gripping pains are frequent accompaniments, and vomiting and persistent diarrhoea may follow if the dose is very large. After poisonous amounts the above symptoms are exaggerated, and inflammation and ulceration of the intestines, bloody stools, great prostration, stupor, and death may follow. The

action upon man and the lower animals is essentially the same. It is supposed to stimulate the liver, and is very extensively given with a view to this effect, in the digestive disturbances called popularly

"biliousness," but probably, as we now know of nearly all so-called cholagogues, it does not increase the production of bile, but merely favors its dejection.

Moderate doses of podophyllotoxin given to man produce the same effects as podophyllum itself, with perhaps less pain and less tendency to vomiting. *Picropodophyllin* acts like the above, but less violently, in consequence,

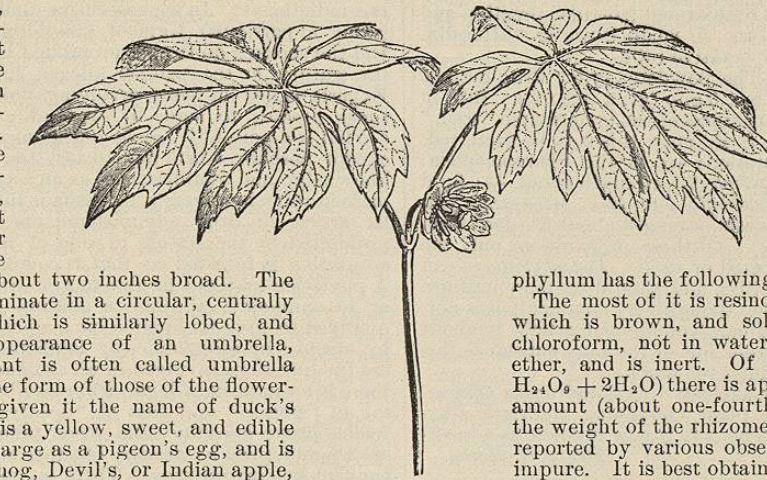


FIG. 3837.—Podophyllum; Flowering Plant. (Ballou.)

The sterile stems terminate in a circular, centrally attached leaf, which is similarly lobed, and presents the appearance of an umbrella, whence the plant is often called umbrella plant, whereas the form of those of the flowering stems have given it the name of duck's foot. The fruit is a yellow, sweet, and edible berry, about as large as a pigeon's egg, and is known as May, hog, Devil's, or Indian apple, also as wild or ground lemon.

The younger portions of the rhizome, after being dried, are dark-colored, thin, and shriveled, and are deficient in medicinal property. The drug is thus described:

Of horizontal growth and indefinite length, occurring in irregular pieces; cylindrical, flattened from above, consisting of joints about 5–10 cm. (2–4 in.) long, the internodes 2–8 mm. ( $\frac{1}{2}$ – $\frac{1}{4}$  in.) thick, the nodes about twice as broad; yellowish-brown to dark brown, the darker pieces usually longitudinally wrinkled, the lighter ones nearly smooth, the nodes marked above by broad cup-shaped scars and underneath by whitish, short stumps of the brittle roots; fracture short and sharp, whitish to pale brown, resinous in the best drug, marked by a loose circle of very short yellow wood wedges surrounding a large pith; nearly inodorous; taste sweetish and bitter, becoming acid.

The active portion of the drug resides in its three to five per cent. of resinous matter, which is associated with much starch, a very little gallic acid, and small amounts of fixed oil, gum, etc. The resin is a somewhat complex mixture, but is an official substance and is very largely employed under the name *Podophyllin*. It is highly subject to adulteration, more than fifty per cent. of adulterant having been reported in it; hence, the official description should receive close attention. It is prepared by exhausting the powdered drug with alcohol, concentrating the filtrate by evaporation, and pouring it into water acidulated with a little hydrochloric acid, when the resin is precipitated. It is afterward dried and powdered. The resin is described as follows in the pharmacopœia:

"An amorphous powder, varying in color from grayish-white to pale greenish-yellow or yellowish-green, turning darker when exposed to a heat over 35° C. (95° F.); having a slight, peculiar odor, and a peculiar, faintly bitter taste. Permanent in the air."

Its alcoholic solution has a faintly acid reaction. Soluble in alcohol in all proportions; ether dissolves fifteen to twenty per cent. of it; boiling water dissolves about eighty per cent., and deposits most of it again on



FIG. 3838.—Rhizome and Bases of Roots of Podophyllum.

as is supposed, of its complete insolubility in water. Podophyllum and its preparations are, then, useful cathartics where action upon the whole intestine, or at least the small one, is desired, and when the expulsion of bile is desirable. They are frequent ingredients of "antibilious" pills, both of regular and irregular practice, and are frequently given, too, in small doses in "after-dinner" and other mildly laxative pills.

ADMINISTRATION.—The powdered crude drug may be given; dose from 0.5 to 1.5 gm. (gr. x. ad xx.). But, in view of the great compactness of the precipitated "resin" (*Resina Podophylli*, U. S. P., etc.), this is to be preferred. The following preparations are in the Pharmacopœia: Extract (*Extractum Podophylli*), strength about  $\frac{1}{10}$ ; fluid extract (*Extractum Podophylli Fluidum*), strength  $\frac{1}{4}$ , and the before-mentioned resin, strength about  $\frac{3}{8}$ , dose from 1 to 3 cgm. (gr.  $\frac{1}{4}$  ad  $\frac{1}{2}$ ). Of these preparations only the latter need be remembered or used. *Podophyllotoxin* can be had in the larger cities, and should be more uniform than either of the above, though very commonly it is not.

The dose of the ordinary commercial article is about one-third that of the resin, but of the pure substance this would be about five times too much.

"Mandrake" of the ancients was *Mandragora officinarum* L., a solanaceous plant, containing mydriatic alkaloids of the atropine type. It is now obsolete as a medicine. Henry H. Rusby.

POISONING, LEGAL ASPECTS OF.—This paper does not discuss the general principles of toxicology. The reader's knowledge of these is taken for granted. The nature of poisons, the distinguishing characteristics of the various kinds, the different modes in which they may be administered and will operate, the appropriate methods of detection—these and other branches of the subject are elsewhere treated. The present purpose is to state very briefly those peculiar duties of the practitioner which are connected with the use or misuse of poisons.

LEGAL DEFINITION.—For the purpose of what may be called legal toxicology, there is little need of establishing a precise definition of the term "poison." Medical authorities on the subject agree that the word is one very difficult (some say impossible) of precise definition. The law, in general, either leaves the question "What is a poison?" to be determined by judges or juries, under the counsel of medical men and experts, in view of the particular case which brings it forward for decision; or relieves the doubts and obscurity which hang over the word by associating others with it which may enlarge its scope. Thus an English statute passed early in Queen Victoria's reign (1 Vic. c. 85, § 2), says that whoever shall administer, etc., to any person "any poison or other destructive thing" with intent to commit murder, shall be guilty of felony. A trial under such a statute as this would not call for any lengthy discussion of the meaning of "poison"; testimony of experts, that the thing administered was adapted, when administered in the way proved, to destroy life, would be sufficient on that point to sustain a conviction. On the other hand, if the experts doubted or disagreed, the judge would instruct the jury to give the accused the benefit of the doubt. Early American statutes use the simple word "poison," leaving the courts and juries to fix the meaning on the principles above stated. Thus in New York there are laws of long standing, punishing every person convicted of having "administered any poison to any human being," and every person who shall "wilfully poison any spring"; and every person who shall "wilfully administer any poison to cattle," etc., or shall "wilfully expose any poisonous substance to be taken by cattle"; etc. The actual administration of even such laws as these does not turn on chemical or medical discussions of the precise meaning of "poison," nor vary materially with changes in the exact idea attached to it by men of science. Statutes passed in recent years specify what are deemed poisons; thus the Act of Congress regulating sales of poisons in the District of Columbia names in two schedules the particular drugs intended; and of course, to sustain a

conviction under such laws, there must be proof that one of the designated drugs was sold. Or, to put the idea in other words, the vital question in a trial at common law, as it is called, is not poisoning, but murder; did the accused kill the deceased by the drugs, etc., described in the indictment? In a prosecution under a statute punishing a particular form of poisoning the question is, Did the accused do the act prohibited by the language of the statute, in the manner alleged in the indictment? Experts called in cases involving poisoning are sometimes pressed to state by way of general definition, "What is a poison?" Such questions are unreasonable, except perhaps when put to test the witness' general knowledge and qualifications as an expert. The legitimate inquiry involved in the issue is this: Is the particular article or drug administered one within the class prohibited by the statute or rule of law on which the accusation is founded, as that is commonly understood? A physician may not be able to give an exact definition, or to enumerate all known poisons, yet he perfectly qualified to give an opinion on a question of poisoning by arsenic, by strychnine, by laudanum, etc., and such are the questions involved in all ordinary cases. Again, there is no important legal difference between the meaning of "poison" and that of "deadly poison." Drugs which prove speedily fatal when taken in small doses are characterized as deadly, but this is a mere matter of convenient classification. There is, however, a class of cases in which a general definition of "poison" may be important; they are such as arise under a statute which uses only "poison" to define the crime, without adding "destructive thing" or any similar term of enlargement; but the thing administered is not a poison in any correct sense, such as pins or needles, bits of sponge or wood, tufts of hair, orange seeds or peel, cherry stones, raw rice, pounded glass, boiling water, all of which have been effectively used with suicidal or murderous intent. In these cases, the objection that the accused had not administered a "poison" would prevail; at least the question of the extension of that term would be legitimately involved. And generally, in inquiries as to criminal poisoning, the intent with which the noxious substance was administered is quite as important an element as is the nature of the substance.

ADVERTISEMENT AND SALE OF POISONS.—The dissemination of advertisements of so-called remedies for procurement of abortion, framed in obscure, deceptive phraseology, has grown during the present generation to be a serious evil, and deserves to be mentioned as connected with the general subject of poisons. The regulation of the issuing of advertisements and circulars announcing such things rests wholly with the State legislatures and police. Congress has no power over that branch of the subject. Several of the States have enacted laws which, however, are not, as a general thing, very stringent or very efficiently enforced. The repression of the circulation of either the advertisements and the circulars, or the remedies themselves, devolves on Congress. The postal law, as in force at the beginning of September, 1887, and which operates, of course, over the whole country, excludes from the mails all poisons and every article or thing intended for the prevention of conception or procuring of abortion, or for any indecent or immoral use, and every written or printed card, circular, etc., advertisement or notice of any kind, giving information when or how such things can be obtained or made; and punishes by fine and imprisonment any person who shall deposit such things in the mails, or take them from the mails for the purpose of giving them circulation (Rev. Stat., § 3878, § 3893, as amended July 12th, 1876, 19 Stat., 90). The duty laws forbid and punish the importation from abroad (a matter wholly within the power of Congress) of all kinds of abortives, and advertisements of them (Rev. Stat. § 2491, as amended March 3d, 1883, 22 Stat., 489).

The selling of poisons, as distinguished from the mere advertisement of them as being for sale, does not belong to Congress (except as respects the Territories and the

District of Columbia), but to the States. The laws are quite numerous and are varied in their provisions, but the general character of them is that they do not forbid, nor indeed restrain, the sale of poisons (in ordinary course of business of dealers), but prescribe a manner in which the vial or package containing a poisonous substance shall be labelled, and record made of the date of sale, name, residence, etc., of the purchaser. Independently of restrictions or penalties imposed by special statutes, the courts throughout the country hold dealers in drugs to a strict responsibility for sales of poisons made by mistake. A druggist who negligently sells a poison labelled as a harmless drug, and thereby causes the purchaser's death, is chargeable with manslaughter. That the error was merely carelessness is no justification; dealers in deadly drugs are held to a strict accountability for their sales. They must take the highest degree of care known among practical men, and are held to responsibility in dealing with poisons corresponding to the degree of knowledge required in the business. They are under a general implied obligation that what they sell is genuine, commercially pure, and fit for the use designed. A Kentucky druggist kept a mill for grinding drugs, and one day had need to grind some Spanish flies in it for a blister, and did so, not cleansing the mill properly afterward. Next day a customer brought a prescription calling for Peruvian bark, and the careless apothecary passed the bark through the same mill. It thus became mixed with a modicum of the dust of Spanish flies, and the unfortunate patient was made very sick. He recovered damages for the suffering and peril to which he had been exposed. The court said an apothecary is bound to know what he sells; and if Peruvian bark alone is called for, he must not sell bark mixed with cantharides (18 B. Mon., 219). More recently, another Kentucky druggist sold croton oil instead of linseed oil for a patient, who died in consequence of the mistake, whereupon his widow was adjudged to have a right to full damages (11 Bush, 380). And there is a memorable case in New York State in which some manufacturing druggists put up belladonna in jars labelled, through mistake, "extract of dandelion." These jars were sold to retailers at random, and one of them, a druggist in Cazenovia, filled a prescription calling for extract of dandelion from this belladonna jar. The patient, a married lady, was nearly killed. As the Cazenovia apothecary acted innocently he was not prosecuted; but the husband sued the manufacturers, and recovered (6 N. Y., 397).

POISONING IN REFERENCE TO THE DISTINCTION OF DEGREES IN MURDER.—In the legislation of many of the leading States during recent years murder has been divided into two degrees, the general purpose being to class the more aggravated, deliberate forms of homicide, in the first degree, and make them punishable with death; while those exhibiting an instantaneous intent only shall incur imprisonment for life. Murder by poisoning is eminently deliberate; in the statutes of several of the States—of Pennsylvania and New Hampshire, for instance—killing by poisoning is expressly declared murder in the first degree; under other statutes it falls into that class by force of general terms employed to define the class, such as "wilful, deliberate, and premeditated killing." Under such statutes there have been one or two convictions for the second degree, where poison was unquestionably the means used for the homicide; but such convictions do not imply that poisoning is not in the view of the law deliberate; they rather show a compromise among the jurors; those who hesitated to join in a conviction which would be capital induced the others to unite in a verdict of the second degree rather than have a disagreement. The intent to kill is, however, essential under all accusations of murder by poisoning. In an Indiana case the accused administered a dose of cantharides to a woman, not meaning to kill her, but to excite her passions, so as to induce her to consent to sexual intercourse; but the dose was excessive, and caused her death. The decision was that, for lack of intent to kill, the crime was not murder.

THE IMPORTANCE AND DIFFICULTY OF THE PHYSICIAN'S DUTIES in cases involving poisoning can scarcely be overstated. His task involves intimate knowledge of chemistry, and often of law, as well as of practical medicine. The recovery of the patient if alive, the honor of the dead in cases of suicide, the reputation of the living in cases of suspected murder, may depend on the acuteness and energy, or on the prudence and reserve, of his measures. He must work, not only with friends and nurses, but often with persons shuddering or smarting under suspicion, and with jealous detectives, and with suspicious police. If he is called while the sufferer is yet living, his duties are complicated by the primary effort to effect a cure. If death has taken place, he may probably be the first person to detect any fleeting indications that crime has been committed, and is above all others best fitted to register and preserve the evanescent evidences. Moreover, with the progress of chemical science, the list of means at the command of the well-instructed poisoner is constantly extending, while the rapidity with which the methods of detection at the command of the practitioner are increased in number and complexity renders his task steadily more difficult and responsible. Moreover, the number and variety of symptoms which poisons produce, many of which closely resemble those characteristic of natural disease and are easily mistaken for them, complicate and embarrass the examination. There are several diseases whose course and termination resemble the action of certain poisons. In short, of all crimes that of poisoning requires the most learning, acuteness, skill, and promptitude for its detection. The importance of the physician's part in the work is equalled only by its difficulty. In the capacity of medical jurist he needs a thorough knowledge of the physiological, therapeutical, and toxic actions of poisons and of the lesions which they may cause. As legal chemist he needs that wide knowledge of the kinds of poisons and of their distinguishing characteristics, and that practical experience and skill in chemical analysis and manipulation, which will enable him not only to detect a poison with certainty if it exists, but also to avoid all risk of obtaining evidence of it, or of confounding things similar but innocent.

CLASSIFICATION OF POISONS FOR LEGAL USES.—Dr. Pugno suggests ("Med.-Leg. Papers," 2d ser., rev. ed.) that the division of poisons into the organic and the inorganic, though acceptable to the chemist, is insufficient for the needs of the medical jurist. He suggests the following:

I. CORROSIVES.	<ul style="list-style-type: none"> <li>Strong Mineral Acids</li> <li>Vegetable Acid</li> <li>Alkalies</li> </ul>	<ul style="list-style-type: none"> <li>Sulphuric acid.</li> <li>Nitric acid.</li> <li>Muriatic acid.</li> <li>Oxalic acid.</li> <li>Strong alkalies.</li> <li>Alkaline carbonates, etc.</li> <li>The above diluted.</li> </ul>
II. SIMPLE IRRITANTS		<ul style="list-style-type: none"> <li>Lime.</li> <li>Zinc.</li> <li>Silver, etc.</li> <li>Arsenic.</li> <li>Mercury.</li> </ul>
III. SPECIFIC IRRITANTS		<ul style="list-style-type: none"> <li>Antimony.</li> <li>Phosphorus.</li> <li>Iodine.</li> </ul>
IV. NEUROTICS.	<ul style="list-style-type: none"> <li>Narcotics</li> <li>Cerebro-spinal</li> <li>Spinal</li> <li>Vaso-motor</li> <li>Anæsthetics</li> </ul>	<ul style="list-style-type: none"> <li>Opium and its active principles.</li> <li>Hyoscyamus.</li> <li>Belladonna.</li> <li>Stramonium.</li> <li>Calabar bean.</li> <li>Digitalis.</li> <li>Aconite.</li> <li>Prussic acid.</li> <li>Tobacco.</li> <li>Hemlock.</li> <li>Hellebores.</li> <li>Chloroform.</li> <li>Chloral.</li> <li>Bichloride of methylene.</li> <li>Ether.</li> <li>Nitrous oxide.</li> <li>Amylene.</li> </ul>
V. ASPHYXIANTS		<ul style="list-style-type: none"> <li>Convulsives..Nux Vomica, Brugine, Strychnine.</li> <li>Noxious gases.</li> </ul>
VI. ABORTIVES		<ul style="list-style-type: none"> <li>Ergot, Savine, etc.</li> </ul>

The corrosives destroy the tissues with which they come in contact by chemical action, and are characterized by causing intense pain with a burning. The simple irritants cause primarily irritation; secondarily, inflammation, which may prove fatal. The specific irritants act primarily as local irritants, but have a secondary specific action. These are the poisons with which the physician is most frequently called to deal in this country. In acute cases they cause lesions of the alimentary canal; but in cases of slow poisoning these are wanting. Of the neurotics, Dr. Pignet says that they have not as yet occupied a prominent place in toxicology, but the day is not distant when the practitioner may be called upon to investigate cases of criminal poisoning by means of them.

The above classification is the most complete which the writer has seen. Others which have received wide approval are those of Orfila, Taylor, and Tardieu (the leading features of which are given in 2 Wharton and Stillé's "Med. Jur." 4th ed.). What recommends it to the toxicologist is that the various poisons are classified according to their distinctive physiological action upon the living organism, and not upon their chemical organization and differences. Classifications by Christison and Foderé are also widely quoted.

**COUNSELS AND CAUTIONS RELATIVE TO A LEGAL INQUIRY.**—The various works that discuss toxicology in its chemical and medical aspects contain numerous counsels and cautions to the practitioner as to the manner of carrying forward the scientific investigation necessary in cases of supposed poisoning. This paper will select and mention such as are particularly applicable where a suspicion of crime arises.

Remember that poisons may enter the system with fatal effect, not only by swallowing, but also by inhalation, by absorption through the skin, including the accessible mucous membranes, and by injection, subcutaneous or per anum. Swallowing is the mode best adapted for administering them with murderous intent, but in cases in which the symptoms are obscure and not explainable by a suspicion of a poison swallowed, the medical jurist will do well to consider the possibility that one or the other modes may have been employed.

In particular persons, substances ordinarily poisonous may be rendered inert, or those not ordinarily unwholesome may be rendered poisonous, by some idiosyncrasy of the individual, by a habit of taking them, or by a condition of disease.

A poisonous compound may, by possibility, be formed within the body by two medicines innocently prescribed or taken, either of which alone would have been innocuous.

An organ may, by possibility, become impregnated with a poison after death, either accidentally, as where it has been laid in a soil in which are poisonous elements, or where such elements are introduced in the process of embalming; or feloniously, as where an attempt is made to introduce a poison in order to give ground for charging an innocent person with murder. The presence of substances introduced after death is scientifically distinguishable, no doubt, from those taken in life; but the two may be confounded if the distinction is forgotten.

The narrative of the symptoms attending the last illness is of less service than is usually supposed in determining the criminal character of the case. Modern experience is, that death cannot be safely attributed to poisoning from the symptoms alone; too many diseases resemble the action of poisons to allow of dispensing with an autopsy and a chemical examination, when poisoning is suspected. And still less light is thrown by the mere symptoms upon the question fundamental in the legal aspects of the subject—whether the poison was taken accidentally or ignorantly, or was taken with suicidal purpose, or was administered with felonious intent this question must be decided from the general attendant circumstances of the case.

The physician should never allow moral circumstances to prejudice his mind, neither should he neglect them.

Indeed, he is the best judge concerning them. Let him ascertain whether an enmity exists between the sick person and any one who attends or visits him; whether any poisonous substances have lately been purchased; whether these are still in the house; whether the alarming circumstances came on immediately after taking a drink or any other substance of an innocent nature; and particularly, in case of a sick person, let him ascertain whether anything has been given without the orders of the physician or by a person ignorant of drugs; and then he should draw a comparison between the symptoms present and those that ordinarily accompany the supposed disease.

He should carefully examine and preserve samples of every article of a suspicious nature, such as vials, boxes or papers containing powders, remains of food or drink, linen, sponges, cooking utensils, etc., in use about the patient; and he may (if assured of the support of the persons interested to promote justice) safely exercise a good deal of assumed authority in taking such precautions as against anybody who may object or oppose. Often a careful search of the premises and of the dead body will bring to light some article which, coupled with peculiar circumstances, warrants suspicion.

To decide between the relative probability of suicide and murder is a difficult question. The following facts are considered to indicate suicide: that the deceased had recently met with great losses or disappointments, or was suffering under disgrace, or under some form of insanity or delirium; that the mode of poisoning was cunningly devised to avoid a suspicion of suicide while yet the deceased held a life insurance policy; that he left any recent writing expressing his last wishes. If death has not occurred, the circumstance that the patient does not complain, but declines medical aid and remedies, confirms a suspicion of suicide. On the other hand, such suspicion is partially excluded when the circumstances favor the presumption that the deceased was in the enjoyment of a prosperous and happy life; when the drug employed is rare and procurable only with great difficulty, or is one which needs the co-operation of a second person for its administration, or is known to be productive of long and severe suffering. Considerations like these, and the results of a skilful toxicological investigation, in which the means afforded by anatomical and microscopic science, chemistry, and spectral analysis are useful to be employed, are more important in determining that the death is attributable to poison, and that this may probably have been criminally administered, than are the mere symptoms.

The examiners should observe perfect cleanliness at every step of their work; the organs removed from the cadaver for chemical examination should not be placed, for example, upon boards or in receptacles which have been cleaned with disinfecting solutions which may have had poisonous constituents, but should be placed in glass or porcelain-lined dishes previously cleansed. The prudent and judicious advice given by Wharton and Stillé (2 "Med. Jur." § 11) is that whenever, in a case involving a suspicion of murder, "a chemical analysis for poison is to be made of any of the organs, these organs should be placed by the physician himself in perfectly clean glass jars; glass preserve jars with a glass or porcelain-lined cover are suitable for the purpose, and can always be obtained in the country or city. Each organ should be placed in a jar by itself—for instance, the stomach in one jar, its contents in another, the intestines in another, contents of intestines in a fourth, the liver in a fifth, the kidneys in a sixth, the brain in a seventh, etc. The organs which should be saved for chemical analysis are, in order of their importance, as follows: stomach, contents of stomach, liver, intestines, contents of intestines, kidneys, brain, heart, spleen, and urine if there be any; in some cases, it is important to save portions of the muscular tissue, and in others a part of the lungs. In some cases it is wise for the physician making the examination to divide each of these substances into approximately two equal parts, each part to be kept in separate

jars, one to be given to one chemist for preliminary analysis, and the other to be retained by the physician himself, in case it may be necessary to have the analysis confirmed by another chemist, as is usually the case in trials for murder by poison. These jars containing the organs should be closed and sealed by the physician himself, the seal to be stamped with a private stamp. They should then be locked up until they are to be delivered to the chemist. It is better that the organs be placed under double lock, one key to be taken by one person and the other by another, so that neither one alone has access to the organs; this is, of course, not necessary if one person possesses the key and another has possession of the stamp with which the seals have been stamped. When the jars are to be sent to a chemist, they should be sent by messenger, preferably by two messengers, since, in the event of the investigation resulting in a trial for murder, the identity of the organs cannot be lost by the death of the messenger. The organs should never be sent by express since it is in that case impossible to preserve with absolute certainty the identity of the organs."

Sending the organs or their contents to the chemist is often not enough, especially when crime is suspected. Thus, the reason why no poisonous substance is found in the stomach may be that all which was not absorbed was vomited; therefore all vomited matter which can be procured, including clothing, or carpet, or surface of floor which has received it, should have chemical examination. The vessel in which vomited matter has been contained will often furnish valuable evidence, since heavy mineral poisons fall to the bottom, adhere to the sides, or leave a sediment. The offender may have had the intelligence and opportunity to empty the basin, etc., but not have thought, or not have been able, to attend to the dress or the floor.

Formerly it was the practice to confine the analysis to the stomach and its contents. Experience has, however, shown that most if not all the viscera, including the bladder and urine, are required before anything like a satisfactory conclusion can be drawn as to the existence of poison.

The stomach, with its contents, should always be received by the analyst in its entire state, and not, as was formerly usual, sent to him slit, and the contents mixed in a jar with other fluids and organs—a practice which is highly objectionable, as it may lead to the ends of justice being defeated by the complication involved. A slight incision may suffice to inform those who perform the autopsy of the state of the organ and the nature of its contents, when it should be tied and handed to the analyst. If, in case of accident or dispute, a necessity arises to preserve a portion of the stomach and other organs, together with any fluids or solids, in bottles or otherwise, for further reference and confirmation, this may be done, but they should all be properly labelled and dated and kept in a cool place.

Besides receiving the matter to be analyzed or examined, the analyst should be thoroughly informed upon the history of the case, and the symptoms and effects, as a knowledge of these will aid his examination, enable him to avoid useless searches, and prevent his overlooking suspicious facts. He should even be informed of the exact time of the death, which is important in reference to the length of time usually taken for a fatal operation of the poison suspected; of the attitude of the body, etc., especially if there were any dying struggle; as certain poisons cause characteristic writhings, or convulsions.

The analyst should never leave the vessel containing the suspected fluid in an exposed situation. He should keep it under lock and key, and, if interrupted in the course of the experiments, should restore it to such a place that he can positively affirm that no one could have meddled with it.

The notes of an autopsy or chemical examination should be promptly reduced to an orderly report; and greater care than is usually taken is desirable to avoid

the use of medical or chemical terms, such as are not easily understood by judges and jurors.

When the chemist has completed his analysis, if he finds that the poisoning has been committed with an inorganic poison, such as arsenic, antimony, etc., he should bring the metal into court and present it to the jury; and there should be a sufficient quantity of it in order to submit it to all the tests necessary for its identification. With the organic poisons, the legal chemist would find this almost an impossibility, as the organic poisons are much more active, and are fatal in smaller doses. Their presence can be proved by various tests which are reliable; but their very nature would tend to prevent their complete isolation in sufficient quantities for presentation to the jury.

*Benjamin Vaughan Abbott.*

**POISONOUS PLANTS.**—It is generally agreed in toxicology that the term "poison" should not be applied to any substance which produces its injury through mechanical means. Following this terminology, we exclude from consideration in this article all such substances as cowhage, which produces intestinal injury chiefly by the piercing quality of its hairs, the sharp awns of the many grasses so fatal to grazing animals, the prickles and thorns of thistles, brambles, cactuses, and similar plants, which act mechanically, at least chiefly, notwithstanding that their presence often produces abscesses from which blood poisoning may result. From this article are excluded also all the ordinary disease germs. Although, strictly speaking, such diseases are the results of poisoning by these minute plants, growing within the system, their proper treatment pertains to bacteriology and pathology.

Since most of the more important poisonous plants are, by virtue of their activity, available for medicinal purposes, they are discussed elsewhere in that connection. Not only are their poisonous effects and the treatment there considered, but descriptions ample for their identification, in the condition of drugs, are provided. In many cases such drug descriptions have been supplemented by others, pertaining to the plants themselves, often with illustrations, in order to provide for their identification in cases of poisoning by the fresh material. The present article is intended to supplement the above by considering important poisonous plants not used as drugs. At the same time many of the latter will be referred to at the proper points in this system, and the other articles upon them will be duly cited.

**GENERAL RECOGNITION.**—The question is frequently propounded, "Is there any general rule by which a poisonous plant can be recognized at sight?" To this question an emphatic negative must be returned. There are certain characteristics which frequently accompany poisonous properties, but this is not true in all cases; and, on the other hand, these characters may exist in the absence of such poisonous properties. Of such characters are the peculiar lurid purple color seen upon the stems of the castor oil, cicuta, conium, pokeberry, dogbane, and many other plants, though shown also by the harmless angelica. A narcotic odor is common to many of the most poisonous plants, but is wanting in many others. An acid taste is probably the most common characteristic, and constitutes the best safeguard which we possess, since it is likely, especially in the fresh article, to furnish a warning before a dangerous quantity has been consumed. Thus the potato, though ordinarily quite bland, imparts, when poisonous, a peculiar bitter, nauseous, and slightly acid taste. Even this taste-guide, however, fails in many notably poisonous substances. It may be added that milky-juiced plants are usually to be regarded with suspicion.

**PRINCIPAL POISONOUS FAMILIES.**

Of the two hundred and eighty or more families of plants, a number are recognized as being specially rich in poisonous species; but not all of the species of any family are poisonous, and important food plants are usually found closely related, in the same family, to violent