ord numerous cases of mercurial poisoning due to the administration of impure calomel.

Iodides of Mercury. The mercurous salt is of no clinical importance. The mercuric salt, of but little more importance, is met with under two modifications: the yellow and the red, the latter being the stable form. Mercuric iodide is moderately soluble in water (1 in 160), more soluble in the presence of hydrochloric, of hydrobromic or of hydriodic acid, of ammonium salts and of the chlorides and bromides of the alkali metals; it is very soluble in solutions of the iodides of the alkalies. This salt is a very powerful poison and in some respects is comparable with mercuric chloride. On animals it acts with great violence. A salve containing 5 gm. (gr. lxxvij.) has caused the death of a two-and-a-half-year-old bull.

Oxides of Mercury. Mercuric oxide is met with in two forms: the yellow oxide prepared in the wet way and the red oxide prepared in the dry way. The yellow is considerably more active and more soluble than the red. Its solubility is, however, very low, being about 1 part in 20,000 of water at ordinary temperatures. Because of its use in medicine a few accidents have resulted. In doses of about 500 mgm. (about gr. vij.) severe symptoms have been observed. The fatal dose can probably be set at from 1 to 1.5 gm. A dose of 30 gm. has caused death in forty-eight hours.

Other Compounds of Mercury.—Mercur-ammonium chloride, white precipitate, is a heavy, white powder, frequently employed in medicine. It is insoluble in alcohol and in ether, and although practically insoluble in water it has led to several cases of poisoning. Doses of from 1.9 to 2.6 gm. (gr. xxx.–xl.) have produced dangerous symptoms, and 7 gm. (gr. cviij.) have proved fatal in eight days.

Of the sulphates of mercury only one is of clinical interest—the Basic Mercuric Sulphate (Hydrargyri Subsulphas Flavus, U. S. P.). This heavy, lemon-yellow, odorless powder possesses a slightly acrid metallic taste, is insoluble in alcohol and slightly soluble in water (1 in 2,000), more soluble in boiling water. This salt, sometimes called turpeth or turbith mineral, caused the death of an adult in eleven days in a dose of 2.6 gm. (gr. xl.), and in another case 3.9 gm. (gr. lx.) it proved fatal to a boy of sixteen in seven days.

The sulphides of mercury are so insoluble that they are sometimes said to be non-poisonous. The red sulphide, vermilion, is known, however, to have been responsible for cases of chronic poisoning in France, due to its presence in cosmetics.

Mercuric Nitrate is responsible for a number of cases of poisoning in the form of the so-called "acid nitrate," a solution of high specific gravity, formerly much employed in Europe as an escharotic. Tardieu records a case in which death resulted in about two hours after swallowing a quantity of this corrosive liquid. Most of the cases of poisoning, however, are the result of its use as an escharotic.

The Sulphocyanate of Mercury which serves as the basis for the manufacture of Pharaoh's serpents possesses such energetic emetic powers that there is little danger to be apprehended from its ingestion. When administered to non-vomiting animals it produces all the symptoms of mercurial poisoning. For further information concerning this interesting salt the reader is referred to the investigations of Ouchinsky (*Ann. d'Hyg. et de Méd. lég.*, 3, xxix., 347), and also to a communication of Brouardel et Ogier (*Ann. d' Hyg.*, 3, xxix., 352). In the burning of the "serpents," vapors of metallic mercury are produced which may lead to evil results in small, ill-ventilated rooms.

Symptoms of Poisoning by Mercury.—Cases of mercury poisoning fall into one of three groups or classes: acute, subacute, or chronic. In the first class fall all those resulting from a large dose or several rapidly taken moderate doses of a readily soluble salt of mercury; the action being, in a general way, that of a violent irritant poison, or of a corrosive; death taking place in from twenty-four to thirty-six hours. Subacute cases result from a somewhat slower action, the primary symptoms are not so violent and the period of illness is quite long. This second form is seen when the dose is smaller than in the first form, when small doses have been administered in too rapid succession, and when the compound taken or absorbed is not easily soluble. The fatal period varies from five to twenty days, or is often even longer; cases under eight to ten days are generally the after-result of acute poisoning. The cases classed as chronic need no explanation; they are the result of "industrial poisoning" or of medicinal poisoning due to excessive prolongation of mercurial treatment. The symptoms do not appear for weeks or even months. Death may sometimes result, but recovery usually follows the removal of the cause.

Acute Poisoning.—This is generally the result of swallowing corrosive sublimate. Immediately after taking the poisonous substance there is experienced by the victim an intensely disagreeable, acrid, metallic taste followed almost at once by a burning sensation (increasing to pain) in the mouth, throat, and epigastrium; this pain rapidly extends with increasing severity to the abdomen. There is excessive thirst. Nausea sets in, followed by frequent retching and vomiting of mucus often tinged with blood and sometimes containing shreds of mucosa. There is diarrhœa with frequent serous, mucous, and usually bloody stools. The pulse is small and frequent. The body of the victim is bathed in a cold perspiration. The victim exhibits great anxiety. The mucosa of the mouth and throat is white and shrivelled and in a short time there is severe swelling of the fauces. Often the swelling of the throat is so severe as to threaten asphyxia, and cases are known in which tracheotomy became necessary to save life. Breathing becomes difficult and dyspnœic. A period of vertigo precedes insensibility, collapse, and death. Death may sometimes occur in convulsions. The fatal period is from twenty-four to thirty-six hours. The shortest time on record is a case recorded by Welch in which death took place in thirty minutes after swallowing the poison.

Subacute Poisoning.—The dividing line between acute and subacute cases is very vague, the former merging into the latter. Thus a case of acute poisoning in which life is prolonged may pass into the subacute stage. In addition to the general symptoms just given, there are seen the characteristic symptoms of poisoning by mercury. The vomited matter is thick, viscid, bilious in character, eventually becomes bloody and has a bad odor. The abdomen is usually, but not always, tense and painful to pressure. The face is alternately pale and flushed and expresses suffering, anxiety, and prostration. The sweat-covered body is without strength. The gums are inflamed, swollen, and painful. There is constriction of the throat, more or less severe cough, often with the expectoration of bloody matter. The breath is very fetid; the odor is peculiar, characteristic, and of great diagnostic value. The swelling of the gums is accompanied by sensitiveness of the teeth, which become loosened and may even be shed. Stomatitis is followed by salivation, becoming at times excessive. The saliva has the same characteristic fetid odor as the breath. Colic is followed by frequent, very painful (tenesmus) bloody stools, closely resembling those of dysentery. This diarrhœa differs from that resulting from poisoning by arsenic, antimony, etc., in that the stools are, as a rule, more frequent, smaller, and composed chiefly of mucus tinged with bile and blood. There is generally complete or almost complete anuria; when the urine is not entirely suppressed it is albuminous. There may or may not be slight jaundice. In very protracted cases there is apt to be a weakening of the intelligence, a loss of muscular power, more or less marked œdema accompanied by paralysis of the lower extremities; and an eruption on the skin, eczema impetiginosum. The temperature is normal or only very slightly raised, until the approach of death, when it is apt to fall with great rapidity. The pulse is small, weak, and thready. The skin of the patient feels cold and clammy. The respiration is

generally dyspnœic and asthmatic. A period of apparent convalescence may intervene after five or six days, the pulse increases in strength, the body warms up, the skin loses its clammy feeling, respiration becomes more regular and normal. This period of reaction is quickly followed by relapse, the patient falls into a state of great prostration, the pulse becomes small, weak, and imperceptible; there are syncope, loss of sensation, and coldness of the lower part of the body; there is more or less marked loss of speech, but the patient remains lucid to the last. Sometimes there is internal hemorrhage from the bowels, stomach, etc., accompanied by a great fall in temperature; Loewy records a case exhibiting a sudden fall of temperature to 33.4° C. (92.1° F.). The average fatal period is from eight to fifteen days.

The channel of introduction of the poison modifies slightly the symptoms observed. For example, poisoning from the excessive use of mercuric chloride in childbirth does not give rise to the acute stomatitis (stomatitis ulcerosa) seen in the introduction of the poison per os, though more or less inflammation and swelling are exhibited no matter what the channel of absorption. Toxic gastritis and enteritis also result from the introduction of mercury into the body no matter what the method of entrance.

Chronic Poisoning.—Chronic mercurialism is the result of constant exposure of the body to contact with mercury in some form, or to the frequent ingestion of mercurial remedies prolonged over a long period. In the arts, several industries give rise to chronic poisoning of workmen, as, for example, the mining of ores of mercury and the extraction of the metal from them; the manufacture of mirrors and of various preparations and salts of mercury; electrotyping, gilding; the manufacture of certain kinds of felt, of barometers, thermometers, and other instruments necessitating the use of mercury; the manufacture of fulminate of mercury and of percussion caps, etc., etc. Of these industries the most harmful are doubtless the mining and extraction of the metal. According to the statistics collected by Kobert, in the best ventilated and hygienically constructed and operated mines from one to two per cent. of the miners are afflicted with mercurialism; while in the extraction of the metal by heat fully eight per cent. of the workmen exhibit typical symptoms of chronic poisoning.

In chronic poisoning by mercury practically all the symptoms accompanying the subacute cases are seen but in a less aggravated form, and in addition there are several distinct and characteristic symptoms. First of importance among these characteristics must be placed tremor mercurialis. This affliction appears as an extraordinarily severe trembling of the patient, in which the upper parts of the body, especially the arms, are first affected. The movements of the lips and tongue are also altered so that speech may become confused and unintelligible. Tremor, as has been said, is most noticeable in the arms where it is almost convulsive in character and renders them vacillating. The seizures are brought on by any attempt at muscular effort and are often so severe as to necessitate the feeding of the victim. When the muscles are relaxed and the patient is quiet, only a twitching is observed, while during sleep no sign of tremor is seen. Children born of parents afflicted with tremor mercurialis have been known to exhibit tremor, but in the majority of cases chronic poisoning leads to abortion. Accompanying tremor there is well-marked erethismus tending to aggravate the seizures of trembling. Resulting from anæmia and gastric and enteric catarrh mercurial cachexia makes its appearance; this is seen in the anæmic condition of the blood, the atrophy of the muscles, and the general wasting away of the body. Salivation is usually excessive, several gallons of saliva have been secreted daily by some patients. The specific gravity of the saliva secreted in the early stages of the disease is usually abnormally high, due to the presence of albumin; later, however, it falls again to the normal value or may be subnormal. Salivation is not a primary symptom but follows stomatitis and may disappear in very protracted illness. The gums are swollen, soft, hemorrhagic, and usually painful; often they show a dark line somewhat similar to that seen in chronic poisoning by lead. The breath is very fetid. Carious teeth decay with great rapidity, sound teeth are painful and loosened, and may even be shed. Necrosis of the jaw not infrequently results. The skin is more or less seriously affected, as shown by an eczematous appearance—eczema impetiginosum, or squamosum (eczema mercurialis)—or in more mild cases by urticaria. There may be falling out of the hair. The patient suffers from albuminuria, generally from obstinate and almost complete anuria, and is afflicted with mercurial cirrhosis of the kidneys. Often a distressing tuberculosis-like cough is heard. Lastly, in very protracted cases many authorities believe that there results decalcifying osteitis, but upon this point there is some dissent; the weight of evidence, however, seems to show that calcium salts are withdrawn from the bones and deposited in the kidneys.

Evidence has been adduced at different times to show that the progress of the disease is more rapid in women than in men; however this may be, it is certain that some individuals are much more sensitive to mercurial action than others, and that persons having a tendency to tuberculosis rarely recover from chronic mercurial poisoning.

Children born of parents suffering from mercurialism are generally weak, frail, and show a decided tendency to tuberculosis.

Post-mortem Appearances.—The symptoms exhibited in poisoning by mercury have been described in sufficient detail to indicate the chief pathological changes which will be seen in an autopsy. These changes are generally sufficiently characteristic to enable an expert to assert with a fair degree of confidence that death was due to mercurial poisoning.

The whole alimentary canal is more or less inflamed; the mucosa of the mouth and throat is red or even ulcerated, especially in the upper part, or in very acute cases it may be shrivelled and whitened; that of the stomach is ecchymosed, even ulcerated; in only one case has perforation been observed. The intestines are more strongly affected than is the stomach and may exhibit greenish-yellow ulcerations, especially in the lower part of the ileum; not infrequently the mucosa is œdematous, swollen, and the submucosa infiltrated with serum. In such an event the intestines are anæmic. These appearances follow the absorption of mercury by no matter what channel; and, save the whitening of the mucosa, are not confined to per os ingestion. Usually the large intestine exhibits macro- and microscopic appearances identical with those seen in dysentery. The liver and kidneys are anæmic, enlarged, and show fatty degeneration unless death has been quite rapid. The liver may be icteric and pasty. Microscopic examination of this organ shows numerous fatty droplets and granulations in the cells in which the nuclei have been destroyed. The kidneys exhibit a somewhat analogous appearance which may sometimes be suggestive of Bright's disease. Sections of the kidneys (in subacute and chronic poisoning) placed under the microscope and treated with dilute sulphuric acid will be seen to give off a gas—carbon dioxide—due to the presence of deposits of carbonate of lime, and in a few seconds the tubuli will be seen to be clogged with characteristic acicular crystals of calcium sulphate formed by the action of the sulphuric acid. The bladder is contracted and usually empty. The muscles of the heart are hemorrhagic and show some fatty degeneration. This steatosis of liver, kidneys, and heart is analogous to that observed in cases of poisoning by arsenic and by phosphorus, but is not quite so severe as in these cases. The lungs are sometimes normal, more often full of blood, the result of bronchopneumonia. The muscles of the body are anæmic with here and there ecchymosed spots; incisions made in the muscles lead to the exudation of a watery fluid. The blood in acute cases is usually dark, thick, and coagulates with difficulty. In chronic cases it is anæmic. The mouth may appear grayish in color; this appearance occasionally ex-

tends down the œsophagus. The walls of the intestines are not infrequently grayish or blackish from mercuric sulphide, the result of putrefactive changes. In a few instances it has been thought that this gray color has been the result of the deposition of very finely divided metallic mercury.

Antidotes.—The only satisfactory antidotes are albumen, such as white of egg, milk, flour and water, etc.; ferrous sulphate with reduced iron or ferrous sulphide; followed immediately by the stomach pump or emetics and purgatives, unless such action has already been induced. Prompt removal of the material from the alimentary canal is imperative, since the insoluble compounds of mercury produced by the action of the antidotes are all more or less rapidly acted upon by the fluids of the body. The administration of too great an amount of albumen is also probably objectionable, as there seems to be good reason for believing that the compound of mercuric chloride with an excess of albumen is more soluble than when the albumen is not in excess. It is better, therefore, to administer only just the amount which it is judged will render the poison insoluble; then remove the precipitate and administer a fresh dose of the antidote. The white of one egg will render about 260 mgm. (gr. iv.) of mercuric chloride inactive. Stomatitis is best treated by frequent gargles or washes of potassium chlorate. In the treatment of chronic poisoning zinc phosphide has given excellent results. Tremor mercurialis can be more or less successfully treated with electricity. There is at present much diversity of opinion as to the value of iodides and of sulphur compounds such as flowers or liver of sulphur, sulphureted hydrogen waters, etc. There are reasons for believing that although good results have, in many cases, followed the use of these disputed remedies, their efficacy has been somewhat overestimated.

All rooms and buildings, etc., in which either metallic mercury or its salts are employed should be exceptionally well ventilated and every possible precaution should be exercised to avoid spilling material on the floors, workbenches, etc. The most scrupulous cleanliness of all workmen should be insisted upon. The floors of the rooms should be free from all fissures and cracks and should slope gradually from all sides toward the centre in order to facilitate cleaning. Meyer has suggested the sprinkling of the floors with dilute ammonia each day after the day's work is done.

Elimination.—Mercury seems to be eliminated from the body through all the secretions, but chiefly by the glands of the stomach and intestines in the fæces, by the kidneys in the urine, by the salivary glands in the saliva, and by the liver in the bile. For the clinical detection of mercury either the urine or the saliva may be employed. In acute cases the greater part of the poison will be ejected in the vomited matter.

Mercury is known to persist in the body for long periods after all ingestion has ceased. The usual period of elimination in acute poisoning by corrosive sublimate is probably about thirty days, but the metal may persist for months. In subacute cases the period of elimination is thought to be about six months; while following chronic poisoning, mercury is slowly eliminated from the body during periods of almost incredible length. Ogier cites a case communicated by Vadja and Pachkis in which mercury could be detected in the urine thirteen years after the cessation of mercurial treatment!

According to Hoffmann, when vapor of metallic mercury is inhaled there is observed the elimination of free metallic mercury in the urine; several other experimenters have observed the same phenomenon.

Mercury seems to possess a marked cumulative action and is localized chiefly in the liver and kidneys, from which organs it disappears only very slowly. It can be detected in the liver, in most cases, after it has disappeared from other organs of the body.

Action on Animals.—Animals poisoned by compounds of mercury exhibit symptoms similar to those described above for man—namely, stomatitis, salivation, catarrh of the stomach and intestines, cough, eczema, apathy, tremor, cachexia, emaciation and death in coma, more rarely in convulsions, in a few hours or in from ten to fourteen days.

Mechanism of the Action of Mercury.—Science has not yet reached a stage where we can formulate a satisfactory theory for the cause of the action of mercury. Lack of space forbids a discussion of the various hypotheses which have been advanced; suffice it to say that none of them is wholly satisfactory. All that is possible is to glance hurriedly and in a very general way at the mechanism of the action.

Owing to the great affinity of mercury for the nitrogen compounds of the tissues, albuminates of mercury or analogous combinations are formed, causing the death of the cells. This layer of destroyed cells is not impermeable but allows deeper and deeper progressive action, due in part to the penetration of a fresh supply of the poison or to the resolution of the mercury in the albuminate first formed. It is probable that the mercury circulates in the blood in the form of what has been called mercuric chloride-albuminate or sodium chloride-mercuric-albuminate, soluble compounds of unknown composition. The result of the circulation of these poisonous compounds is the death of cells, etc., as shown by the progress of the disease in stomatitis, gastritis, enteritis, salivation, and, even in the early stages, in ulceration of the glottis. That these symptoms are not the result of contact but are of secondary action through the blood is proved by the fact that they appear when mercury is applied externally (ointment) or injected subcutaneously and when only the faintest trace of mercury has reached the intestines. In circulating through the liver the mercury produces an abnormal secretion of bile, accompanied, according to some investigators, by the destruction of countless blood corpuscles, the latter being deposited, so to speak, in this organ, and giving rise to its fatty infiltration, and to anæmia and cachexia. An analogous action takes place in the kidneys where the changes produced in the tubuli give rise to albuminuria. In a short time after circulating through the body mercury causes more or less marked paralysis of the muscles and of the heart; this Rabuteau believes to be due to the destruction of the contractility of the muscles without any action on the motor nerves. According to this view the cardiac paralysis observed soon after the administration of a very large dose is due to the loss of contractile power of the cardiac muscles and is not the direct result of neural paralysis. The experiments of von Mering have shown that mercury exerts a decided and very deleterious action on the vaso-motor system and on the heart. In prolonged illness there can be no doubt that mercury exerts a specific action upon the central nervous system; since we observe erethismus mercurialis and a weakening of the intelligence, perhaps the tremor can be ascribed in part to this action. One of the most remarkable of the effects of mercury is that of the dissolving of calcium salts in the bones, to which reference has already been made; the lime thus extracted is eventually deposited, in part at least, in the kidneys, apparently as the carbonate, clogging the canals (see von Weichselbaum, *Centralbl. f. Path.*, 1891, 1). How and why this action is brought about is unknown.

Kaufmann believes death to be the result of primary intravital multiple capillary embolism in the kidneys and that this is shown in epithelial necrosis, calcification, and capillary thrombosis. Jolles, on the other hand, believes death to be the result of capillary embolism, not in the kidneys but in the intestines.

Clinical Tests for Mercury.—The urine and the saliva are the most satisfactory materials upon which to work. In case the urine is employed it is best to concentrate it to about half its volume. Acidify the solution to be tested with pure hydrochloric acid. Introduce two or three tiny strips of pure bright copper foil about 1 mm. wide by 3 or 4 mm. long. Heat almost to boiling for from ten to fifteen minutes. Pour off the liquid from the foil and wash the latter first with water, then with alcohol, and dry by pressing gently between sheets of filter paper. If mercury is present the copper foil will be coated with a gray or silvery film. A gray film gently rubbed with the end of a finger becomes bright and silvery. The mere deposition of a film upon the copper should not be taken as conclusive evidence of the presence of mercury. In order to confirm the presence of this element the perfectly dry foil can be introduced into a small glass tube closed at one end. The tube should then be heated at a point from about 3 to 5 cm. above the roll of copper foil and drawn out to a bore of say 2 mm., care being taken to avoid heating the bit of coated copper. When the tube thus prepared is perfectly cold, the end containing the foil is heated red hot in a Bunsen or alcohol lamp. The mercury amalgamated with the copper is thus vaporized and condenses on the walls of the tube; by progressively heating the tube above the foil all the mercury is driven into the constricted part of the tube and an examination with a microscope or pocket magnifier will disclose many tiny silvery globules of metallic mercury. In case the globules are very minute, rubbing the deposit with a fine iron wire or with a drawn-out glass rod will cause them to unite into globules large enough to be readily detected. Although this reaction is a very delicate one, it can be rendered even more delicate by converting the sublimate of mercury into red mercuric iodide. This is accomplished by proceeding as follows: The closed end of the tube is cut off, a small fragment of iodine introduced, and the end of the tube closed with a tiny cork. Thus prepared the tube is laid in a warm place for half an hour or more. The slow vaporization of the iodine causes the formation of brilliant red mercuric iodide, which is generally easily visible to the naked eye if the tube be held over white paper. Too high a heat will cause the sublimation of much iodine, thus masking the red color of the iodide. In such an event a gentle current of air drawn or blown through the warm tube will remove the iodine. By this iodine method 0.1 mgm. of mercuric chloride can be detected with ease, and with great care the delicacy can be pushed to beyond 0.01 mgm.

Instead of copper foil a little spiral of thin pure gold foil (dental foil) can be wound around a tiny rod of metallic tin or zinc. The electrolytic couple thus obtained is dropped into the acidulated liquid to be tested. No heating is necessary. After several hours the couple is removed, washed, dried, and heated in the manner suggested above. Most of the mercury amalgamates with the gold, but a part is always deposited upon the tin or zinc; hence after carefully unrolling the gold each part of the couple should be tested.

Another method consists in winding a spiral of platinum foil around a common steel sewing needle, introducing this couple into the liquid and proceeding as described above.

A very convenient arrangement when employing a couple is to drop it into a separatory funnel of suitable size, pour in the acidulated liquid, and open the stopcock so that tiny drops fall very slowly. To make doubly sure, the liquid can be poured back and again allowed to come in contact with the couple.

Solid organic matter can be brought into solution by treating with hydrochloric acid and potassium chlorate on the water-bath. The strongly acid solution thus obtained can be partly neutralized with sodium bicarbonate and tested for mercury by any of the above-mentioned methods.

Emile Monnin Chamot.

MESCAL (OR MUSCALE) BUTTONS.—*Anhalonium. Pellote.* The dried tops of several species of *Lophophorus* (*Anhalonium*), especially *L. Williamsii* (Lem.) Coulter and *L. Lewinii* (Henning) Rusby.

These cactuses grow in high, arid mountain localities of Northern Mexico, and probably also in the adjacent portions of the United States. The stem is mostly subterranean, its upper portion projecting slightly above the surface as a flat disc, roughened with triangular, thick, short, fleshy lobules and bearing in the centre a mass of bristly whitish hairs, in which the small pink flowers are partly concealed. These tops are sliced off and dried, which causes them to shrink to button-shaped discs, one or two inches broad and from an eighth to a quarter of an inch thick. These dics constitute the commercial drug. They are wrinkled underneath and bear above the dried fleshy lobules and the central mass of hairs. In this condition, the withered flowers are scarcely discernible, except after soaking. In the first-named species the hairy tufts are somewhat separated, while in the second they are matted together and less white. The first-named species contains nearly one-half per cent. of the alkaloid *pellotine* ($C_{12}H_{17}NO_3$). The second contains a smaller total of the four alkaloids, *anhalonine* ($C_{17}H_{15}NO_3$), *mescaline* ($C_{11}H_{17}NO_3$), *anhalonidine* ($C_{12}H_{15}NO_3$), and *lophophorine* ($C_{13}H_{15}NO_3$). The Mexican aborigines use this substance as a powerfully narcotic intoxicant, the effects apparently much resembling those from the use of Indian hemp. Ceremonial assemblies are held, at which each participant chews one or more of the "buttons," passing at length into a trance-like state, productive of strange intellectual experiences. Occasionally, when an unusual amount is ingested, the subject does not recover, death resulting.

Nixon found all the alkaloids of *L. Lewenii* to act similarly, being non-irritant, sialagogue, constipating in small doses, apt to be purgative in large ones, which were apt also to cause nausea and vomiting, these results occurring from either gastric or hypodermic administration. Small doses greatly strengthen and, for a time only, accelerate the heart's action, and increase arterial pressure; toxic doses paralyze the vagal endings and later the nerve cells. They also produce a rapid and shallow breathing, death, when it results, being due to respiratory failure. There is a primary stage of exhilaration and talkativeness, followed by complete intoxication. The pupils are now dilated, there is increased reflex activity, but with blunting of cutaneous sensitiveness, and there are auditory and nasal hyperæsthesia, inco-ordination and trembling, hallucinations, especially of vision, with kaleidoscopic play of colors and a rapid flow of ideas, without control. Intellection and introspection appear normal, but dual existence is sometimes imagined. Lewin found the toxic symptoms in rabbits to be similar to those from strychnine. Cushney regards the mescaline as the exhilarating constituent, pellotine as the hypnotic. The medicinal uses of anhalonium have been but little developed. Beneficial effects have been secured from its administration as a cardiac and respiratory stimulant in asthma, from two to five minims of the fluid extract being administered. Anhalonine and pellotine have also been administered for the same purpose, in doses rather smaller than those of strychnine.

Henry H. Rusby.

MESENCHYMA is a term introduced by the brothers Hertwig to designate the non-epithelial portions of the mesoderm. The mesenchyma develops into a great variety of important tissues, so that a knowledge of the histogenesis of the mesenchymal derivatives is indispensable for the pathologist. From the mesenchyma of the embryo arise the connective tissues, the supporting tissue (cartilage and bone), the lymphoid tissue, Wharton's jelly, blood-vessels, blood, lymph vessels and glands, wandering cells, fat cells, pigment cells, marrow, and smooth muscle fibres. The embryonic mesenchyma consists of more or less widely separated cells connected by intercellular bridges of protoplasm and embedded in a highly transparent homogeneous matrix; it is always covered by epithelium, which may be either ectodermal, mesotheliial, or entodermal, according to the location of the tissue. See *Embryos* and *Germ Layers*.

Charles S. Minot.

MESENTERY. See *Abdomen*.

MESODERM is the middle layer of the body of the embryo (see *Fœtus* and *Germ Layers*). Mesoblast is also used as a synonymous term; sometimes, however, the term mesoblasts is applied to the large cells in the segmenting ova of certain lower animals, from which the mesoderm