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Ignatia.—Ignatia. The seed of *Strychnos Ignatii* Bergius (Nat. Ord. *Loganiaceæ*). (U. S. P.) St. Ignatius's bean; *Fève de Saint-Ignace*, Fr.; *Ignazbohnen*, Ger.

Abstractum Ignatiæ.—Abstract of ignatia. Dose, gr. $\frac{1}{4}$—gr. j.

Tinctura Ignatiæ.—Tincture of ignatia (10 parts of ignatia to 100 parts of menstruum). Dose, ♏ ij—♏ x.

Composition.—Ignatia has the same composition as nux-vomica, but yields relatively larger proportions of the alkaloids *strychnine* and *brucine*. These principles exist in the bean in combination with *igasuric acid*. Formerly, the bean of St. Ignatius was the principal source of commercial strychnine, but the abundance and low price of nux-vomica now compensate for the difference in strength. The preparations of ignatia are stronger than the corresponding ones of nux-vomica.

Antagonists, Incompatibles, and Synergists are the same as for nux-vomica.

Actions and Uses.—Ignatia, containing the same principles as nux-vomica, must have the same physiological actions and corresponding therapeutical properties.

The tincture of ignatia, the most useful preparation, has a powerful and persistent bitter taste, and, in common with bitters, has the effect known as stomachic tonic. It is a very effective stimulant of the gastric mucous membrane, promotes the flow of gastric juice, and hence increases the activity of the stomach digestion, and may therefore be used with advantage in *atonic dyspepsia*, and in the *nausea* and *vomiting* of gastric and cerebral anæmia. It is also often highly serviceable in the *gastralgia* of nervous women having impoverished blood. The *migraine* or *sick-headache* of such subjects, also, may be relieved by ignatia. It may be very useful in the various disturbances belonging to *chronic gastric catarrh*, but it is contraindicated in all acute inflammatory affections. It is in these stomachal affections more especially that ignatia is preferred to nux-vomica by many practitioners.

Ignatia affects the nervous system of animal life in the same way, but more energetically in the same dose, that nux-vomica does. It exalts in the same way the reflex function of the spinal cord, and similarly arrests respiration by a tetanic fixation of the respiratory muscles. It is, however, not used in affections of the nervous system, the alkaloid strychnine being now universally employed.

Cocculus.—The fruit of *Anamirta cocculus*, or *Cocculus Indicus*. (Not official.)

There are no official preparations except picrotoxin, the active principle. A saturated tincture may be used. Dose, ♏ ij—♏ xv. A fluid extract can be made, and is a useful form for administration. Dose, ♏ ij to ♏ x, gradually increased.

Composition.—The effects of cocculus are due chiefly to the presence in it of a peculiar neutral principle known as *picrotoxin*. This has been admitted to the Pharmacopœia of 1880, and is therefore official.

Picrotoxinum.—Picrotoxin. Is not an alkaloid, although allied to this group of substances. It does not combine with acids to form salts. It is neutral, crystallizable, forming needle-shaped, stellar, or foliaceous crystals. It is soluble in 150 parts of cold and 25 parts of warm water, and in alcohol, and dissolves freely in alkaline solutions. It is unaffected in solution by the metallic salts, tannin, etc., and is not precipitated by the tests for the alkaloids. It may be administered in pill-form, and can be combined with any of the usual so-called nervine tonics. Picrotoxin may be administered subcutaneously, in solution in water—one grain to ʒ ss—the dose ranging from $\frac{1}{60}$ of a grain to $\frac{1}{40}$ of a grain. By the stomach it may be given in from $\frac{1}{60}$ of a grain to $\frac{1}{20}$.

Antagonists.—The carefully-conducted researches of Browne show that chloral is its physiological antagonist in rabbits and Guinea-pigs, and probably will prove to be of value in cases of poisoning in man. The anæsthetics, and the motor depressants in general, are antagonistic in respect to its power to produce spasm.

Synergists.—All the remedies of this group, notably strychnine, brucine, and ergot, increase the effects of picrotoxin.

Physiological Actions.—The taste of picrotoxin is bitter. It increases the flow of saliva. In what form soever administered, more or less nausea is produced, when the quantity given is sufficient to cause cerebral effects. It is not an irritant to the gastro-intestinal mucous membrane; it increases secretion, and promotes peristalsis, but no hyperæmia of the mucous membrane has been observed after death from a toxic dose. The secretions of the glandular appendages of the mucous membrane, probably also of the pancreas and liver, are decidedly increased, the stools becoming soft and more copious. Administered at any point, picrotoxin diffuses readily into the blood, but nothing is known at present of the changes which it induces, if any, in the composition of the blood. After death the right side of the heart is distended, and the left side incompletely emptied and flaccid. The action of the heart varies with the stage of the effects, and doubtless also more or less according to the size of the dose. At first the cardiac movements are slowed, the arterial tension somewhat elevated; during the convulsions the action grows rapid, but, succeeding the convulsions, and during the stage of coma, the pulse becomes slow again. According to Planat, by small doses, the cardiac pulsations are slowed before the convulsions come on; then the muscular excitement

induces rapid action, to be succeeded again by the retarding effects of the remedy, increased by the coma. Roeber also finds that the cardiac contractions are retarded, and the walls of the heart dilated and flaccid. The respiration is also accelerated, and there occurs strong inspiratory dilatation, because of spasm of the glottis—effects which are due to stimulation of the pulmonary portion of the vagus, and which cease on division of this nerve (Roeber). When the convulsions cease, the respiration becomes slower and more shallow. No engorgement of the lungs is found after death (Browne).

The pupils are not specifically affected. During the convulsions they dilate somewhat, when the tonic spasms come on, and contract again during the clonic spasms. The fundus of the eye, examined by the ophthalmoscope, exhibits considerable hyperæmia.

The cerebral effects of picrotoxin are variously interpreted. Drowsiness, stupor, some muscular trembling, are observed in cold- and warm-blooded animals, and have also been experienced in man. A heavy, stupid intoxication, with vertigo, inco-ordination, and diminished sensibility, followed by after-headache, depression, and nausea, are symptoms ascribed to the action of cocculus Indicus in beer sophisticated by this drug. Restlessness, unsteady gait, and weakness of the hind extremities, also precede the convulsions in animals. Twitching of the ears, shaking of the head, and spasms in the eyelids, eyebrows, lips, and fore-paws, now come on. Then follows a distinct tonic convulsive stage, with opisthotonos, or emprosthotonos, tetanic fixation of the muscles of respiration, cyanosis, and stertor. This tetanic stage is succeeded by the general clonic convulsions, and the seizure is terminated by a temporary paralysis and coma. In the order and succession and character of phenomena, a remarkable similarity in the actions of picrotoxin to the epileptic paroxysm must be discerned. By Roeber the convulsions are referred to the effects of the poison on the medulla. He finds that, after destruction of the brain, the symptoms are the same as before; after destruction of the optic lobes, the convulsions are less violent; but when the medulla is removed the convulsions do not occur, and a large dose causes coma only. These facts indicate that picrotoxin acts on the spasm and vagus centers in the medulla, and on Setschenow's inhibitory center. Planat, Chirone, and Testa, also hold that this agent acts on the cerebellum, medulla, and spinal cord, and leaves the brain exempt. Against these opinions we have the carefully-considered but still hypothetical view of Browne, who finds in Ferrier's cortical centers the real seat of the action of picrotoxin. That the center, and not the periphery, is the place where the action of the poison is expended, seems proved by the studies of Roeber, who finds that the electrical reactions of nerve and muscle remain unaltered.

The action of the heart is arrested in the diastole, and, while the

cavities are full, the capillaries at the periphery are empty. The vascular lesions, *post mortem*, are similar to those of epilepsy. That some of the poison is yet in the blood, is proved by the fact that flies eating it are poisoned. Elimination probably takes place by the various channels of excretion, but chiefly by the kidneys. The skin is powerfully acted on, and hence picrotoxin ranks among the most active diaphoretics. The urinary excretion is also increased, but more exact observations are needed on these points.

THERAPY.—Picrotoxin will, probably, be found very useful in cases of *torpor of the intestines*, dependent on deficient secretion and paresis of the muscular layer. In the *night-sweats* of consumption it has been used with great success by Murrell, who had but one failure in twenty cases. He finds that it is best to give the necessary dose at night—from $\frac{1}{180}$ grain to $\frac{1}{60}$. The effect lasts about ten days, when the sweating begins again, and the remedy must be repeated. Picrotoxin has been used with success in the treatment of *epilepsy* by Planat, Dujardin-Beaumetz, Hurd, and by Hammond. It is more especially adapted to the weak and anæmic type. It has been also used with success in *chorea*, and with promising results in *paralysis agitans*. In a case of *glosso-labio-laryngeal paralysis* Gubler obtained a notable amelioration. Further experiences with these diseases are much needed. It is probable that this remedy may be applied with advantage to the treatment of other paralyses. According to *Tschudi*, it has been given in *paralysis of the sphincters* with good results. The *tremors of chronic alcoholism* have, it is said, been removed by it. One of the forms of *sick-headache*—that occurring at or about the menstrual period—is sometimes greatly relieved by its timely exhibition. An ointment of picrotoxin—ten grains to an ounce of simple ointment—has been applied with success to the treatment of *parasitic skin-affections*. Care is necessary, and abraded surfaces must be avoided.

A saturated tincture of cocculus Indicus might be employed in place of picrotoxin. Planat recommends a tincture composed of one part of the berries to four parts of alcohol, and of this one drop is the initial dose, morning and evening, increased daily by the addition of two drops, up to sixty or seventy drops for an adult, daily. In the discases for which it is prescribed, it is necessary, to secure curative effects, that the physiological action be produced. Planat has used this tincture successfully in chorea, epilepsy, eclampsia (infantile), and in painful contractures of the extremities. Gubler advises the dose of a millegramme of picrotoxin for subcutaneous use. He has observed that indurated spots result from the injections, but they slowly disappear.

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Ergota.—Ergot. The sclerotium of *Claviceps purpurea*, replacing the grain of *Secale cereale* Linné (Nat. Ord. *Graminaceæ*). (U. S. P.) *Ergot de seigle*, Fr. ; *Mutterkorn*, Ger.

Extractum Ergotæ Fluidum.—Fluid extract of ergot. Dose, ʒ ss —ʒ j.

Vinum Ergotæ.—Wine of ergot. Dose, ʒ j—ʒ ss.

Ergotin.—This preparation must not be confounded with a constituent of ergot, supposed to be an active principle. The ergotin of the shops gets its name from "Bonjean's ergotin." It varies very much in strength, owing to faulty modes of preparing it, and is not unfrequently inert. As prepared by Squibb it is entirely soluble in water, and represents the powers of the drug. Ergotin (the aqueous extract) is the most eligible preparation for hypodermatic injection. From one to five grains may be injected at one time. In preparing it for this purpose, the quantity to be injected should be rubbed up with fresh distilled or rain water, and then passed through the filter. It is always better to prepare it whenever required. If it is necessary to preserve the solution, the addition of a little carbolic acid—one grain to four ounces—will usually suffice. The addition of glycerin is not necessary, unless added as a preservative fluid ; and is objectionable, because it greatly increases the pain which attends the subcutaneous injection.

Composition.—Some confusion yet exists in regard to the constituents of ergot, notwithstanding recent advances in our knowledge. An unfortunate nomenclature is in part responsible for the confusion ; but the complexity of the subject and the conflicting views of chemists are the chief causes of the present condition of the pharmaceutical knowledge of ergot.

Ergot contains about thirty per cent of a saponifiable, non-drying oil, with which is associated a small quantity of resin and cholesterin. When extract of ergot is treated with an alkali, a peculiar fishy odor is developed, due to *methylamine*, according to some authorities, and *trimethylamine* according to others. Ergot also contains lactic and phosphoric acids and phosphates. The two principles, *ecbolina* and *ergotina*, separated by Wenzell in 1864, are not true alkaloids of ergot, and are said by Dragendorff to be identical. In 1830 a supposed alkaloid was obtained by Wiggers, which he named *ergotin*, but this is not the true active principle. Unfortunately, an aqueous extract, prepared by Bonjean, was also named *ergotin*. Köhler has examined the ergotin of Wiggers and that of Bonjean, and finds that they are mixtures : the former containing the ingredients of ergot not soluble in water ; the latter, those that are soluble in water. According to Köhler, neither of these so-called ergotins represents the properties of ergot. More recently Dragendorff and Podwissotzky have gone over the chemistry of ergot anew, with different results. They have introduced new terms also, which add to the complications. The most important principles obtained by them are *sclerotic* or *sclerotinic acid*, and *scleromucin*, the former existing in good ergot in the proportion of about four per cent, and the latter, two to three per cent. They have also separated other principles and secondary products, named respectively *sclererythin*, *scleroidin*, *scleroxanthin*, and *sclerocrystallin*. Another alkaloid has lately been discovered by Tanret, to which he has given the name *ergotinine*. This substance seems to be the nearest approximation to a genuine alkaloid of any hitherto proposed. It is a white, crystallizable solid, insoluble in water, and soluble in ether and chloroform. It is alkaline in reaction and has strong basic properties, and combines with acids to form salts. It is an unstable substance, and in the air soon decomposes.

Antagonists and Incompatibles.—The caustic alkalies and the metallic salts are chemically incompatible. Aconite, veratrum viride, tobacco, lobelia, and amyl nitrite (Shafer), antagonize the action of ergot on the circulation.

Synergists.—Electricity, cold, digitalis, belladonna, are synergistic as regards the vascular system. Savin, gossypium, rue, borax, increase its parturient action.

Physiological Effects.—In small medicinal doses ergot does not produce sensible physiological effects. In large doses it causes symptoms referable to the gastro-intestinal canal, and to the cerebro-spinal axis. It is bitter to the taste, and excites more or less heat and dryness of the throat, followed by thirst, stomach-pain, vomiting, intestinal pain, and occasionally purging. These gastro-intestinal symptoms are unquestionably due to the local irritant action of the drug ; for, after death, in a few fatal cases which have resulted from its administration, there have been found patches of inflammatory redness in the stomach and intestines.

The active constituents of ergot diffuse into the blood. What changes, if any, are caused in the composition of the blood, are at present quite unknown. Very characteristic effects are, however, produced in the circulatory system : the action of the heart becomes slower, and an enormous rise takes place in the blood-pressure. This influence on the circulatory system modern research has shown to be