dose of gr. viij followed by gr. iv an hour later, is effective in uterine inertia, and is used by many practitioners in labor to increase the expulsive power of the uterus, and by promoting firm uterine contraction to lessen the tendency to hemorrhage.

Quinine Sulphate was used in Asiatic cholera from 1831 to 1873 with much success, 3146 cases so treated showing a mortality of less than 24 per cent., including 30 cases with 2 deaths (Kosser), 220 cases with only 3 deaths (Schlömann), and 350 cases with 15 deaths (Henry). Dr. Fullerton has called attention to the value of Quinine as an inhibitory agent on the comma bacillus, and has shown that the instances of its unsuccessful use in cholera were chiefly those in which it was administered hypodermically or by intra-venous injection, and therefore did not reach the contents of the intestinal canal. He insists that it should be given only by the mouth or by enteroclysis; in the former case in 10-grain dose as powder or in acid solution, repeated every hour until 40 grains have been taken, then less frequently. In amebic dysentery the use of high intestinal irrigation with a solution of the sulphate, 1 in 3000, has been highly successful in many cases, the drug having destructive action on the ameba coli.

Quinine is contraindicated in patients who have any idiosyncrasy in regard to it, also in gastritis, cystitis, epilepsy, meningitis, cerebritis, and otitis media, on account of its congestive action upon the regions affected in these diseases.

Administration.

It is said that Quinine is tasted by the posterior part of the tongue and not by its tip. Its persistently bitter taste is best obviated by administering it in capsules, or in pills made with glycerin as an excipient. If given as a powder or in solution Licorice or Chocolate may be used to cover the taste. An excellent vehicle for quinine in solution is a combination of glycyrrhizin and the fluid extract of eriodictyon, named *Velatine*, but the quinine salt must be suspended in it by the aid of mucilage, for when dissolved by the aid of an acid its taste cannot be disguised.

The Hypodermic Injection of Quinine is advocated by many authorities as more effectual in obstinate cases than any other method of administration. It becomes necessary in malarial fevers when vomiting is persistent and the rectum irritable, if the patient is insensible and cannot swallow, also when life is in imminent danger and the earliest possible action of the drug is important (Manson), The best salt for hypodermic use is the Acid Hydrochloride (see page 230), which is soluble in its own weight of water. The Sulphate may be used, its solution being effected by adding one-half its weight of tartaric acid. The Bisulphate is soluble in 10 of water, but even its solution should be slightly acidulated, in order to prevent precipitation of the quinine by the alkaline juices of the cellular tissue. The Carbamide Hydrochloride is soluble in its own weight of water, and is said to be devoid of irritant effects. The addition of Urethane or Antipyrine to solutions of the Hydrochloride, increases its solubility. *Aufrecht's Formula* is—Quinine Hydrochloride gr. vijss, Urethane, gr. iv, Distilled Water, ♏lxxx. *Laveran's Formula* is—Quinine Hydrochloride 3, Antipyrine 2, Distilled Water 6 parts, giving a 50 per cent. solution, the injection of which is painless. This solution was used extensively during a severe epidemic of malaria in Algiers in 1894 and always proved satisfactory (Blum). In it is formed by chemical transformation a new salt, named *Chinopyrin*, which is similar but not equivalent to the quinine salt (Santesson).

CINNAMOMUM, Cinnamon,—is official under two titles, viz.—*Cinnamomum Saigonicum*, Saigon Cinnamon, the bark of an undetermined species of Cinnamomum, nat. ord. Lauraceæ; and *Cinnamomum Zeylanicum*, Ceylon Cinnamon, the inner bark of the shoots of Cinnamomum zeylanicum. The official Oil is distilled from Cassia Cinnamon, an undetermined species. The first named is a constituent of the compound tinctures of Cardamom, Gambir, and Lavender. Their taste is warm and aromatic, and their odor is very fragrant. Their active principle is the *Volatile Oil*, which contains *Cinnamic Aldehyde*. Dose, gr. j–x [av. gr. iv.]

Official Preparations.

Oleum Cinnamomi, *Oil of Cinnamon, Oil of Cassia,*—a volatile oil distilled from Cassia Cinnamon. A yellowish liquid, soluble in 2 of 70 per cent. alcohol. Becomes darker and thicker by age and exposure to air. Dose, ♏ss–ij [av. ♏j.]

Aqua Cinnamomi, *Cinnamon Water,*—has of the Oil 2, triturated with Talc 15, and Distilled Water to 1000. Dose indefinite [av. ℥iv.]

Spiritus Cinnamomi, *Spirit of Cinnamon,*—has 10 per cent. of the oil in Alcohol to 100. Dose, ♏v–℥j [av. ♏xxx.]

Tinctura Cinnamomi, *Tincture of Cinnamon,*—has of Cinnamon 20, Glycerin 7½, Alcohol and Water to 100. Dose, ♏xx–℥j [av. ♏xxx.]

Pulvis Aromaticus, *Aromatic Powder,*—has of Cinnamon 35, Ginger 35, Cardamon 15, Nutmeg 15, triturated together to a fine powder. Dose, gr. x–xxx [av. gr. xv.]

Fluidextractum Aromaticum, *Aromatic Fluidextract,*—has of Aromatic Powder 100 per cent. in Alcohol. Dose, ♏x–xxx [av. ♏xv.]

Cinnaldehydum, *Cinnamic Aldehyde,* C_9H_8O,—is an aldehyde obtained from Oil of Cinnamon or prepared synthetically; soluble in alcohol, ether, and fixed and volatile oils. Dose, ♏ss–ij [av. ♏j.]

Cinnamon is an agreeable carminative, somewhat astringent and stimulant, also highly aromatic and antiseptic. The Oil is not astringent, but is a stimulant to the nervous and vascular systems, and seems to have the specific action of a uterine hemostatic. In overdose it acts as an irritant and narcotic poison. The various preparations are in general use as flavoring excipients, and the Water is a pleasant vehicle for extemporaneous mixtures. The Bark and its preparations, in combination with opium, chalk, or some vegetable astringent, are used to check diarrhea.

Oil of Cinnamon is a good remedy for flatulence, cramp of the stomach, enteralgia, and paralysis of the tongue, and is sometimes used to check nausea and vomiting. It has an ancient reputation for healing and antiseptic properties, especially on the mucous membranes, and has been employed as an injection in gonorrhea. It has been used as an internal germicide, and has given good results in the treatment of typhoid fever, against the bacillus of which it is believed to have specifically destructive power. In influenza it has proved a valuable remedy, cases in which it was used early having returned to their avocations within three or four days.

COCA, Coca, (*Cuca*)—the dried leaves of *Erythroxylon Coca*, or of *E. Truxillense*, shrubs of the nat. ord. Erythroxylaceæ, indigenous to the mountains

of Peru and Bolivia, and cultivated in those and other S. American states, also in India and Java. Their odor is tea-like, taste slightly bitter and aromatic. They contain a crystalline alkaloid, *Cocaine*, $C_{17}H_{21}NO_4$, which when heated with HCl is split up into methylic alcohol, benzoic acid and another alkaloid named *Ecgonine*, a pyridine derivative, resembling tropine very closely in composition. The Java leaves furnish another alkaloid, *Tropacocaine*, which is also a compound of benzoic acid, with a base resembling the pseudotropine derived from hyoscine, but of somewhat different constitution. Other constituents are the alkaloids *Cocamine*, *Isococamine*, *Homococamine*, and *Homoisococamine*, all of which contain the ecgonine molecule, also an aromatic oil and coca-tannic acid. The leaves should contain not less than 0.5 per cent. of the ether-soluble alkaloids. Coca should not be confounded with Cocoa, the seed of the chocolate-tree. Dose gr. x–℥j [av. gr. xxx.]

Preparations.

Fluidextractum Cocæ, *Fluidextract of Coca*,—made with diluted alcohol. Dose, ♏x–℥j [av. ♏xxx.]

Vinum Cocæ, *Wine of Coca*,—has of the Fluidextract 6½, Alcohol 7½, Sugar 6½, Red Wine to 100. Dose, ℥j–℥j [av. ℥iv.]

Glyceroles, Elixirs, Pastes, etc. (Unofficial),—are manufactured in great variety, usually as proprietary preparations.

Celerina, (Unofficial),—a proprietary preparation said to contain in each fluid-drachm gr. v each of Coca, Celery, Kola and Viburnum, with aromatics. Dose, ℥j–ij.

Alkaloids and their Preparations.

Cocaina, *Cocaine*, $C_{17}H_{21}NO_4$,—exists in the leaves in very small quantity, from 0.02 to 0.04 per cent., is soluble in 600 of water, in 5 of alcohol, and in 3.8 of ether at 77° F., very soluble in chloroform, soluble in 12 of olive oil, in 4 of oleic acid, insoluble in glycerin. Dose, gr. ⅛–j [av. gr. ss.]

Cocainæ Hydrochloridum, *Cocaine Hydrochloride*, $C_{17}H_{21}NO_4.HCl$,—occurs in colorless prisms or a white, crystalline powder, of slightly bitter taste, producing on the tongue a tingling sensation followed by numbness; soluble in 0.4 of water and in 2.6 of alcohol at 77° F. Dose, gr. ⅛–j [av. gr. ss]; by hypodermic injection gr. ⅛–½.

Oleatum Cocainæ, *Oleate of Cocaine*,—has of Cocaine 5, Alcohol 5, Oleic Acid 50, Olive Oil to 100.

Injectio Cocainæ Hypodermica, *Hypodermic Injection of Cocaine* (B.P.),—is a 10 per cent. solution, and has of Cocaine Hydrochloride gr. xxxiij, Salicylic Acid gr. ss, Distilled Water to ℥vj. Dose, by subcutaneous injection, ♏ij–v.

Schleich's Solutions for infiltration anesthesia. *No.* 1, *Strong*, has of Cocaine Hydrochloride gr. iij, Morphine Hydrochloride gr. ss. Sodium Chloride gr. ij, Distilled Water, sterilized ℥iij ℥iij, of which ℥vj may be used during one operation. *No.* 2, *Normal*,—Cocaine, Hydroch. gr. jss, Morph. Hydroch. gr. ss, Sod. Chlor. gr. ij, Distilled Water, sterilized, ℥iij ℥iij, of which ℥iijss may be used at one operation. *No.* 3, *Weak*,—Cocaine Hydroch. gr. ⅛, Morph. Hydroch. gr. ss, Sod. Chlor. gr. iij, Distilled Water, sterilized, ℥iij ℥iij, of which a pint may be used at one operation.

Tropacocaine, *Benzoyl Pseudotropeine* (Unofficial),—is an alkaloid obtained from the Java coca leaves, now made synthetically. It is much less toxic than cocaine and is used as a succedaneum therefor, as it may replace the latter in every case as a mydriatic and an anesthetic. The Hydrochloride is applied in 3 to 10 per cent. solution in 0.6 per cent. sodium chloride solution. Dose, gr. ⅛–j; by spinal injection for general anesthesia, gr. $\frac{4}{5}$–$\frac{9}{10}$.

Incompatibles.

Incompatible with Cocaine are: Acids (concentrated), Alkaloidal precipitants (see page 5), Alkalies, Hot Water; with the *Hydrochloride* are: Calomel, Chloroform water, Mercuric Oxide, Silver Nitrate. Physiologically incompatible are: Alcohol, Amyl Nitrite, Caffeine, Chloral Hydrate, Digitalis, Morphine.

Unofficial Analogues.

Anesthesin,—is the *ethyl-ester of paramido-benzoic acid*, and occurs as a white powder, soluble in ether, alcohol, fatty and ethereal oils, insoluble in water. It is used as an anesthetic for minor injuries, painful skin affections and those of mucous membranes, carcinomatous ulcers, etc., as a dusting powder, also in throat and nose practice. Its anesthesia lasts longer than that of Cocaine, and it is much less toxic. The Hydrochloride is used internally in gastric hyperesthesia and ulcer, in doses of gr. v–vij. Doses of 30 grains have not proved toxic.

Eucaine-A, $C_{19}H_{27}NO_4$,—is an artificial alkaloid, which is much less toxic than Cocaine and almost as efficient as a local anesthetic, but causes irritation and some pain. The Hydrochloride is soluble in 10 of water and in 3 of alcohol.

Eucaine-B, $C_{15}H_{21}NO_2$,—is preferred to Eucaine-A for ophthalmic work, being less irritant. Solutions of the Hydrochloride of 1 to 2 per cent. are used in the eye, of 2 to 5 per cent. for other mucous surfaces and for hypodermic injection. This salt is soluble in 20 of water and in 14 of alcohol, and its solutions may be sterilized by boiling without undergoing decomposition. Locally it causes hyperemia of the mucous membranes, which militates against its use in active inflammatory conditions thereof. Alone, or in combination with Cocaine, it is employed for producing general anesthesia, by injection into the spinal canal, with great satisfaction, and less toxic action than occurs from the injection of Cocaine. The Eucaine preparations are proprietary, being manufactured by patented processes. Dose, gr. ⅛–j.

Euphthalamin,—the hydrochloride of the mandelic acid derivative of Eucaine-B, is a brief and efficient mydriatic, but not an anesthetic. Two drops of a 5 per cent. solution cause maximal dilatation of the pupil in 35 minutes, without any raise of tension or appreciable effect on accommodation, the patient being able to read as usual. The effect passes off in 2 to 4 hours. It is the most satisfactory mydriatic for ophthalmoscopy, being safe in glaucomatous cases, and of rapid and short action.

Holocaine,—is a patented synthetic product prepared by the interaction of Phenacetin and Paraphenetidin. The Hydrochloride is soluble in 50 of water and in 6 of alcohol. It is highly toxic and cannot be used hypodermically, but is employed by ophthalmologists in a 1 per cent. solution. It produces complete and rapid anesthesia and neither dilates the pupil nor affects the blood-vessels.

Nirvanin,—a patented coal-tar derivative of the orthoform type, is very soluble in water, can be sterilized, and is antiseptic as well as anesthetic, non-irritant and only one-tenth as toxic as cocaine. It is used for local anesthesia in 2 to 5 per cent. solutions.

Orthoform,—a patented product, is the *methylester of amido-oxybenzoic acid*, and has no chemical relation to cocaine, which it resembles only in its action on the sensory nerve terminations. It occurs as a white, crystalline, odorless and tasteless powder, almost insoluble in water. It is efficient as a local anesthetic only when it comes in contact with exposed sensory nerves, and has been used chiefly as a dusting powder or ointment for painful abrasions, ulcers, or burns. Applied in powder to raw surfaces, as burns, and excoriated nipples, it has frequently produced local gangrene. Internally it has been given in doses of gr. viij–xv for the pain of gastric ulcer and cancer. It does not relieve the pain of simple gastralgia, and hence it has been employed as a test for gastric ulcer. A saturated solution in collodion may be used as a paint, and an emulsion in glycerin is employed during operations within the uterus. The Hydrochloride is more soluble in water and may be used for internal administration or urethral injection, but is too acid for hypodermic injection or eye application. Its *Incompatibles* are Antipyrine, Bismuth Subnitrate, Silver Nitrate.

Stovaine,—is the trade name of a synthetic derivative of the amino-alcohols, chemically a *Hydrochloride of Dimethylamine-β benzoyl-pentanol*. It is more stable than Cocaine, though decomposed by the least trace of an alkali, and its aqueous solutions are sterilizable by heat below 248° F. It is less than one-half as toxic as Cocaine, though equally powerful as an anesthetic, and has the great advantage of being a vaso-dilator, Cocaine being a vaso-constrictor. As a substitute for the latter it is used with great satisfaction for local and spinal anesthesia. For anesthesia of the skin it should be injected under the epidermis or into the derma, not subcutaneously, and when employed in the cephalo-rachidian fluid, (which is alkaline), sodium chloride should be added to it in the proportion of 5 per cent. Dose, gr. ½–ss, in pill; for intramuscular or epidural injection ♏xxx of a 1 per cent. solution; for spinal injection, gr. ¾–$\frac{9}{10}$ in the spinal fluid.

Physiological Action.

Coca is an aromatic bitter tonic, a diuretic and a cerebral and nervous stimulant. Small doses improve digestion, stimulate respiration, increase the heart's action after a brief depression, raise the arterial tension, and increase the excitability of the sensory nerves. It stimulates the brain by increasing its blood-supply, producing wakefulness, a sense of well-being, and a marked diminution of the senses of fatigue, hunger and thirst. Under its daily use a considerable amount of labor and loss of sleep can be borne without suffering. Though diuretic, it lessens the quantity of urea eliminated by checking the processes of waste. Large doses produce impaired coördination, hallucinations and delirium.

Cocaine acts upon the lower animals similarly to Caffeine. It tetanizes frogs, and in large doses paralyzes their sensory nerves and the posterior columns of the spinal cord. It kills rabbits and dogs by paralysis of the respiratory centre. In proper doses it raises arterial tension by stimulating the vaso-motor centres and the cardiac motor system. An affect of cocaine, observed in mice, is a wide-spread destruction of the hepatic cells, which become vacuolated and frequently necrosed. and the liver is much enlarged and pale from fatty infiltration.

On man, in small doses Cocaine is a cerebral, cardiac, respiratory and nervous stimulant, a vaso-constrictor, and a prompt diuretic. It improves digestion, stimulates respiration, increases the heart's action, raises the arterial tension and exalts the irritability of the sensory nerves. It stimulates the brain by increasing its blood-supply, producing wakefulness and marked diminution of the senses of fatigue and hunger. Though decidedly diuretic, it lessens the quantity of urea by checking the processes of waste, thus acting as an indirect nutrient, and enabling the body to maintain its energy on a lessened supply of food. It first decreases and then increases the cutaneous circulation, flushing the surface, exciting perspiration and a sense of heat, and raises the body-temperature. It dilates the pupil, both when locally applied and when taken internally, and stimulates intestinal peristalsis as well as the evacuation of the bladder in a few minutes after its ingestion.

An overdose produces symptoms of cardiac and respiratory embarrassment in a very short time. The pulse, at first quick and forcible, becomes small, rapid and intermitting, the heart apparently standing still in systole once in every 10 or 12 beats. Respiration is slow and shallow, and a sense of tightness about the chest is often very marked; the blood pressure falls, the skin becomes cold and clammy, and the subject is seized with a sense of impending dissolution. Death occurs in animals by paralysis of the respiration, but in man a tetanoid spasm of the cardiac muscle seems to occur, which is equally dangerous to life. Maurel has shown that, as the capillaries contract powerfully under the influence of cocaine, thromboses and embolisms, particularly pulmonary embolisms, capable of causing fatal accidents, may be produced thereby. It

profoundly affects the leucocytes, which become spherical and rigid, increase in size, and no longer adhere to the walls of the vessels. Other symptoms are impairment of coördination, hallucinations and delirium. Lethal doses paralyze the intracardiac motor ganglia, the posterior columns of the cord, the sensory nerves, and the respiratory centre.

In general action, Cocaine resembles Atropine very closely, especially in its influence upon the pulse and blood-pressure, the respiration, pupils, salivary glands, sweat-glands and intestinal peristalsis. In its symptoms, both from large and small doses it almost parallels Sparteine, another cardio-inhibitory depressant. It is the most complete antagonist to the effects of Morphine, stimulating the respiration, heart, vaso-motor system, general metabolism, the muscular system, and the psychic functions, increasing arterial pressure and the body temperature, all of which are profoundly depressed by morphine in the second and third stages of its toxic action.

Several years ago, Satterwhite, as a result of the study of one hundred cases of poisoning by this alkaloid, called attention to the dangers attending the use of even very small doses, and at about the same time another author, after summarizing the records of fifty cases, made a similar announcement. A case is reported by Broughton in which unconsciousness, an irregular, slow respiration, and a slow pulse, followed the application of three minims of a twenty per cent. solution within the cavity of a tooth. Whistler, after the application of a four per cent. solution to the nasal cavity, noted vertigo and threatening syncope. In a case of glossitis, Ricket states that the patient became moribund after the use of a similar solution. Myrtyle dropped three minims of a three per cent. solution into each eye, which immediately caused a sense of numbness in the back of the tongue and throat, palpitation, threatened syncope and nausea. Bettleheim records that in one case the hypodermic injection of one-sixth of a grain induced alarming symptoms; and in another, one-eighth of a grain similarly injected caused unconsciousness, congestion of the face, irregular breathing and trismus. Baker mentions a case in which one grain injected into the gums by a dentist produced death in a few minutes, and Hænel records the case of a man in whom the injection of $1\frac{1}{3}$ grains was followed by a fatal result.

As a *Local Anesthetic* the power of Cocaine is very great over a limited area. Applied to such structures as the Schneiderian membrane, and the mucous covering of the glans penis, or injected hypodermically in other locations, it blanches the structures and causes a profound but temporary anesthesia throughout a small space. Applied to the tongue it temporarily destroys both taste and tactile sensibility; to the ocular conjunctiva, it produces profound anesthesia of that membrane, together with dilatation of the pupil, partial paralysis of accommodation, enlargement of the palpebral fissure, slight lachrymation, and sometimes temporary ptosis. This profound degree of anesthesia is thought by some to be caused by its paralyzing the terminal twigs of the sensory nerves, —by others to be due to vaso-motor stimulation rendering the nerves bloodless and therefore unable to transmit sensory impressions. It produces mydriasis by stimulation of the ends of the sympathetic in the iris, but does not affect the third nerve or the sympathetic centre.

As a *General Anesthetic* Cocaine is remarkably efficient when injected into the spinal canal. After the administration of gr. $\frac{1}{4}$ by this method complete anesthesia usually follows in the lower extremities within ten minutes, in the upper parts of the body within twenty or thirty minutes, and lasts from one to

four hours, with no effect on consciousness. The after-effects in many cases include vertigo, headache, nausea and vomiting. This procedure is not free from danger, mental shock, circulatory disturbances, and profound collapse being frequently experienced, and death has occurred in several cases. Tropacocaine, in dose of about gr. ¾, is equally efficient and much less toxic, and is preferred for this purpose by many operators.

The Cocaine-Habit.

Cocainism, the Cocaine-habit is now presenting itself to observation, numerous instances of persons addicted to its excessive use being met with. Loss of digestive power, absolute insomnia, enfeeblement of the intellect, great emaciation, ascites, general marasmus, nausea, decay of the teeth, an excessively fetid breath, amblyopia, visual hallucinations and complete anorexia, form a consensus of symptoms which rival the worst effects of the opium habit. Peculiar hallucinations are characteristic of the action of cocaine. One patient was always scraping his tongue to extract from it little black worms; another made his skin raw in the endeavor to draw out cholera microbes; a third was constantly looking for crystals in his skin. Two of these subjects suffered from epileptic attacks and the third from cramps. (Magnan and Saury.) Some observers report the most extraordinary mental changes resulting from cocainism, exceeding those produced by any other drug. Intense selfishness, utter disregard of all social and domestic duties, the most debasing habits, complete destruction of all noble qualities, and a general condition of depravity, are some of the results which are charged to this drug. The author's experience with a large number of such cases convinces him that a cocaine habitué who has used the drug daily for a month is practically an insane individual while under the influence of the drug; but that the mind soon resumes its normal condition after withdrawal thereof, which can be done, in nearly all cases, at once, without involving any great suffering.

Many of the proprietary catarrh-snuffs contain cocaine, and their use may cause the cocaine-habit, which, however, is in most cases acquired by morphine habitués who go to cocaine in the expectation of finding help in their struggle against the tyranny of the former drug. In this hope, however, they are always disappointed when the drugs are in their own hands. The victim soon finds that one of these agents antagonizes the other to a great extent, while, at the same time, it sets up peculiar troubles of its own; and that there is a constant need of more morphine to counteract the cocaine-symptoms, and of more cocaine to antagonize the symptoms due to the increased amount of morphine. The result is that one who is using only a moderate daily amount of morphine, if cocaine be added will soon be using a very great amount of morphine, as well as of cocaine, and "the last state of that man is worse than the first."

As the stimulant effect of a single hypodermic injection passes off very quickly, within about 15 or 20 minutes, the cocaine habitué is under the necessity of constantly injecting the drug, so that, as one expressed it, "I had no time to go home,—no time to do anything except to prepare and take one 'shot' after another." The effect of such repeated puncturing of the skin is very disastrous to that tissue, causing great induration and numerous sloughing sores.

THERAPEUTICS.

Coca-leaves are chewed by the Peruvians for the purpose of sustaining them during arduous labors and long journeys, and are so highly esteemed as to be represented on their national coat-of-arms, the people using them much as we do tea, coffee or tobacco. This example was imitated by Weston, the pedestrian, who is said to have been detected chewing the coca-leaf during one of his protracted walks. Cocaine is a useful stimulant to the brain and the nervous system in many morbid conditions, particularly cerebral and spinal anemia, neurasthenia, melancholia, hysterical and hypochondriacal insanity, and in protracted mental depression with suicidal tendency. It may be employed with benefit in wasting diseases to retard waste and to stimulate digestion, in convalescence from fevers and other acute maladies, and in migraine

and neuralgia due to depression of the nervous system. It is very beneficial in some cases of the vomiting of pregnancy, in stomatitis and gastralgia, and in functional impotence due to general atony of the system.

A wine of the leaves is thought by singers and speakers to relieve hoarseness, to make tense the vocal cords and to improve the timbre of the voice. Coca-leaves may be smoked in cigars or cigarettes to obtain the exhilarating effects of the drug, and for the relief of asthma, hay-fever and many irritable throat affections. The Oleate of Cocaine is an efficient palliative application to painful hemorrhoids, fissures of the anus, burns, boils, and irritable ulcers; also in pruritus pudendi et ani and skin diseases attended with intolerable itching.

Cocaine Hydrochloride has achieved celebrity as a local anesthetic, and is of great value in many operations on the eye and ear, nasal passages, uterus and urethra. A 2 to 4 per cent. solution is brushed lightly over the mucous surface or injected into the urethral canal, the application being repeated within 5 or 10 minutes if profound local anesthesia is required. After about fifteen minutes any superficial operation may be performed without giving the slightest pain. It is used in the same manner with decided benefit in congestion of the nasal passages from acute catarrh and hay-fever; and is applied to the cervix uteri to relieve the first pains of labor, to the ear for tinnitus aurium, and by inhalation to strengthen the vocal cords, to relieve hoarseness and cough, and to improve the quality of the voice. It may be injected into the bladder before lithotrity, into the urethra before the passage of sounds or catheters or to relieve chordee, and it is an excellent application to the gums of teething infants. To be efficient it must reach the terminal filaments of the sensory nerves in sufficient concentration. Rhus poisoning, by either the oak or ivy, is promptly controlled by the application of a 5 per cent. solution or oleate, freely over the affected surface. It gives instant relief from the burning and itching, and speedily reduces the dermatitis. It is injected hypodermically around the prepuce to prevent pain during circumcision, into the vicinity of the supra-orbital and infraorbital foramina to cut short neuralgia of those nerves, into hemorrhoids previous to their ligation, and into the skin and the subcutaneous tissues to produce local anesthesia in many minor operations. The conjoined use of Adrenalin with cocaine (♏iij of the ordinary solution of adrenalin chloride with ♏xvij of a 1 per cent. solution of cocaine hydrochloride), diminishes the toxicity of the latter and increases its anesthetic power in duration, intensity and area.

The Infiltration Method of Schleich is the injection in quantity (up to 100 Cc.) of very dilute solutions (1 in 10,000, 1 in 1,000 and 1 in 500), at first superficially into the epidermis and then deeper, by long, fine needles, so as to produce a local edema over the field of operations (see page 238 for the solutions used). *The Intraneural Method* is the injection of a 2 per cent. solution into the nerve-trunk supplying the region to be anesthetized, but this has produced neuritis. *The Paraneural Method* is the injection of the same solution in the immediate vicinity of the nerve-trunk.

The rapid accumulation of cases in which alarming symptoms followed the local application of small quantities of cocaine, together with the fact that these untoward effects are due

to individual idiosyncrasy and do not invariably occur immediately, is a positive warning to the profession that this powerful substance should not be used in any case for the first time without the proper antidotes at hand and the patient being kept under surveillance for at least a half hour. There seems to be no doubt that cocaine is absorbed with extraordinary rapidity and that the stronger the solution which is locally applied, the greater the danger of toxic symptoms, but whether the latter are to be attributed merely to the larger dose or to some obscure action, is not apparent. Falk has found that the rapidity of absorption varies in the different tissues—absorption taking place most rapidly through the conjunctiva, then in the following order: nose, larynx, mouth, and ear.

For the purpose of general anesthesia without loss of consciousness the injection of Cocaine into the spinal canal was introduced by Corning in 1884, but received little attention at that time. It was revived fifteen years later by Bier, and has been employed by many surgeons in major operations on all parts of the body, also by physicians in cases of labor, for the cure of sciatica, and the relief of eclampsia. Unpleasant and even dangerous symptoms are occasionally experienced, but as a rule this method of producing anesthesia has given satisfaction to those who have used it. Ten or fifteen minims of a freshly made and sterilized solution (gr. $\frac{1}{5}$ to $\frac{1}{3}$) of Cocaine Hydrochloride, (or gr. $\frac{3}{4}$ to $\frac{9}{10}$ of Tropacocaine Hydrochloride), are injected through a long needle inserted between the 2nd and 3rd or the 3rd and 4th lumbar vertebræ into the spinal subarachnoid space. A more recent method of preparing the injection is to dissolve the proper quantity of the drug in the cerebro-spinal fluid which escapes from the needle. The maximum quantity of Cocaine is stated by Bier at gr. $\frac{1}{4}$, that of Tropacocaine gr. $\frac{4}{5}$ (Schwarz), gr. $\frac{9}{10}$ (Neugebauer). Eucaine-B has been used alone, as well as in combination with cocaine, and is considered to be as efficient as the latter, and less toxic. Stovaine is equally efficient, much less toxic, and has the advantage over cocaine in being a vaso-dilator (see page 239). Complete anesthesia occurs in the lower extremities usually within ten minutes, in the upper parts of the body within twenty or thirty minutes, and lasts from one to four hours. During its continuance any surgical operation may be performed, with no sensation of pain being experienced by the patient, who is entirely conscious of his surroundings.

Tuffier has reported 1,300 cases with only one death, Hahn 1,700 with 8 deaths, and Morton states that he has used this method in over 1,000 cases, 80 of which were for operations above the diaphragm, including excision of the tongue and the maxillary bones. Murphy reports 631 cases, in 21 of which the injection failed of effect. Tropacocaine was used by Schwarz in 100 cases, by Kopfstein in 40, by Neugebauer in 60 cases, and is preferred to cocaine or eucaine by Morton, Kozlowski, and Schwarz.

As a mydriatic for ophthalmological use, Cocaine has peculiar qualities which make it one of the most serviceable agents of the class. The dilatation produced by it is great, is quickly attained, lasts only 12 to 20 hours, is promptly overcome by physostigmine, and is not accompanied by much photophobia, due to the fact that the cocainized pupil is not rigidly dilated (as with atropine), but reacts to light. The accommodation, moreover, is greatly reduced, but not entirely paralyzed, and is quickly regained.

As an antagonist Cocaine is of especial value in narcotic poisoning by chloral or opiates, where depression of the cardiac and respiratory centres exists. It

is the most complete antagonist to morphine (see page 241), but has no value in the treatment of morphine addiction except to antagonize certain heart symptoms, for which purpose it should be administered only by the physician in charge of the case; but never as a regular remedy, at regular intervals of time, even by him. It is indicated in chronic depressant poisoning from the bromides, and in spinal paralyses, in which it has all the advantages of strychnine without its poisonous character.

COCCUS, Cochineal,—is the dried female insect, *Pseudococcus cacti*, nat. ord. Hemiptera, which feeds on the cactus plants of Mexico and Central America. It is of ovate, plano-convex form, of a purple-gray or purple-black color, yielding when crushed a dark-red powder, which contains *Carminic Acid*, or *Carmine*, the red coloring-matter, which is soluble in water and in alcohol, but not in oils. Cochineal is an ingredient of Tinctura Cardamomi Composita, and is used in pharmacy solely as a coloring material.

The only therapeutic use of Cochineal is in whooping-cough and neuralgia, in which affections it is supposed to have considerable influence, especially in the former. Its dose for an infant is about gr. $\frac{1}{3}$ thrice daily.

COLCHICUM, Meadow Saffron,—is the corm and seed of the *Colchicum autumnale*, a European plant of the nat. ord. Liliaceæ. It contains an intensely bitter, poisonous alkaloid, *Colchicine*, $C_{22}H_{25}NO_6$, which by the action of acetic and mineral acids is converted into *Colchicein* and a resin; also tannic and gallic acids, resin, starch, sugar, etc. It is official in two forms, namely—

Colchici Cormus, *Colchicum Corm*,—the dried corm, about an inch long, white internally, grooved on one side, inodorous, taste sweetish, bitter and acrid. Is less active than the seed. Dose, gr. ij–viij [av. gr. iv.]

Colchici Semen, *Colchicum Seed*,—about $\frac{1}{12}$ inch thick, sub-globular, resembling black mustard seed but larger, very hard and tough, inodorous, of bitter and acrid taste. Dose, gr. j–v [av. gr. iij.]

Preparations.

Extractum Colchici Cormi, *Extract of Colchicum Corm*,—made with Acetic Acid 35 parts to 100 of the root, and sufficient water. Dose, gr. $\frac{1}{2}$–ij [av. gr. j.]

Fluidextractum Colchici Seminis, *Fluidextract of Colchicum Seed.* Dose, ♏j–v [av. ♏iij.]

Vinum Colchici Seminis, *Wine of Colchicum Seed*, 10 per cent. Dose, ♏x–ʒj [av. ♏xxx.]

Tinctura Colchici Seminis, *Tincture of C. Seed*, 10 per cent. Dose, ♏x–ʒj [av. ♏xxx.]

Colchicina, *Colchicine*,—a white or yellowish, amorphous powder, of saffron-like odor and bitter taste, soluble in water and in alcohol. Dose, gr. $\frac{1}{150}$–$\frac{1}{60}$ [av. gr. $\frac{1}{128}$.] Is suitable for hypodermic injection.

Colchicine Salicylate (Unofficial),—is marketed in capsules, each capsule containing Colchicine, gr. $\frac{1}{240}$ and natural Methyl Salicylate (Oil of Wintergreen), gr. iij. Dose, 1 capsule every 2 hours, up to 10 or 15 daily.

Laborde and Houdé condemn all preparations made with acetic acid, also those made from the tubers and all wines. The best preparation is Colchicine, in granules or in a wine; or a strong tincture made from fresh seed with the shell on, the latter containing a very volatile but active oil. Of this seed ʒj to ½ pint of highest proof alcohol, standing for 2 weeks. Of this ʒv to water q. s. ad O½, of which the dose is ʒss every 4 hours night and day, avoiding acids, until nausea, vomiting and purging set in.

Incompatible with Colchicine are: Acids, Alkalies, and the Alkaloidal precipitants (see page 5).

Physiological Action and Therapeutics.

Colchicum is emetic, diuretic and diaphoretic, a drastic purgative, a gastro-intestinal irritant and a cardiac depressant. In small doses it increases secretion, especially the urine and the sweat. In full doses its action is emeto-cathartic, producing profuse watery discharges, great nausea and extreme muscular feebleness. In large doses it is a powerful irritant of the gastro-intestinal tract, causing severe griping, choleraic discharges, lowered arterial tension and depression of the heart by reflex action over the distribution of the pneumogastric,—then great prostration, convulsions and collapse, death occurring from exhaustion, with consciousness preserved until carbonic acid narcosis sets in. The extent of its influence on the excretion of uric acid and urea is very much disputed, but it probably increases the flow of bile, and certainly unloads the portal circulation.

Colchicum is a specific palliative in acute gout, in which it should be given with an alkali, and kept short of emeto-catharsis. It does not prevent relapses, and its power in this disorder is weakened by repetition. In ascites from obstructive disease of the liver it is most effective, given in full doses to establish a profuse drain, with opium to sustain the heart. In acute cerebral congestion and in portal congestions it is well given as a drastic purgative. It is often used with marked success in acute rheumatism, but frequently fails, and in no case should it be continued long in this affection. It has given good results in the treatment of gonorrhea and chordee. The alkaloid is probably the best preparation for general use, and is admittedly superior to the other preparations in gout. The preparation known as Colchicine Salicylate is a solution of colchicine in oil of wintergreen. It should prove to be a reliable remedy for gout and rheumatism, and also for many disorders in which the rheumatic diathesis is a factor.

COLOCYNTHIS, Colocynth,—is the dried fruit of *Citrullus Colocynthis*, deprived of its rind. The plant is a native of Spain and Asiatic Turkey and belongs to the nat. ord. Cucurbitaceæ. The fruit is of the size of a small orange white, light, spongy, inodorous, very bitter, containing many flat, brown seeds which should be rejected before the pulp is used. Its active principle is *Colocynthin*, $C_{56}H_{84}O_{23}$, an amorphous but crystallizable bitter glucoside, readily soluble in water. It also contains *Colocynthein*, a resin, and *Colocynthitin*, a tasteless, crystalline powder, soluble in ether but not in water, and devoid of purgative action. Dose, gr. ss–jss [av. gr. j.]

Preparations.

Extractum Colocynthidis, *Extract of Colocynth.*—Dose, gr. ¼–j [av. gr. ss.]

Extractum Colocynthidis Compositum, *Compound Extract of Colocynth,*—contains of the preceding 16 parts, Aloes 50, Cardamom 6, Resin of Scammony 14, Soap 14, Alcohol 10. Dose, gr. v–xx [av. gr. vijss.]

Pilulæ Catharticæ Compositæ, *Compound Cathartic Pills,*—have of the preceding 8, Calomel 6, Resin of Jalap 2, Gamboge 1½, Water to make 100 pills. Dose, j–iij [av. ij pills.]

Pilulæ Catharticæ Vegetabiles, *Vegetable Cathartic Pills,*—have of Compound Extract of Colocynth 6, Extract of Hyoscyamus 3, Resin of Jalap 2, Extract of Leptandra 1½, Resin of Podophyllum 1½, Oil of Peppermint 0.8, Water to make 100 pills. Dose, j–iij pills [av. ij.]

Laville's Anti-Gout Remedy,—is a proprietary medicine prepared in France and purporting to be "a mixture of prepared Kino-colocynthine." The published formula is as follows: Active principle of Colocynth 2½, Quinine and Cinchonine 5, Spanish Wine 800, Alcohol 100, Water to 1000 parts; but there is good reason for believing that it contains *Colchicine* instead of Colocynthin.

Incompatibles.

Incompatible with *Colocynth* are: Alkalies, Ferrous Sulphate, Lead Sulphate, Lime-water, Mercuric Chloride, Silver Nitrate.

Colocynth is classed among the tonic-astringent and resin-bearing purgatives. In moderate doses it increases peristalsis and the intestinal glandular secretions, producing bilious, watery evacuations with much colicky, griping pain. Its purgative action is specific, and may be obtained by its application to the skin over the abdomen. In large doses it is a violent irritant of the gastro-intestinal tract, and has frequently produced fatal gastro-enteritis. It is popularly supposed to be abortifacient, but this is true only of quantities sufficient to endanger life. It is an indirect diuretic.

Colocynth is too severe an agent to be administered alone for constipation, but it makes a useful factor in compound purgatives, as the compound cathartic pills. In cerebral congestion it may be used to produce rapid derivation, and in ascites to set up a profuse drain from the intestinal canal. In certain cases of chlorotic amenorrhea it stimulates the pelvic nerves and vessels with excellent results. There seems to be abundant evidence that in very small doses, ♏ $\frac{1}{20}$–$\frac{1}{16}$ of a tincture, Colocynth is an efficient remedy in colic, sciatica, ovarian and other neuralgiæ, as well as in the pain of glaucoma. These actions may be due to its two non-purgative principles, which may prove to possess powers not heretofore suspected, an example of which is seen in the cardiac influence of Convallaria, a drug which was formerly known only as a purgative and a diuretic.

CONIUM, Hemlock,—is the full-grown, unripe fruit, of *Conium maculatum*, the spotted hemlock, nat. ord. Umbelliferæ. It contains 3 alkaloids, *Coniïne*, $C_8H_{15}N$, liquid and volatile, *Methyl-coniïne*, $C_8H_{14}NCH_3$, and *Conhydrine*, $C_8H_{17}NO$, solid and volatilizable; also coniïc acid and a volatile oil. *Paraconiïne* is an artificial substance produced by the reaction between butyric aldehyde and an alcoholic solution of ammonia, and is isomeric with coniïne but not identical with it. Dose, gr. j–v [av. gr. iij.]

Fluidextractum Conii, *Fluidextract of Conium,*—Dose, ♏j–x or more [av. ♏iij.]

Coniïna, Coniïne, $C_8H_{15}N$ (Unofficial),—an oily, limpid, volatile liquid, of acrid taste, alkaline reaction, and an odor comparable to that of the urine of mice. It is quickly decomposed by heat, and if exposed to the air soon becomes inert. Dose, gr. $\frac{1}{60}$–$\frac{1}{10}$, or in minim doses, ♏ $\frac{1}{10}$–ij. Is too irritant for hypodermic use, unless carefully neutralized by acetic acid. The Hydrobromide in watery solution of gr. viij to the ℥, of this ♏x = gr. ⅙, is a good form for subcutaneous or stomachal administration, and may be given in doses of gr. $\frac{1}{12}$ to gr. j, as it is not actively toxic.