

tion of amylic alcohol; but the two acids are not identical. The valerianic acid of pharmacy is, however, obtained in this way, and the various valerianates are products of the combination of the acid formed from amylic alcohol with bases.

ANTAGONISTS AND INCOMPATIBLES.—Quinine, digitalis, ergot, and remedies acting similarly, antagonize the actions of valerian.

SYNERGISTS.—All the agents of this group, opium, alcohol, ether, etc., increase the action of valerian.

PHYSIOLOGICAL ACTIONS.—Valerian and its preparations have a hot, pungent taste, and a peculiar and disagreeable odor. A sensation of warmth at the epigastrium follows when it is taken into the stomach. In large doses, nausea, hiccup, eructations of the drug, vomiting, and diarrhoea, may be produced. In small doses no appreciable physiological effects are observed; but in considerable doses the action of the heart is increased, the temperature of the surface rises, and diaphoresis occurs. As respects the nervous system, headache, vertigo, exhilaration of mind, spectral illusions, hallucinations, have, it is said, been produced by valerian; but these results are by no means constant phenomena. According to Von Grisar (Köhler), oil of valerian reduces the reflex excitability, motility, and sensibility, and antagonizes the tetanizing action of brucine.

The odorous principle—valerianic acid—appears in the sweat, breath, and also the urine.

THERAPY.—*The flatulence of the hysterical and hypochondriacal* is quickly relieved by the tincture or fluid extract of valerian.

It sometimes happens that a mild attack of *spasmodic asthma* may be relieved by valerian, but this by no means efficient remedy quickly loses its effect. *Whooping-cough, laryngismus stridulus,* and other *neuroses of the respiratory organs,* may be occasionally modified by this agent; but it is by no means equal to many other remedies now available.

The chief therapeutic use of valerian is in the treatment of *nervousness, hysteria, and hysterical disorders generally.* There can be no difference of opinion as to its great value in these cases; but as respects *epilepsy, chorea, paralysis agitans,* etc., in which it was formerly used, it must suffice to say that it is now never prescribed.

Under the impression that the physiological and therapeutical activity of valerian depends on valerianic acid, various valerianates have been introduced into practice. The only one which requires notice here is the *valerianate of ammonia,* which in the form of elixir is frequently prescribed in hysterical affections. Fluid extract of valerian has been used with advantage in *diabetes insipidus* and also in *saccharine diabetes,* but the results are not permanent. It diminishes the amount of urinary water in both, and lessens the excretion of sugar in the latter, but these effects continue only while the remedy is given.

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Cannabis Indica.—Indian cannabis. The flowering tops of the female plant of *Cannabis sativa* Linné (Nat. Ord. *Urticaceæ, Cannabineæ*), grown in the East Indies. (U. S. P.) *Chanvre Indien,* Fr.; *Hanfkrout,* Ger.

Cannabis Americana.—American hemp.

PREPARATIONS.—*Extractum Cannabis Indicæ.*—Extract of cannabis Indica. Dose, gr. $\frac{1}{4}$ —gr. ij or more.

Extractum Cannabis Indicæ Fluidum.—Extract of cannabis Indica. Dose, \mathfrak{m} ij—3 ss.

Tinctura Cannabis Indicæ.—Tincture of cannabis Indica. Dose, \mathfrak{m} v—3 j.

COMPOSITION.—The physiological activity of hemp is influenced largely by soil and climate; for, although in botanical characters Indian and American hemp are identical, the Indian hemp possesses decidedly more narcotic power. Indeed, until recently, it was supposed that American hemp was devoid of the peculiar properties possessed by the Indian; but it has been shown that American hemp does really have effects similar in kind to, but much less in degree than, those caused by the Indian.

The most important constituent of hemp is a peculiar *resin, cannabin,* which possesses the active powers of the plant. By distillation of the leaves and stems, a peculiar *volatile oil* is obtained; and this is divisible into *cannabene,* a very light hydrocarbon, and *hydride of cannabene,* a solid crystalline substance.

An impure resin, collected in an imperfect and crude way from the leaves and stems, is known as *charas,* or *churris.* *Bhang* consists of the dried leaves and stalks made into a confection with preserved fruits and aromatics, and, in this form, constitutes the well-known *hashish.* *Gunjah* is the female flowering plant, dried, from which the resin has not been extracted.

No arbitrary rules for the dose can be laid down. In beginning the use of any newly-made preparation, it is safer to commence with the minimum dose. Having, by gradually increasing the quantity, ascertained the physiological activity of that particular specimen, it may then be pushed according to the necessities of the case.

ANTAGONISTS AND INCOMPATIBLES.—The caustic alkalies, the acids, strychnine, and induction electricity, oppose the actions of hemp. In cases of poisoning, the stomach should be evacuated, and symptoms be combated as they arise. Strychnine may be injected hypodermatical-

ly, and the respiration be maintained by faradization of the respiratory muscles. As, however, hemp possesses but feeble toxic power, cases of acute poisoning have never been reported.

SYNERGISTS.—Alcohol, ether, nitrous oxide, the mydriatics—belladonna, hyoscyamus, etc.—opium, and the cerebral stimulants generally, promote the actions of hemp.

PHYSIOLOGICAL ACTIONS.—The resin of hemp is a soft solid; is soluble in alcohol and in ether, in the fixed and volatile oils, and in the fats. It has a balsamic taste, but is bitter and acrid. It promotes the appetite and the digestion somewhat. The most important actions are those referable to the nervous system. There is a distinction to be made between the effects on the nervous system of the inhalation of the fumes of hashish and those effects which follow the stomach administration. Inattention to this point has, probably, given rise to most of the confusion regarding the physiological actions of this remedy. When inhaled it produces a singular muscular erythism and agitation, a great desire for muscular activity and motion, an entire absence of the sense of fatigue; but these sensations are followed by exhaustion, even by syncope. Hallucinations occur, but they are not usually agreeable; they are often painful, and are replaced by stupor.

By the stomach, and in moderate doses, hashish is an excitant of the nervous system, increasing intellectual and motor activity. In large doses, it lowers the tactile sense and the sense of pain—in other words, it is analgesic and anæsthetic—and it induces a cataleptic state, in which the muscles maintain any position in which they may be placed. The mental intoxication is ordinarily of an agreeable kind; the ideas flow more easily, are highly pleasurable, and are usually accompanied by bursts of gay laughter. Not unfrequently the excitement takes the form of a furious delirium, in which acts of violence are committed—whence the name “haschaschins,” or assassins, applied to the unfortunate hashish-eater who, under the influence of the drug, commits murder. It has been maintained, and probably rightly enough, that the form which the delirium takes represents the mental and moral condition of the individual in his normal state: those who are amiable and gay become more so under the influence of hashish; and those possessed of evil and malignant dispositions enact deeds of violence.

Under the influence of hashish the knowledge of time is lost; such are the number and variety of the images which occupy the mind, that a few minutes appear to be hours, days, or even years. After the effects of the drug have passed off, the hashish-eater is usually unconscious of the events that have transpired. Sleep or coma, according to the dose, ends the effects of the drug.

Dilatation of the pupil, and disorders of vision, which contribute to the hallucinations by the distortion of external objects, are produced by hemp. Aphrodisiac effects are said to follow the use of hashish;

but impotence, which is common in hashish-eaters, doubtless results from the repeated over-stimulation of the sexual organs.

It is not known by what organs, or in what form, hashish is eliminated. The effects of a large dose are not entirely expended in twenty-four hours, and those who have taken it by way of experiment have suffered vertigo, headache, and other cerebral symptoms, for some time subsequently. It does not increase any of the secretions, except it may be the urinary, somewhat; and it does not stimulate into increased activity any organs except the cerebro-spinal and the sexual. The sleep or stupor which it produces, and which comes on after the stage of excitement, is not followed by after nausea and depression, as in the case of opium.

THERAPY.—The extract of cannabis Indica enters into the composition of chlorodyne, a nostrum which has had a great reputation as an anodyne and hypnotic. In *cholera morbus* and *diarrhœa* this remedy has been used successfully, but we now possess more efficient ones.

Before the days of anæsthesia, and in very remote times, the fumes of hashish were employed to stupefy and to render painless surgical operations. It was also employed to relieve *pain*, and as a substitute for opium in *neuralgia*, and as an *hypnotic*. In *migraine* it has been used with decided success by Seguin, Williams, and others. Good results have been obtained from it in *epilepsy* by Sinkler and others, and it deserves further consideration in this disease. In *chorea*, and in *delirium tremens*, it is strongly urged by De Cavaillon, and in *senile trembling* and *paralysis agitans* it has afforded relief. About one half of the cases of *tetanus*, for which hemp was much prescribed a few years ago, got well under its use; but more accurate knowledge of the natural history of this disease has shown that many cases tend to recovery without the aid of medicines.

It is well established that hemp has the power to promote uterine contractions. It can not initiate them, but increases their energy when action has begun. It may be given with ergot. In consequence of this power which it possesses to affect the muscular tissue of organic life, hemp is used successfully in the treatment of *menorrhagia*. It is said to be especially useful in that form of *menorrhagia* which occurs at the climacteric period (Churchill). It has, more recently, been shown to possess the power to arrest *hæmorrhage* from any point, but it is chiefly in *menorrhagia* that so much good is accomplished.

There can be no doubt that cannabis Indica is a useful remedy in cases of *impotence*. It need hardly be stated that it is adapted to the functional disorder. It may be advantageously combined with ergot and nux vomica in this malady; for example: ℞ Ext. cannabis Indicæ, gr. x; ergotin (aq. ex.), ℥ij; ext. nucis vom., gr. x. M. Ft. pil. no. xx. Sig.: *One morning and evening.*

This agent has also been used with success in the treatment of

gonorrhoea. It diminishes the local inflammation, allays chordee, and lessens the pain and irritation, with the accompanying restlessness.

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Erythroxyton.—Coca or cuca. The leaves of *Erythroxyton coca* Lamarck (Nat. Ord. *Erythroxyllaceæ*). (U. S. P.)

PREPARATION.—*Extractum Erythroxyli Fluidum*.—Fluid extract of erythroxyton. Dose, 3 ss—3 ij.

COMPOSITION.—The effects of coca, or cuca, depend on the presence of a peculiar alkaloid—*cocaine*. It contains also an aromatic oil which gives it the special aroma and taste, and it possesses considerable astringency, due to the presence of a tannic acid. The odor, taste, and appearance of the infusion are comparable to those of tea. Cocaine has decided basic properties, and combines with acids to form salts. It crystallizes in prisms in the smaller rhombic system (Husemann), which, when pure, are transparent and colorless. It is very slightly soluble in water and in alcohol, but dissolves freely in ether. It has a bitter taste, and the salts are more bitter than the alkaloid itself.

ANTAGONISTS AND INCOMPATIBLES.—The actions of coca are opposed by all those agents which increase waste. The infusion and fluid extract are incompatible with the metallic salts. Muriatic acid splits cocaine into benzoic acid and an alkaloid—*ecgonine*; hence the mineral acids should not be prescribed with the infusion and fluid extract.

SYNERGISTS.—The agents promoting constructive metamorphosis, caffeine, the cerebral stimulants, and the narcotics generally, increase the effects of coca.

PHYSIOLOGICAL ACTIONS.—The historical notes of Sir R. Christison show that the peculiar properties of cuca-leaves have long been known to the inhabitants of Peru. The leaves have a strong, tea-like odor, and the infusion resembles ordinary tea in taste. The volatile oil and the active principle are readily diffusible, and enter the blood with facility. A momentary depression of the pulse and diminution of the blood-pressure take place, but these effects are quickly overcome, and a considerable increase in the action of the heart and of the blood-pressure follows (Ott). A feeling of contentment and of well-being takes possession of the mind, the sense of fatigue is removed, drowsiness is experienced for a brief period, but it is soon succeeded by wakefulness, and increased mental activity. It has long been known to the mountaineers of the Peruvian Andes that chewing cuca-

leaves increases the respiratory power, and removes, or lessens, the sense of fatigue. The celebrated pedestrian, Weston, having learned this fact, was detected in the use of cuca during one of his extraordinary feats in London (Thompson).

As respects the action of cocaine on the nervous system, it has been demonstrated that it diminishes the excitability of the motor nerves, and impairs the power of voluntary co-ordination. Its influence on the sensory nerves depends on the quantity of the drug ingested; a small quantity increases the excitability of the sensory nerves, whereas a large quantity causes paralysis (Ott). It is not known whether or not the paralysis is the result of over-stimulation and an exhaustion of the sensibility. The posterior columns of the spinal cord are chiefly affected. The paralysis of the heart which ensues from a large quantity seems to be due to an action on the intra-muscular ganglia of this organ. It first excites, then paralyzes, the respiratory center.

The most interesting question connected with the action of cuca is its influence over the metamorphosis of tissue. It certainly lessens urea-elimination. As is the case with coffee and tea, cuca acts as an indirect nutrient, by checking waste, and hence a less amount of food is found necessary to maintain the bodily functions. It is probable that some of the constituents of cuca are utilized in the economy as food, and that the retardation of tissue-waste is not the sole reason why work may be done by its use which can not be done by the same person without it.

THERAPY.—Although cuca possesses valuable powers as a restorative, but little use has been made of it, except by the French. It will, no doubt, be found useful in *phthisis*, and *wasting diseases* generally, and in *convalescence from acute maladies*. It is a valuable remedy in the nervous form of sick-headache, *migraine*. It has been used with distinct advantage in the depression caused by the withdrawal of opium, in the treatment of the *opium-habit*, and in functional *impotence*, due to a lowered condition of the general health.

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 OTT, DR. ISAAC. *Cocaine, Veratria, and Gelsemia*. Philadelphia: Lindsay & Blakiston, 1874.
 THOMPSON, MR. J. ASHBURTON. *The British Medical Journal*, March 11, 1876, and March 18, 1876.

Caffeina.—Caffeine. A proximate principle of feebly alkaloidal power, generally prepared from the dried leaves of *Camellia thea* Link (Nat. Ord. *Ternstroemiaceæ*), or from the dried seeds of *Coffea Arabica* Linné (Nat. Ord. *Rubiaceæ*), or from guarana, and occurring also in other plants. (U. S. P.)

PREPARATIONS.—Citrate of caffeine. Dose, gr. j—grs. v.

PROPERTIES.—Caffeine crystallizes in needle-shaped crystals, and in prisms, the form depending on the mode of evaporating a concentrated solution. It has a bitter and disagreeable taste, and is soluble in water, alcohol, and ether. As regards composition, caffeine is remarkable for the quantity of nitrogen which it contains, surpassing in this respect almost all the alkaloids. In the coffee-bean, caffeine exists in combination with a peculiar acid, caffeic, and with caffeo-tannic acid.

ANTAGONISTS AND INCOMPATIBLES.—Tannic acid, iodide of potassium, and the salts of mercury, precipitate caffeine from its solution in water. Physiologically, it is antagonized by opium (Bennett).

SYNERGISTS.—The actions of caffeine are promoted by the agents of this group, and by the mydriatics.

PHYSIOLOGICAL ACTIONS.—The effects of coffee as a beverage have been sufficiently discussed elsewhere.

Caffeine, in small medicinal doses, promotes appetite, increases the digestive power by stimulation of the gastric glands, and relaxes the bowels slightly. On the heart it exerts at first a decided stimulant action, and raises the arterial tension; but these effects are succeeded by weakened cardiac movements and diminished blood-pressure, the cardiac muscle and its contained ganglia being both probably paralyzed by it. Respiration ceases before the heart stops in animals poisoned by caffeine (Bennett).

As regards the cerebral effects, it may be stated that, at first, drowsiness occurs; but this is soon followed by wakefulness, excitement, muscular trembling, confusion of mind, hallucinations, and delirium. The cerebral effects terminate in deep sopor, but this is probably the result of exhaustion. Rise of temperature, convulsions, general paralysis, occur when toxic doses are administered to animals; but the temperature declines when paralysis supervenes (Leven, Schmiedeberg, Bennett, and others).

THERAPY.—Caffeine is a useful *stomachic tonic*. In convalescence from acute maladies, it is in a high degree serviceable, given to promote the constructive metamorphosis. *Chronic catarrh* of the stomach, with occasional attacks of *migraine*, is a combination of maladies in which caffeine is especially useful. Paullinia, or *cuca*, may be used instead.

In the *diarrhoea of phthisis*, in ordinary *atonic diarrhoea*, in *cholera infantum*, and in *cholera morbus*, produced by agencies affecting the nervous system, the remedies of this group, especially caffeine, are often extremely useful. When the vital powers are depressed, and when there is at the same time an abnormal excretion of urea—a condition of things which exists in incipient phthisis, associated with indigestion—caffeine, *cuca*, and paullinia are in a high degree service-

able. They increase the appetite and the digestive power, and diminish tissue-waste.

Black coffee, or caffeine, increases the action of the heart and raises the arterial tension, and is therefore useful when the circulation is depressed from various causes.

An important use of caffeine, at present, is in the treatment of *headache*. It is adapted especially to the relief of *migraine*, the so-called nervous headache, accompanied with or without stomach-derangement. In this disorder we may administer a grain of caffeine every half-hour, until the headache is relieved; or the citrate of caffeine may be given in an effervescent draught. A very elegant preparation is the granular, effervescent citrate of caffeine.

Caffeine has proved very useful in *cardiac dropsy*; and in *renal dropsy* in inverse ratio to the amount of damage suffered by the kidneys, for, as Brackenridge has shown, this remedy does not increase the flow of urine when the renal epithelium is destroyed. It may be used with advantage in *ascites* when any diuretic will prove serviceable. It has, within the past two years, been much employed by the French therapeutists, in place of digitalis, in the treatment of certain cardiac affections. According to Huchard, caffeine acts more rapidly than digitalis, causing free diuresis in twenty-four hours. It slows the pulse and raises the arterial tension, thus effecting a better distribution of the blood. To bring about these desirable effects, Huchard rapidly increases the dose, so that on the third day he gives a gramme (15½ grs.) hypodermatically.

The action of opium is antagonized by caffeine; hence this agent is employed in *opium narcosis*, and in some cases with success. It may be injected hypodermatically when the patient is unable to swallow; but it can not take the place of atropine.

In *hypochondriasis*, and in *simple melancholy*, caffeine has been used with advantage. It may be given to relieve the *drowsiness* which in so many persons comes on after a late dinner. It helps to dissipate the *stupor of uræmia*.

Cases of *cervico-brachial neuralgia* have been relieved by the hypodermatic injection of caffeine.

Guarana.—A dried paste, prepared from the crushed or ground seeds of *Paullinia sorbilis* Martius (Nat. Ord. *Sapindaceæ*). (U. S. P.)

Extractum Guaranae Fluidum.—Fluid extract of guarana. Dose, ℥ x—3 ij.

COMPOSITION.—It contains a principle which has been entitled *guaranine*, and which subsequent researches have proved to be identical with caffeine.

ACTIONS AND USES.—The physiological effects of paullinia are due to its alkaloid, chiefly; and, as this is the same as caffeine, the ob-

servations already made on the latter are equally applicable to the former.

The special use of paullinia is in the treatment of sick-headache or *migraine*. It is adapted to the so-called nervous form of sick-headache, and is less efficient when the attacks are due to stomachal troubles. As it possesses, directly or indirectly, restorative powers, it may be employed to promote constructive metamorphosis. Administered with this view, it may be given with advantage in the *convalescence from acute maladies*, in *incipient phthisis*, and in the *wasting diseases generally*.

The most agreeable form in which to administer paullinia is the elixir, but, as this preparation varies according to the taste, honesty, and skill of the apothecary, the physician needs to be assured of its quality before prescribing.

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 PRATT, DR. *Boston Medical and Surgical Journal*, vol. ii, 1868, p. 6.
 SCHMIEDEBERG, PROF. O. *Ueber die Verschiedenheit der Caffeinwirkung an Rana temporaria L. und Rana esculenta L.* *Arch. f. exper. Path. u. Phar.*, 1874, p. 63.

REMEDIES WHICH DIMINISH OR SUSPEND THE
 FUNCTIONS OF THE CEREBRUM AFTER A PRE-
 LIMINARY STAGE OF EXCITEMENT.

To this group belong the so-called narcotics, the anæsthetics, and some of those usually classed as antispasmodics. They all agree in these respects : their effects are expended, chiefly, on the nervous system ; they first stimulate the functions of the brain, but this stage of excitement, which may be of shorter or longer duration, is followed by sopor, coma, and complete insensibility.

Alcohol.—Alcohol. A liquid composed of 91 per cent by weight (94 per cent by volume) of ethyl alcohol, and 9 per cent by weight (6 per cent by volume) of water. Specific gravity, 0.820 at 60° Fahr. A transparent, colorless, mobile, and volatile liquid of a characteristic, pungent, and agreeable odor, and a burning taste. (U. S. P.)

Alcohol Dilutum.—Diluted alcohol. A liquid composed of 45.5 per cent by weight (53 per cent by volume) of ethyl alcohol, and 54.5 per cent by weight (47 per cent by volume) of water. Specific gravity,

0.928 at 60° Fahr. Alcohol, 50 parts ; distilled water, 50 parts. (U. S. P.)

Alcohol Amylicum.—Amylic alcohol. Fusel-oil.

A peculiar alcohol, obtained from fermented grain or potatoes, by continuing the process of distillation after the ordinary spirit has ceased to come over. An oily, nearly colorless liquid, having a strong, offensive odor, and an acrid, burning taste. Its specific gravity is 0.818, and its boiling-point between 268° and 272°. It is sparingly soluble in water, but unites in all proportions with alcohol and ether. It does not take fire by contact with flame, and, when dropped on paper, does not leave a permanent greasy stain. Exposed to the air in contact with platinum-black, it is slowly oxidized and yields valeric acid. (U. S. P., 1870.)

Spiritus Frumenti.—Whisky. An alcoholic liquid, obtained by the distillation of fermented grain (usually corn, wheat, or rye), and at least two years old.

Whisky has an amber color, a distinctive taste and odor, and a specific gravity not above 0.930 nor below 0.917, corresponding approximately with an alcoholic strength of 44 to 50 per cent by weight, or 50 to 58 per cent by volume.

Spiritus Vini Gallici.—Brandy. An alcoholic liquid obtained by the distillation of fermented grapes, and at least four years old.

Brandy has a pale, amber color, a distinctive taste and odor, and a specific gravity not above 0.941 nor below 0.925, corresponding approximately with an alcoholic strength of 39 to 47 per cent by weight, or 45 to 55 per cent by volume. (U. S. P.)

COMPOSITION.—A large number of bodies have been classed under the generic term of alcohols. A list of the most important of these is subjoined :

Methylic alcohol.....	CH ₄ O.
Ethylic "	C ₂ H ₆ O or CH ₄ O+(CH ₂).
Propylic "	C ₃ H ₈ O or CH ₄ O+2(CH ₂).
Butylic "	C ₄ H ₁₀ O or CH ₄ O+3(CH ₂).
Amylic "	C ₅ H ₁₂ O or CH ₄ O+4(CH ₂).
Caproic "	C ₆ H ₁₄ O or CH ₄ O+5(CH ₂).

These alcohols are called "homologous," because they are closely related to each other, and differ by the common multiple CH₂. Ethylic is the common or ordinary alcohol, and amylic is an impurity existing in certain alcoholic beverages—for example, whisky, in which it occurs in consequence of the cupidty of distillers in carrying on the process after all the ethylic alcohol has distilled over. Absolute alcohol should be entirely free from any odor except its native ethereal odor, and no products but carbonic acid and water should result from its combustion.

Whisky is a solution of alcohol in water (48 to 56 per cent), but