chorea and epilepsy. It does not promise well as a therapeutic agent, but undoubted cases of hydrophobia are reported by high authority as having been cured by this drug.

CUSSO, Kousso, (*Brayera*)—is the dried female inflorescence of *Hagenia abyssinica*, an Abyssinian tree of the nat. ord. Rosaceæ. It contains tannic acid, a volatile oil, and a crystalline principle named *Koussin*. Dose, ʒij–ʒj [av. ʒss.]

Cusso has little or no effect except the nausea, vomiting, colic and slight diarrhea produced by large doses. Its chief action is anthelmintic against both varieties of tapeworm, but it rarely expels the head of the parasite, and is very nauseous to the taste and difficult of retention by the stomach in the large doses necessary to efficiency. From ʒij to ʒj of the flowers infused in ʒiv of boiling water is the usual dose, which should be taken on an empty stomach and followed by a castor-oil or saline purge after 3 or 4 hours. An emulsion of a 6 per cent. infusion with castor-oil, yolk of egg, a few drops of ether and oil of anise with 10 to 20 drops of the Oleoresin of Aspidium, is more agreeable and efficient than the infusion alone.

CYDONIUM, Quince Seed (Unofficial),—is the seed of *Cydonia vulgaris*, a tree of the nat. ord. Rosaceæ, native in Crete and Austria, and cultivated elsewhere. The seeds placed in water swell up, forming a mucilaginous mass. The mucilage is the only constituent of importance and is contained in the epithelial cells. It is named *Cydonin*, and is considered to be a compound of gum and cellulose.

Mucilago Cydonii, *Mucilage of Cydonium* (Unofficial),—is prepared by macerating 2 parts of Cydonium in 100 of Distilled Water. Dose, indefinite.

Cydonium is of value for its mucilage, which is used as a bland, demulcent application in conjunctivitis, abrasions of the skin, and fissures of the mucous membranes, and as a vehicle for injections in gonorrhea. Internally it may be used as a soothing remedy for the throat, stomach, or intestines. The preparation known as *Bandoline*, used as a hair-dressing, is identical with mucilage of cydonium.

CYPRIPEDIUM,—is the dried rhizome and roots of *Cypripedium pubescens*, the Ladies' slipper, or of *C. parviflorum*, the moccasin-plant, or American valerian (nat. ord. Orchidaceæ). It contains a volatile oil, a volatile acid, resins, and tannin.

Fluidextractum Cypripedii, *Fluidextract of Cypripedium*.—Dose, ɱx–xxx [av. ɱxv.]

Cypripedin (Unofficial),—is an impure alcoholic extract. Dose, gr. ss–ij.

Cypripedium is antispasmodic, tonic, stimulant and diaphoretic, possessing the same general properties as Valerian, whence one of its common names, American valerian. It is a popular remedy in some parts of the United States for nervous hyperesthesia unaccompanied by organic lesions, and especially in morbid sensibility of the eye. It is reported to have even cured epilepsy, and is said to be highly useful in neuralgia, hysteria, nervous headache and insomnia.

DAMIANA (Unofficial),—the leaves of *Turnera aphrodisiaca*, a plant of the nat. ord. Turneraceæ, growing in Mexico and Lower California. Several varieties of so-called Damiana are in the market, but the true leaf is of a light-green color, small, lanceolate, and dentate along the margin. It contains a volatile oil and a resin. Dose, ʒj daily.

Damiana is said to be a powerful aphrodisiac in cases of sexual atony, but the published reports of its use vary greatly as to its efficacy. It is probably a stimulant diuretic, a bitter tonic, and a purgative in sufficient doses. Besides its use as an aphrodisiac Damiana has been administered with benefit in some forms of cerebral exhaustion and general atony of the nervous system, also in sick headache and in some few cases of paralysis. It forms the chief stock in trade of the numerous charlatans who fill the daily papers with advertisements of "manhood-restorers."

DIGITALIS, Digitalis,—is the dried leaves, collected from plants of the second year's growth, at the commencement of flowering, of *Digitalis purpurea*,

the purple foxglove, a plant of the nat. ord. Scrophulariaceæ, which grows wild in Europe, and is cultivated in this country, often in private gardens for its beautiful spike of purple flowers, and largely by the Shakers for the drug market. Dose, gr. ss–ij [av. gr. j.]

The British Phar. formerly directed that the official drug shall consist of "the dried leaf, collected from the *wild*, indigenous plant, when about two-thirds of the flowers are expanded." Much of the leaf found in our shops is of very poor quality, a large proportion being inert; but whether this is due to our Pharmacopœia not restricting the official drug to the wild plant, or to careless treatment in gathering and drying, is not definitely known. When the leaves are imperfectly dried a process of decomposition sets in, which destroys the active principles, and may produce new and poisonous ones. A similar decomposition is said to occur whenever the tincture of Digitalis is mixed with watery or syrupy solutions. It is a fact that Digitalis is one of the most unreliable drugs, in respect to the physiological activity of any particular sample or preparation. The seeds are known to contain the active principles in much greater proportion than the leaves, but they are never used.

Constituents of Digitalis.

The supposed active principle of Digitalis was first designated by the term *Digitalinum* (Digitalin), under which name a substance was official in the U. S. Phar. and a process was given therein for its extraction, until the revision of 1880, when it was omitted. It was an amorphous product, of complex composition, and did not represent Digitalis. In 1871 Nativelle received the Orfila prize from the French Academy for the discovery of a crystalline principle in Digitalis, which he named *Digitaline*. This was supposed to be the active principle of the plant, until Roucher (1872) and Schmiedeberg (1875) found it to be a complex body consisting of a mixture of Digitalin and Digitoxin.

Schmiedeberg's latest analysis is now accepted as the most accurate determination yet obtained of this vexed question. He enumerates five principles as contained in Digitalis, namely—

Digitalin, a granular glucoside, soluble in alcohol, almost insoluble in water, sparingly soluble in ether or chloroform; possesses in a high degree the medicinal action of digitalis; the active ingredient of Homolle's French Digitaline and the Digitalin formerly official in the U. S. and Br. Pharmacopœias.

Digitoxin, a crystalline principle, perhaps an alkaloid; soluble in alcohol, slowly in chloroform, sparingly in ether, quite insoluble in water; the most toxic of all the constituents, but uncertain, cumulative and dangerous in its action; the principal constituent of Nativelle's prize Digitaline.

Digitaleïn, an amorphous glucoside, soluble in both water and alcohol, insoluble in ether or in chloroform. Its action on the heart is non-cumulative and it causes no irritation when subcutaneously injected.

Digitonin, a crystallisable glucoside resembling *Saponin*, soluble in water, insoluble in cold alcohol, in ether or in chloroform. It is probably the diuretic agent.

Digitin, a crystalline body, insoluble in ether or chloroform, scarcely soluble in water, more readily in alcohol. It is physiologically inert.

The first three are cardiac stimulants and are highly poisonous. Digitonin is a direct depressant of the heart and antagonizes the stimulant action of the others. All five are non-nitrogenous, and except Digitoxin and Digitin are glucosides. Digitalis contains no alkaloid unless Digitoxin be considered one.

Official Preparations.

Fluidextractum Digitalis, *Fluidextract of Digitalis*,—Dose, ɱss–iij [av. ɱj.]

Extractum Digitalis, *Extract of Digitalis*,—prepared by evaporating the fluidextract to a pilular consistence. Dose, gr. ⅛–ss [av. gr. ⅓.]

Tinctura Digitalis, *Tincture of Digitalis,*—10 per cent., in diluted Alcohol. Dose, ♏v–xx [av. ♏xv.]

Infusum Digitalis, *Infusion of Digitalis,*—Digitalis 1½, Alcohol 10, Cinnamon Water 15, Boiling Water 50, Water to 100. Dose, ℥j–iij [av. ℥ij.] Notice that the dose is in drachms, not in ounces. The British infusion has less than ½ the strength of the above and is given in doses of ℥ij–iv. In France a cold infusion is preferred, 5 grains of the powdered drug being macerated in 4 ounces of cold water for 8 to 12 hours and then filtered; dose ℥ss every two hours.

Unofficial Preparations.

Digitalinum, *Digitalin,*—is the complex product of the process formerly official in the U. S. and Br. Phar. Dose, gr. $\frac{1}{60}$–$\frac{1}{30}$.

Homolle's or **Quévenne's Digitalin,**—is much used in France in form of granules. Consists chiefly of Digitalin with a little Digitoxin, and possesses the action of the leaves. An amorphous, yellowish-white powder or small scales, intensely bitter, inodorous, but irritant to the nostrils. Dose, gr. $\frac{1}{60}$, equal to about gr. jss of the powdered leaves.

Nativelle's Digitaline,—consists largely of Digitoxin, and is cumulative in action. Light, white, crystalline tufts of needles, of very bitter taste; soluble in alcohol, insoluble in water. Dose, gr. $\frac{1}{100}$–$\frac{1}{60}$ in pill.

Digitalinum Verum,—is the distinguishing name given by Kiliani to Schmiedeberg's Digitalin, which he believes to be the best form in which to prescribe Digitalis. Its composition is definite, it is obtainable commercially in a sufficiently pure condition, it possesses the medicinal action of Digitalis on the heart, is non-cumulative, and is soluble in 100 parts of 50 per cent. alcohol, and in 1000 of water. Dose, gr. $\frac{1}{300}$ every 2 or 3 hours.

Digitalinum Germanicum, *German Digitalin* (Merck),—is a mixture of the Digitalin of Kiliani, with Digitalein, Digitoxin, and certain inert principles. It occurs as a white powder, soluble in water and in alcohol. Dose, gr. $\frac{1}{10}$–$\frac{1}{2}$, thrice daily.

Digitoxinum, *Digitoxin,*—is crystalline, soluble in alcohol, insoluble in water, and is one of the most powerful poisons known. Dose, gr. $\frac{1}{750}$.

Digalen, *Soluble Digitoxin* (Cloetta, 1904),—is chemically identical with Schmiedeberg's crystalline Digitoxin. Used hypodermically 2 to 4 times in doses of mg 0.25 (gr. $\frac{1}{250}$) it produces the physiological effects of digitalis within 24 hours, viz.—increased blood-pressure, marked diuresis, and at times slowing of the pulse. Dose, gr. $\frac{1}{500}$–$\frac{1}{250}$.

Incompatibles.

Incompatible with *Digitalis* are: Acids, Alkalies, Alkaloidal precipitants (see page 5), Cinchona infusion, Ferrous Sulphate, Lead Acetate, Tannic Acid, Vegetable astringents, Syrupy and Aqueous solutions. Physiologically incompatible are: Aconite, Chloral Hydrate, Cocaine, Glonoin, Muscarine, Saponin, Scoparin, Strychnine.

Physiological Action.

Digitalis is a cardiac and vascular stimulant, a diuretic in certain conditions, an emetic to some persons, hemostatic, anaphrodisiac, excitomotor and at last a paralyzant. In over-doses it irritates the mucous membranes, causing sneezing, gastric disturbance, nausea, vomiting, colic and purging, the discharges being of a grass-green color. In such doses it lowers temperature, probably by lessening the blood-supply to the tissues, produces headache, irregularity of the cardiac action, vertigo, and an appearance of vibratory fringes of color around objects. Even in moderate doses it frequently causes hallucinations and delirium.

Digitalis slows the action of the heart but increases its force at the same time. It stimulates the cardiac muscle and its inhibitory apparatus, and also stimulates the vaso-motor centres, contracting the arterioles and thereby greatly

raising arterial tension. The continued use of full doses dilates the blood-vessels, exhausts the irritability of the cardiac motor ganglia, and finally paralyzes the cardiac muscle itself. The recumbent posture must be maintained when Digitalis is given for its full cardiac effects. Its final effect on striped muscular tissue is to lessen the contractile power, causing great weakness and languor. Under its influence the excretion of urea is at first increased, but soon decidedly diminished. It lessens the sexual appetite and impairs the venereal function. Lethal doses lessen the reflexes by stimulation of Setschenow's centre, and paralyze the muscles and the peripheral nerves, motor and sensory. Respiration, at first slowed, becomes rapid and feeble; cyanosis, coma and convulsions follow, finally death by sudden paralysis of the heart, which is arrested in systole.

It has been conclusively shown that in many cases of pneumonia Digitalis failed to influence the pulse, the result probably of the partial paralyzant influence of high body-temperature upon the vagus centre and endings in the heart, thus weakening the inhibitory apparatus to such a degree that the drug awakens no responsive increase of inhibition. In cases with but moderately high pyrexia the characteristic action of the drug is not interfered with.

Compared with Aconite, both that drug and Digitalis slow the heart, but otherwise their actions are antagonistic. Aconite at first stimulates and soon relaxes inhibition and depresses the cardiac motor ganglia,—Digitalis increases inhibition and stimulates the cardiac muscle. Both drugs finally paralyze the heart, Aconite by direct depression of its motor ganglia, Digitalis by over-stimulation of the cardiac muscle. Under Aconite the heart is arrested in diastole, under Digitalis in systole. The arterial tension is lowered by Aconite but is raised (at first) by Digitalis. Aconite acts quickly, Digitalis very slowly,—a fact which makes the latter drug of little value in poisoning by the former.

During the use of this drug for any length of time the muscle of the heart is so strained by over-stimulation that on suddenly assuming the erect position the cardiac energy may fail, more especially if the doses are administered too close together to admit of the elimination of one before the ingestion of the next. This is the explanation of the so-called cumulative action of Digitalis, which is not now generally recognized in the sense in which the term was formerly applied. Another explanation is that it may stop its own excretion, by arresting the renal circulation and the secretion of urine through extreme contraction of the renal vessels, and thus may really accumulate in the blood.

The diuretic action of Digitalis is not yet fully understood. All authorities agree that this action is exercised indirectly through the circulation, but many differ in regard to its details. One theory is that the constituent principle Digitalin contracts the bloodvessels all over the body, while others (Digitoxin and Digitaleïn or perhaps Digitonin) dilate the renal arteries. The effect of this, together with the increased force of the ventricular contractions caused by the drug, is to greatly raise the general arterial tension and consequently

to increase the bloodpressure in the glomeruli; while the rapidity of the renal circulation is increased and its volume augmented by the strengthening of the cardiac contractions and the dilatation of the afferent renal vessels. If this explanation be true, no other drug possesses such double power, and so far as vascular action is concerned Digitalis is the ideal diuretic. Another theory is that when a small dose is given, or during the first stage of a large dose, the renal arteries contract as do the other arteries of the body, but they are the first to dilate under the continued influence of the drug, which then acts as a diuretic. It is generally conceded that Digitalis has some diuretic power in health, but that this is slight compared with the diuresis produced by it in cases of dropsy, especially when due to cardiac disease. Much uncertainty exists as to its effect upon the constituents of the urine, some maintaining that it increases the elimination of urea, others that this is diminished, and still others that it is at first increased and afterwards diminished. It is slowly absorbed, and slowly eliminated by the kidneys.

Therapeutics.

The employment of Digitalis in disease is chiefly based on its powers of giving rest and tone to the heart, and stimulating the action of the kidneys. The forms of heart disease in which it is indicated are the affections of the auriculo-ventricular orifices, namely, mitral and tricuspid disease, whether regurgitant or obstructive in character. It is contra-indicated in aortic disease, except for special symptoms, and is injurious in fatty degeneration of the cardiac muscle. Its particular sphere of usefulness is *mitral regurgitation*, especially when accompanied by venous engorgement of the lungs, the right heart, the liver, kidneys and subcutaneous tissues. In such cases its action is shown to striking advantage, ameliorating all the symptoms by assisting the flow of blood in the veins. By prolonging the diastole, it gives the heart some amount of rest, and affords time for the dilated auricle to empty itself through the incompetent orifice; and by strengthening the contraction of the left ventricle, it causes the better approximation of the mitral flaps, consequently less regurgitation occurs, less venous engorgement, and the propulsion of more blood into the arterial system. If it also acts as a diuretic, as it usually does in these cases, the diuresis will tend to remove the edema; and the general improvement in the circulation produced by it will relieve the cardiac pain and distress, the dyspnea and cyanosis. The less a case of mitral regurgitation approaches the edematous type, the less good will Digitalis do as a rule. In *mitral constriction*, Digitalis is usually of great assistance, the lengthened diastole giving more time for the blood to pass through the narrowed orifice, and the increased force of the auricular contraction helping in the same direction.

In *tricuspid regurgitation* or *constriction*, Digitalis is beneficial in the same manner as in disease of the mitral valve. It is particularly useful in dilatation of the right side of the heart with incompetence of the tricuspid. The rational

symptoms which indicate its use are—rapid and feeble cardiac action, low arterial tension, cough, dyspnea, pulsating jugulars, a dusky face, scanty and high-colored urine and general dropsy.

In *aortic regurgitation*, Digitalis is generally injurious; the prolonged diastole caused by it giving more time for the blood to regurgitate through the imperfectly closed orifice, thus increasing the danger of fatal syncope. It may do good if compensatory hypertrophy has not set in, if the heart is feeble and its action rapid, or when there is but little blood regurgitating, or when there are reasons, such as the coincident presence of aortic obstruction, for wishing to strengthen and regulate the contraction. In any case, the dose administered should be a small one, and its effects should be carefully watched. In *aortic constriction*, Digitalis is generally contra-indicated, especially when this lesion is accompanied by aortic regurgitation, as is usually the case. It may be of service, however, when the force of the heart-beat requires strengthening; or when, as a result of the obstruction, mitral dilatation has set in, with much regurgitation and the consequent venous and pulmonary engorgement. It should not be used in aortic stenosis with compensatory hypertrophy, in simple hypertrophy when compensated, in pericarditis or in fatty degeneration of the heart, except temporarily for some special indication.

In the irritable heart of soldiers Digitalis is often curative, and palpitation, cardiac failure and venous engorgement are well treated by it. In exophthalmic goitre it has apparently benefited some cases, when used over a long course of treatment; but, as a rule, this affection is not amenable to its influence.

Digitalis is not a suitable diuretic in Bright's disease, though it has been used with benefit in the early stage of the acute form. If its action produces dilatation of the renal arteries it is questionable practice to increase the circulation in any acutely inflamed organ; while on the other hand the arterial tension is always raised in such cases, and this drug only aggravates that condition. In chronic Bright's disease it is still more injurious, for the same reason, the arterial tension being already very high in that affection. It may be useful in cases of renal cirrhosis, when the cardiac hypertrophy has failed to overcome the peripheral resistance, and consequently there is dilatation of the left ventricle and the left auriculo-ventricular orifice, with the resulting mitral regurgitation. In such cases, a diuretic pill is frequently of service, consisting of digitalis leaves in powder, calomel and squill, a grain of each, made into pill with extract of hyoscyamus.

Digitalis is always an uncertain diuretic unless the heart is diseased; yet it has rendered good service in renal dropsy as well as in the cardiac form. Its contractile power over the arteries may so predominate as to arrest the renal circulation, and stop the secretion of urine, hence it is well to administer at the same time an agent which causes dilatation of the renal vessels, as sodium nitrite. Contrary to theory it has been employed with benefit in the early stage of scarlet fever, and when the kidneys strike work in that disease. As a hemo-

static it may be used in hemorrhage from a large surface, in the hemorrhagic diathesis, hemoptysis, and menorrhagia. As an antipyretic it has been used in fevers, in the first stage of pneumonia, and in other inflammations, but a reaction is setting in against this employment of so powerful an agent, which by over-stimulation may act as a heart-depressant. In rheumatic fever it lowers the temperature, shortens the duration of the disease, and is particularly indicated for cardiac complications. It was formerly much used in delirium tremens, in congestive headaches, acute mania and other congestive conditions of the brain, but generally without much benefit. In spermatorrhea of the plethoric it may be well combined with potassium bromide, and when this affection is complicated with an atonic condition, shown by feeble erections, frequent emissions, and cold feet and hands, it is a serviceable anaphrodisiac. Finally, Digitalis is said by high authority to be particularly adapted to blondes and persons of sanguine and indolent temperament. Sometimes the vomiting caused by it is so severe as to prevent its use.

Administration.

Of the four active principles contained in this plant, namely—Digitalin, Digitoxin, Digitaleïn and Digitonin, the first two are soluble in alcohol and practically insoluble in water, the third is soluble in both menstrua and the fourth is insoluble in alcohol but is freely soluble in water. Consequently all alcoholic preparations of Digitalis contain the first three principles and all aqueous ones contain the last two. In action the first three are very similar, producing the characteristic effects of the plant, while Digitonin is directly poisonous to the cardiac muscle, decreasing its contractile power. This principle produces dilatation of the arteries, generally antagonizes the action of the other constituents, and perhaps irritates the renal epithelium. When, therefore, the cardiac action of Digitalis is desired, the tincture should be employed, given on sugar or bread, prohibiting the ingestion of any aqueous fluid within 20 minutes, either before or after swallowing it. If the diuretic action is required, the proper preparation is the infusion. The latter preparation may be employed hypodermically, and very small doses so administered have been found efficient when larger ones given by the stomach have failed to act. An infusion for this purpose has the strength of 3 parts of the leaf in 100 of water, and its hypodermic dose is 15 minims twice or thrice daily.

DIOSCOREA, Wild Yam, Colic-root (Unofficial),—is the rhizome of *Dioscorea villosa*, a creeping plant of the nat. ord. Dioscoraceæ, indigenous to the eastern U. S. It contains an acrid resin, and is reported to be expectorant and diaphoretic in action, as well as stimulating to the intestinal canal, and in large doses to cause general neuralgic pains with erotic excitement. It is used with success in bilious colic; and in the cramps of cholera morbus, spasmodic hiccough, dysmenorrhea and noctornal emissions of sthenic type it is said to be very efficient. A powdered extract named *Dioscorein* is on the market, the dose of which is gr. j–iv. A fluidextract made according to the pharmacopœial rule may be administered in doses of ♏xv–xxx.

DITA BARK (Unofficial),—is the bark of *Alstonia scholaris*, a tree of the nat. ord. Apocynaceæ, growing in the Philippine Islands. It contains two active alkaloids, *Ditaine* and *Ditamine*, the former of which has an action identical with that of Curare. The bark is considered tonic and antiperiodic, and is used in the East as a remedy for intermittents. It may be given in doses of ʒj–iv, in powder or as a fluidextract.

The Australian bitter bark, *Alstonia constricta*, yields an alkaloid *Alstonine*, which resembles quinine in many respects. A tincture of the bark has slight diuretic and diaphoretic action, and has been used with benefit in influenza.

DROSERA, Sundew (Unofficial),—a fluidextract of *Drosera rotundifolia*, the round-leaved Sundew, is said to have been successfully used in phthisis pulmonalis. It is certainly a most useful agent in whooping-cough and other spasmodic coughs; especially when marked by violent paroxysms, the cough being loud and harsh, and followed by bleeding from the nose or mouth, and perhaps by vomiting of the contents of the stomach. The expressed juice has been applied to warts and corns, for the purpose of curing them. Dose of the fluidextract, ♏v–xx.

DUBOISIA (Unofficial),—is the leaf of *Duboisia myoporoides*, an Australian tree of the order Solanaceæ. It contains a poisonous alkaloid, *Duboisine*, which is believed to be identical with Hyoscyamine; also *Hyoscine*, *Pseudohyoscyamine*, and other alkaloids. Another species, *Duboisia Hopwoodii*, contains *Piturine*, an alkaloid which is practically identical with Nicotine.

Unofficial Preparations.

Extractum Duboisiæ, *Extract of Duboisia,*—Dose, gr. $\frac{1}{6}$–$\frac{1}{4}$.

Tinctura Duboisiæ, *Tincture of Duboisia,*—Dose, ♏v–xx.

Duboisinæ Sulphas, *Duboisine Sulphate* (Langenberg's),—Dose, gr. $\frac{1}{100}$–$\frac{1}{30}$.

Incompatibles are the same as for Belladonna (see page 172).

PHYSIOLOGICAL ACTION AND THERAPEUTICS.

The actions of Duboisia are in all respects similar to those of its congener, Belladonna, except that Duboisine is more soluble in water than Atropine, is less irritant to mucous membranes, and more prompt in mydriatic action, but its effects are of shorter duration. It is also less of a cerebral excitant and more of a calmative and hypnotic. On man its action is said by some authorities to be more powerful than that of Atropine, but less powerful on frogs. If administered before meals it disorders the ensuing digestion, but does not so act if given while digestion is in progress.

Duboisine is highly praised for its sedative action in the mental excitability of the insane, in the treatment of the morphine habit and in paralysis agitans. In doses of gr. $\frac{1}{100}$ to $\frac{1}{75}$ of the sulphate, administered hypodermically twice daily, it induces quiet and refreshing sleep and is not dangerous. When given in larger doses it may produce vertigo, nausea or even syncope, but no fatal cases from its moderate use have been reported (Massant). Its sedative effect is at the same time the most persistent and also that of which the patient first acquires a tolerance. Of 22 cases in which the calmative effect was at first decided, a tolerance was acquired in eight. In such cases the sedative action of the drug may be restored by ceasing its continuous administration and length-

ening the interval between the doses (De Montyel). It has been well employed in puerperal mania, and may be used instead of Atropine in many conditions, especially in the night-sweats of phthisis, respiratory neuroses and cardiac failure. It is employed as a mild mydriatic by eye surgeons, its advantages over Atropine being its more rapid action in paralyzing accommodation and effecting mydriasis, the shorter duration of its effects and the slight degree of conjunctival irritation produced by it.

DULCAMARA, Bittersweet (Unofficial),—the young branches of *Solanum Dulcamara*, the woody night-shade, a shrub of the nat. ord. Solanaceæ, growing in Europe and N. America. It contains the glucoside *Dulcamarin*, a peculiar principle named *Picroglycion*, and the alkaloid *Solanine*, $C_{42}H_{87}NO_{15}$, which is found also in other species of Solanum, namely, *S. tuberosum* (potato), *S. Lycopersicum* (tomato), and *S. nigrum* (black night-shade). *Solanine* is of bitter taste and alkaline reaction, crystallizing in minute prisms, which are soluble in 125 of boiling alcohol but very insoluble in water. It is a narcotic poison, but exists in very small quantity in the plant.

Unofficial Preparations.

Fluidextractum Dulcamaræ, *Fluidextract of Dulcamara,*—Dose, ʒss–jss.

Decoctum Dulcamaræ, *Decoction of Dulcamara,*—may be made of 10 per cent. strength and given in doses of ʒj–ij.

Physiological Action and Therapeutics.

Dulcamara is but imperfectly understood. In overdoses it has produced nausea and vomiting, vertigo, convulsive muscular movements, pruritus, erythematous eruptions on the skin, and languid circulation with a dusky color of the face and hands. In children who have eaten the berries there have been observed signs of severe enteralgia, abdominal tenderness, nausea, thirst, heat in the throat and chest, great prostration, rapid pulse, quick and painful respiration. In very large doses it is a narcotic poison, causing paralysis by depression of the central nervous system, with lowered activity of the heart and respiration. It is believed by some authorities to be anaphrodisiac, diaphoretic and diuretic.

Dulcamara was formerly used in a variety of affections, as herpetic diseases, chronic rheumatism, gout, and jaundice. It is now chiefly employed in obstinate scaly skin diseases, as psoriasis and pityriasis, in which it is unquestionably serviceable. It is also serviceable in the diarrhea of children when produced by exposure to cold and damp, in mania with strong venereal propensities, in chronic bronchitis and in whooping-cough. As a diaphoretic it has been used with benefit in rheumatic and venereal disorders, and is often beneficial in nasal, pulmonary and vesical catarrhs. It is said to be particularly useful in affections of a rheumatic or catarrhal nature when caused by exposure to damp weather.

ECHINACEA (Unofficial),—is *Echinacea angustifolia*, Black Sampson, or Nigger-head, a plant with narrow leaves, and purple cone-shaped flowers, found in the prairies west of the Mississippi river. Its properties are anesthetic, antiseptic and alterative, it improves the appetite and digestion, is stimulant and nutritive to the nervous system, and seems to be specifically antagonistic to all organic infections of the blood, as acute sepsis, pyemia, and serpent venom.

Extraordinary accounts are reported of the efficacy of this drug in poisoning by rattlesnake venom, in which a strong tincture is used both locally and internally with invariable success; also for the bites of tarantulas, spiders, scorpions, the stings of wasps and other insects. It has a high reputation for tetanus and pyemia, and has given great satisfaction in dyspepsia, ulcerative stomatitis, and ulcerations of the gastro-intestinal tract. In typhoid fever it modifies the symptoms and lowers the temperature. It has proved of positive value in septicemia, uremia, boils, carbuncles, abscesses, glandular inflammations, and cerebro-spinal meningitis. In diphtheria it is believed to antagonize the action of the toxin in the blood. In medicinal doses it has no toxic or other undesirable effects, and it is eliminated perfectly. Dose of a strong tincture ʒss–jss; of a fluidextract, ♏xx–xxx every 2 hours. (Ellingwood).

ELASTICA, Rubber, (*Caoutchouc*),—is the prepared milk-juice of several species of *Hevea* (nat. ord. Euphorbiaceæ), known in commerce as Para Rubber. It is very elastic, insoluble in water, dilute acids, or dilute solutions of alkalies, soluble in chloroform, carbon disulphide, oil of turpentine, benzin and benzol. When pure, or nearly pure, it floats on water.

Rubber is a hydrocarbon, and may be combined with sulphur by the aid of heat (vulcanized), which process, long continued, converts it into hard rubber. It is used in the fabrication of catheters, bougies, pessaries, court plaster, bandages, elastic stockings, tubing, etc. An analogous substance is—

Gutta-percha (Unofficial),—the concrete exudation of *Isonandra gutta*, a large tree of the nat. ord. Sapotaceæ, growing in the Malay peninsula and adjoining islands. It occurs in tough but somewhat flexible pieces, of grayish or yellowish color, plastic above 140° F., soft at 212° F., insoluble in water or alcohol, soluble in chloroform, oil of turpentine, carbon disulphide, benzin and benzol. It contains a hydrocarbon, *Gutta*, $C_{10}H_{16}$ (80 per cent.), two resins named *Fluavil* and *Albau*, also a volatile oil, salts, fat and coloring matter.

Liquor Gutta-perchæ, *Solution of Gutta-percha* (Unofficial),—Gutta-percha 9, Carbonate of Lead 10, in Chloroform 91. Used as a protective application to eruptions and slight wounds, the evaporation of the menstruum leaving behind a thin adhesive and non-irritating pellicle.

Traumaticin (Unofficial),—is the name given to a 10 per cent. solution of Gutta-percha in Chloroform, which forms on drying a permanent, unirritating, adhesive, flexible and non-contractile skin for the treatment of skin affections and slight wounds. It forms an excellent basis for the application of Chrysarobin to psoriasis.

Gutta-percha has neither physiological action nor therapeutics, being used for its physical qualities alone. In surgical practice it has several applications, making a good material for splints, as it can be softened in hot water and adapted to any surface while pliable. From it are manufactured pessaries, specula, stethoscopes and other instruments. The solution may be used as a protective covering for excoriations and slight wounds, to prevent pitting in small-pox, and to paint over the line of suture after post-mortem examinations.