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NOTES ON VEGETABLE DRUGS USED IN MEXICO.

By John M. Maisch.

On the appearance of the second edition of the Mexican Pharmacopœia, a series of articles published in this Journal in 1885 and 1886, gave an account of the drugs admitted into that work, the title of the papers being "Materia Medica of the New Mexican Pharmacopœia." Quite recently—the introductory part is dated October 28, 1890—additions to that Pharmacopœia have been issued under the title of "Apéndice á la segunda edicion de la Nueva Farmacopea Mexicana de la Sociedad Farmacéutica de México; escrita por la Comisión Permanente de Farmacopea." The work is printed in a style conforming to that of the main work, the additions being contained upon 51 pages, not including index or preliminary matter. The permanent commission was the same as the one who edited the Pharmacopœia, except Dr. Fernando Altamirano, who was appointed in the place of Dr. Soriano, resigned. The other members are Professors Alfonso Herrera, José M. Lasso de la Vega and Severiano Pérez.

It is intended to give in the present paper an account of the vegetable drugs admitted, and of such corrections of previous statements, as well as of such other notes that may appear to merit special notice. Instead of following the alphabetical arrangement according to the Spanish names of the drugs, a more comprehensive view will probably be had by considering the drugs under the botanical names of the plants grouped together in natural orders.

Anacardiaceæ.—Rhus Toxicodendron, *Linné*, grows from the valley of Mexico and from Jalapa northward, and is popularly known as *mala mujer*, *guau*, etc. The leaves are used in incontinence of urine; a hot strong decoction is employed against the bites of poisonous animals by bathing the affected parts, and the juice is given for coughs in doses of five drops, with a hot aromatic infusion. The alcoholature (tincture of the fresh leaves) has been used by Dr. Garcia in elephantiasis (mal de San Lazaro).

Tapiria cyrtocarpa, *Bentham et Hooker*, *copalcocote;* the seeds are said to cure lepra.

Apocynaceæ.—Aspidosperma Quebracho, *Schlechtendal*, yields *quebracho blanco*, the bark being given in doses of 1 to 4 gm.

Asclepiadeæ.—Asclepias Cornuti, *Decaisne*, grows near the northern frontier of Mexico, and is known as *soliman vegetal.* The rhizome is used in doses of 0·5 to 1 gm.; the fresh milk-juice serves for destroying warts, and after drying as a sternutatory.

Berberideæ.—Berberis pinnata, *H. B. K.*, known as *cachisdá*, grows in Guanajuato, Toluca, etc. The constituents of the root bark are probably analogous to those of Berberis vulgaris. The comestible fruit is employed as an antiscorbutic, and the bark as a laxative; the wood is used for dyeing yellow.

Cacteæ.—*Tuna* is the name by which the fruit of several species of Opuntia are designated. They are regarded as possessing diuretic properties and are employed for curing diarrhœas, while the juice is used in biliary affections; the flowers have the reputation of being useful in pectoral complaints. Among the economical uses of the berries may be mentioned that they are eaten as table fruit; that a very agreeable fermented beverage, known as *colonche*, is made from the juice in San Luis Potosi; and that the fruit is converted into a preparation called *queso de tuna* (tuna cheese).

Capparideæ.—Polanisia uniglandulosa, *Cavanilles*, which grows in the valley of Mexico, Puebla, etc., is the *yerba del coyote*, and is employed as a stimulant, stomachic and vermifuge, and externally for its rubefacient properties.

Connaraceæ.—Rourea oblongifolia, *Hooker et Arnott*, var. floribunda, which is found in Southern Mexico, Vera Cruz, etc., is called *chilillo de la huasteca.* The root is flexuose, little branched, annu-

late from complete or interrupted wrinkles, brown, the liber and meditullium of a reddish color, the latter compact and upon transverse section appearing porous from the ducts, of a peculiar odor and a somewhat astringent taste. Professor Guzman showed the presence of resins soluble and insoluble in alcohol, orange yellow coloring matter, volatile acrid principle and tannin. The root is used for dyeing hides of a light brown color.

The testa of the seeds is blackish brown, glossy, fragile, at the base provided with a yellowish fleshy arillus cleft in the anterior part; the tegmen is whitish, membranous, and is intimately united with the oily cotyledons, which are convex upon the back and concave upon the face. Fats, neutral and acid resins, volatile oil, tannin, glucose, pectin compounds and a volatile acrid principle, identical with that of the root, were found in the seeds by Prof. Guzman. The seeds appear to possess tetanic properties, and are used against itch and various skin diseases, also, like the roots, for poisoning prairie wolves (*coyotes*). It is asserted by the rural inhabitants that dogs eating the bones of the *cojolite* (*Penelope purpurascens*) and of other gallinaceæ having fed upon the fruit of the chililló, die with symptoms of poisoning, but that men may eat with impunity the flesh of the same birds.

Compositæ.—This order furnishes a much larger number of additions than any other order.

Ambrosia artemisiæfolia, *Linné*, grows throughout North America to the central part of Mexico, and according to Professor F. Barradas, contains fat, volatile oil, neutral resin, gum, tannin, starch (?), etc. It is stimulant, emmenagogue, and febrifuge, and appears to act as a good anthelmintic. In the same manner is used Ambrosia elatior, *Linné*, which is also indigenous to Mexico, and has leaves attaining a length of 16 cm. and a width of 10 cm., less deeply divided, and provided with ciliate petioles; it is destitute of the bitter taste of the former species.

Baccharis conferta, *Kunth*, *yerba del carbonero*, is a dicœcious woody plant; leaves alternate, nearly sessile, obovate, cuneate at the base, with few teeth, the upper ones entire, rough, glossy, glandular, and coriaceous; involucre imbricate, the outer scales small and oval-lanceolate, the inner ones larger and linear, all with a whitish margin; receptacle flat, pitted; akenes compressed, striate, the pappus in several series; aromatic and bitter. According to

A. Martinez, the plant contains acid resin, volatile oil, fat, yellow coloring matter, gum, tannin, etc. The infusion of the leaves enjoys considerable reputation against coryza.

B. multiflora, *Kunth*, and B. Alamani, *DeCandolle*, like the preceding species, grow in the valley of Mexico, and are known by the same popular names.

Calea Zacatechichi, *DeCandolle*, grows in Vera Cruz, Orizaba and other localities of Southern Mexico. Leaves petiolate, oval, subtriplinerved and, like the whole plant, pubescent; heads radiate, twelve-flowered; involucre cylindric; scales obtuse, the margin scarious; akenes top-shaped; inodorous, bitter. For use, see AMER. JOUR. PHAR., 1886, p. 122.

Cirsium mexicanum, *DeCand.*, is recognized as *cardo santo*; but the following plants are likewise popularly known by the same name; Cnicus acantholepis and C. rhaphilepis, *Hemsley*, in the valley of Mexico, and Carduus tenuiflorus, *DeCand.*, in Jalisco.

Eupatorium (Brickellia, *Asa Gray*) veronicæfolium, *Kunth*, is known as *gobernadora de Puebla*, *orégano del cerro*, *pexto*, etc. Leaves small, cordate or reniform; heads discoid, blue, then rose-colored, hoary pubescent, of a musklike odor, and bitter and pungent taste. It contains resins, volatile oil, yellow coloring matter, tannin and a bitter principle named *eupatopextin*. The infusion is used in gastralgia and in atonic dyspepsia, and in the form of baths or fomentations for soothing arthritic and rheumatic pains.

Helenium mexicanum, *Kunth*, is called *yerba de las animas*. Heads radiate; involucral scales many, in one row, united below, equal linear, hispid, reflexed; receptacle nearly spherical, with small membranous lanceolate chaff near the margin, otherwise naked; ligules pistillate, oblong, three-cleft, yellow, pellucid-punctate; disk-florets harmaphrodite, tubular, five-toothed, yellowish-brown; akenes obovate, compressed, covered with short and rigid hairs, the chaffy scales of the pappus membranous, transparent and slender above. An analysis by Professor P. A. Carrillo showed the presence of volatile oil, acid resin, coloring matter, fat, bitter substance, tartaric acid, and a poisonous alkaloid named *andrealfonsine*. The powdered drug is used as a powerful errhine.

Heterotheca inuloides, *Cassini;* valley of Mexico, Aguascalientes, etc. Heads radiate; involucre campanulate, the scales in several series, linear, hairy and scarious on the margin; florets yellow, the

ligules in one row and pistillate, the tubular florets hermaphrodite; akenes cuneiform; pappus double, the inner row reddish, and the outer row short and whitish; odor mild, taste bitter. Resin, yellow color, tannin, gallic acid, gum, fat, bitter principle, and a trace of volatile oil were ascertained to be present by Pr. Reyes Bruciaga; arnicine is absent. The flowers are known as *arnica del país*, and are employed in the place of arnica flowers; but such substitution should not be made, nor has it been proven that they have the same properties.

Lænnecia parvifolia, *DeCandolle;* near Toluca and in the north-eastern part of the valley of Mexico. Leaves sessile, oblong, acute, featherveined, tomentose; heads ligulate; involucre imbricate; pappus silky; inodorous, bitter. A neutral amorphous yellow bitter principle was obtained by Sandoval, besides resin, tannin, gum, etc. The plant, which is known as *simonillo* or *false zacatichichi*, has been used by Dr. Altamirano in the form of infusion against biliary calculi, and the extract in pills as an aperient.

Parthenium Hysterophorus, *Linné*, grows in the valley of Mexico, Orizaba, Córdoba, Monterrey, etc., and is known as *cicutilla confitilla* or *yerba amarga*. For description and use of the plant, see AMER. JOUR. PHAR., 1886, p. 451; 1887, p. 70, and 1890, p. 121.

Piqueria trinervia, *Cavanilles*. Herbaceous; stem and branches with two lines of hairs; leaves opposite, oval-lanceolate, serrate, three-nerved; heads homogamous with the white florets perfect; involucral scales four, mucronate; receptacle flat, naked; akenes reversed pyramidal, pentagonal, five-ribbed, and without pappus. Frías obtained from the plant volatile and fixed oils, amorphous acid, etc. The plant is popularly known as *yerba del tabardillo* or *de San Nicolás*, and is employed in infusion as a stimulant and febrifuge.

Peritre del Cáucaso, different species of Pyrethrum, furnish the well-known insect powder, which is employed for killing fleas and other parasites.

Senecio Grayanus, *Hemsley* (Cacalia decomposita, *Asa Gray*), and S. cerviariæfolius, *Hemsley*, grow in Chihuahua, the second species also in Oaxaca and Chiapas, the plants being known as *matarique*, *maturin* or *guereña*. The rhizomes vary in form and attain a thickness of about 3 cm.; they are gray, above with a dingy gray tomentum, and with irregular depressions and thin scales upon the sur-

face; transverse section shows a thin gray bark containing some resinous dots and near the wood a resin circle of a reddish-brown color; the wood is pale greenish-yellow and contains resin dots. Rootlets numerous, 10 to 15 cm. long, 3 to 4 mm. thick; gray, longitudinally wrinkled, brittle, fracture even; the transverse fracture shows a very thin gray exterior circle, next a much broader glossy layer, followed by a circle of reddish-brown resin dots near the meditullium, the latter being of the same color as the second layer of the bark. Odor strongly aromatic; taste persistently bitter and pungent. The drug contains resin, volatile oil, tannin and glucose, according to Altamirano; but, according to Henckel, the active principle is a glucoside resembling digitalin in its action.

A subcutaneous injection of 0·12 gm. of the alcoholic extract given to a frog, causes paralysis of the voluntary and cardiac motions; 0·50 gm. of the same preparation, in intravenous injection, to a dog, produces general analgesia, diminution of the blood pressure, pulsations and respirations, lasting for one or two hours, and afterward disappearing completely. Taken internally, the drug has an emetic and purgative action which, however, is quite variable. The tincture, applied to the skin, is used as an analgesic, and as an antiseptic to wounds and ulcers. For internal use, the dose is two spoonfuls of the tincture diluted with water, given in various portions during the day.

Senecio tolucanus, *De Candolle*, is the *rabanillo* or *niños del monte* of San Luis Potosi, Sierra de Jaripeo, etc. Stem erect, fistular, glabrous and fluted; leaves semiamplexicaul, oval, serrate, about 24 cm. long and 8 cm. broad; heads radiate, yellow; involucre campanulate, calyculate, in one row; receptacle naked, flat, alveolate; ligules obtuse, pistillate; disk-florets perfect; anthers caudate; pappus white, plumose, in one row; odor unpleasant; taste somewhat pungent. The plant possesses tetanic properties. Besides fat and a volatile principle, Vélez isolated the alkaloid *toxisenecine*, which crystallizes in oblique rhombic prisms.

Solidago mexicana, *Kunth*, has the leaves sessile, semiamplexicaul, lanceolate, narrowed below, entire and glabrous, about 8 cm. long; heads in axillary racemes; involucral bracts small, scarious on the margin; ligules pistillate; disk-florets perfect; receptacle naked; pappus simple; inodorous; taste herbaceous and acrid.

Solidago velutina, *De Candolle*, like the preceding species, is

known as *calancapatle de Mexico* (see also AMER. JOUR. PHARM., 1885, p. 387), and differs from the former by having the stem tomentose above, and the leaves obovate, mucronate, rough above, and with two lateral nerves running from the mid-rib, about one-third from the base.

The decoction and powder of both plants are used topically as vulneraries in atonic ulcers.

Stevia salicifolia, *Cavanilles*. The tincture of the fresh-flowering branches, containing volatile oil and resin, is employed in rheumatic arthritis, and as a substitute for arnica in contusions. The popular name of the plant is *zazale de olor*, which is also given to species of Galium, Mentzelia and other adhesive plants.

Verbesina Capitaneja, *Nees*, is the *capitaneja* of Mexico (see also AMER. JOUR. PHAR., 1885, p. 388). Stem erect, four-winged; leaves sessile, decurrent, opposite, entire, with hexagonal meshes of the veins; heads radiate; involucral scales in two rows; receptacle chaffy; ligules sterile, oval, with four nerves uniting above; disk-florets perfect; akenes oblong, with a membranous wing and two awns; inodorous. *V. crocata* is easily distinguished by the lower leaves being hastate, and the upper ones pinnatifid. Professor Leon de la Pena found in the plant neutral and acid resins, tannin, gum, etc.

Cruciferæ.—Two species of Lepidium are employed under the common name of *coclearia del país*. L. latifolium, *Linné*, was introduced by D. Vicente Cervantes, and grows near Chapultepec, Toluca, etc. L. virginicum, *Linné*, is found throughout the valley of Mexico. Both are employed as substitutes for Cochlearia officinalis, *Linné*. But the popular name given above is also applied to Ranunculus tridentatus and Ran. Cymbalaria, *Pursh*, which have different properties, and are poisonous.

Cyatheaceæ (Filices).—Cyathea mexicana (?) *Chamisso et Schlechtendal*, is the *ocopetate* or *cola de mono* of Cordoba, the State of Vera Cruz, etc. The hairs covering the young fronds are topically employed for their hæmostatic properties in the same manner as those of Cibotium Baromez, *Kunze*. They are yellow, curly, soft, glossy, articulated, about 3 cm. long, inodorous and tasteless; each plant produces from 15 to 20 gm. of hairs.

Euphorbiaceæ.—Jatropha Curcas, *Linné*, growing in Cordoba,

Colima, Morelos, etc., furnishes the *piñoncillo* or *piñon de Indias*, the purging nut of our commerce. The seeds are of about the size and shape of ricinus seeds, are rounded upon the back, have the raphe upon the ventral side, and at one end a circular scar; the surface is black, rough, not glossy, irregularly fissured; kernel surrounded by a transparent integument, oily, inodorous, of an acrid taste. The seed and oil are dangerously drastic, and the oil vesicating like croton oil, but milder. The oil is given in doses of 2 to 8 drops. In cases of poisoning Dr. Grosourdi has recommended good wine and brandy given freely.

Gramineæ.—Zea Mays, *Linné.* The styles or corn silk, called *jilotes* or *cabellos de elote*, are used for their diuretic and lithontriptic properties, and in rural districts are smoked like tobacco.

Hamamelideæ.—The leaves of Hamamelis virginiana, *Linné*, are tonic and astringent, and are given in doses of 4 gm. in decoction.

Hippocrateaceæ.—Hippocratea obcordata, *Lamarck*, grows in Tasco, and is known as *coanabichi.* The infusion of leaves and flowers is employed as a cough remedy, and the seeds yield a fixed oil which may be used in the place of oil of almonds.

Juglandaceæ.—Carya olivæformis, *Nuttall*, the pecan-nut of our Western and Southwestern States, grows in San Luis Potosi, Oaxaca, Queretaro, etc., where the fruit is known as *nuez encarcelada*, or *nuez chiquita.* The seeds are comestible, and yield a considerable quantity of fixed oil. The bark of the branches has been recommended as an antiperiodic and in dyspepsia. A strong decoction of the epicarp is used as an astringent in leucorrhœa.

[*To be continued.*]

THE MEDICINAL AND OTHER USEFUL PLANTS OF ALGERIA.

By P. L. Simmonds, F.L.S.

At the Paris International Exhibition there were published and circulated many important treatises and essays on the vegetable products of different countries, and among others I met with one concerning those of the Algerian Colony, which is deserving of more extended circulation. I have, therefore, thought it useful to translate and condense some of the details furnished therein, since they were submitted by Messrs. Bathandier and Trabut, Professors of the School of Medicine. Possessing as Algeria does a remarkably

rich flora and a climate which admits of the culture of the plants of the temperate, as well as the subtropical regions, with the added knowledge which the Arabs have derived of the therapeutical knowledge of the Greeks as to simples and perfumes, the industry of medicinal plants, and distilled perfumes has been largely developed, of late years, in the colony by the French.

The popular knowledge of the uses of plants is extensive among the native population, and varied according to the districts, while some are not generally known elsewhere. I therefore follow the families of plants in their natural orders.

RANUNCULACEÆ. — *Anemone palmata*, plant strongly vesicant, according to the experiments of Professor Bomlier. *A. coronaria*, and *Clematis cirrhosa* and *C. Flammula* have analogous properties.

Delphinium Staphisagria.—Dr. Bernon cites, in 1880, a case of poisoning with the seeds.

PAPAVERACEÆ.—*Papaver somniferum.* In its wild form this plant is common. The culture of the opium poppy succeeds, but has not been found remunerative.

Papaver Rhœas. The flowers of this species are largely collected for medical use.

Argemone mexicana and *Eschscholtzia californica*, plants said to contain morphine, prosper well here.

Many of the cruciferous plants have fallen out of use in Algeria.

CISTACEÆ.—The leaves of the *Cistus albidus* are employed by the Arabs for tea. *C. ladaniferus* is very common, but the resinous product is not used.

VIOLACEÆ.—*V. odorata* is gathered in small quantity for medical use; it used to be grown at Bonfante for perfume, but is now chiefly used for bouquets. The woody violets are all emetic and it would be worth while experimenting with. *V. arborescens* is common in the thickets of Tell.

CAROPHYLLACEÆ.—*Spergularia rubra.* Much used as a diuretic under the name of *Arenaria rubra.* One house of Algiers exports annually 400 to 500 pounds.

MALVACEÆ.—The flowers and leaves of *Malva sylvestris* are gathered for medical use. The Arabs employ the leaves as a vege-

table. The firm of Legout & Peyron export 2,500 to 3,000 pounds of leaves of *M. sylvestris, macrocarpa, nicæensis, Lavatera critica*, etc.

GERANIACEÆ.—Many of the *Erodiums* have large astringent roots, but the most important product of this family is the geranium oil, obtained by distilling the leaves of various species of *Pelargonium*, as *P. capitatum* and *P. roseum*, cape plants much cultivated in Algeria. There are three cuttings yearly of the leaves. In Algiers alone there are 48 distillers who produce 6,600 pounds of essence. Messrs. Chiris & Gros make about 4,000, and many other settlers produce large quantities.

RUTACEÆ.—Among the species rich in essential oil are: *Ruta graveolens, R. chalepensis and montana*, growing wild and cultivated, and *Haplophyllum tuberculatum. Peganum Harmala* and its seed are much employed by the Arabs for rheumatism, purulent ophthalmia and skin diseases.

AURANTIACEÆ.—Although the orange tribe is largely cultivated in Algeria, their medicinal products have not been largely utilized. Several industries have distilled essences of lemon and bergamot, but have not made much headway. Chiris & Gros alone make essences of lemon and petit grain, but have had to give up their Bigarade, owing to the low price at which an essence, passing under the name of "Paraguay," is sold. This firm make about 350 to 420 pounds of neroli oil yearly. Orange flower water is produced in large quantity, and of excellent quality, by the Moors. Orange leaves are largely exported. The manufacture of citric acid has not been attempted, but lemon juice is made for the navy and marine.

TEREBINTHACEÆ.—*Pistacia Terebinthus* furnishes to Materia Medica its tanning galls and its oleoresin or Chio turpentine. Both leaves and galls are used for tanning and dyeing black. The seeds of *P. Terebinthus and P. atlantica* are sometimes eaten by the Arabs. From the latter species they collect turpentine in large quantity, and in Tunis a species of mastic, called *Huclc*, is obtained. From the bruised seeds, boiled, of *P. Lentiscus* the Arabs obtain an odoriferous oil, used for itch and rheumatism and also for food.

LEGUMINOSÆ.—Although *Melilotus officinalis* is not found in Algeria, it is advantageously replaced by numerous other species

rich in coumarin; among which may be named *M. macrocarpa*, the fruits of which are of the size of small peas, and are employed by the natives as antispasmodic and as spice.

Lathyrus sativus.—This vetch, much cultivated by the Kabyles, forms an important part of their food, and causes often veritable epidemics of medullary spasmodic lathyrism.

Duvernoy, in 1770, cited for the first time paralysis of the legs (Miller's Dict. of Gard.), also mentions as an effect rigidity of the limbs. Vilmorin, in 1853, in the *Bon Jardinier*, mentions many cases cited by La Houe & Deslandes. Prof. Bomlier, in 1882, also instances many cases of lathyrism in Kabyle. Lastly, Dr. Astier, of the School of Medicine, Algiers, presented a remarkable thesis on lathyrism (Lyon, 1883,) and isolated an alkaloid from the seeds.

Anthyllis vulneraria, *Lupinus albus*, *luteus*, *hirsutus* and *angustifolius* and *Vicia sativa*, more or less medicinal, are common in Algeria. Liquorice and the indigo plants are easily cultivated.

A large number of *Acacias* are cultivated, and the products of some are utilized, especially *A. Farnesiana*, commonly known as *Cassie*. The firm of Chiris & Gros use up annually 40,000 or 50,000 pounds of Cassie flowers for perfume. The Cassies and Sumas are of easy culture. The *Calabar bean*, lately sown in the botanic garden of the School of Medicine, thrives well, and so does *Soja hispida*, now recommended as a food for diabetic patients.

Rosaceæ.—Of this family, but little used at present, may be mentioned *Spiræa Filipendula*, *Geum urbanum*, *Potentilla reptans*, *Cratægus Oxyacantha* and *Azarolus*. The root of *Fragaria vesca* is collected for pharmacy. *Rosa gallica*, like all the rose tribe, flourishes admirably in Algeria, but is seldom gathered. Rose water is made in small quantities. *Amygdalus communis* is found wild in many districts, but yields only bitter almonds. Its varieties are, however, cultivated. The kernels of the wild cherry, *Prunus avium*, are employed in Arab medicine; and the seeds of *Eriobotrya japonica* are very rich in amygdalin.

Myrtaceæ.—*Myrtus communis* has astringent leaves and fruit, but they are little used. The Pimento of Jamaica has been introduced.

Eucalyptus Globulus, introduced by M. Ramel, is largely grown; but is now much superseded by *E. rostrata*, more hardy but much

inferior in its production of essential oil. About 4,500 pounds of oil of *E. globulus* is produced in Algeria, but this is insufficient to meet the demand. There are more than 120 species and varieties of Eucalyptus now grown in Algeria, and some, like *E. citriodora*, are capable of yielding agreeable essences.

Punica Granatum.—The pomegranate is much cultivated, and furnishes to Materia Medica the bark of its root and branches, its floral buttons, known as Balaustas, an acid juice and the astringent bark or peel of its fruits. The house of Legout & Peyron, of Algiers, alone export annually 5,000 to 7,000 pounds of pomegranate bark, employed either directly, or for the extraction of pelletierine.

LYTHRARIEÆ—*Lawsonia inermis*.—The henna leaves are much employed by the natives to color their nails and hair, as a vulnerary and a remedy for leprosy. There is an important commerce in henna in Algeria.

[*To be continued.*]

IMPROVED ASSAY OF CANTHARIDES.

The following process of assay is offered as being suitable for pharmacopœial purposes:

Moisten 10 grams of the drug, in moderately fine powder, with sufficient solution (10 per cent.) of sodium hydrate to render the mixture strongly alkaline, and digest six hours in a warm (130° F.) place until the mass becomes somewhat brittle; add dilute hydrochloric acid until a decided acid reaction is retained; again dry at a low temperature (about 130° F.) and pulverize; transfer to a modified Soxhlet extractor and exhaust the powder with hot chloroform by repercolation. (50 cc. $CHCl_3$ is sufficient.)

After three or four hours of percolation, evaporate or recover the chloroform by distillation from the flask; add CS_2; transfer the contents to a filter and continue to wash with CS_2 as long as it takes up soluble matter. Allow the filter to dry spontaneously; treat with hot chloroform, collect the filtrate and pass through a small quantity of purified charcoal, thoroughly washing with $CHCl_3$, and evaporate the chloroform solution in a tared capsule; dry the residue (crystals) in a warm place or over H_2SO_4 (cantharidin being volatile at 212° F.) to a constant weight and weigh as cantharidin. Yield 1 per cent. on an average. J. B. NAGELVOORT.

THE GALENICAL PREPARATIONS OF THE ADDITIONS TO THE BRITISH PHARMACOPŒIA.

By the Editor.

In the following it is proposed to give, from the advance copy of the work received, the formulas for such galenical preparations as have now received official recognition in Great Britain, with such details of manipulation appearing desirable or necessary. It should be remembered that the British fluidounce differs from that of the U. S. P., in being the measure of 437½ grains, or 1 avoirdupois ounce of water.

Acetum Ipecacuanhæ.—Ipecacuanha, in No. 20 powder, 1 oz.; Diluted Acetic Acid sufficient to obtain, by maceration for 24 hours, followed by percolation, 20 fluidounces of the vinegar of ipecacuanha.

Adeps Lanæ hydrosus.—Woolfat (anhydrous), 7 oz.; Distilled Water, 3 oz. Melt the woolfat in a warm mortar, stirring in the water gradually and thoroughly.

Emplastrum Menthol.—Menthol, 2 oz.; Yellow Wax, 1 oz., Resin, 7 oz. Melt the wax and resin together, and as the mixture cools, stir in the menthol until dissolved.

Extractum Euonymi siccum.—Euonymus bark, in No. 20 powder; exhaust by percolation with a mixture of equal parts of rectified spirit and distilled water; distil or evaporate the spirit; incorporate with the still fluid extract so much sugar of milk—the actual amount having been ascertained experimentally—that the final product shall contain 80 per cent. of dry extractive; evaporate over a water-bath; powder, and keep in a well-corked bottle. Dry extract of euonymus is commonly known as "euonymin."

Extractum Hamamelidis liquidum.—Hamamelis leaves, in No. 40 powder, 20 oz. Prepare by percolation one pint (20 fluidounces) of fluid extract, using as menstruum a mixture of one volume of rectified spirit and two volumes of distilled water.

Extractum Hydrastis liquidum.—Hydrastis rhizome, in No. 60 powder, 20 oz. Prepare by percolation 20 fluidounces of fluid extract, using as menstruum a mixture of equal parts of rectified spirit and distilled water.

Liquor Cocainæ hydrochloratis.—Cocaine hydrochlorate, 33 grains

(or 100 parts); Salicylic Acid, ½ grain (or 1½ parts); Distilled Water sufficient to produce 6 fl. drachms (or 1,000 fluid parts). Boil the water, add the salicylic acid, and then the hydrochlorate of cocaine; cool, and add water, if necessary, to produce the required volume.

Liquor Morphinæ sulphatis.—Morphine Sulphate 35 grains (or 1 part); Rectified Spirit 2 fl. oz. (or 25 fl. parts); Distilled Water sufficient to produce 8 ounces (or 100 fl. parts). Dissolve.

Liquor Trinitrinæ.—Pure Nitroglycerin 1 part by weight; Rectified Spirit sufficient to produce 100 fl. parts. Dissolve.

Magnesii Sulphas effervescens.—Magnesium Sulphate, in crystals, 100 parts; Sodium Bicarbonate 72 parts; Tartaric Acid 38 parts; Citric Acid 25 parts; Refined Sugar 21 parts. The final product should weigh about 200 parts. Dry the magnesium sulphate at about 130° F. (54·4° C.) until it has lost nearly one-fourth (23 per cent.) of its weight; powder the product, mix with the sugar and then with the other ingredients, all in powder; heat the mixture to between 200° and 220° F. (93·3° and 104·4° C.), and when the particles begin to aggregate, stir them assiduously until they assume a granular form; then by means of suitable sieves, separate the granules of uniform and most convenient size, and preserve the preparation in well-closed bottles.

Mistura Olei Ricini.—Castor Oil 6 fl. drachms; Oil of Lemon 10 minims; Oil of Cloves 2 minims; Syrup 1½ fl. drachm; Solution of Potash 1 fl. drachm; Orangeflower Water sufficient to produce 2 fl. ounces. Mix the oils in a mortar; then incorporate one-third of the potash solution, afterwards the syrup, then an additional third of the potash solution, then gradually, half of the water, the remainder of the potash solution and lastly, sufficient of the orangeflower water.

Pilula Ferri.—Ferrous sulphate 60 gr.; Potassium Carbonate 36 gr.; Refined Sugar, in powder, 12 gr.; Tragacanth, in powder, 4 gr.; Glycerin 2½ minims; Distilled Water, sufficient. Reduce the ferrous salt to fine powder in a mortar, add the sugar and tragacanth, and mix intimately; finely powder the potassium salt in another mortar and incorporate it with the glycerin; transfer this mixture to the mortar containing the iron mixture, beat thoroughly

until the mass becomes green, adding water, if necessary to impart a pilular consistence, and divide into five-grain pills. The pills are known as Blaud's pills. Each pill contains about one grain of carbonate of iron.

Pulvis Sodæ Tartaratæ effervescens.—This is the Seidlitz powder, and differs from the formula of the U. S. P. only in the use of 38 (instead of 35) grains of tartaric acid for each powder.

Sodii Phosphas effervescens.—Sodium Phosphate, in crystals, 100 parts; Sodium Bicarbonate 100 parts; Tartaric Acid 54 parts; Citric Acid 36 parts. The final product should weigh about 200 parts. Dry the phosphate until it has lost rather more than half (60 per cent.) of its weight, powder, mix with the other ingredients, previously powdered, and granulate as directed above for effervescent magnesium sulphate.

Sodii Sulphas effervescens.—Prepared like the preceding, using sodium sulpnate, in crystals, 100 parts, in the place of the phosphate, and drying it until it has lost about 56 per cent. of its weight.

Suppositoria Glycerini.—Gelatin, cut small, ½ oz.; Glycerin, by weight, 2½ oz.; Distilled Water sufficient. Place the gelatin in a weighed evaporating dish with sufficient water to cover it; after allowing it to stand a minute or two pour away the excess of water; set aside until the gelatin is quite soft; add the glycerin; dissolve over a water-bath, and evaporate until the mixture weighs 1,560 grains; pour the product into suppository moulds holding 30, 60 or 120 grain-measures, or having other capacities as required. Each suppository contains 70 per cent. by weight of glycerin.

Syrupus Ferri Subchloridi.—Iron Wire, 300 gr.; Hydrochloric Acid, 2 fl. oz.; Citric Acid, 10 gr.; Distilled Water, 10 fl. drachms; Syrup sufficient. Mix the hydrochloric acid with 1 oz. of water in a flask, add the iron wire, and apply heat gently until action ceases; remove the flask from the source of heat, add the citric acid, filter the solution through a small paper filter into 10 fl. ozs. of the syrup, pass the remainder of the water through the filter into the syrup, add sufficient syrup to make one pint (20 fl. oz.), and mix thoroughly.

Tinctura Hamamelidis.—Hamamelis Bark, in No. 20 powder, 2 oz.; Proof Spirit sufficient for preparing one pint (20 fl. oz.) of tincture by maceration and percolation.

Tinctura Hydrastis.—Hydrastis Rhizome, in No 60 powder, 2 oz.; Proof Spirit sufficient for preparing one pint (20 fl. oz.) of tincture by maceration and percolation.

Tinctura Strophanthi.—Strophanthus Seed, in No. 30 powder, and dried at 110° F. (43.3° C.), 1 oz.; Pure Ether and Rectified Spirit, of each sufficient. Moisten the powder with the ether, macerate for 24 hours, and percolate with ether until the fluid passes through colorless; dry the marc at 120° F. (48.9° C.), again reduce it to powder, moisten with spirit, macerate for 48 hours, percolate slowly with rectified spirit, until half a pint of tincture is obtained, and dilute this with rectified spirit to one pint (20 fl. oz.).

Trochisci Sulphuris.—Precipitated Sulphur, 36½ gr.; Acid Potassium Tartrate, 720 gr.; Refined Sugar, in powder, 5,760 gr.; Gum Acacia, in powder, 720 gr.; Tincture of Orange Peel, 720 minims; Mucilage of Acacia, 720 minims. Make into 720 lozenges.

Unguentum Conii.—Juice of Hemlock, 2 fl. oz.; Hydrous Wool-fat, ¾ oz.; Boric Acid, 10 gr. Evaporate the juice to 2 fluid drachms at a temperature not exceeding 140° F. (60° C.), add the boric acid and the wool-fat and mix thoroughly.

Unguentum Hamamelidis.—Liquid Extract of Hamamelis, 50 minims; Simple Ointment, 410 grains. Mix thoroughly.

POLARIZATION WITHOUT A POLARIZER.

To the Editor of the American Journal of Pharmacy:

I have accidentally made a quite useful discovery, which I have not seen mentioned before. In order to *polarize*, we put a polarizer (Nicol) beneath the stage and an analyzer (Nicol) above the objective (either right next to it, at the end of the draw-tube, or above the eye-piece), the selenite comes on top of the polarizer. Now, I found that the polarizer is not absolutely indispensable. Given a certain polarizing condition of the sky (*i. e.* blue, with more or less watery vapor—as either before or after a rain, snow, or fog), you can polarize very nicely with the *analyzer alone*, and, if you want display of color, put the selenite on top of the slide, or anywhere convenient to you—so it comes beneath the analyzer. The colors (and crosses) will, of course, be somewhat fainter than when you use the polarizer too. In order to get the best display, it will be necessary to rotate both analyzer and selenite until in the proper

relative positions; or, to speak more correctly, the relative position of the P. A. of the selenite to the beam of light from the mirror decides the more or less intense coloration. With any other sky, the polarization is not observed.

This observation is useful in so far as to enable the possessors of microscopes, without substage facilities, to polarize fairly well—under the circumstances—and the proper condition of the sky is often obtained in our latitude. H. M. WILDER.

Philadelphia, November 20, 1890.

GLEANINGS FROM THE GERMAN JOURNALS.

By FRANK X. MOERK, Ph.G.

Cholesterin.—Of the homologues and isomers of this compound occurring in the vegetable and animal kingdoms only the iso-cholesterin has been more closely studied and differences from cholesterin noted. To finally establish the formula of cholesterin, K. Obermüller made a series of derivatives from which the formula $C_{27}H_{45}OH$ follows. Of these compounds the propionate $C_{27}H_{45}C_3H_7O_2$ affords a means of distinguishing cholesterin from allied substances. The cholesterin is first separated from the fat or oil by evaporating the ethereal solution obtained by agitating the aqueous soap solutions with ether, or in the new method of saponification (AM. JOUR. PHARM., 1890, 490) evaporating at once the ethereal solution after the precipitation of the soap; a small quantity of this dried ethereal residue is melted in a dry test tube with 2 or 3 drops of propionic anhydride over a small flame. A very characteristic play of colors is produced if a small quantity of the cold fused mass is heated on a glass rod and allowed to cool, holding the rod in front of a dark background; first violet, gradually blue, green, dark gray, orange, carmine-red and, finally, copper-red. The blue and green colors continue for some time; by suddenly cooling the fused mass the copper-red color results lasting for some time. The blue color alone is obtainable if the cholesterin propionate be placed in a test tube and melted by immersion in a glycerin bath at 98° C. These colors are to be observed by reflected light, as by transmitted light the complementary colors are seen.

Cholesterin benzoate $C_{27}H_{45}C_7H_5O_2$ is easily obtainable by heating cholesterin to 160° C. for a few minutes, with a slight excess of benzoyl chloride; from an ether-alcoholic solution characteristic

tetragonal crystals are obtainable, melting at 145·5° C. Isocholesterin benzoate can also be made by the same method; this melts at 178·5° C.—*Ztschr. f. Physiol. Chemie*, 1891, 37–48.

A vegetable charcoal is now being made by carefully heating wood and allied substances with strongly alkaline solutions under great pressure; the product is equal, if not superior, and cheaper than charcoal obtained from blood. After use it can easily be regenerated by treatment with hydrochloric acid, ignition and thorough washing water. It has been very satisfactory in purifying and clarifying water, organic and pharmaceutical preparations, oils, honey, glycerin, ammonia, tannin, vaselin, alcohol, etc. In the examination of urine for sugar this vegetable charcoal will replace treatment with lead subacetate. Alkaline solutions containing more alkali than corresponds to 0·04 per cent. calcium oxide cannot be treated with this charcoal; ammonia solutions are exceptions to this. Odorous and bitter principles are removed by using it in excess, hence, in the presence of these, very little charcoal must be used, generally 1 or 1·5 parts in 1,000 is sufficient. Honey has been obtained almost colorless by using larger quantities, but it was devoid of aroma; by treating the dried charcoal with ether this can again be extracted and incorporated with the purified honey.—W. Müller, *Apoth. Ztg.*, 1890, 714.

Detection and estimation of nitrates in waters.—In 5 cc. of the water 2 centigrams sodium salicylate are dissolved, and 10 cc. colorless concentrated sulphuric acid gradually added so as to form a distinct layer; by gentle shaking, the two layers are mixed, a pale yellow to deep red color indicating the presence of nitrates. This color is then compared with that obtained by using dilute potassium nitrate solution of known strength, allowing the tests to become cold before comparing. A standard solution of potassium nitrate is made by dissolving 1·870 gm. pure and dried salt in one liter, this contains 1 part N_2O_5 in 1,000 parts; from this, solutions are made containing 1 part N_2O_5 in 5,000, 10,000, 20,000, 50,000 and 100,000 parts, respectively. These solutions are compared with the water to be examined. The limit of this test is one part N_2O_5 in 100,000 parts, indicated by a pale yellow color; these colors remain permanent for several days.—G. Looff, *Pharm. Centralhalle*, 1890, 700.

Examination of powdered spices.—As a preliminary examination, Borgmann recommends that one gram of the sample be agitated with 10 cc. water and the mixture poured upon an unglazed porcelain plate; the water is rapidly absorbed, leaving the isolated particles so that they can easily be examined with a magnifying glass.—*Pharm. Centralhalle*, 1890, 707.

Professor Koch's lymph.—L. Reuter, coming into possession of a few drops of this remarkable fluid, describes it as being transparent, of a pale brown color, completely soluble in water; the liquid is neutral; after acidifying with hydrochloric acid, auric chloride and solution of iodine in potassium iodide produce heavy precipitates; after acidifying with nitric acid, silver nitrate produces a white precipitate of silver chloride, soluble in ammonia. The indications are that the lymph is a neutral solution of the hydrochlorate of an alkaloidal body, possibly a ptomaine.—*Pharm. Ztg.*, 1890, 747.

Cytisine, the alkaloid of Cytisus Laburnum, had been given the formula $C_{20}H_{27}N_3O$ by Husemann and Marmé, but recent analyses of the double chlorides with platinum and gold give the formula $C_{11}H_{14}N_2O$ identical in composition with ulexine obtained from the seeds of Ulex europæus by Gerrard (see Am. Jour. Pharm., 1890, 454). The method of separating cytisine was as follows: The coarsely powdered seeds were extracted with alcohol containing HCl, the solvent distilled off, the residue dissolved in water and filtered through a wet filter to remove oil, the filtrate was freed from coloring matter by addition of lead acetate and filtration; after making alkaline with KOH the alkaloid was removed from the solution by agitating with amyl alcohol, which, in turn, was agitated with acidulated water; this latter solution on evaporation yielded the hydrochlorate. To remove the still adhering coloring matter, cold absolute alcohol was used, and the salt recrystallized from aqueous solution.—Dr. A. Partheil, *Apoth. Ztg.*, 1890, 691.

Larixolin is the name given to a patented imitation of French turpentine oil; it is a mixture of 2 parts of a petroleum fraction (specific gravity 0·8224 at 15° C.) and one part camphor oil (specific gravity 0·9149). The odor and specific gravity are those of the natural oil, the flash test is obtained at 55° C., while in the natural oil this is at 45° C.—L. Reisberger, *Pharm. Centralhalle*, 1890, 669.

To remove rust from iron or steel utensils, the following solution

is applied by means of a brush after having removed any grease by rubbing with a clean, dry cloth: 100 gm. stannic chloride are dissolved in one liter water, this solution is next added to one containing 2·5 gm. tartaric acid dissolved in one liter water, and, finally, adding 20 cc. indigo solution diluted with two liters of water. After allowing the solution to act upon the stain for a few seconds, it is rubbed clean with first a moist cloth, later with a dry cloth; to restore the polish, use is made of silver sand.—Patent of A. Bücher, *Pharm. Centralhalle*, 1890, 672.

Piperazidine, $C_4H_{10}N_2$ (prepared synthetically by Die Chem. Fabrik auf Actien, formerly E. Schering), identical in composition with *spermine*, has not proven identical in physiological action. It, however, possesses the property of dissolving large quantities of urates, and is likely to be of service in dissolving urate concretions if applied subcutaneously. Its solvent power for uric acid exceeds twelve times that of lithium carbonate and it has the advantages of being soluble in almost all proportions of water, and not poisonous or caustic.—*Pharm. Centralhalle*, 1890, 714.

The iodine test for peppermint oil of the German and Russian pharmacopœias, in which an adulteration with turpentine oil is indicated by a rise in temperature or by slight detonation, has been examined by E. Hirschsohn, who finds that all peppermint oils produce with iodine an increase in temperature, and that to cause detonation at least 40 per cent. turpentine oil would have to be present, smaller quantities not being indicated.—*Pharm. Ztschr. f. Russland*, 1890, 708.

A good soap for removing stains can be made, according to the *Pharm. Zeitung*, by rubbing together 30 parts each of borax and quillaia extract (made by exhausting the ground bark with boiling water and evaporating to syrupy consistence; 100 parts bark usually yield 20 parts extract) and adding 120 parts fresh ox-gall; this mixture is then incorporated with 450 parts melted soap and the mass poured into suitable containers.

Extractum cinchonæ liquidum.—M. C. Traub, in the *Schweizerische Wochenschrift für Pharmacie*, 1890, 377, publishes an improved method for making this extract proposed by De Vrij, which consists in macerating for two days the powdered cinchona

bark (100 parts) with a mixture of 10 parts glycerin, 10 parts hydrochloric acid and 200 parts water, then percolating, finishing with water until the percolate ceases to precipitate with sodium hydrate. The percolate is next distilled in a vacuum of 700 mm., at a temperature not exceeding 40° C. (this is regulated by placing the retort in a water-bath kept at 45° C.) until a syrupy liquid remains in the retort; this is removed to a tared vessel, the retort being rinsed with successive small portions of water until the total liquid weighs 90 grams; then 10 gm. alcohol are added, and the extract filtered. By the above process, change in the bark constituents is avoided and an extract obtained only slightly darker in color than the bark used. A temperature of 65°–70° C., even in a vacuum, is sufficient to bring about decomposition of the cinchotannic acid.

The distillation of cassia oil to detect addition of resin, if not properly carried out, may lead to the condemning of a pure oil; if in the distillation the retort be exposed so that the atmosphere cools the upper portion, the distillation proceeds slowly, and as much as *sixty* per cent. residue is obtainable; but if the retort be surrounded by some non-conducting material, like asbestos, the distillation is rapid and only *five* per cent. residue is obtained from the same oil. The residue in the first case has all the characteristics of asphalt: solubility, odor, color; while in the distillate are found water, acetic acid, phenol and hydrocarbons. These results would indicate that the asphalt found in nature was produced by the action of heat and, probably, pressure upon essential oils or resins.—E. Hirschsohn, *Pharm. Ztchr. f. Russl.*, 1890, 692.

A METHOD OF SOAP ANALYSIS.

By Dr. T. Pinette.

The following method embodies a simplification of the usual process of soap analysis. It requires a separating funnel, such as is used by B. Rose in his method for the estimation of the fat in milk. This is provided with a stopper and tap, holds about 230 cc., and is graduated up to 200 in half cc. Such a funnel is useful for many purposes, and should certainly be employed. The analysis is carried out by dissolving 2 gm. of soap in boiling alcohol free from acid; if any matter is left undissolved, it should be filtered off and examined. A few drops of phenolphthalein solution are then added, and,

if any red coloration is produced, the free alkali determined by decinormal sulphuric acid. The neutralized liquid is diluted with water to about 80 cc., and transferred to the separating funnel. As soon as the liquid has cooled to the temperature of the air exactly 10 cc. of normal sulphuric acid are added, and the funnel filled up to the 200 cc. mark with a mixture of equal parts of ether and light petroleum. The moistened glass stopper is then inserted, fastened down with string, and the whole vigorously shaken until the fatty acids have completely dissolved. After allowing the funnel to stand for some time, the volumes of the aqueous solution and the ethereal solution are read off.

To determine the fatty acids, 25 cc. of the ethereal solution are removed by a pipette to a weighed basin, the liquid evaporated, and the residue dried and weighed. It can then be further examined if required; e. g., it may be dissolved in alcohol, and the saponification equivalent determined by titration.

The alkali, combined with the fatty acids, is estimated by drawing off the acid aqueous solution by means of the tap, and determining the excess of sulphuric acid in 25 cc. by titration with decinormal caustic soda. All the data are then obtained for the calculation of the alkali. The potassium and sodium may be separately determined by evaporating the neutral solution in which the alkali has been determined, heating to redness and weighing. As the sulphuric acid in the mixture is known, the potassium and sodium present can easily be calculated. The amount of soda added in titrating the excess of sulphuric acid must, of course, be subtracted from that found, in order to give the quantity present in the soap.

The advantages of this process are mainly that it avoids the wearisome washing and filtering of the fatty acids, that at least three determinations can be made of fatty acid and alkali in the same sample, and that if required portions of the liquid may be submitted to further examination.—*Chemical Trade Journal.*

THE TOXIC ACTION OF URANIUM.[1]

In view of the recent discovery of uranium deposits in Cornwall and the large reduction in price, and the consequent endeavor to find useful applications for the metal and its salts, it is well to be alive to

[1] From the *Pharmaceutical Journal and Tra* *ns*, Sept. 13, 1890.

the fact, of no great importance whilst the use of uranium salts was confined to the chemist and technologist, that the substance in question is one of the most powerful of the metallic poisons. Although this fact has been known for years, it has been somewhat overlooked in much the same way as the extreme toxicity of barium salts has been little insisted on, and the researches of Woroschilsky, chronicled in the *Chemiker Zeitung*, are especially *apropos* at this time.

Our knowledge of uranium dates from its discovery in Bohemian pitch-blende by Klaproth, about a hundred years ago, but the first investigation of the physiological action of its salts appears to have been made in 1824 by Gmelin, who mentions its poisonous character. Leconte, in 1851, confirmed this assertion, and added that one of the most characteristic symptoms of poisoning by uranium was the occurrence of large quantities of sugar in the urine, whereupon homœopathists jumped to the conclusion that it must be a specific for diabetes. Woroschilsky's experiments show that sugar certainly appears in the urine after the administration of uranium salts by the mouth, or by subcutaneous injection. As the net result of eight experiments with the nitrate, he agrees with the conclusion of Leconte and Chittenden that it is intensely poisonous. But neither the nitrate nor the acetate is well suited for physiological investigations, as both salts coagulate albumen, even when diluted in the proportion of 1 : 10000. Further experiments were, therefore, instituted with the double tartrate of uranium and sodium, which is both readily soluble and does not precipitate albumen. It may be prepared by neutralizing a solution of 10 grams of pure uranic oxide (UO_3) in 300 cc. of a 4 per cent. solution of tartaric acid, with caustic soda, and diluting to 400 cc. The resulting brown-yellow clear liquid is stable if kept from light; it yields, on evaporation, a glassy, amorphous mass, no crystalline double salt being formed. The double tartrate gives with potassium ferrocyanide a deep brown coloration instead of the usual precipitate yielded by ordinary uranium salts, and with ammonium sulphide, after standing a moment, an intensely yellow precipitate, which is soluble in ammonium carbonate.

The physiological action of this salt, exhibited in various ways, was studied in the case of worms, frogs, birds and mammals. It was found that whether absorbed through the mucous membrane of the stomach, or introduced by subcutaneous injection, it is powerfully

poisonous. Subcutaneous doses of 0·5–2·0 milligrams per kilo of body weight cause death with all the symptoms of acute poisoning. It is noteworthy that very small doses administered subcutaneously are almost as quickly fatal as are considerably larger quantities, the only difference being that the action of the latter on the organs affected is more marked. It is remarkable that during the first day or two after the administration of the poison there is no outward evidence of its effects save the pathological character of the urine, although afterwards the toxic action is increasingly manifest, so that the whole nature of the poisoning may be said to be of a subcutaneous character.

The exact symptoms produced by poisonous doses of uranium are as follows: Severe gastro-enteritis follows its administration, while nephritis is induced by such small doses as 1–2 milligrams per kilo of body weight. It is distinguished from other metallic poisons by acting directly, even in very small doses, on the walls of the blood-vessels. This tendency is doubtless closely connected with its specific action on the blood by causing the hæmoglobin to retain oxygen altogether abnormally, in which respect it resembles hydrocyanic acid. A knowledge of this fact throws considerable light on the phenomena attending poisoning by uranium. On its introduction into the circulation, the difficultly-reducible oxyhæmoglobin, resulting from its action above mentioned, probably affects the walls of the blood-vessels in the same manner as venous blood and causes their dilatation. The failure of the oxyhæmoglobin under the influence of uranium salts to part normally with its oxygen accounts also for the profound disorganization of the nutritive functions which ensues, and for the derangement of the nervous system, liver and kidneys, which accompanies it. It also explains the general waste of tissue, resulting in the emaciation of the animal under experiment, which was a characteristic symptom, and further elucidates the first noted pathological phenomenon, viz: the appearance of sugar in the urine, which is merely a sign of imperfect oxidation in the circulatory system, disappearing with the removal of the ultimate cause. Professor Kobert has recommended, on account of their extreme toxicity, the insertion of the soluble salts of uranium in the list of poisons officially current in Russia, and it is certainly desirable that other countries should make a similar move.

ON THE ACTION OF MORPHINE AND ITS DERIVATIVES.[1]

By D. J. Leach.

The paper of Dr. Stockman and Mr. Dott is an important contribution to our knowledge of the influence of chemical change on physiological action as well as to the pharmacology of morphine.

Recent researches have indicated that morphine ($C_{17}H_{19}NO_3$) contains two hydroxyl (OH) groups, and its formula is often written C_{17} H_{17} NO OH OH, though many points with regard to its exact constitution yet remain to be determined. It has been shown, too, that certain of the hydrogen atoms can be replaced by more or less complex radicles (CH_3,C_2H_3O, etc.), the hydrogen atoms of the hydroxyl groups being most easily replaced, and one of them more easily than the other. New bodies can likewise be formed by adding radicles to the morphine molecule itself.

It is manifest that the difference between the physiological action of morphine and the new compounds formed by substituting radicles for hydrogen elements in the morphine molecule or by adding radicles to the molecule itself will give a clue to the physiological influence of these radicles.

Stockman and Dott have prepared a large number of new substances both by substitution and addition of radicles, and compared their physiological effects with that of morphine; in the present paper they give a summary of their results. The details of the experiments have been communicated to the Royal Society of Edinburgh.

The authors first give their views concerning the action of morphine.

It is well known that morphine primarily affects the nervous system. If small doses (2 to 5 cg.) of a soluble morphine salt be injected into a frog, there is first narcosis and depression of the junction of the spinal cord, but in about an hour the reflexes are exaggerated and tetanic spasms occur. It has been assumed that

[1] *The Medical Chronicle*, Novbr., pp. 138–143; an abstract prepared from two papers by R. Stockman and D. B. Dott, on The Pharmacology of Morphine and its Derivatives (*Brit. Med. Journ.*, July 26, 1890); and by E. Tauber, on The Fate of Morphine in the Animal Organism (Ueber das Schicksal des Morphins im thierischen Organismus. *Archiv für Experimentelle Pathologie und Pharmakologie*, July 24, 1890).

morphine first depresses and then stimulates the cord, but the experiments of Stockman and Dott lead them to the conclusion that this view is erroneous. Morphine they hold in small doses depresses the action of the cord; in larger doses stimulates it. The late appearance of increased reflexes is they think due to the fact that at first only a small quantity of morphine reaches the cord. It has been held by some observers that morphine is capable of directly paralyzing the motor endings of nerves, but Witkowski considered that the depressed excitability of the motor endings was the result of the exhaustion consequent on the prolonged tetanus caused by morphine. Stockman and Dott record experiments tending to show that morphine does paralyze more or less completely the nerve endings, but only when large amounts come into contact with them. The end organs, however, are certainly not very sensitive to the action of morphine. With sensory nerves the state of affairs seems to be much the same. Mammals are affected by morphine like frogs, but die so soon from paralysis of the respiratory centre that the tetanic stage is not usually well developed. In man tetanic symptoms are very exceptional, for after therapeutic doses the amount of morphine reaching the peripheral nerve endings is not usually sufficient to affect them.

After thus setting forth the physiological action of morphine, the authors proceed to compare with it the influence of groups of new compounds which they prepared from morphine by substitution and addition.

Substitution of alkyls.—Three compounds were produced by the replacement of an atom of hydrogen in morphine by an atom of methyl, ethyl, and amyl, respectively, viz:

Methyl morphine,	$C_{17}H_{18}NO_2OCH_3$
Ethyl morphine,	$C_{17}H_{18}NO_2OC_2H_5$
Amyl morphine,	$C_{17}H_{18}NO_2OC_5H_{11}$

Chemically these substances may be looked upon as the methyl, ethyl, and amyl ethers of morphine. The first of the three is the well-known alkaloid codeine. Comparing the physiological effects of these three substances with that of morphine, it was found that in all the narcotic action was much diminished by the substitution of the alkyl radicle for the hydrogen atom, whilst the tetanic action and the action on the motor nerves was increased. The paralyzing action, too, on the motor nerve endings was more decided. The

lethal dose of these compounds was found to be smaller, owing to their increased tendency to cause convulsions. The action of all three substances was practically identical; they all affect the same parts of the central nervous system as morphine, though they do not influence these parts in the same degree. It would seem that if the same atom of hydrogen be replaced, it does not matter which alkyl radicle is substituted, though it is possible that further investigations may indicate some quantitative difference so far as regards their action on the different parts of the nervous system.

Substitution of acid radicles.—Four compounds were prepared in which one or two equivalents of hydrogen were replaced by acetyl or benzoyl, viz:

Acetylmorphine,	$C_{17}H_{18}(C_2H_3O)NO_3$
Diacetylmorphine,	$C_{17}H_{17}(C_2H_3O)_2NO_3$
Benzoylmorphine,	$C_{17}H_{18}(C_7H_5O)NO_3$
Dibenzoylmorphine,	$C_{17}H_{17}(C_7H_5O)_2NO_3$

The substances thus produced have almost identical physiological effects. It seemed quite indifferent which acid radicle was introduced, and whether one or both hydrogen atoms were replaced. The tetanizing power of all four was much greater than that of morphine, their narcotic action distinctly less. The depressant action of small doses on the cord and on the respiratory centre is very much greater than that of morphine. Compared with codeine they produce an equal narcotic effect with about one-tenth the dose, whilst about three times larger dose is necessary to cause tetanus; their depressant action on motor nerves is about the same. Acetylmorphine affects the heart more than codeine.

Substitution of chlorine.—Compounds were produced by substituting chlorine for the atoms of hydrogen in morphine and codeine.

In *trichloromorphide* $C_{17}H_{16}Cl_3NO$ both the hydroxyl groups and one hydrogen atom have been replaced by three atoms of chlorine. The new alkaloid acts primarily on the central nervous system, and causes depression, followed by tetanus. It has a marked paralyzing action on the motor nerves, and has some slight action as a muscle poison.

In *chlorocodide* $C_{18}H_2ClNO_2$ a hydroxyl group in codeine has been replaced by chlorine. Chlorocodide causes narcotic and tetanic symptoms in frogs to much the same degree as codeine. Its action

on motor nerves is, however, more marked, and it is distinctly a muscle poison.

It will be noted that the introduction of chlorine into the morphine and codeine molecules gives them a paralyzing influence on muscle tissue not possessed by the unaltered molecules.

Substitution of NO and HSO_3.—Morphine sulphuric acid $C_{17}H_{18}NO_3HSO_3$ and nitrosomorphine $C_{17}H_{18}(NO)NO_3$ have much the same physiological action as the substances produced by the introduction into the morphine molecule of alkyls or acid radicles. The sulphuric compound is less toxic than codeine.

Addition of radicles to the morphine and codeine molecules.—Experiments made with *methylmorphium chloride* $C_{17}H_{19}NO_3CH_3Cl$ and *methylcodeium sulphate* $(C_{18}H_{20}NO_3CH_3)_2SO_4$ show that the addition of chloride and sulphate of methyl to morphine and codeine respectively alters but little the action of these alkaloids. The paralyzing influence on motor nerves is considerably increased, but qualitatively the effects on the animal organism remain similar to those of codeine or morphine. The conclusions arrived at by Stockman and Dott with regard to the action of these two substances are not quite in accord with the results of earlier observers.

Crum, Brown and Fraser, in their well-known investigations concerning the relation between chemical composition and physiological action, found that a methylmorphium salt was hypnotic and paralyzed the termination of motor nerves, but had no convulsant action, whilst methylcodeium sulphate was neither hypnotic nor convulsant, but a paralysant of the terminations of motor nerves.

Stockman and Dott find that the methylmorphium chloride does stimulate the spinal cord, but the paralysis of motor nerves obscures the spasmodic symptoms, and that methylcodeium sulphate acts slightly as a narcotic, and like codeine, in small doses depresses, and in large doses stimulates the spinal cord. The paralysant effect on the motor nerve endings hides to some extent its stimulant effect on the spinal cord.

Methocodeine $C_{17}H_{17}NO_22(CH_3)$.—In this body two methyl molecules have been introduced into morphine. One of these replaces a hydroxyl atom, while the other is introduced into the body of the morphine molecule $C_{17}H_{17}(CH_3)NO\ OH\ CH_3$. By this substitution a great change in physiological effects is produced. Methocodeine has neither narcotic nor tetanizing effect. It is a

poison of voluntary muscle, and to some extent depresses the functions of the spinal cord.

Stockman and Dott conclude from their researches that so far as morphine is concerned, chemical changes restricted to what may be called the outlying groups of the molecules cause very little change in the physiological action, but when a change is made in the kernel or groundwork of the molecule the action is much more profoundly altered. To determine the exact influence of the molecules under varying conditions, will, of course, require an extensive series of similar observations on many other substances.

Dr. Tauber, in his paper on the fate of morphine in the animal organism, gives a résumé of the investigations already published concerning the excretion of morphia, and adds some experiments of his own made for the purpose of ascertaining what becomes of morphine after it has been absorbed. He points out that whilst some observers have found morphine in the urine of men and lower animals after its administration by the mouth and subcutaneously, others have been unable to detect its presence in this secretion, and that of those who have detected it in the urine, only one professed himself able to recover morphine from the urine, and even his success was open to question. No one has so far succeeded in obtaining it from the blood after absorption. He holds the discovery of the traces of morphine in the urine by the color test after its absorption is no proof that the kidney is the special seat of its excretion, since a color test such as Fröhde's is so delicate that it detects $\frac{1}{1300}$ of a grain. Any definite quantity of morphine in the urine should be easily separated, for he records experiments that even from blood 95 per cent. of morphia mixed with it can be recovered. Some have thought it probable that morphia is destroyed in the body. Eliassow found in the urine, after small doses of morphia, a substance, probably the product of the metamorphosis of morphine, which does not give the same color test as morphine with Fröhde's and Husemann's reactions.

After large doses he noticed an increase in the paired sulphuric acid of the urine and also in the excretion of ammonia. Berkhart, too, in chronic morphine poisoning found in the urine a substance which gave with Fröhde's test a color differing from that produced by morphine, and Marmé a substance which he thought gave the reaction of oxidi-morphine in the stools, blood, liver, lung and kidneys.

If morphine be destroyed in the organism, its destruction would probably occur, Tauber says, in the liver, kidneys or blood. In order to ascertain whether such destruction takes place, he passed blood containing a definite quantity of morphine through excised but living organs after the manner employed by Schmiedeberg and Bungé, but in neither the liver nor the kidneys of the pig could he find evidence that any destruction of morphine occurred.

The amount of morphine in the blood passed through was not materially decreased, nor was it in any way destroyed, according to Tauber, in blood arterialized by the passage through it of air. As there is no evidence that any considerable quantity of morphine is destroyed in the system or excreted by the urine, it seemed to Tauber probable that morphine might be excreted through the bowels.

Alt has already pointed out that after injection subcutaneously morphine could be detected in the stomach, and Vogt, after subcutaneous injections of morphine found a considerable quantity of the alkaloid in the fæces.

Tauber gives an experiment which seems to show that a considerable quantity of morphine taken into the organism is excreted by the bowels. He injected during ten consecutive days small quantities of morphine into a dog ; altogether, the animal received about thirty-two grains, and he succeeded in recovering from the fæces 41·3 per cent. of the morphia. This latest contribution, then, concerning the fate of morphine in the animal organism, points to the intestinal tract rather than the kidneys as the seat of the excretion of this alkaloid.

LEAVES OF STRYCHNOS NUX-VOMICA.

By David Hooper.

The leaves of the nux-vomica plant are little used in Indian medicine, as the seeds, on account of their abundance and the facility of collection, are the best known of its products. The bark, wood and roots of this and other species of *Strychnos* are occasionally administered as tonics and febrifuges. The leaves are made into a decoction and applied externally in paralysis and in rheumatic swellings of the joints. The juice of the leaves has been given for the relief of headaches. They have also been known to make very effectual leaf-poultices for tumors and sprains ; in fact, in India leaf-poultices are made from very numerous and widely distributed plants.

The poisonous nature of the leaves has never to my knowledge been investigated, but being informed of some suspected cases of poisoning of animals from their use as fodder, I considered this a sufficient reason for prosecuting an inquiry into the subject. Mr. J. Cameron, F.L.S., Bangalore, about a month ago asked if fresh nux-vomica was known to be poisonous, informing me at the same time that a gentleman residing near him had lost three horses from, it was supposed, their eating the leaves of the tree. Another case was that of a cow dying under suspicious circumstances, and nux-vomica trees were growing in the compound where she was in the habit of grazing. "The cow had convulsions, bled at the mouth and nostrils, and only lived for a short time from the commencement of the attack." Mr. J. F. Duthie has drawn up a list of Indian fodder-yielding trees, shrubs and herbs, including certain bitter leaves and branches of the Simarubeæ and Meliaceæ, but no mention is made of any species of *Strychnos* affording edible foliage.

The leaves forwarded from Bangalore were very variable in size, the largest being 4½ in. (113 mm.) by 2¾ in. (63 mm.), and the smallest 2¾ in. (63 mm.) by 1¾ in. (46 mm.), petiole from ¼ to ½ in., oval or oval-rotundate, rounded or somewhat tapering at the base, acute at the apex or abnormally rounded, entire, thick, smooth, shining on both sides, mostly three- rarely five-nerved from the base, only the midrib reaching the apex. The leaves when dried made a dark green powder having an acidulous and bitter taste.

A preliminary examination for alkaloid in the aqueous solution of an alcoholic extract gave abundant evidence of its presence by giving precipitates with tannin, potassio-mercuric iodide, and iodine and bromine solutions. The alkaloid did not answer to strychnine when the sulphuric acid and bichromate of potassium test was applied, but afforded the reaction of brucine by turning a vivid red color with nitric acid. It was found that cold alcohol was insufficient of itself to dissolve out the whole of the alkaloid, for after percolating until all the chlorophyll and soluble substances had been removed the marc was still bitter. Alcohol dissolved out 0·315 per cent. of alkaloid calculated as brucine. Chloroform with 25 per cent. of alcohol, boiled with the leaves for one hour, the process adopted by Messrs. Dunstan and Short for extracting the seeds, proved to be very satisfactory in exhausting the alkaloid, as the resulting extract contained more of the base and the marc was free from bitterness.

Five grams of the powdered leaves were exhausted with boiling chloroform and alcohol for one hour, using a reflux condenser. The extract evaporated to dryness was heated with water acidulated with sulphuric acid, and when cold was filtered and the filter washed. The light colored liquor was treated with freshly prepared Mayer's reagent (1 cc. indicating 0·0197 gram of anhydrous brucine) and required 0·9 cc. for complete precipitation, equivalent to 0·354 per cent. of brucine.

The estimation was repeated, and exactly the same amount of Mayer's reagent was required to precipitate the alkaloid from the acid solution obtained from 5 grams of the leaves. The precipitates were collected on a filter, washed, dried and weighed together. Calculating from the formula of the brucine iodide with mercury iodide, $C_{23}H_{26}N_2O_4HI$, HgI_2, containing 40·37 per cent. of brucine, the united precipitates from the 10 grams of leaves showed the presence of 0·368 per cent. of alkaloid.

A larger quantity of the leaves was worked up for alkaloid, and the residue, purified by chloroform, was converted into acid sulphate, and its solution treated with ferrocyanide of potassium, as described in Messrs. Dunstan and Short's method for separating strychnine and brucine. The very slight precipitate that fell was not characteristic of strychnine ferrocyanide, and upon testing it further with sulphuric acid and potassium bichromate, the violet color was not developed. A neutral solution of the alkaloid was tested with potassium chromate, but no precipitate appeared until the liquor was concentrated, and the precipitate gave no color reaction with the oxidizing mixture. Wynter Blyth considers potassium chromate a very delicate test for strychnine. On the other hand, the alkaloid obtained from the leaves responded to the more important reactions of brucine. The action of nitric acid was specially studied, and among the products were detected crystals of kakotelin, and the mother liquor contained oxalic acid.

Other constituents of nux-vomica leaves are an acid resin soluble in spirit and aqueous alkalies, and dissolved by sulphuric acid with a green color changing to reddish-brown, and a caoutchouc-like substance dissolved by benzol, but not by spirit or alkalies. An organic acid, probably the strychnic or igasuric acid of older writers, is associated with the alkaloid in both the alcoholic and aqueous extracts. It strikes a green color with ferric chloride, and is

removed from solution by neutral plumbic acetate. Crystals of a body which might be referred to loganin separated from the hot chloroform-alcohol extract, but I could not obtain much more than a trace of this body from the alcoholic extract after the removal of other substances by ether. The dried leaves afforded 11·86 per cent. of ash.

From these experiments it is evident that the alkaloid of nux-vomica leaves is brucine, and that no strychnine could be separated. The bark of nux-vomica has been analyzed by Shenstone, Dragendorff and Greenish, and the alkaloid from this source was shown to be mainly brucine, with a very small proportion of strychnine mixed with it. As brucine has the same physiological effects as strychnine in inducing well-marked tetanic symptoms, the leaves of nux-vomica taken in sufficient quantity would produce poisonous results. Compared with the seeds, the leaves contain about one-tenth the amount of total alkaloid, but, notwithstanding the smaller proportion of brucine present, the leaves would be highly injurious as fodder, and precautions should be taken in keeping cattle from feeding upon them.—*Phar. Jour. and Trans.*, Dec. 6, 1890, p. 493.

SOME NOTES ON NATAL ALOES.[1]

By J. Medley Wood.

As the Director of Kew Gardens, and also Mr. Holmes, of the Pharmaceutical Society's Museum, had expressed a wish for information as to the plant from which Natal aloes had been made, and for any information I could obtain on the subject, I decided to relinquish the idea of proceeding to Drakensburg for my annual botanizing trip, and to visit the neighborhood of Greytown instead. From this place some years ago the drug was exported in quantity, but at the present time its manufacture appears to be quite discontinued, and not a single person was engaged in it through the whole district, as far as I could learn. I was also informed before leaving Durban that the aloe plants would be in flower about the middle of April, later than which I could not defer my journey. This information, however, proved incorrect, as I could not find a single plant either in flower or bud, though I searched carefully, and residents in the neighborhood informed me that the flowers would not appear

[1] From the Kew *Bulletin*, August; reprinted from *Phar. Jour. and Trans.*, Dec. 6, 1890, p. 495.

before July. Mr. Newmarch, Jr., who has been engaged in the manufacture of the drug, very kindly accompanied me to the "Thorns," and pointed out places where the manufacture had been carried on, the whole country, both on the level ground and far up the hill-sides, being thickly covered with the plants, so thickly, that making our way between them on horseback was often a matter of difficulty. The average height of the mature stem was 8 to 10 feet, but Mr. Newmarch informed me that they are frequently met with from 15 to 20 feet high. As to the species, it is undoubtedly the one which has always been known to me as *A. ferox*, with perhaps a few of the variety *subferox*, and in the district which I visited it is quite certain that no other species has been used in the manufacture. Mr. Newmarch, Jr., however, informed me that across the Mooi River, and in the direction of Weenen, another species is found in moderate quantity, and its leaves have been used, but whether alone or mixed with those of *A. ferox* I am unable to say; we were not, however, able to find even a single specimen of this plant, and the time at my disposal would not allow of my visiting the Weenen country on this occasion. The plant was described to me as being equal to *A. ferox* in size, the leaves light green or glaucous, prickly on the edge, but without any prickles on either surface, and the flowers red. I regret very much not having been able to meet with it. I forward by the kindness of Mr. Newmarch, Sr., a small specimen of the drug, made about two years ago, from the plants which I saw, and which is certainly unmixed with the juice of any other species than the one known to me as *A. ferox*, the sample being taken from a full box opened by Mr. Newmarch for the purpose. Mr. Newmarch pointed out to me in his garden another species which he believed had been sometimes used, and which was said to yield a lighter colored juice; but other persons said that they had never seen or heard of its being used, nor is it at all plentiful in the district where the drug is made, seeming to prefer the tops of the hills, while *A. ferox* is more plentiful in the valleys and along the hill-sides. I send a photograph of a plant of this species taken in the Botanic Gardens, and plants or cuttings can be sent at any time desired. I think, however, that its leaves have not been used, except perhaps accidentally. The process of manufacture as described to me by Mr. Newmarch, Sr., is as follows: Each workman is provided with a stout leather glove for the left hand, a cut-

lass or bill-hook, and a trough similar to a pig-trough, made of 6-inch board, with square ends so as to stand level, and having on each side a rail at a sufficient height from the top of the trough to support the ends of the leaves. As the leaves are cut the workman places them on each side of the trough, with the cut end downwards, and lays one row over the other, until the trough is full. He then fills in the same manner a second and a third trough, by which time the leaves in the first are sufficiently drained of their juice, and are taken off and thrown away, the juice in the trough being then emptied into a bucket. A good hand will collect about a bucketful of juice each day. I was also informed that those plants which were most covered with prickles were considered to be the best, as they were thought to yield more juice than the others. When sufficient juice is collected it is placed in an iron pot or boiler. Mr. Newmarch used an iron boiler holding about 100 gallons, which rested upon brickwork, and was provided with a chain and lever, by means of which it could be quickly lifted from the fire and swung aside when the juice was sufficiently cooked. As soon as the fire is lighted the attendant commences to stir the juice, which at first adheres both to the stirring stick and to the sides of the pot, but after half an hour to an hour's boiling the juice becomes thicker, until when it leaves the sides of the pot quite clean it is considered to be sufficiently cooked, and is quickly lifted from the fire and at once poured into the box, where it is left to cool before being screwed down for export. Mr. Newmarch also informed me that much carelessness has been shown in the manufacture; some in consequence of not having sufficient hands employed, leaving the juice too long in the iron pots before boiling; some have boiled too much and others too little, and he has seen boxes being carted away with the juice dripping through the joints of the boxes. He also informed me that the manufacture has been carried on at all seasons of the year, the yield of juice being greater during the summer months, but requiring more boiling. If it would be any advantage to you to have plants of the species alluded to here as *A. ferox*, from which the sample of the drug sent has been made, and which is undoubtedly identical with the plant growing in the Botanic Gardens here, and represented in *Gardeners' Chronicle*, vol. v., p. 113, fig. 14, I shall have much pleasure in obtaining for you, either small plants or a moderately-sized trunk, whichever you may

prefer, and I shall also try to obtain specimens of flowers for the Herbarium.

In conclusion, I may say that I noticed at least two species of dwarf aloe intermixed with the large plants of *A. ferox*. One of these is common all over the colony, the other I had not previously noticed, and I was unable to identify either. All accounts, however, agree that the leaves of these species are never taken, nor would it pay to do so, as they would require some searching for, while *A. ferox* abounds in every direction. Their leaves also are few, and comparatively small, and would not be worth the trouble of collecting.

BENZOIN.

By E. M. Holmes, F.L.S.

The specimen of Palembang benzoin, sent by Dr. M. Treub (Director of the Government Botanic Gardens in Java) to the British Pharmaceutical Society, is scarcely a typical sample of the product as met with under that name in the London market. It has lost the opalescent translucency on the outer surface, but has the same lustrous fracture as Palembang benzoin, although darker in color, as if it had been kept and exposed to the light for some time. It contains two or three white angular tears like those of Siamese benzoin, but the latter do not show any evidence of exposure to light.

The interesting point about Palembang benzoin is, that while it has the same odor as ordinary "Sumatra" benzoin, it is more translucent and appears to contain a considerable amount of moisture, freshly broken specimens readily becoming mouldy when placed in a closed glass vessel. So far as I have been able to learn only one species of benzoin tree is commonly known at Palembang, and that, judging from specimens presented to the Society's Herbarium by Mr. R. Jamie, in 1883, is undoubtedly *Styrax Benzoin*, Dry., as well as from the specimens from Java sent by Dr. Treub, since they have the globular fruits characteristic of that species. If the Palembang and Sumatra bezoins of commerce are derived from the same tree, there is probably some difference in the mode of preparation; the Palembang variety may, perhaps, be melted into blocks in hot water, and the Sumatra by artificial heat; and this might account for the moisture present in the former and the larger percentage of benzoic acid that it generally affords, but I have not been able to learn any

facts tending to confirm this suggestion. The specimen of benzoin sent by Dr. Treub has the same odor as the Palembang and the ordinary Sumatra benzoin.

The odor of the Penang benzoin is so characteristic and so strongly resembles storax, that I cannot doubt it is produced by a different species. It is pointed out in the Pharmacographia that *Styrax subdenticulatum*, Miq., occurs in W. Sumatra, and therefore in the province in which Penang is situated, and that this tree bears the same native name "kajoe kemingan," as *S. Benzoin*, as if it yielded a benzoin. There is also a fragmentary specimen of another species from Penang in the Society's Herbarium, viz: *S. Porterianum* but I have no evidence to offer that either of that yield Penang benzoin. The subject needs further investigation, and I hope that Mr. H. M. Ridley of the Singapore Botanic Gardens, with whom I have also been in correspondence on the subject, may be able ultimately to clear up the matter.

Attached to the Java specimen are some very curious galls of a cornucopia shape, developed at the expense of the flowers. These galls are produced in Java in such numbers that the production of fruit is much lessened thereby, and consequently the spreading of the tree is considerably diminished. The insect producing the galls has been quite recently described as a new species of aphis by Dr. A. Tschirch (*Ber. der deutsch. Bot. Ges.*, 1890, p. 48) under the name of *Astegopteryx styracophila*, Tschirch. The interesting account he gives of these galls is accompanied by illustrations, both of the insect and of the structure of the galls (taf. iv.).

The specimen of the stem in section showing the gum resin exuding, does not bear evidence of the application of heat, although it has been stated that it is formed under the stimulant action of applied heat, benzoic acid not existing naturally in the bark. Neither in this specimen nor in that of the Siam benzoin tree, presented by Mr. Jamie seven years ago, is there any evidence of treatment beyond the application of an axe or adze to gash the bark.

I may here take the opportunity of pointing out that the Siam benzoin, which has a distinct vanilla odor, is also the product of a different species of styrax. The leaves, examined in section by Mr. Shenstone, of Colchester, some years ago, showed sufficient difference from those of S. Benzoin to indicate that they probably belong to a different species, whilst the drawing by Dr. Pierre in the Her-

barium of this Society of the ovary of a species of Styrax from Luang Prabang in the Laos States, where the Siam benzoin is produced, shows an oval or elliptical outline, that of S. Benzoin being spherical. —*Pharm. Journ. and Trans.*, Dec. 13, 1890, p. 519.

THE PHYSIOLOGICAL ACTION OF THE CONSTITUENTS OF THE ARTIFICIAL SALICYLIC ACID OF COMMERCE.[1]

By M. Charteris, M.D.
Professor of Therapeutics and Materia Medica, Glasgow University.

Dr. Latham, of Cambridge, in the Croonian lectures for 1886, thus formulated a rule for the administration of salicylic acid in the treatment of acute rheumatism: "The true salicylic acid from the vegetable kingdom must alone be employed. If you have to give large doses avoid giving the artificial product from carbolic acid, however much it may have been dialyzed and purified. An impure acid will very quickly produce symptoms closely resembling delirium tremens."

From time to time, before and after Dr. Latham's statement, doubts as to the prudence of prescribing the artificial acid were expressed in professional circles, and occasional reports of bad symptoms having followed its use were published in the medical journals. From my clinical experience, when from giving it in the hospital patients became delirious, I could not fail to see that it was a remedy to be watched and not to be trusted, and I relied entirely for the last ten years on salicin and the natural salicylate of sodium in treating rheumatism.

But yet I felt I might have been mistaken, and I resolved, with the assistance of Dr. MacLennan, to enter upon an experimental research as to the physiological action of the two acids.

I may briefly summarize the first experiments which I carried on with Dr. MacLennan on natural and artificial salicylic acid and their salts of sodium, by stating that artificial salicylic in a 10 grain dose and artificial salicylate of sodium in an 18 grain dose were sufficient to cause the death of a rabbit weighing from 2½ to 3 pounds, while

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[1] Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, November 12; reprinted from *Phar. Jour. and Trans.*, November 22, p. 436.

natural salicylic acid and its salt of sodium in proportionate doses caused no bad results.

The deductions from these experiments indicated that artificial salicylic acid and its salt of sodium were dangerous to animal life, while natural salicylic acid and its salt of sodium were not.

Further, it was shown that the difference was due to an impurity in the artificial acid, not a trace of which existed in the natural salicylic acid.

This impurity was observed by experiment to be of the nature of a slow but certain poison, and that its lethal dose was relatively much less than that of the salicylic acid from which it was obtained.

I therefore concluded from these experiments that artificial salicylic acid contained an impurity or impurities, and that until this or these could be extracted by the aid of chemistry, the internal administration of the acid or its salt should be discountenanced. Large and repeated doses of the sodium salt were necessary in the treatment of acute rheumatism, and hence the restlessness, the confusion and the delirium attendant at times on their use. The retarded convalescence also which occurred in some cases of acute rheumatism after the salicylate treatment was due in all probability to the great and protracted prostration to which the impurity or impurities gave rise. In connection with these symptoms it was noted that prescriptions for the salicylate of sodium were invariably made up, unless otherwise indicated, from the artificial and not the natural salt.

The conclusion of the paper, which was published in the *British Medical Journal* of November 30, 1889, was "in a further communication we will state the physiological action of the acid from which the impurity has been removed."

An interval of some months elapsed before the artificial salicylic acid, purified by Dr. Henderson, of the Chemical Laboratory of Glasgow University, was submitted to the physiological test. The result was disappointing. We found that it caused death in a 10 grain dose, when administered to a full grown rabbit, and that the same thing happened when a sample of the acid of a Berlin firm, guaranteed pure, was tried under similar conditions.

In the paper read before the Royal Medico-Chirurgical Society on February 14th, I entered into full details as to the time when an article by the late Mr. Williams was brought under my notice, in

which one mode of purifying the artificial salicylic acid was given. Proceeding on the lines Mr. Williams laid down, and modifying in the final part his process by employing repeated slow crystallization from water instead of rectified spirit, a purified artificial salicylic acid was obtained identical in its chemical form, its solubility, its melting-point and its physiological action with that of the natural acid. It was also shown that if the form, the solubility and the melting-point varied in the artificial from that of the natural, no uniform physiological result could be obtained.

I did not venture to give a name to the impurity or impurities which could be extracted from commercial salicylic acid. I only said they were probably some form of cresotic acid, and left their investigation to chemists able and willing to make an exact analysis.

On the 4th of October I received with great pleasure a letter from Professor Dunstan, whose capabilities as a careful and competent chemist are well known in scientific circles, stating that he had made commercial salicylic acid a matter of investigation, and asking my co-operation in regard to the physiological action of the constituents which he had found in it. My assent was willingly given, and the results of these experiments will now be detailed.

On the 7th of October, 1890, I received from Professor Dunstan a sample of artificial salicylic acid and two samples of substances which had been removed from this acid and marked O-acid and P-acid, and I subsequently received another substance marked M-acid. For convenience of description the characters of these samples will be given in their alphabetical order, although the details of their physiological action are recorded in the order of time in which they were examined.

M-acid (meta-cresotic acid).—Hard white crystals, melting-point 174·5° C.

O-acid (ortho-cresotic acid).—White silky crystals, very light, melting-point 163° C.

P-acid (para-cresotic acid).—Whitish powder, somewhat like coarse flour, melting-point 151° C.

Artificial salicylic acid.—Small crystals with slight interlacing needles, melting-point 157° C.

These samples were examined as to their physiological action in the following way.

O-acid. October 18, 1890—10 a.m.—Two grains of this sample

were dissolved in twenty minims of rectified spirit and injected into a rabbit, which weighed one and a half pounds. Within fifteen minutes the animal assumed a prone position, with its hind legs stretched out.[1] In the course of half an hour the breathing became labored and there was also great prostration, as evidenced by the head resting between the fore-limbs and inability to move. In the evening the hind-limbs were completely paralyzed, and in thirty hours from the time of the injection being given the animal died.

P-acid. On the same day and at the same time two grains of this sample similarly dissolved were injected into a rabbit also weighing one and a half pounds. In the course of thirty minutes slight symptoms of prostration were evinced, but it was found that these were not so severe as in the previous case, for when roused the animal could move about fairly well. Yet it was observed that the animal was under the influence of a poison by its refusing to take food and by the peaked expression of its face. On the morning of the 10th it was found dead, having lived twelve hours longer than the rabbit which had received the injection of ortho-cresotic acid.

Artificial Salicylic Acid.—This acid was slowly crystallized from solutions in boiling water, and as the result of this procedure the crystals became better defined. On October 28th ten grains dissolved in rectified spirit were injected into a rabbit weighing three pounds. Another specimen of the purified artificial acid from Professor Dunstan in larger crystals also afforded a satisfactory result.

M-acid.—November 1, 1890. Two grains of this sample dissolved in rectified spirit were injected into a rabbit weighing one and a half pounds. In this instance there was not the slightest evidence of any unhealthy action.

Summary.—The ortho- and para-cresotic acids by their physiological action show that they are slow but certain poisons, causing prostration and paralysis affecting first the hind limbs and gradually extending over the body. The lethal dose is about 1 grain for a pound rabbit. These facts, now corroborated, were mentioned in the article which appeared in the *British Medical Journal*, Novem-

[1] The mode of injection in this and the following experiments may be stated. An assistant held the rabbit on its back. A piece of skin was picked up from the abdominal wall—the hypodermic needle was then inserted and the contents of the syringe slowly pressed out.

ber 30, 1889, as the result of trying the impurity obtained from salicylic acid, which Dr. Henderson had isolated by Mr. Williams' method but had not further examined. The meta-cresotic acid was innocuous.

The conclusion from all these experiments seems to be that a high melting-point is not the only or the best test for purity. Something more is required, and this is that the artificial crystals should be identical with those of the natural variety, for similarity of crystallization seems to be absolutely essential to secure a uniform and harmless physiological action. Pharmaceutical chemists may not have the apparatus or the time for applying the melting-point test, but they can all easily observe the difference between well-defined crystals, like those of strychnine, and others which present an appearance like quinine.

The well-defined crystalline form of the acid with a melting-point of almost 157° C., should be the official form of artificial salicylic acid, and from this alone should the salicylate of sodium be prepared.

I may add that if salicylic acid be prepared from synthetic carbolic acid, having a melting-point of 42° C., it then contains no impurity. Its melting-point is 157° C., and its physiological action is in every way satisfactory. This pure carbolic acid is about three times the price of the ordinary form, and until this can be reduced the more economical plan will be to produce salicylic acid from ordinary carbolic acid and subsequently to purify it.

I would recommend as additions to the forthcoming Addendum of the British Pharmacopœia—

ACIDUM SALICYLICUM PURIFICATUM.

Characters.—White, separate, large, prismatic crystals, inodorous, taste at first sweetish, then acid. Soluble in about 500 parts of cold water and 15 of boiling water; readily soluble in hot chloroform; soluble in alcohol and ether. Melting-point about 157° C. Dose, 10 to 30 grains

SODII SALICYLAS PURIFICATA.

Obtained by the action of purified salicylic acid on carbonate of sodium.

Characters.—Well defined white odorless crystalline scales, having a sweetish saline taste; soluble in nine-tenth part of its weight in water, or in 6 parts of rectified spirit. Dose, 10 to 30 grains.

Professor Dunstan agrees with me as to the importance of making these additions to the Addendum, and in this way avoiding the great delay which would be involved in waiting for a new edition or reprint of the Pharmacopœia itself.

NOTES ON ESSENTIAL OILS AND ALLIED PRODUCTS.

By Geo. M. Beringer, Ph.G.

Abstract from the Semi-Annual Report of Schimmel & Co.

Alant Oil (from Inula Helenium, L.)—The liquid constituent of alant root can only be obtained in very limited quantities. The drug is now worked exclusively for its helenin, a crystallizable substance melting at 66° C., which has recently been successfully employed in Spain against cholera. According to Marpmann, helenin prevents the development of tuberculosis.—See Amer. Jour. Pharmacy, 1876, p. 353, and 1884, p. 530 and 646.

Almond Oil, Essential.—Attention is again directed to the sophistication of bitter almond oil with artificial benzaldehyde and the value of the test for the detection of the latter published in their April report. The test offered is as follows: "Into a small porcelain vessel sitting in a larger one, is placed a piece of filter paper folded together like a lighter and soaked with the oil to be tested. This paper being set on fire, it is quickly covered with a two-liter beaker ready at hand, which is moistened inside with distilled water. The gases arising from the combustion settle on the damp sides of the beaker and with a little distilled water are washed into a filter. The addition to the filtrate of a solution of nitrate of silver should not cause any turbidness, much less a precipitate of chloride of silver. The value of the test depends upon the fact that the artificial oil, prepared from benzylchloride, shows traces of chlorine products, which cannot be removed. Genuine oil distilled from almonds or peach kernels, never gives a chlorine reaction.

Recently Heppe has proposed another test for the detection of artificial benzaldehyde in bitter almond oil. He allows a few drops of the oil to fall into a melted mixture of KHO and KNO_3 mixed intimately by stirring with a platinum wire. The flux is dissolved in water acidulated with nitric acid and tested for chlorine with silver nitrate. These tests are based upon the same scientific principles.

Anise Oils.—According to reports from Russia the favorable weather has resulted in more than an average yield of anise in the cultivated areas. The production of anise has almost continually increased, not only in Russia, but also in Italy, Syria and Turkey, and India has recently entered the field. The resulting decline in price of the oil will enable it to largely displace star-anise oil. A monopoly of the latter oil is reported to have been secured by a French firm in Hanoi, from January 1, 1891.

Boldo-leaf Oil.—According to the Real-Encyclopädie der gesammten Pharmacie, boldo-leaf oil is employed in affections of the liver and in gall-stones, as also recently against gonorrhœa, dyspepsia and rheumatism.

Camphor and Camphor Oil.—From January 1st to August 7th, of this year, the shipments of camphor from Japan amounted to 19,042 tubs or about 1,428,150 kilos, and thereby attained the average of the previous year, which witnessed a total export of 2,487,458 kilos. It cannot be overlooked that the production of camphor is decidedly too small compared with the world's demand, now that, both in the celluloid industry and also in the manufacture of smokeless powder, two consumers of importance have arisen. It is, therefore, urgently to be desired that planting of the trees in Japan should be extended, and that experiments should be made with its cultivation in other countries with suitable climates. In February, 1889, camphor plants were brought from Hongkong to Singapore, but nothing has yet been announced as to the success of the experiment. The percentage of camphor in the oil is stated to be so much less than formerly that it hardly pays to work it. Nothing is more likely than that the Japanese, in consideration of the enormous market value of camphor, now work up the residues. Messrs. Schimmel & Co., refer to *light camphor* oil, sp. gr. 0·895–0·920 and to heavy camphor oil (boiling between 240° to 300°, sp. gr. 0·970.) Heavy camphor oil is of a pale green color and oily consistence, inflames with difficulty and has a powerful antiseptic and disinfectant action. It is a good solvent for resins of all kinds and for india rubber and is useful to render varnishes flexible.

Cassia Oil.—The quality of the oil received in recent shipments appears to approach the good quality of that of former years. The Chinese have plainly confessed adulteration with resin and mineral oil, and adulterated qualities are still quoted in Hongkong. The following are results of recent examinations of shipments since April:

	Sp. gr.	Residue from Distillation.	Per Cent. of Aldehyde.
Cheong Loong,	1·061	8 per cent. soft	77
" "	1·061	6 " "	77
Yan Loong,	1·058	8·5 " "	78
" "	1·060	7 " "	77
Ye Tac,	1·062	18 " hard	45

It is recommended to purchase cassia oil on the guaranteed aldehyde strength.

The following process for estimation of aldehyde is recommended: 10 cc. of the oil to be examined are measured with the pipette and allowed to run into a specially manufactured flask of 100 cc. capacity, with a neck 13 cm. long and 8 mm. internal width, which is divided into tenths up to 6 cc., the last drops being blown out of the pipette with the mouth. The flask is then about three-fourths filled with a 30 per cent. solution of sodium bisulphite and the contents thoroughly mixed by shaking. It is then warmed on the water-bath until the curd formed is *completely dissolved* and there floats on the solution a layer of clear oil, sharply defined against the solution. The flask is then allowed to cool and filled up with the bisulphite solution (toward the end, drop by drop), till the oil has entirely risen into the neck of the flask and its lower limit accurately coincides with the lowest mark on the neck. This oil consists of the non-aldehydes, whose volume, subtracted from the 10 cc. oil used, shows the amount of cinnamic aldehyde contained. Strictly speaking, these are volume

and not weight percentages; as, however, the specific gravity of the non-aldehyde in Cassia oil (1·060 at 20° C.) almost exactly accords with that of cassia oil (1·059–1·061 at 20° C.), the actual difference is only small and of no practical importance.

If the curd will not dissolve after a day's heating an extraordinarily heavy adulteration, with a hard resin, may be assumed, in which case a volumetric estimation of the aldehyde is impossible. When the oil is adulterated with both resin and mineral oil, the separated non-aldehydes are still liquid in the presence of 30 per cent. of resin.

The cinnamic acid present in every cassia oil is determined in this process as cinnamic aldehyde. As, however, even in very old oil less than 1 per cent. of acid is present, this error is insignificant.

If the percentage of cinnamic aldehyde present is less than 70 per cent., the distillation test is serviceable for the detection of sophistication. If the residue left at 290° amounts to over 10 per cent. and is firm, hard resin has been used; if it remains liquid, after cooling, fatty oils or other liquid adulterants have been used.

In order to determine the resinification of cassia oil, under the influence of the air, 200 cc. of the oil was placed, on September 20, 1889, in a glass dish only covered with perforated filter-paper in a room exposed to midday sunshine and continually heated in winter. Light, warmth and access of air, the three active agents for effective resinification, were therefore present in such abundance, as they never occur in keeping the oil in commerce.

In the course of the experiment the oil underwent the following alterations:

Examined.	Distill. Residue.	Cinnamic Aldehyde.	Cinnamic Acid.
Sept. 20, 1889, ...	5·5 per cent.	77·7 per cent.	0·7 per cent.
May 1, 1890, ...	10·6 "	— "	— "
Sept. 10, 1890, ...	12·6 "	68·5 "	8·5 "

The cinnamic acid was estimated by shaking out the oil with hot soda solution and identified as such by the melting-point 131° C. (m. p. pure cinnamic acid, 133°) and by the formation of benzaldehyde by oxidation with permanganate of potassium.

Messrs. Schimmel have examined the tests proposed by Mr. Ed. Hirschsohn (see AMER. JOURN. PHARMACY, 1890, p. 294 and p. 487). He found that a pure cassia oil, shaken with three times its volume of petroleum ether, should undergo no alteration of volume. They report a variation observed in the volume of both pure and sophisticated oils, though with the former somewhat less. The differences were too small for a practical test. The correctness of Hirschsohn's other test is confirmed. It is: To a solution of cassia oil in 70 per cent. alcohol 1 : 3 is added, drop by drop, half its volume of saturated solution of lead acetate in alcohol of same strength, no precipitate should form, otherwise colophony or similar resin is present. Oils without the addition of resin remain quite clear, as also the old cassia oils with their slightly increased content of cinnamic acid. On the other hand, the sample of oil mentioned above, as containing 8·5 per cent. of cinnamic acid in consequence of exposure to air, did not satisfactorily stand the test. As such oils, however, are not met with in commerce, the possibility of a precipitate of cinnamate of

lead would only have to be borne in mind in the examination of old cassia oil left in badly-closed vessels.

Eucalyptus Oils.—The production of the genuine oil of Eucalyptus Globulus in Algiers only amounts to about 2,000 kilos per year. The consumption of eucalyptus has not increased, on the whole, especially since a highly productive substitute has been found in cajeput oil for the preparation of eucalyptol (cineol). P. W. Squire has called attention, in the *Chemist and Druggist*, to an oil coming in the market as that of Eucalyptus amygdalina, which contains no phellandrene and rotates a ray of light to the right instead of to the left. Similar observations have been made, and the opinion is expressed that the various kinds of the eucalyptus leaves are no longer carefully separated. Large samples of the distillate of Eucalyptus maculata var. citriodora have been received from Queensland. Its sp. gr. at 15° was 0·873. When distilled, about ¾ goes over between 205°–210° ; while smaller fractions boil under and above these temperatures. The fraction 205°–210° consists almost entirely of pure *citronellon*. When shaken with solution of sodium bisulphite, the mixture becomes hot and a fairly solid mass forms, from which, after washing with ether, pure citronellon separates on decomposing with soda solution. The fraction boiling under 200°, about 4 per cent., showed none of the characteristic reactions of cineol (eucalyptol), and it must, therefore, be assumed that this body is not present in the oil of Eucalyptus maculata var. citriodora. The well-rectified oil is colorless, has a pleasant melissa-like odor, and may be useful in perfumery and soap manufacture. Cineol is reported as existing in the following oils not previously reported as containing it: Zedaary root oil (Curcuma Zedoaria), California Laurel oil (Oreodaphne californica) and in oil of Canella alba.

Garlic Oil.—This is now prepared principally for use in sauces and spices. 1,600 kilos of fresh garlic yield 1 kilo of the oil ; sp. gr. 1·057 at 15°.

Geranium Oils.—The African Geranium oil from Algiers is now brought in competition with oil from a new source, Réunion, and in the neighboring isle, St. Mauritius, distillation is also carried on on a smaller scale. The Réunion oil is distinguished by a beautiful green color, which is not due to presence of copper. No important chemical differences appear to exist between the two kinds. The specific gravities are as follows: Algerian, 0·899 ; Réunion, 0·891. The so-called "Turkish" geranium oil is distilled from the well-known grass, Andropogon Schœnanthus. A great part of that distilled in the Nimar district is adulterated by the distillers with turpentine oil, regularly supplied from Bombay for the purpose. The grass flowers in October and November, when it is cut and distilled ; 373 pounds of grass from Kandesh, distilled in Bombay, yielded 1 pound 5½ ozs. of oil. The oil adulterated with turpentine is the ordinary Ginger-Grass oil of commerce. For statements of F. W. Semmler, regarding composition of Indian Geranium oil, see AMER. JOUR. PHARMACY, 1890, p. 400.

Lavender Oil.—The reappearance of an old test for detecting adulteration in lavender oil—namely, the solubility of the oil in 3 parts of 70 per cent. volume alcohol at 16° C.[1]—induced Messrs. Schimmel to make an inspection of the

[1] This test was recently given prominence in a circular to the trade by Mr. George Lueders, who stated that 1 part of lavender oil dissolved in 3 parts of

finest products of the lavender districts of South France. As will be seen from the appended table, the sp. gr. varied considerably, and gave evidence of a relationship to the solubility, those of lower gravity being more soluble. The optical polarizing power is also subject to considerable variation, and does not appear to be very suitable for the detection of adulteration.

	Source and Age.	Sp. gr. at 15°.	Rotation in a 100 mm. col.	Solubility in 70 per cent. alcohol.
A	Alpes maritimes, 1889, ...	0·897	— 4° 15′	insoluble
B	" " "	0·896	— 6° 8′	"
C	" " "	0·893	— 8° 22′	"
D	" " "	0·894	— 8° 16′	"
E	Gard, 1889, ...	0·891	— 9° 20′	insoluble at 16°, but dissolved on warming to 20°.
F	Alpes maritimes, 1889, ...	0·887	— 4° 48′	soluble
G	" " "	0·887	— 7° 8′	"
H	" " "	0·888	— 6° 51′	"
I	Gard, 1889, ...	0·888	— 6° 20′	"
K	Drôme, 1889, ...	0·885	— 6° 48′	"
L	Alpes maritimes, 1889, ...	0·889	— 6° 58′	"
M	Drôme, 1890, ...	0.885	— 4° 26′	"
N	Hérault, 1889, ...	0·887	— 6° 56′	"

In order to discover the constituent, which was the cause of the insolubility, 25 kilos A was fractionated with steam. Lavender oil, boiling at a higher temperature than turpentine, the latter, if present, would appear in the first fraction and be detected by its slight solubility in 70 per cent. alcohol. But the four first fractions readily dissolved, and only the last and smallest refused to dissolve. The presence of turpentine was, therefore, negatived.

The difference in behavior with the solvent ought to be ascribed to the fact that in the case of insoluble oils the distillation is pushed further than in that of the soluble, i. e., that constituents with higher boiling points and difficultly soluble are carried over toward the end of the process. It is probable that the soluble oils are subjected to rectification in which the least volatile fractions are kept back. These experiments prove that an oil may be unadulterated and not stand the test. Messrs. Schimmel state that the test is unreliable in detecting adulteration, as the soluble oils G, H and I dissolved perfectly clear with 70 per cent. alcohol at 16° even after the addition of 15 to 20 per cent. oil of turpentine. The age of the turpentine used proved to have some influence on the solubility. Of an old, somewhat resinified oil of turpentine, 20 per cent. could be added, whilst of a freshly rectified specimen only 15 per cent. were admissible.

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the 70 per cent. alcohol, and 1 part of spike oil in 2 parts. Insolubility indicating adulteration with turpentine, camphor oil, castor oil, etc. The test is stated to be relied on by the large houses in Grasse, who all buy these oils from small distillers in the mountains. G. M. B.

Massoy bark Oil.—The raw material is imported from German Guinea. An import of worthless bark is reported from Java, devoid of odor and of another botanical origin.

R. Woy reported a new terpene, massoyene, as contained in the oil (see AMER. JOUR. PHARMACY, 1890, 296). Prof. Wallach has now shown this to be erroneous (Liebig's Annalen, vol. 258, 340). The so-called massoyene is a mixture of not less than three distinct terpenes, namely, pinene, limonene and dipentene.

Mustard Oil.—The new German Pharmacopœia, having again rightly negatived the substitution of the artificial product by recognition of the natural oil alone, reasons for the presence of the former in pharmacy are finally removed, and it is hoped that continued endeavors to find a distinctive test may be successful.

Myrtle Oil.—Myrtol obtained from this oil is not a simple body, but a mixture of pinene, cineol and dipentene boiling between 160° and 180° C. It is recommended for its valuable antizymotic and deodorant properties, being useful to disinfect the lungs, as through this organ it is chiefly excreted.

Peppermint Oils.—Dr. Ed. Polenske has observed that peppermint oil which had stood for some time in sunlight lost the power of giving color reactions with acids (see AMER. JOUR. PHARMACY, 1890, page 491). The III Dutch Pharmacopœia requires as a test for the identity of peppermint oil that a mixture of 5 drops with 20 drops of glacial acetic acid shall gradually develop a dark blue color with a copper colored fluorescence. It has been observed that the formation of the colored compound was due to oxidation, and did not occur when air was excluded. If a small bottle is completely filled with the mixture of acetic acid and oil, and closed with a cork, the mixture becomes scarcely perceptibly blue, and the color does not deepen in intensity after several days. If air is admitted, the change gradually takes place. It is curious that Japan peppermint oil gives no color reaction or only to a very slight extent.

The new German and the Austrian Pharmacopœias require that peppermint oil shall form a clear solution with diluted alcohol. To this condition the Mitcham peppermint oil answers, while the requirement of the Dutch Pharmacopœia, which only prescribes complete solubility in 90 per cent. alcohol, admits the American oil also.

Pepper Oil.—Phellandrene is proven to be a constituent of this oil by the formation of a solid nitrite on adding sodium nitrite to a solution of the oil in glacial acetic acid.

Rose Oil.—Messrs. Schimmel report favorably upon the results of their experiment of producing otto of rose in Germany, and the supply of superior oil in the future is guaranteed. Twenty-three thousand kilos of freshly-gathered roses yielded 4½ kilos of otto. The adulteration of the Turkish rose oil with geranium oil is still carried on to a large extent. The government has forbidden the import of this oil, but it continues to be smuggled into the country. Rose oil, mechanically freed from stearopten, is now an article of the trade. It was observed, during the purification of a large lot of stearopten from Turkish rose oil, that when distilled in vacuo no constant boiling point could be obtained, and that the lower boiling fractions remained liquid at normal temperatures, while those boiling at higher temperatures immediately

solidified. By digesting the stearopten near its melting point and by repeated crystallization two constituents were obtained, one melting at 41° C. and the other at 22° C. The stearopten from German rose oil behaved the same. One part was separated from it, melting at 22° C., and another, which melted between 40°–41° C. It is therefore manifest that contrary to the views hitherto held, rose oil stearopten is no uniform substance, but a mixture of what are probably a whole series of homologous hydrocarbons.

Wintergreen Oil.—An artificial product, recently received in New York from Hamburg, contained such a large proportion of methyl benzoate that it was easily recognizable by the odor. Its sp. gr. was only 1·133. Genuine oil being 1·180 and methyl benzoate 1·095, it was presumably a mixture of about equal parts of methyl benzoate and salicylate.[1]

Messrs. Schimmel report having experimented with a number of novelties of their own distillation.

Mosoi flower oil.—The material received from the South Sea Islands under the name of mosoi flowers proved to be dried cananga flowers: 8½ kilos yielded 100 grms. of oil, sp. gr. ·922, differing somewhat in odor from Indian cananga oil, but contained large quantities of benzoic acid.

Walnut leaves oil (Juglans regia).—800 kilo yielded 235 grms. of oil, solid at ordinary temperatures, and of a pleasant tea-like odor.

Japanese Pepper Oil, from Xanthoxylum piperitum D. C., known in Japan as "Sansho." The comminuted fruit yielded 3·16 per cent. of a yellowish essential oil, sp. gr. 0·973 boiling between 160°–230° C., having a pleasant lemon-like odor, probably due to citral.

Ash Bark.—The bark of *Fraxinus americana* yielded 0·030 per cent. of oil, which, at ordinary temperatures, has a consistence of butter and a characteristic fruity odor.

Bugleweed, Lycopus virginicus.—The dried herb yielded 0·075 per cent. of oil, sp. gr. 0·924 at 15° C.

Spicewood, Lindera Benzoin, *Blume.*—All parts of the shrub possess pleasant aromatic odors which, however, are strikingly different. The bark yielded 0·43 per cent. of an oil smelling like wintergreen, sp. gr. 0·923 and boiling between 170°–300°. The berries yielded 5 per cent. of an aromatic and camphoraceous smelling oil, sp. gr. 0·855, boiling point 190°–270° C. This oil had been prepared by Dr. A. W. Miller,[2] who obtained about 4 per cent., sp. gr. 0·850. The twigs yielded 0·3 per cent. of an oil smelling like camphor and calamus, sp. gr. 0·925. The leaves yielded 0·3 per cent. of oil with a pleasant lavender-like odor, sp. gr. 0·888.

Sweet Fern Leaves.—The dried leaves of Myrica asplenifolia, *Endl.*, yielded 0·08 per cent. oil, with a cinnamon-like odor, sp. gr. 0·926 at 15° and becoming solid in a freezing mixture.

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[1] The presence of a benzoic ether in a commercial sample of artificial oil of wintergreen was reported in AMER. JOUR. PHARM., 1889, p. 404.

[2] In *Proceedings Amer. Pharm. Assoc.*, 1878, p. 773, Dr. Miller reported the oil of a bright green color, and in taste resembling that of allspice and prickly ash; yield not quite 1 per cent. P. M. Gleim (AM. JOUR. PHAR., 1875, p. 246), reported 5 per cent. of oil, sp. gr. ·870 of a fragrant odor resembling that of jessamine.—G. M. B.

Botan Root (Pæonia Moutan), a Japanese drug, yielded no essential oil, but yielded *peonol*, a substance first found by Will, of a pleasant aromatic odor, crystallizing in large needles.

Citral.—This name has been proposed for terpene-free lemon oil containing only the valuable aromatic portion of the oil. It has been prepared to meet the demand for a more soluble oil. In a partial vacuum under a pressure of 16 mm. citral boils at 116° C., and under normal atmospheric pressure at 228°–229°, without decomposition, if pure. Its sp. gr. is 0·899; it is probably an aldehyde, as it forms stable compounds with alkaline acid sulphites. Its formula is probably $C_{10}H_{16}O$. Lemon oil contains only an average of 7½ per cent. of citral.

MINUTES OF THE PHARMACEUTICAL MEETING.

On motion of the Registrar, Mr. Wm. B. Webb was called to the Chair, and the reading of the minutes of the last meeting was dispensed with.

Prof. Maisch presented to the library from Mr. Lancaster Thomas a copy of Lemery's Course of Chemistry translated and edited by James Keill, third English edition, published in 1698; and also a copy of the Prussian Pharmacopœia of 1840.

Professor Maisch stated that he had received from Professor Alfonso Herrera a copy of the Appendix to the Mexican Pharmacopœia which has just been issued, and that a copy of it would also be sent to the library of the College, by the Mexican Academy of Pharmacy; also that an advance copy of the Additions to the British Pharmacopœia, had been forwarded to him by Professor Attfield. Among the remedies made officinal in the latter work, for the first time, was glonoin, a solution being directed under the title of *liquor trinitrinæ*, of the strength of one part of nitroglycerin in one hundred parts of alcohol; *Eucalypti Gummi*, described as being almost entirely soluble in rectified spirit, cold water dissolving from 80 to 90 per cent. of the gum; *Euonymi cortex* (and dry extract), *Hamamelidis cortex* (tincture 1 : 10), *Hamamelidis folia* (and fluid extract), *Hydrastis rhizoma* (tincture 1 : 10, and fluid extract), Strophanthus (tincture 1 : 20), Adeps lanæ and Adeps lanæ hydrosus (lanolin), Oleum cadinum, Picrotoxinum; and of the recently discovered chemicals Acetanilidum (antifebrin), Glusidum (saccharin), Homatropinæ hydrobromas, Paraldehydum, Phenacetinum, Phenazonum (antipyrine), and Sulphonal. Among the pharmaceutical preparations adopted are Syrup of ferrous chloride; glycerin suppositories with 70 per cent. of glycerin, and prepared with gelatin; Menthol plaster with 20 per cent. of menthol.

A new German Pharmacopœia has made its appearance, and this is for the first time printed in the German language, it has heretofore been issued in Latin; percolation has been introduced for the preparation of fluid extracts, which are now officinal.

Mr. Beringer suggested that the pharmaceutical meetings might probably be rendered more attractive and the attendance greatly increased; he thought that a committee appointed for the purpose could bring forward subjects of general interest, and induce members to furnish papers or information upon these subjects.

Professor Maisch favored the plan, and moved that the Chairman appoint a committee of five for the purpose indicated.

Mr. Ellis asked if the reputation of the pharmacist of to-day was equal to that of the pharmacist of forty years ago.

Mr. McIntyre said he was not in business forty years ago, but that the pharmacist of the present time was ready for any business that offered; that to carry on the business successfully required about three times as much work now as it did ten years ago, a much greater investment of capital and greater expense in the matter of help about the store. In his opinion it was proper that all the preparations of the Pharmacopœia should be made in his store.

The query was raised what is the proper article to dispense when *fluid extract of witch hazel* is prescribed; that of the leaf or bark? It was claimed that as the extract of the leaves is officinal it should be dispensed unless otherwise ordered.

Mr. Thompson said that 40 or 50 years ago there were comparatively few scientific pharmacists and relatively a large community who would naturally look to them and obtain their medicines from them; and that now the greater number of educated pharmacists rendered the individual less prominent. By making and dispensing his own pharmaceutical preparations, every pharmacist would secure the confidence of the physician and of the public.

Mr. Beringer recommended that new drugs or preparations introduced for medical use be brought forward as subjects for discussion at these meetings.

Mr. Thompson referred to the recent action of the American Medical Association in establishing a section of materia medica and pharmacy to which pharmacists will be admitted, and said that if this action was met in a proper spirit, keeping steadily in view the advantages which would accrue from a harmony of action to both professions, instead of thrusting every grievance, real or fancied, upon the attention of the section, then a great deal of good would be accomplished and much closer and fairer relations between the two professions would be effected.

There being no further business, a motion to adjourn was put and carried.

T. S. WIEGAND,
Registrar.

EDITORIAL.

The Philadelphia College of Pharmacy has been lighted by electricity since the middle of December. Measures had been taken by the Board of Trustees to have this improvement in use at the beginning of the session, but the delay occurred through the inability of the electric company of furnishing the necessary current at an earlier day. Each of the lecture rooms is now supplied with thirty Edison incandescent lamps, and a sufficient number of them have been placed in the different rooms, offices, hall-ways, the museum, etc. To mark this event a social gathering of the members of the College and their ladies was arranged for the evening of January 2, under the direction of a Committee consisting of Howard B. French, Professor Remington and Dr. A. W. Miller. Nearly two hundred persons assembled in the Pharmacy lecture room to listen to an informal talk—as it was called—on electricity by Professor E. J. Houston, of the Central High School, who gave a brief but very interesting résumé of the history of electricity as a science, and of the progress made in its varied applications, dwelling also upon some of the problems awaiting solution to still

further increase the usefulness of that force. The motors now in use in the United States were estimated at not less than 20,000 horse-powers, besides about 175,000 horse-powers on electric railways running over 2,000 miles of track. In producing the electric light at the present time, it was stated that much of the energy was wasted through the production of heat; but the electric light of the future would be similar to that of the glow-worm and fire-fly, where all the energy was used in producing light without heat. The concentration of energy would be reached, when it became possible to produce electricity directly from the burning of coal, which would render useless the steam-engine of to-day. The application of electricity as a therapeutic agent, for aërial navigation and many other purposes was also alluded to.

After the conclusion of the lecture, Professor Sadtler showed the materials from which the different kinds of electric lamps are made, and illustrated experimentally the principles governing incandescent and arc lighting, and of some electric phenomena.

A microscopic exhibition had been arranged in the library by the instructor in microscopy, A. P. Brown, Ph.G., who showed many objects interesting to the pharmacist and of general interest.

A collation was served in the museum, where an orchestra was stationed, and contributed much to the pleasure of the evening. The entertainment was evidently enjoyed by all present, many expressing the wish that such social gatherings would take place more frequently in the future than has been the case in the past.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Medical Bulletin Visiting List, or Physician's Call Record. New edition. Philadelphia and London: F. A. Davis. 1891. Price, $1.25 (70 patients); $1.50 (105 patients).

This visiting list is stated to be arranged upon an original and convenient monthly and weekly plan for the daily recording of professional visits. The plan is quite simple, and is easily understood; the make-up of the pages is such as to facilitate the correct keeping and the examination of the professional records. Various tables, formulas and other information for convenient reference are printed upon the first 24 pages.

A Laboratory Manual of Chemistry, medical and pharmaceutical, containing experiments and practical lessons in inorganic synthetical work; formulas for over three hundred preparations, with explanatory notes; examples in quantitative determinations and the valuation of drugs, and short systematic courses in qualitative analysis and in the examination of urine. By Oscar Oldberg, Ph.D., etc., and John H. Long, Sc.D., etc. With original illustrations. Second edition, revised and enlarged. Chicago: W. T. Keener. 1891. 8vo. pp. 475. Price, $3.50.

On the first appearance of this work, about three years ago, we have given an extended account of its scope and arrangement, showing that it is a guide to practical work in the laboratory, the authors being directors of the pharmaceutical and chemical laboratories in the Northwestern University. In noticing the present edition, we observe that the chapter on the analysis of urine

has been entirely rewritten and enlarged to bring it up to our present knowledge, and that a new chapter on the microscopical examination of urinary sediments has been added. The remainder of the work is an exact reprint of the first edition, except that typographical errors, as far as observed, have been corrected, and that several alterations have been made in the descriptions of the methods of preparing certain pharmaceutical products.

A Manual of Weights and Measures, including principles of metrology, the weights and measures now in use, weight and volume, and their reciprocal relations, weighing and measuring, balances (scales) and weights, measures of capacity, specific weight and specific volume, etc., with rules and tables. By Oscar Oldberg, Ph.D., etc. Third edition, revised. Chicago : W. T. Keener. 1890. 8vo. pp. 256. Price, $1.50.

The first and second editions of Professor Oldberg's work on weights and measures were noticed at the time of their appearance ; the present edition differs from the preceding one mainly in the re-arrangement of the tables of the co-efficient of expansion of certain liquids. It is obvious that a study of the subject matter is of especial interest at the present time, since the metric system has been adopted for the revision of the Pharmacopœia.

Proceedings of the Ninth Annual Meeting of the Virginia Pharmaceutical Association, held at Old Point Comfort, September 9 and 10, 1890. Lynchburg. 8vo. pp. 79.

A brief account of the meeting will be found on page 539 of our last volume.

Catalogue des thèses soutenues devant l'École de Pharmacie de Paris, 1815–1889. Par le Dr. Paul Dorveaux, Bibliothécaire de l'École supérieure de pharmacie de Paris. Avec une préface de M. G. Planchon, Directeur de l'École supérieure de pharmacie de Paris, membre de l'Academie de médecine, etc. Accompagné d'un fac-simile de la synthèse illustrée de cheradame. Paris : H. Welter, Editeur. 1891. 8vo. pp. 75.

The collection of theses at the Paris School of Pharmacy is incomplete, but in some cases the titles of the missing theses could be supplied. The list is arranged in chronological order, and gives also brief biographical data of the authors, dates of the publication of the theses, etc.

Beitrag zur Kenntniss der Isomerieverhältnisse innerhalb der Terpenreihe. Inaugural-Dissertation von Edward Kremers aus Milwaukee. Göttingen. 1890. 8vo. pp. 74.

Contribution to the knowledge of isomerism within the terpene series.

A dissertation from the University of Göttingen for the degree of Doctor of Philosophy.

The Treatment of the Morphine Disease. By J. B. Mattison, M.D., Home for Habitués, Brooklyn. pp. 24.

Reprint from the Therapeutic Gazette, September, 1890.

Abnormal Intra-Thoracic Air-Pressures and their Treatment. By Charles Denison, A.M., M.D., of Denver, Col. 8vo. pp. 41.

An address delivered by President Denison, at the Seventh Annual Meeting of the American Climatological Association, and reprinted from the Sanitarian of November, 1890.

OBITUARY.

Professor Dr. Heinrich Will died in Giessen, October 15, 1890, aged 78 years. After completing his school education, he became a pharmacist, and subsequently continued his studies at the University of Heidelberg, where he became the assistant of Geiger and, afterward, of Gmelin. In 1837, he went to Giessen as the assistant of Liebig, received the degree of Dr. Phil. in 1839, then became lecturer on chemistry, and, in 1846, was called to the chair of experimental chemistry, retiring from that position in 1882. He was an excellent teacher, both in the lecture hall and in the laboratory, and though not a prolific writer, was well known throughout the scientific world as an author and investigator. His name is connected with researches on the determination of nitrogen, the valuation of alkali, the analysis of urine, the glucosides of mustard, several volatile oils, some alkaloids, etc. Will's analytical tables and his work on qualitative analysis have been used in most civilized countries. When Liebig retired as editor of the famous Jahresbericht der Chemie, Kopp and Will became the editors from 1857 to 1862, and for the following five years the work was issued by Will alone.

Professor Dr. Heinrich Schwarz died in Eberswalde, September 15 last, aged 66 years. For some years he had been connected with the University of Breslau, and afterward with the Technical High-school at Gratz, retiring from the latter position about a year ago. His numerous researches relate, mostly, to applied chemistry and to methods of analysis; he took great interest in the introduction of volumetric analysis and in the perfection of its processes.

Emma Bour Nardyz, Ph.G., class 1889, died in Philadelphia, November 30 last, of typhoid fever, at the age of 24 years.

VARIETIES.

Resorcin spray in Whooping Cough.—Dr. J. W. Farlow (*Boston Med. and Surg. Jour.*) uses a 2 per cent. solution in water which is sprayed into the nose, pharynx and larynx every two hours. Thus used the solution is inodorous, nearly tasteless, non-irritating, and not poisonous, but gives speedy relief.

Styron or cinnamic alcohol has been found by Dr. Tcheltzoff (*Bolnit. Gazeta Botk.*) to act as an excellent disinfecting and deodorizing agent, useful in purulent discharges of the ear. Styron is a constituent of Peru balsam and of storax, and is somewhat soluble in water, but freely soluble in alcohol and ether.

Aristol, for external use, is combined by Dr. Pollak with soft soap, as follows: Aristol, 3; alcohol 5; ether, 5; soft soap, 30 gm. Soft paraffin is, likewise, a good vehicle for the external application of aristol. (*Monatsh f. Pr. Dermat.*) A mixture of equal parts of lanolin and petrolatum has been recommended for the same purpose.

Camphorated Salol (see AMER. JOUR. PHAR., 1889, p. 136) is recommended by Dr. Cuvillier in the treatment of suppuration of the ear. The meatus having been cleansed with solution of boric acid, the camphorated salol is applied by means of a tampon of wool, which is allowed to remain in the ear not longer than twenty-four hours.—*Revue d'Otol.*

CLASSES

—OF THE—

PHILADELPHIA COLLEGE OF PHARMACY,

SEVENTIETH ANNUAL SESSION, 1890-1891.

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Ware, Louis Cornelius,	Union Springs,	Ala.	H. H. Hayes.
Weisner, Nicholas Frederick,	Leesport,	Pa.	L. A. Podolski.
Wellinseck, Harry,	Atlantic City,	N. J.	A. D. Cuskaden, Ph.G.
Welsh, Charlie Augustus,	York,	Pa.	A. H. Lafean & Bro.
Westphal, Charles,	Hamburg,	Germany,	Emil Graff.
Whilt, John Henry,	Philadelphia,	Pa.	Dr. I. R. Landis.
White, Charles Henry,	Titusville,	Pa.	Geo. B. Evans, Ph.G.
White, Preston Barnes,	Chambersburg,	Pa.	H. A. Newbold, Ph.G.
Whittem, William Henry,	Philadelphia,	Pa.	William A. Whittem.
Wier, Thomas Jefferson, Jr.,	Wilmington,	Del.	N. B. Danforth, Ph.G.
Wilkinson, Howard Marion,	Camden,	Del.	F. H. Davis, Ph. G.
Wilkinson, Richard,	Philadelphia,	Pa.	Frank Bowker, Ph.G.
Williams, Charles Morgan,	Lambertville,	N. J.	Geo. M. Shamalia, Ph.G.
Winch, Howard George,	Bethlehem,	Pa.	Harry Lee Barber.
Wingert, Harry Kitzmiller,	Knoxville,	Tenn.	G. A. Wingert.
Wirth, Alexander Edward,	Milwaukee,	Wis.	Oscar Zinn.

Name.	*Place.*	*State.*	*Preceptor.*
Wohlgemuth, Julius,	Philadelphia,	Pa.	Frank C. Davis.
Wright, Thomas Edmund,	Germantown,	Pa.	Bullock & Crenshaw.
Yohn, Charles Ragan,	Hagerstown,	Md.	Jas. H. Munson, Ph.G.
Zimmerman, Howard,	Mt. Carmel,	Pa.	E. W. Sharp.

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Arnold, Henry Peter,	Philadelphia,	Pa.	Lautz Bros.
Baker, Thomas Jennings,	Easton,	Md.	R. W. Cuthbert, Ph.G.
Baldauf, Julius Leopold, Ph.G.,	Henderson,	Ky.	J. A. Flexner.
Baumgärtner, William Jacob,	Philadelphia,	Pa.	R. Kindig, M.D.
Beavers, Frank Washington,	Scranton,	Pa.	Geo. W. Jenkins.
Beck, Robert Wilbert,	Sharon,	Pa.	A. L. Beck, Ph.G.
Belt, James Ferris,	Wilmington,	Del.	Z. James Belt.
Bender, Edward Augustus,	Elm,	Pa.	L. C. Funk, Ph.G.
Berkemeyer, Francis Molton,	Philadelphia,	Pa.	L. C. Berkemeyer, M.D.
Berkstresser, W. J.,			
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Bietsch, George Edward,	Chambersburg,	Pa.	Wm. E. Lee, Ph.G.
Bitler, Harry,	Reading,	Pa.	Wm. M. Koenig.
Blackwood, Russell Thorn,	Bristol,	Pa.	Fred. Rapp, Ph.G.
Blair, Henry Cowan (3d),	Philadelphia,	Pa.	H. C. Blair's Sons.
Blow, Robert Gillingham,	Beverly,	N. J.	A. W. Taylor, M.D.
Boggs, Harry Leslie,	Charleston,	W. Va.	E. L. Boggs.
Boush, Albert Lewis,	Meadville,	Pa.	C. M. Zinck.
Boyer, Franklin Nagle,	Reading,	Pa.	J. A. Gingrich, Ph.G.
Boyles, Col. Jas. Clarkson,	Du Bois,	Pa.	Dr. R. M. Boyles.
Breisch, William H.,	White Haven,	Pa.	C. M. Driggs, Ph.G.
Bresser, Otto Carl,	Scranton,	Pa.	Carl Lorenz.
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Bridgman, William George,	Liverpool,	England,	H. Lee Barber, Ph.G.
Brown, Albert Ludwig,	Reading,	Pa.	McCurdy & Durham.
Brown, Charles,	Philadelphia,	Pa.	W. J. Pechin, Ph.G.
Brown, Frank Luther,	Lebanon,	Pa.	R. P. Marshall, Ph.G.
Buckner, John Armstrong,	Pleasant Hill,	Mo.	E. T. Buckner, M.D.
Bunker, William Beatty,	Bellefontaine,	Ohio,	H. K. Mulford & Co.
Burdick, Arch Webster,	Carbondale,	Pa.	A. W. Reynolds.
Burnett, James H.,	Hackensack,	N. J.	Levi B. Hirst.
Butz, Alfred Sylvester,	Kutztown,	Pa.	F. M. Reed.
Cadmus, Alfred Brooks,	Philadelphia,	Pa.	John C. Keys, Ph.G.
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Christ, Franz,	Philadelphia,	Pa.	Dr. J. D. Moore, Ph.G.
Christman, Albert S.,	Allentown,	Pa.	E. J. Danowsky.
Clewell, William Henry,	Philadelphia,	Pa.	J. R. Elfreth, Ph.G.
Clingan, William Arthur,	Sioux City,	Ia.	F. Hansen.
Cochrane, Ardesco Bright,	Apollo,	Pa.	T. A. Cochrane.
Codville, Henry Lawson,	Philadelphia,	Pa.	C. G. A. Loder.
Colquhoun, John H.,	Upland,	Pa.	O. P. Hooper.
Comfort, Newton C.,	Mechanicsburg,	Pa.	Henry Müller, M.D.

Name.	*Place.*	*State.*	*Preceptor.*
Cooper, Herbert,	Dover,	Del.	H. S. Eckels.
Cope, Frank Henry,	Philadelphia,	Pa.	F. C. Reighter, Ph.G.
Costin, John Richard,	Centreville,	Md.	J. B. Moore.
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Davis, Harry Morgan,	Delaware Co.,	Pa.	Harry Cox, Ph.G.
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De Vries, Robert Tivis,	Wheeling,	W. Va.	Charles Menkemeller, Ph.G.
Dickel, William John,	Philadelphia,	Pa.	F. F. Drueding, Ph.G.
Dierolf, Charles B.,	Mt. Joy,	Pa.	Dr. J. F. Meade.
Driesbach, Luther Albert,	Easton,	Pa.	William E. Hammon.
Dubbs, Robert Lovine,	Allentown,	Pa.	S. Gerhard, Ph.G.
Dunwody, Richard Gaillard,	Ph.G., Brunswick,	Ga.	
Eby, Edwin Stanton,	Newport,	Pa.	B. M. Eby.
Eckels, Charles Alfred,	Mechanicsburg,	Pa.	H. S. Eckels, Ph.G.
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England, William Taws,	Philadelphia,	Pa.	Robt. England, Ph.G.
Eppley, John Hake,	Three Rivers,	Mich.	
Eppstein, Jacob,	Hoppstaedter,	Germany,	C. E. Spencely, Ph.G.
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Faust, Jacob Mauger,	Pottstown,	Pa.	Dr. E. R. Smiley.
Ferguson, Enoch Pennock,	Coatesville,	Pa.	Jos. C. Roberts, Ph.G.
Fernsler, Edward Shoener,	Pottsville,	Pa.	J. N. Hodgson.
Fessler, Thomas Addison,	Muncy,	Pa.	D. S. Jones, Ph.G.
Fies, John Henry,	Lancaster,	Pa.	A. A. Hubley.
Finney, John Joseph,	Conshohocken,	Pa.	H. G. J. Hallowell.
Fisher, Thomas Leroy,	Peru,	Neb.	Edward H. Dort.
Frankelberger, Allen J.,	York Co.,	Pa.	J. J. Ottinger, Ph.G.
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Fredericks, Harry,	Philadelphia,	Pa.	L. C. Funk, Ph.G.
French, Francis Freas,	Philadelphia,	Pa.	W. H. Koons, Ph.G.
Fry, Nelson Becker,	Harrisburg,	Pa.	James T. Shinn, Ph.G.
Garcia, Juan Reyes,	Porto Rico,	W. Ind.	Ramun Cleto Martin.
Garges, Alfred Batt,	Zanesville,	O.,	Harry Lippen.
Garland, John Kistler,	Centre,	Pa.	Rea & Jones.
Gerlach, Frank Christian,	Wooster,	Ohio,	J. Zimmerman & Co.
Gibbony, David Clarence,	Lisbon,	Iowa,	Sol. Kittering.
Glenk, Robert,	Philadelphia,	Pa.	W. T. Baker, Ph.G., dec.
Good, Benjamin Mylin,	Lancaster,	Pa.	Franklin P. Albright, Ph.G.
Goos, Charles,	Philadelphia,	Pa.	William A. Fetters, Ph.G.
Gordon, Jean, Miss,	Cincinnati,	Ohio,	W. B. Cleim, Ph.G.
Garrell, Jr., Benj. Harvey,	Lexington,	Va.	B. H. Gorrell.
Gressley, William Robert,	York,	Pa.	J. E. Lehman.
Grotevent, John Frederick,	Harrisburg,	Pa.	T. E. Conard, M.D.
Gruhler, Christian,	Shenandoah,	Pa.	A. Wasley.
Guest, Owen Lovejoy,	Swedesboro,	N. J.	Guest & Guest.
Haake, William Henry,	Cleveland,	Ohio,	A. Mayell & Co.
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Haines, Joseph Ridgway,	Lumberton,	N. J.	Prickitt & Barrington.
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Hankey, William Tabor,	Trempealean,	Wis.	T. H. Spence.
Hartman, Frank Gast,	Lancaster,	Pa.	Dr. Samuel B. McCleery.
Hasson, Harry Decora,	Phillipsburg,	Pa.	D. H. Ross, Ph.G.
Haydock, Susannah Garrigues,	Philadelphia,	Pa.	Susan Hayhurst, M.D. Ph.G
Head, Raymond Cyril Joseph,	Latrobe,	Pa.	Dr. H. S. Bossert.
Heckler, Jr., Franklin Jacob,	Columbia,	Pa.	P. S. Brugh.

Name.	*Place.*	*State.*	*Preceptor.*
Henry, William Frederick,	Bellaire,	Ohio,	M. N. Mercer.
Herber, Conrad J. A. S.	Terre Haute,	Ind.	John F. Gulick.
Hickman, Thomas Rlwood,	Wayne, Del. Co.	Pa.	Wm. H. Hickman, M.D.
Hoch, Jacob,	Easton,	Pa.	Wm. H. Lantz, Ph.G.
Hohman, Theodore Albert,	Wheeling,	W. Va.	C. R. Goetze.
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Hornby, Walter Melvin,	Roxborough,	Pa.	Harry H. Anderson.
Hough, John Wallace,	Shippensburg,	Pa.	J. C. Altick & Co.
Hudson, Charles Marcus,	Stockton,	Md.	Edgar Fontaine.
Hutchison, Burtt Taylor,	Bangor,	Pa.	S. E. R. Hassinger, Ph.G.
Irvine, Jr., John,	Carlisle,	Pa.	A. Tatem.
Jones, William Hewitt,	Lansford,	Pa.	Dr. J. Benj. Jones.
Keppler, Charles Lewis,	New Orleans,	La.	C. L. Keppler.
Kessler, Edward Francis,	Logan,	Ohio,	F. W. E. Stedem.
Keyes, James E.,	Oneonta,	N. Y.	E. E. Ford.
Kiger, Harry Stiles,	Wilmington,	Pa.	H. C. Snitzer, M.D.
Kinsel, Grant Arthur,	Lewistown,	Pa.	A. P. Martin.
Kitchen, Charles E.,	Piqua,	Ohio,	Pearl I. Hedges.
Knowles, George Alexander,	Philadelphia,	Pa.	Bullock & Crenshaw.
Koch, Lewis Homer,	Leetonia,	Ohio,	Harper & Witzeman.
Koenig, Albert,	Philadelphia,	Pa.	Decatur Milligan, Ph.G.
Kogetschatz, William,	Martinsburg,	W. Va.	Barclay Hall.
Krall, George Heyde,	Mechanicsburg,	Pa.	Eberly Bros.
Krebs, Harry J.,	Mahanoy City,	Pa.	Alexander A. Weber.
Krebs, Paul,	Cleveland,	Ohio,	Herman Krebs.
Kulp, William Austin,	Lock Haven,	Pa.	T. C. Hilton & Co.
Lack, C. Eugene,	Bethlehem,	Pa.	H. A. Burkhart, Ph.G.
LaDow, Addington,	Newport,	N. J.	J. P. Frey, Ph. G.
Laessle, Henry Adolph,	Philadelphia,	Pa.	Dr. F. Seitz, Ph.G.
Landis, Charles Paul,	Philadelphia,	Pa.	C. Petzelt.
Landon, Francis Patterson,	Salem,	Va.	F. W. Fenn, Ph.G.
La Place, Edgar Ranson,	Deep River,	Conn.	Thomas L. Parker.
Lefferts, Henry Tomlinson,	Southampton,	Pa.	Jos. V. Antill, M.D., Ph.G.
Lehman, Edward,	Memphis,	Tenn.	Dowdy & Co.
Leinbach, Frank Irvin,	Lewisburg,	Pa.	T. D. Baker, Ph.G.
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Lupus, Herman Ernest,	Camden,	N. J.	Alexandria A. Weber.
Lutz, William Dellet,	Germantown,	Pa.	Thos. L. Buckman, Ph.G.
Lyons, Frank Floyd,	Youngstown,	Ohio,	McEwen & Breaden.
McCandless, Edward Sloan,	Philadelphia,	Pa.	H. C. Eddy.
McClintook, James,	Germantown,	Pa.	W. H. Poley.
McDonnell, Charles Pancratius,	Philadelphia,	Pa.	Jas. M. Wallis, M.D.
McFarland, Robert,	Philadelphia,	Pa.	W. V. Stansbury.
McGregor, Eugene Charles,	Columbia,	S. C.	W. C. McGregor.
McLaughlin, Philip Celestine,	York City,	Pa.	Dale, Hart & Co.
McMeekan, Charles James Harvey,	Philadelphia,	Pa.	Dr. Harrison Duffield.
McNabb, Henry Steely,	Belleville,	Pa.	James T. Shinn, Ph.G.
MacLennan, William Feinour,	Philadelphia,	Pa.	H. Lautenbacher.
Main, Clinton Eugene,	Frederick,	Md.	S. Schley & Bro.
Manning, Charles La Forge,	Trenton,	N. J.	Wm. H. Laubach, Jr.
Manter, Fred. Augustus,	Farmington,	Me.	W. H. Braddock, Ph.G.
Markley, William Arnold,	Reading,	Pa.	Wm. Weis, Ph.G.
Matthews, Edgar Morton,	Jefferson,	Ga.	A. A. Bell.
Mendenhall, Harry Carleton,	Bloomsburg,	Pa.	
Mengel, Levi Walter,	Reading,	Pa.	Chas. M. Steinmetz, Ph.G.
Merkel, Wm. M.,	Minersville,	Pa.	Dr. J. M. Bradford.
Meroney, John Patrick,	Camden,	S. C.	Dessausure & De Lorme.
Meyers, Quillas Albert,	Petersville,	Pa.	Stewart M. Hohl.
Miller, Frank,	Danville,	Pa.	Dr. S. Y. Thompson.

Name.	*Place.*	*State.*	*Preceptor.*
Mitchell, Henry,	Philadelphia,	Pa.	Chas. W. Hallowell, Ph.G.
Moore, James Johnson,	Dillsburg,	Pa.	Dr. H. W. Fishel.
Morales, Guadalupe,	Nicaragua,	C. America,	Dr. Morales.
Mueller, Charles August,	Philadelphia,	Pa.	A. G. Keller.
Muhn, Harry Jacob,	Wheeling,	W. Va.	Chas. Menkemeller, Ph.G.
Murrell, Alexander Harrison,	Allen,	Md.	Dr. H. H. Sherk.
Mustard, Frank Havelin,	Philadelphia,	Pa.	A. E. Norton, M.D.
Myers, Arnold Armstrong,	York,	Pa.	Dr. E. C. Warg.
Myers, Harry Joseph, Jr.,	Philadelphia,	Pa.	J. B. Cook.
Nickum, Elwood George,	Bethlehem,	Pa.	Dr. C. B. Lowe, Ph.G.
Noon, Edward John,	Philadelphia,	Pa.	Louis Genois, Ph.G.
Odbert, James Henry,	Wheeling,	W. Va.	Thos. H. Potts, Ph.G.
Ogden, Charles Sheppard,	Camden,	N. J.	U. F. Richards, Ph.G.
Otis, Amos Ray,	Hicksville,	Ohio,	L. S. Loughridge.
Parvin, Harry Rocap,	Bridgeton,	N. J.	H. F. Seeley, Ph.G.
Paxson, Elmer May,	Philadelphia,	Pa.	H. James Batdorff, Ph.G.
Pazmiño, Francisco,	Ecuador,	S. A.	H. C. Manloe.
Peacock, Josiah Comegys,	Millington,	Md.	H. Trimble, Ph.G.
Pentz, John Flemming,	Easton,	Pa.	Stewart M. Hohl.
Petrie, Jr., Alexander Bain,	Guelph, Ontario,	Can.	John A. Clark.
Pfeuffer, William R.,	New Braunfels,	Tex.	John V. Bodenmann.
Pfromm, George Washington,	Philadelphia,	Pa.	D. S. Wiltberger.
Phillips, Lehman Blew,	Bridgeton,	N. J.	Geo. H. Whipple.
Post, Francis Elmer,	Towanda,	Pa.	Horace C. Lutz.
Pratt, William Henry,	Camden,	N. J.	L. H. Wilson.
Randal, Harry Lee,	Shepherdstown,	W. Va.	C. C. Sanderson.
Randolph, Budd Alfred,	Houston,	Tex.	Dr. E. L. E. Castleton, Ph.G.
Randolph, Thomas Owen F.,	Versailles,	Ohio,	T. M. Newbold, Ph.G.
Raub, Frederick Miller Dickson,	Lancaster,	Pa.	Dr. M. W. Raub.
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Reap, Edward Augustine,	Pittston,	Pa.	Jos. Feldman.
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Remington, Samuel Jacobs,	Philadelphia,	Pa.	John Ogden.
Reuss, William Henry,	Philadelphia,	Pa.	Wm. H. Morrett.
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Richardson, James Henry,	Charlestown,	Md.	S. R. Kirk, M.D.
Riegel, Samuel Jacob,	Lebanon,	Pa.	Jos. L. Lemberger.
Rinedoller, Robert Grant,	Philadelphia,	Pa.	Wiley & Wallace Co.
Rinker, Francis,	Mt. Airy,	Pa.	J. A. Jeffries.
Roth, Theodore William,	Philadelphia,	Pa.	Geo. H. Ischler, M.D., Ph.G.
Ruff, U. Gilbert,	Bryansville,	Pa.	S. E. R. Hassinger, Ph.G.
Ruhl, Harry Fry,	Manheim,	Pa.	W. E. Moyer.
Schaak, Milton Franklin,	Lebanon,	Pa.	G. W. Schools, Ph.G.
Scheirer, Franklin Benjamin,	Hokendauqua,	Pa.	W. A. Rumsey, Ph.G.
Scherer, Bernhard Frederick,	Philadelphia,	Pa.	C. E. Haenchen.
Schetky, Laurence Oliphant,	Mt. Holly,	N. J.	Prickitt & Barrington.
Schloer, Charles Albert,	New York,	N. Y.	C. A. Usilton.
Schmidt, Justus,	Dayton,	Ohio,	H. F. James.
Scott, Robert Burns,	Philadelphia,	Pa.	Dr. John S. Ranck.
Seltzer, Charles Jacob,	Coatesville,	Pa.	W. S. Young, Ph.G.
Shafer, Erwin Clement,	Montoursville,	Pa.	G. C. Saeger, M.D.
Shore, Thomas Walter,	Germantown,	Pa.	J. L. Kooker, Ph.G.
Shull, Carl Whittaker,	Bridgeton,	N. J.	J. V. Slaughter, Ph.G.
Shuman, Calvin Bruce,	Mainville,	Pa.	Geo. W. Henry, Ph.G.
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Sitgreaves, Wesley Cline,	Vincentown,	N. J.	F. S. Hilliard,
Smith, Albert,	Parsons,	Kan.	Irvine Smith.

Name.	*Place.*	*State.*	*Preceptor.*
Smith, Benjamin Franklin,	Harrisburg,	Pa.	J. Wilson Hoffa, Ph.G.
Smith, Charles Adams,	Obolds,	Pa.	C. J. V. Fries, Ph.G.
Smith, George Anselm,	Nazareth,	Pa.	B. C. Watermann, Ph.G.
Smith, Harry Allen,	Philadelphia,	Pa.	Van Buskirk & Apple.
Smith, Herbert Johnson,	Elkton,	Md.	T. C. Tomlinson, M.D.
Speer, Edgar Lacy,	Chambersburg,	Pa.	J. S. Nixon & Son.
Spencer, Edward Thomas,	Newville,	Pa.	H. K. Mulford & Co.
Spragle, Elmer,	Bartonsville,	Pa.	G. W. Barton, Ph.G.
Stein, Edward Theodore North,	Millersville,	Pa.	Jacob H. Stein, Ph.G.
Steinau, Lee,	Monroe,	La.	Thos. Y. Aby, M.D.
Steiner, Ephraim Henry,	South Easton,	Pa.	A. N. Richards.
Stem, Harvey Nevin,	Allentown,	Pa.	Heiberger & Stem.
Stiles, William H.,	Camden,	N. J.	E. C. Jones & Co.
Stimmel, Walter,	Wilmington,	Del.	P. Steelman.
Stoffregen, Louis Franklin,	Pottsville,	Pa.	C. S. Commings, Ph.G.
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Strouse, Theodore Herman,	Pottsville,	Pa.	H. F. Vorhage.
Sultzbach, Harry Miller,	Marietta,	Pa.	A. D. Wike, Ph.G.
Swartley, Harry C.,	Norristown,	Pa.	W. H. Llewellyn.
Sweeney, Joseph Henry,	Ellsworth,	Minn.	John M. Rudolph, Ph.G.
Taggart, George Corson,	Norristown,	Pa.	Atwood Yeakle.
Taggart, Howard M.,	Philadelphia,	Pa.	C. H. Wagner, Ph.G.
Taylor, Harry Baker,	Altoona,	Pa.	E. L. Taylor.
Taylor, Merle Hampton,	Butler,	Pa.	J. H. Parks.
Teeple, Harry Sutherland,	Philadelphia,	Pa.	G. W. Wolfersberger, Ph.G.
Thompson, Oan Joshua,	Reading,	Pa.	J. H. Burkwalter.
Tielke, Maxwell Gustav,	Cleveland,	Ohio,	G. Tielke.
Van Buskirk, Frank,	Bethlehem,	Pa.	S. L. Van Buskirk, Ph.G.
Van Dyke, Alfred Nelson,	Van Dyke,	Pa.	Frank P. Linns.
Venn, Joseph,	Memphis,	Tenn.	J. Goldbaum.
Voss, Frederick John,	Borgloh, Hanover,		F. F. Drueding, M.D. Ph.G.
Wahle, Edwin,	Davenport,	Ia.	Theo. H. Busch,
Walls, John Henry,	Media,	Pa.	A. Roidot.
Walter, Andrew Wendell,	Philadelphia,	Pa.	John B. Ferguson.
Wamsley, James Winter,	Gloucester,	N. J.	J. A. Wamsley, M.D.
Ward, Robert Toomer,	Daviston,	Ala.	L. C. Ward, M.D.
Waterall, Charles Albert,	Philadelphia,	Pa.	Wm. Waterall & Co.
Weber, Frank Charles,	Meadville,	Pa.	C. M. Zinck.
Weber, Frank Nicholas,	Millville,	N. J.	Geo. W. Weber, Ph.G.
Wescott, Frank,	Media,	Pa.	W. E. Dickeson, Ph.G.
Weston, Geary Augustus,	Millersville,	Pa.	A. A. Hubley.
Whipple, Oscar Kellog,	Bridgeton,	N. J.	George H. Whipple.
Whitaker, George Nixon,	Cedarville,	N. J.	H. C. Manlove, Ph.G.
White, Frank Willett,	Atchison,	Kan.	A. H. Leyman.
White, Ishmael James,	Baltimore,	Md.	W. G. Nebig.
Williams, Clarence Edward,	Philadelphia,	Pa.	Bullock & Crenshaw.
Wittel, John Kaler,	Florin,	Pa.	Leidy Seipel.
Woertz, George A.,	Philadelphia,	Pa.	W. A. Auffurth.
Wolfenden, Benjamin Franklin,	Upland,	Pa.	Wm. Procter Jr. & Co.
Wolff, Oliver Brown,	Dry Run,	Pa.	Robt. McNeil, Jr.
Wollmuth, Richard J.,	Bethlehem,	Pa.	Paul Kempsmith.
Zeainer, Harry Wisler,	Columbia,	Pa.	W. H. Llewellyn.
Zeller, John Paul,	Mifflinburgh,	Pa.	Dr. E. S. Beary, Ph.G.
Zerr, Samuel N.,	Reading,	Pa.	P. M. Ziegler.
Ziegler, Albert Lewis,	York,	Pa.	R. Wm. Ziegler, Ph.G.

THE AMERICAN
JOURNAL OF PHARMACY.

FEBRUARY, 1891.

SOLANUM CAROLINENSE (*Linné*).

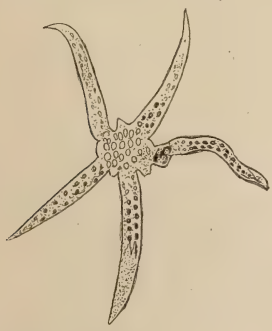
By G. A. Krauss, Ph.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, January 20.

II. THE LEAVES.[1]

The leaves are broadly oblong, sinuate-serrate, and their mibrid is beset with from 6 to 10 prickles of about 3 mm. length. The microscopical examination revealed a beautiful appearance due to numerous stellate hairs or scurfs upon both surfaces, and approximately estimated at from 800 to 1,500 on each leaf.

For analysis the leaves were collected by the author, near Memphis, during the month of September, and reduced to the requisite fineness of powder:



Petroleum ether extract:

	Per Cent.	
Volatile oil,	0·014	
Fixed oil and chlorophyll,	1·708	
		1·722

Ether extract:

Soluble in water; containing alkaloid,	0·060	
Soluble in alcohol; resin, chlorophyll,	1.040	
Soluble in ether; resin,	0·338	
		1·438

Alcohol extract:

Soluble in water; KCl and solanine,	2·930	
Soluble in ether; chlorophyll and resin,	0·420	
Loss,	0·110	
		3·460

[1] For analysis of the root bark, see this Journal, December, 1890, p. 602.

	Per Cent.		
Aqueous extract,	11·540		
Containing ash,	6·850		
Mucilage,	3·140		
Containing ash,	2·540		
Net mucilage,		0·600	
Dextrin, etc.,	4·320		
Containing ash,	2·380		
Net dextrin,		1·940	
Glucose,		0·172	
Albumen,		0·900	
Undetermined,		1·078	
Total extract, less ash,			4·690
Caustic soda extract,	5·078		
Containing ash,	1·884		
Albuminoids,	1·530		
Containing ash,	0·230		
		1·300	
Undetermined,		1·894	
Total extract, less ash,			3·194
Hydrochloric acid extract,	6·558		
Containing ash,	3·192		
Pararabin,		2·374	
Albuminous substances,		0·992	
Total extract, less ash,			3·366
Incrusting matter and cellulose,		47·326	
Ash and silica,		26·700	
Moisture,		8·160	
			100·056

A glance at this analytical table shows the large amount of ashes taken from the soil, carried into the leaves and there deposited. In Emil Wolff's *Aschen-Analysen*, I, p. 73, the largest amount of crude ash from a solanaceous plant is reported as 22·84 per cent. While exhausting 500 gm. of powdered leaves with alcohol, for the extraction of alkaloids, I separated nearly 2 gm. of well defined crystals, which, after examination, proved to be chloride of potassium. The specimen before you represents the greater part of this KCl extracted from the leaves by commercial alcohol.

The aqueous extract contained over 50 per cent. of mineral matter and had a strong acid reaction, which was not due to a vege-

table acid, as an experiment with acetate of lead proved, but it was due to a free mineral acid. The ash of the mucilage precipitate consisted largely of calcium phosphate, also the ash of the dextrin precipitate, but this contained likewise much chloride and sulphate of potassium. The ash of the caustic soda extract contained phosphoric acid, no lime and it would appear as if the free mineral acid was phosphoric acid. The cellulose finally contained 10·60 per cent. of silica and insoluble matter.

A quantitative analysis of the ashes of the leaves was made, and showed the presence of 3·55 per cent. KCl, K_2SO_4 and KOH; 3·67 per cent. of Ca; 2·22 per cent. of P_2O_3. Iron was not present.

No alkaloids could be found in the petroleum ether extract.

The ether extract contained a small amount of an alkaloid, which seemed to be solanidine. It is present in such small quantities that the amount obtained from 500 gm. of the leaves was insufficient for further experiments. It did not reduce Fehling's solution.

The alkaloid extracted by alcohol was identified as solanine by the following reactions: It reduces Fehling's solution after having been boiled with an acid; its salts gelatinize when evaporated over H_2SO_4; $HgCl_2$ throws down a white flocculent precipitate; Mayer's solution gives a similar precipitate, and $AuCl_3$ causes a yellow precipitate, with gradual reduction of metallic gold.

Five hundred gm. were used for the extraction of solanine, but only 0·2 gm. of a fairly pure product could be obtained.

Starch was not present in the leaves.

In concluding, I would say that water extracts the alkaloid. This is contrary to the statements of other investigators on solanine in other plants, but in this case it is due to the presence of the free mineral acid referred to.

Laboratory, Mansfield Drug Co.,
Memphis, Tenn., January 16, 1891.

NOTES ON VEGETABLE DRUGS USED IN MEXICO.

By John M. Maisch.

[*Continued from p. 8.*]

Anacardiaceæ.—Schinus Molle, *Linné.* Professor S. Pérez has analyzed the fruit (La Farmacia, I, p. 1) with the following results: Glucose, acrid and bitter resin-acid, volatile oil, tannin, leptin (?), etc.

Mangifera indica, Linné. The flowers are used in the form of infusion for catarrh of the bladder, and in fumigations for driving off flies.

Aristolochiaceæ.—Aristolochia microphylla, *Willd.*, yields *yerba* and *raíz del indio*. The root is top-shaped and somewhat cylindrical, yellowish gray, annulate and irregularly wrinkled; the bark rather thick, compact and yellowish-white, the meditullium radiating and porous from the large ducts; odor camphoraceous and mintlike; taste aromatic and bitter. The leaves are roundish-reniform, obtuse, entire, five-nerved, pubescent, and about 1·5 cm. long and broad. The leaves are reputed to be vulnerary, and the root is credited with properties analogous to those of colombo; it was much used during the epidemics of cholera morbus in 1850 and 1853. The analysis cited for the root of *A. fœtida* was published in this JOURNAL, 1886, p. 113, but the root examined was that of *Rumex hymenosepalum*.

Burseraceæ.—Elaphrium Aloexylon, *Schiede*, S. Amyris Linaloe, *LaLlave*, yields the Mexican linaloe wood, which is of a dull yellowish color, soft, often perforated with cavities formed by the larva of an insect; circles of wood parenchyma not readily distinguished from the fibrous layer; ducts large and numerous; medullary rays from two to four cells in width; the tissue contains yellowish odorous resin and oil, and has an agreeable odor resembling that of a mixture of lemon and jessamine. The wood yields from 7 to 9 per cent. of volatile oil, boiling between 189° and 192°. The resin which concretes spontaneously in the bark is used for fumigations.

Compositæ.—Viguiera excelsa, *Hemsley*, is designated as *raíz del manso*, according to Dr. Villada; but it is not stated whether the root resembles that of Echinacea (see AMER. JOUR. PHAR., 1886, p. 76).

Gymnospermum multiflorum, *DeCand.*, grows in the valley of Mexico and, under the name of yerba de tata-lencho, is used as an antirheumatic in the form of tincture, while the decoction is employed for injections in metritis.

Crassulaceæ.—Sedum dendroideum, *Mociño et Sessé*, is the siempreviva de Mexico.

Juglandaceæ.—The bark of Carya ovata contains a crystalline bitter principle, resin, tannin, gum, etc. (G. Mendoza in *Gac. Méd. de México*, III, 99).

Leguminosæ.—Oxytropis Lamberti, *Pursh*, grows in Chihuahua,

and is called *yerba loca.* E. Ordaz found in the plant a crystalline acid, fat, sugar, gum, etc. The plant is used for toothache, it being formed into pulp and this placed into the carious tooth. In rural districts it is asserted that domestic animals feeding on this plant are rendered unfit for work, which has been proven incorrect by the experiments of Professor Gómez.

Calliandra grandiflora, *Bentham*, is found in many parts of Mexico. The part used consists of the contorted rhizome, which is 2 to 6 cm. thick, and has fasciculate fibrous roots; is of a reddish-brown color externally, white internally, inodorous, and of an astringent and persistently acrid taste. Dr. Villepasi determined the presence of fat, wax, volatile oil, resin and tannin; no alkaloidal compound is present. It is employed as an astringent and antiperiodic, and is regarded as possessing antiseptic properties. The dose is 5 or 6 gm. in decoction with 120 gm. of water; a tincture is likewise used. The roots are also employed for promoting alcoholic fermentation, and for preventing acetic and putrid fermentation. The plant is popularly known as *pambotano, lele, cabellos de ángel* (angel's hair), etc., which names are also used for *Pachira insignis.* (See Malvaceæ.)

Melilotus parviflora, *Desrousseaux*, has been naturalized in fields in some parts of Mexico, and is to a limited extent used as a stimulant. *Medicago polycarpa*, which has been mistaken for it, is readily distinguished by its spiral legumes, which are provided with hooked prickles.

Erythrina coralloides, *Flor. Mex. ined.* (see AMER. JOUR. PHAR., 1885, p. 432), has been recently subjected to analysis. Among the important principles isolated by Dr. F. Altamirano from the seeds (*Gaceta Médica de México*, 1888, p. 369) is a peculiar acid called erythrinic acid, and two alkaloids, *coralloidine* and *erythroidine*, the latter of which has a paralyzing effect upon the extremities of the motor nerves. A crystalline alkaloid has also been isolated from the stem bark by Professor J. M. Prieto (Thesis, Mexico, 1890).

Liliaceæ.—Convallaria majalis, *Linné, lirio de los valles*, is not met with in Mexico, but the rhizome is used as a heart tonic, the daily dose being 0·20 gm. given in ten portions.

Linaceæ.—Erythroxylon macrophyllum, *Cavanilles*, and E. mexicanum, *Kunth*, may perhaps be used as substitutes for coca; the former grows in Córdoba and the latter in Chilpancingo.

Lobeliaceæ.—Lobelia laxiflora, *De Candolle*, which is abundant in the valley of Mexico, contains notable quantities of lobeline, according to Torres.

Magnoliaceæ.—Talauma mexicana, *Don*, grows in the state of Morelos, and a second species, probably T. macrocarpa, *Zuccarini*, in Vera Cruz and on the mountains of the Pacific coast. Both are known as *yoloxochitle*, and the flowers, fruit and bark are employed. The former are 8 to 10 cm. long, white, or after drying, yellowish-brown, of an aromatic and astringent taste, and nearly inodorous, but in the fresh state of a peculiar aromatic odor. The flowers of the first-named species contain volatile oil, resin, quercitrin, tannin, etc. (*Gac. Méd. de Méx.*, II, p. 223). The seeds of the second species contain a fixed oil of a disagreeable o or, tannin, coloring matter, and a principle, probably a glucoside, which dissolves the blood corpuscles. The aqueous extract of the seeds, applied subcutaneously to a frog in the dose of 0·001 gm., causes suspension of the respiratory and cardiac movements and contraction of the lungs, killing the animal speedily. The bark is used as an antiperiodic; the tincture of the fresh petals as a tonic; the infusion of the same as an antispasmodic; and the wine prepared with the anthers is a remedy against epilepsy.

Malpighiaceæ.—Malpighia glabra, *Linné*, is the nanche or nanci of Monterrey, Vera Cruz, Morelos, etc. The nance bark of F. Holberg (Am. Jour. Phar., 1886, p. 239) was very likely this bark, a decoction of which is employed for injection in leucorrhœa and metrorrhagia. The aromatic acidulous fruit is used as a refrigerant. Several other species of Malpighia are employed in different parts of Mexico under the same names and for similar purposes.

Malvaceæ.—Hibiscus esculentus, *Linné*, is cultivated in the hot districts of Mexico, and the fruit, which contains considerable mucilage, is used as an aliment, in the preparation of pastilles and syrups, and in domestic practice as a diuretic and pectoral.

Pachira macrocarpa, *Schlechtendal*, grows on river banks from Yucatan to Vera Cruz, and is known as *apompo*. The leaves and flowers contain much mucilage, and the latter are employed for their emollient properties in conjunctivitis. The fruit resembles the mammee (Lucuma) in appearance and contains from 30 to 40 edible seeds which, according to Dr. Altamirano, yield starch 20, glucose 1, tannin 1, albumin 5 and fat 25 per cent. The fat resem-

bles cacao butter, is non-drying, melts near 40°, and is readily saponifiable, producing hard soaps.

Pachira insignis, *Savigny*. An infusion of the root bark is used for curing ulcerated gums and in toothache; the flowers are emollient and, according to Dr. Grosourdy, the seeds are comestible.

Oleaceæ.—The ash employed in Mexico (see AMER. JOUR. PHAR., 1885, p. 556) is Fraxinus viridis, *Michaux*, var. Berlandiereana, *Asa Gray*.

Papaveraceæ.—Bocconia frutescens, *Linné*. The milk-juice has been examined by Prof. Laso de la Vega, who found, besides resins, etc., an alkaloid, *boconine*, and a second alkaloid not sufficiently characterized. Boconine is stated to have properties analogous to those of morphine, to be crystallizable and to form salts having a red color; it may be, probably, identical with sanguinarine and chelerythrine.

Polemoniaceæ.—Lœselia (Hoitzia, *Cavanilles*) coccinia, *Linné*, the *espinosilla* has the leaves alternate, petiolate, oval-lanceolate, mucronately serrate, rough, pubescent, penninerved; flowers axillary, with five linear-lanceolate bracts, a tubular calyx, a red funnel-shaped corolla, five exserted stamens and a tri-fid style; inodorous; taste bitter. (See AM. JOUR. PHAR., 1885, p. 554.)

Polygonaceæ.—Rumex hymenosepalum, *Torrey*, has been repeatedly referred to in this JOURNAL (1876, p. 49; 1886, pp. 113, 115, 158, 264; 1889, p. 395). It is know in Mexico as *ráiz del indio*, *ráiz de la frontera* (it grows near the northern frontier) and canaigra, and is employed as an astringent and for tanning.

Primulaceæ.—Anagallis arvensis, *Linné*, indigenous to Europe, has been completely naturalized in the valley of Mexico, the plant being used as a substitute for saponaria (see AMER. JOUR. PHAR., 1886, p. 122).

Piperaccæ.—Piper sanctum, *Mociño*. The leaves are petiolate, oval, deeply cordate, acuminate, undulate, pubescent, three-veined, the lateral veins running from the base to the apex of the leaf, forming curved lines on both sides of the midrib, the space thus enclosed being of a lanceolate shape. The leaves have an agreeable, piperaceous odor, and an aromatic and somewhat bitter taste.

Rhamnaceæ.—Rhamnus Humboldtiana, *Rœmer et Schultes*, is the *capulincillo* of Queretaro and other sections. The drupes are of the size of a cherry, dark violet in color, and have a woody endocarp,

enclosing four seeds, of which two are frequently abortive; the testa is membraneous and beset with glandular tubercles filled with a yellow substance; kernel yellowish and oily; inodorous; taste of the mesocarp, very sweet. According to Altamirano, the pulp of the fruit contains crystallizable sugar, much glucose, pectin compounds, tannin, etc. The seeds yield 25 per cent. of yellow oil, and contain, probably, a glucoside, to which the extract owes the property of paralyzing the voluntary motions of a frog when injected subcutaneously in the dose of 0·20 gm.; dogs are not thus affected. The seeds have anti-convulsive properties resembling those of curare and of erythrina (see above). The tincture and aqueous extract are used, the former being given in hourly doses of 20 drops, and of the latter 0·10 gm. every four hours. The extract of the pulp is inert.

Rhamnus Purshiana, *DeCandolle*, is stated to have laxative, tonic and febrifuge properties.

Ceanothus azureus, *Desfontaines*, and C. cæruleus, *Kunth*, are known in different parts of the country as *chaquira* or *chaquirilla*. The bark is employed as a tonic and febrifuge; the root in gonorrhœa and syphilitic complaints, and the decoction of the leaves in aphthæ and ulcerated throat.

Rosaceæ.—Licania arborea, *Aublet*, is the *cacahuananche* of the states of Guerrero, Morelos and Michoacan. The drupe, which is the part employed, has the shape of an olive; testa membraneous cotyledons large, fleshy, plano-convex, rose colored, oily, of a disagreeable rancid odor and a nauseous taste. The seed yields 36 per cent. of fat, melting between 34° and 39°, and easily saponified, furnishing a hard soap. A fat acid may be extracted from it, melting at 88°, and useful for the manufacture of candles. The wood is useful for various purposes.

Cerasus Capollin, *De Cand.* (see Am. Jour. Phar., 1885, p. 388). The leaves are short petiolate, oval oblong, very acuminate, finely dentate, glabrous, coriaceous, of a bitter almond odor and bitter taste.

Agrimonia parviflora, *Aiton*, is used in place of A. Eupatoria, *Linnê*.

Potentilla candicans, *Kunth*, s. P. lineariloba, *Seringe*, is the *sinfito* of Central Mexico. The rhizome and roots, as seen in commerce, consist of fragments 2 to 4 cm. long, of the thickness of a quill to that of a finger, cylindrical, with a thin brown bark, and with scars

from the detached rootlets, on the upper side with imbricate, scarious brown scales, and the terminal bud surrounded by a tuft of white hairs; the transverse section shows inside the dark cambium line a circle of linear radiating fibrovascular bundles; wood white mottled with reddish; pith thin; inodorous; taste astringent. The rootlets are deeply wrinkled longitudinally. The drug has astringent properties, and is employed in the place of comfrey.

Rosa Monctezumæ, *Red.*, yields *una de gato*, the hips, which are used in the place of those from Rosa canina, Lin., of Europe.

Quillaia Saponaria, *Molina*. The alcoholic tincture of the bark is used for emulsionizing oils.

Sapotaceæ.—Achras Sapota, *Linné*, s. Sapota Achras, *Miller*, grows in the hot districts of the republic, and is popularly known as *chicozapote*. The bark is from 5 to 12 mm. thick, externally dark gray, longitudinally striate, marked with roundish leaf-scars, with whitish or greenish patches, and with ridges more prominent in the thicker bark; inner surface dark chestnut-brown; fracture fibrous in the inner layer; odor slight; taste astringent and somewhat bitter. Bernon found in the bark an alkaloid, *zapotine*, a peculiar acid, zapotinic acid, and crystallizable sugar, glucose, starch, mucilage, pectin, albumin, resins, fat, etc. Dr. Berthrand employed the bark as a stimulant and antiperiodic.

To the same plant is also referred *chicle*, reference being made to a thesis by A. Uribe, on various products of the chicozapote, and it is stated that a similar substance is prepared from the leaves and stem of *Asclepias lanuginosa*, which grows in abundance in the Valley of Mexico. *Chicle virgen*, which is yellowish and internally white and homogeneous, is prepared from the fruit by allowing the juice to ferment for a few days, when the chicle is deposited and the aqueous liquid is separated. *Chicle común* is procured from the milk juice exuding from incisions made into the bark, and hardening upon the trunk; it is externally reddish and internally rose-colored. The constituents found by Uribe are 44·8 crystalline resin soluble in ether and alcohol; 17·2 caoutchouc; 9·0 sugar; 6·4 gum; 8·2 starch, coloring matters and salts, the balance being water and loss.

Chrysophyllum glycyphlœum, *Casaretti*. Monesia has tonic, astringent, antihæmorrhagic and antidysenteric properties, the daily dose being from 0·3 to 1·5 gm.

Sapindaceæ.—Cardiospermum molle, *Kunth*, indigenous to vari-

ous parts of Mexico, is regarded as possessing lithontriptic and diuretic properties, the root being used under the name of *munditos.*

Scrophulariaceæ.—Castilleja canescens, *Bentham,* grows in the Sierra Madre, in Northern and Central Mexico, the popular name being *cola de borrego.* It has the leaves entire, linear-lanceolate, semi-amplexicaul, the floral ones broader and acute, and the upper ones somewhat colored at the apex; calyx tubular, compressed, cleft on one side; corolla bilabiate, the upper lip galeate, the lower lip with three short teeth; inodorous; taste bitter and aromatic. Prof. Luna found in the plant volatile oil, bitter principle, etc. The drug augments the salivary and urinary secretions, and has been used by Dr. Galindo as a stimulant in hepatic colics. Dose, 4 gm., in infusion, with 120 gm. of water.

Sterculiaceæ.—Guazuma ulmifolia, *Lamarck,* and several other species of the same genus growing in Southern Mexico, have a mucilaginous bark which is employed as an emollient and for the clarification of sugar. The fruit is capsular, almost globose, or ovoid, blackish-gray, with numerous acute tubercles and irregular crevices upon the surface; the five cells contain angular gray seeds having a coriaceous and dotted testa. The fruit is used as an emollient and astringent.

Solanaceæ.—Nicandra physaloides, *Gærtner,* grows in the valley of Mexico, and is known as belladona del país. The leaves are petiolate, oval-lanceolate, acute, wedge-shaped at the base, sinuate-dentate, ciliate, somewhat hairy, and without the whitish dots observed upon belladonna leaves. The leaves are reputed to possess the same properties as belladonna leaves, but no exact observations on this point have been recorded. Professor Perez announced the presence of an alkaloid, the nature of which has not yet been determined. See also AMER. JOUR. PHAR., 1889, p. 554.

Physalis Costomatl, *Mociño et Sessé.* The root is diuretic, and is used against diarrhœa and for suppressing the secretion of milk.

Ternstrœmiaceæ.—Ternstrœmia Altamirania, *Schiede;* T. sylvatica, *Schlecht.* (See AMER. JOUR. PHAR., 1886, p. 169). Leaves elliptic, entire, glabrous, glossy, ribs prominent, the ultimate divisions forming a network of fine meshes; inodorous; taste slightly bitter. Guevara (Thesis, 1881) ascertained the presence of coloring principles, resin, tannin, gum, glucose, and, probably, theine. The leaves of T. Tepezapote, *Schlecht.,* of Mazatlan are used in like manner for baths against rheumatism.

Turneraceæ.—Turnera aphrodisiaca, *Ward*, grows in San Luis Potosi and other parts of Northern Mexico; its common name is damiana de California.

Verbenaceæ.—Verbena supina, *Mociño*, is used under the name of *cantuezo*, as a substitute for Lavandula Stoechas, Linné.

Lippia citriodora, *Kunth*, known as *cedron*. Leaves in whorls of 3 or 4, lanceolate, acute, entire, 8 to 10 cm. long, 2 cm. broad, the secondary nerves forming with the midrib nearly a right angle; odor lemon-like; taste aromatic. They possess antispasmodic properties.

Urticaceæ.—Cecropia mexicana, *Hemsley*, is the *coilotapalo* of Michoacán and the valley of Mexico. Its milk-juice is used as an escharotic for indolent ulcers, and for destroying corns and warts.

Ficus (Urostigma, *Miquel*,) nymphæfolia, *Linné*. From incisions made into the bark *tescalama* is obtained. The milk-juice forms roundish masses, varying in size, soft, elastic and adhesive, ductile when mixed with vegetable or earthy substances; gray, in thin layers white and transparent, on exposure to the air turning hard and yellow (hence it is to be kept under water), in boiling water becoming very soft and more adhesive; odor urinous, disagreeable; tasteless. According to Dr. Altamirano it contains caoutchouc 15, amatlin (resin soluble in alcohol) 55, ether-soluble resin 5, pectin and salts 17, and insoluble matter 2·5 per cent. Sand, ashes, earthy matters, vegetable fragments, and chicle are used for adulteration, the latter being recognized, according to Uribe, by boiling with water when, in the presence of chicle, the liquid will become yellow, and with hydrochloric acid rose colored. Tescalama is used as a substitute for ocuje de la Habana (see Amer. Jour. Phar., 1886, p. 23), for fractures, as a plaster against urinary affections, etc. Altamirano has used it in the preparation of porous plasters.

Zygophyllaceæ.—Larrea mexicana, *Moric.*, is the gobernadora de Mexico (see also Amer. Jour. Phar., 1885, p. 601), and grows in the northern Mexican States; also in the United States from Texas and Southern Colorado westward, where it is known as creosote-bush, owing to its peculiar odor. The leaves are employed in Mexico in the form of fomentations and baths against arthritic pains, and the infusion internally in dysuria. Analyzed by Chavez, the leaves were found to contain tannin, resin, volatile oil, etc. The resin exuding from the plant is useful for varnishes. The buds preserved in vinegar are a substitute for capers.

THE MEDICINAL AND OTHER USEFUL PLANTS OF ALGERIA.

By P. L. Simmonds, F.L.S.

[*Continued from p. 12.*]

Cucurbitaceæ.—*Citrullus Colocynthis*, *Ecballium Elaterium* and *Bryonia dioica* are common, but not used. The seeds of *Cucurbita Pepo* are employed as a taenifuge. *Cucumis sativus* is used to perfume a cucumber pomade. The fruit of *Momordica Balsamina*, preserved in alcohol, is employed as a vulnerary by the Spaniards.

Illecebraceæ.—*Paronychia argentea* is much employed by the Arabs as a tea infusion; one house exports 650 pounds annually. Other species are also used, viz: *P. nivea*, *capitata*, *longiseta*, etc.

Cacteæ.—*Opuntia Ficus-indica.* The branches rasped are mucilaginous and employed as cataplasms. The mucilaginous flowers, slightly astringent, are a good remedy in diarrhœa. The use of the fruit by the natives leads to frequent mechanical constipation.

Ficoideæ.—Many species of *Mesembryanthemum* were formerly used in medicine. *M. cristallinum*, reputed febrifuge, is found wild and is also cultivated.

Umbelliferæ.—*Thapsia garganica* is very widely spread over the Tell and the elevated districts. The bark of the root is exported to extract the resin used in the manufacture of a revulsive plaster, and this resin is also prepared at Arba and at Constantine. The Arabs who have received this medicine from the Greeks have always held it in high honor as the local name implies, *Bon-Nefa*, "father of health." It is employed internally and externally, and is believed to be the silphium of the Greeks. *Thapsia villosa* is less active than the preceding.

Ferula communis. This plant, very common in Algeria, near the Moroccan frontier, yields voluminous tears of a gum resin much resembling ammoniac, and is probably the product formerly sent from Morocco under the name of Fushog. This product was attributed to *F. tingitana*, but this plant, as well as *F. longipes*, *vesceritensis* and *tunitana*, only yield small quantities of gum resin. To the usage of the root of *F. communis* in a time of dearth as food was attributed a special cutaneous disease.

Conium maculatum. The Arabs employ the seeds of this plant as sedative, under the name of Harmel, which is that of *Peganum Harmala*.

Coriandrum sativum.—The Arabs employ the leaves of this plant instead of parsley, notwithstanding its strong offensive odor.

They collect for food, under the generic name of "Talronda," the tubercles of many umbellifers, *Carum*, *Bunium*, *Balansæa*, etc.

COMPOSITÆ.—*Anacyclus Pyrethrum* furnishes a pellitory root, which is employed by the Arabs and exported from Tunis to India in large quantities. *Pyrethrum Willemoti* and other species, the pulverized flower-heads of which are sold as insecticides, succeed well in Algeria. They have been tried for the destruction of an insect called Altise, which attacks the vine.

Anthemis nobilis, the Roman chamomile, is found wild, but that found in commerce is imported from Europe. The Arabs employ for the same purposes *Perideræa fuscata*, *Santoline Chamæcyparissus*, *S. squarrosa*, etc.

Diotis candidissima is sold in the markets as a febrifuge and emmenagogue.

Artemisia arborescens is employed in medicine by the Arabs, and sold in all the markets. The roving distillers make an essence of absinthe.

Artemisia Huba-alba is used by the Arabs as Semen-contra. The natives also use many other corymbifera, such as *Pulicaria mauritanica* with a strong camphor odor, *P. dysenterica* and *Inula viscosa*, *Erigeron canadense* and *Coryza ambigua*, which abound, are sometimes employed as diuretics.

Atractylis gummifera. This plant has caused many deaths by poisoning. The large root divided furnishes an abundant milky juice, which concretes into tears like small nuts. These tears pressed into balls, about the size of the fist, are commonly sold for bird lime. The artichoke, which is found wild, furnishes the Arabs with food in its flower heads and sides of the leaves. The *Warionia Saharæ* (Bentham), is employed medicinally by the natives.

ERICACEÆ.—The roots of *Arbutus Unedo* are collected in small quantities for medical use; the leaves are used for tanning skins.

SOLANACEÆ.—*Withania somnifera* is employed at the Civil Hospital, Alger, as a sedative and hypnotic. The seeds are diuretic. The plant contains an alkaloid, which is probably the active principle.

Esteemed by the ancients as equal to opium, it has been since neglected. *Nicotiana* is grown by the Arabs. *Capsicum annuum* and *frutescens* are largely cultivated. A number of solanums, several of which have active principles, are cultivated for ornament in gardens.

OLEACEÆ.—*Fraxinus excelsior* is common. The Arabs employ the fruit medicinally and as a spice. The manna ash *F. Ornus* and *F. rotundifolia* are easily grown.

The Jasmines are cultivated with great facility, and can be utilized for enfleurage.

GENTIANCEÆ.—*Erythræa Centaurium*, common among the thickets, is exported in large quantities. One house of Alger ships 5,000 to 7,000 pounds yearly, and certain herbalists give special attention to this plant. *E. pulchella*, which is less bitter, is often substituted for it. *Chlora grandiflora*, very plentiful, might be tried.

BORAGINACEÆ.—*Borago officinalis* is very abundant, and two thousand five hundred pounds of the flowers are annually exported. *Alkanna tinctoria* is common but little collected. *Heliotropium europæum* is also common, and grows to a considerable size. It possesses a toxic alkaloid.

LABIATÆ.—This family is richly represented in Algeria, and it is strange that the ambulant distillers have not utilized the plants of rosemary, lavender and thyme so common on the heaths. Pennyroyal is very common, and is largely exported. Messrs. Chiris & Gros estimate the production of the essential oil of *Mentha Pulegium* at 4,500 pounds. *Mentha rotundifolia, aquatica* and *sylvestris* are also distilled.

Many species of indigenous *Salvia* are utilized. *Calamintha officinalis* and *Teucrium Polium* are much used by the Arabs. *Marrubium vulgare* is sometimes employed as a febrifuge.

VERBENACEÆ.—*Lippia citriodora* is much cultivated. Legout & Peyron export annually over 1,700 pounds of the leaves of this odoriferous verbena. The flowers of *Citharexylum quadrangulare* might be utilized for enfleurage.

Globularia Alypum, very common; is much employed by the Arabs in medicine, so is the *Limoniastrum Guyonianum* as an anti-scorbutic.

THYMELACEÆ.—*Daphne Gnidium* is employed by the Arabs as a blister, and the leaves to dye yellow and to bring on abortion. The woody *Passerinæ* have also vesicant barks.

CYTINACEÆ.—*Cytinus hypocistis* is extremely common in Algeria. It is to be regretted that the extract obtained from the juice, which was formerly a valuable astringent medicine, has fallen into disuse.

URTICACEÆ.—*Parietaria officinalis* is abundant, and collected for medical use and exported. The seeds of *Urtica pilulifera* are employed in native medicine under the name of Oundjoura.

CANNABINACEÆ.—*Cannabis indica*, under the name of *kif*, is habitually smoked by the natives, and all the measures to restrain its use have been ineffectual. Hence there is an important traffic carried on in this product.

JUGLANDACEÆ.—*Juglans regia.* The leaves are collected in small quantity for medical use. The bark of the roots is employed as a dentifrice by the Arabs, who have in general remarkably fine teeth.

CONIFERÆ.—*Cedrus Libani.* Although this cedar is abundant in Algeria, it is remarkable that no use has been made of the odoriferous wood, and the resin which has an agreeable citron odor. What is sold as cedar oil is obtained from *Juniperus virginiana.*

Callitris quadrivalvis. The resin, very partially collected, constitutes the sandarac of commerce.

Pinus halepensis furnishes also an abundant resin.

Juniperus Oxycedrus is very common, and is sought by the natives for the manufacture of oil of cade.

LILIACEÆ.—*Scilla maritima*, s. *Urginea Scilla.* Before the clearance of the land this squill covered all the culturable lands of the Tell. It attains a large size, the bulb often weighing 14 or 15 pounds. It is collected in large quantities for medicine, owing to its bitter principle. The house of Legout & Peyron, of Alger, export annually about 1,300 pounds of the dried bulbs. All the aloes are easily cultivated, but no useful product is obtained from them.

AMARYLLIDEÆ.—*Agave americana* is very common, but is not now employed medicinally as formerly. The pulp obtained in crushing the leaves is rubefiante. According to Marcano if meat is moistened with the sap of the Agave it soon develops a pepsinogenous mycelium, which transforms the flesh into peptone. Among the other amaryllids formerly employed in medicine were the *Pancratium maritimum* very common, and *Amaryllis Belladonna*, said to be poisonous, much grown for ornament.

ORCHIDACEÆ.—If salep came again generally into use, no plants could be found more useful than *Orchis Munbyana and Robertiana*, the tubercles of which attain enormous dimensions. *Vanilla* is only cultivated in green-houses. There has been much talk of a pretended indigenous "Faham," obtained from the dried leaves of *Aceras anthropophora*. In reality this product is of little importance and has never been seriously utilized.

FUNGI.—*Claviceps purpurea*; Ergot. Rye is very little grown in Algeria, but *Dyss* (*Ampelodesma tenax*) is extremely common, and an ergot is formed on it very abundant in rainy seasons. It is richer in ergotin than rye ergot, 18 instead of 14 per cent. The ergot of *Claviceps microcephala* is frequently met with on *Arundo Pliniana* and might be tested.

Finally it may be stated that M. Lallemant, chemist and druggist at Arba, exports considerable quantities of myrtle leaves, lesser centaury, thapsia root and pennyroyal. According to the Customs returns, the following were the exports: Sarsaparilla root, 150 pounds in 1886 and 1887; liquorice root, 200 pounds in 1886, none in 1887; other medicinal roots, 40,000 pounds in 1886 and only 19,000 pounds in 1887; citron, orange and other peel, 5,200 pounds in 1886 and 8,500 pounds in 1887; medicinal barks, 8,700 pounds in 1886 and 5,000 pounds in 1887; medicinal herbs, 163,000 pounds in 1886 and only 33,600 pounds in 1887; other leaves about 13,000 pounds yearly; lavender and orange flowers about 550 pounds yearly; other flowers, 39,000 pounds in 1886 and 8,000 pounds in 1887; non-spirituous perfumes, 15,500 pounds in 1886 and 71,500 pounds in 1887; essential oils of different kinds, 51,000 pounds in 1886 and only 26,000 pounds in 1887.

BROMOFORM.

BY GEORGE M. BERINGER, Ph.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, January 20.

Attention was first called to the value of bromoform in the treatment of whooping cough, by Dr. Stepp, of Nürnberg, in 1889, who attested to its value, both in inhalation and in internal administration. He recommended the following prescription for internal administration: Bromoform 10 drops, Alcohol 3 to 5 cc., Aqua destillata 100 cc., Syrupus 10 cc. He states that bromoform is

entirely non-poisonous; giving a child of 5 to 10 years of age 15 to 20 drops in 100 to 120 cc. of solution, he claims to cure in 5 to 10 days. It may also be administered in capsules. (*Phar. Zeitsch. für Russland*, 1889, p. 775.)

Since then, his statements have been confirmed by Prof. Senator and Dr. Loewenthal, in Germany, and recently by Dr. Louis Fischer, of New York. The latter details in the Medical Record, a number of cases of pertussis in which he had used bromoform and writes: "I have in all, used bromoform in fifty-one cases and still have several under observation; and there is no question but that it is the best known remedy when properly applied." He prefers "giving it after food in a small teaspoonful of water. Owing to its weight, care must be taken to see that the child swallows the bromoform and that it does not remain in the spoon." Dr. Fischer recommends the following doses: "One year or under 2 to 3 drops three times a day, two to four years of age 3 to 4 drops three or four times a day. Under eight years of age 4 to 6 drops. After the third or fourth day the dose was usually increased gradually by adding one drop to the usual dose."

Dr. Rabuteau long ago proposed to use bromoform as a local anæsthetic, claiming that it was less revulsive and painful than the application of chloroform. (AMER. JOURN. OF PHARMACY, 1875, p. 370.)

In 1874, Prof. Walter George Smith, in the course of a lecture on "Therapeutical Remedies Recently Introduced" (see *Pharm. Journ. and Trans.*, 1874, January, p. 623), speaks of bromoform $CH.Br_3$ as a *reddish liquid* and says "it is *irritant* and does not appear likely to fufil any useful indications in practice." It is perhaps needless to state that the specimen of bromoform possessed by the professor must have been decomposed and unfit for use.

In looking over the literature relating to bromoform, one is confused by the discordant statements of the various investigators. As, for example, Carnelly, in "Melting and Boiling Point Tables," quotes the boiling point, as obtained by various authorities, 144° C. to 152° C., and solidifying point at + 7·8° to — 9°, and the specific gravity has been variously stated at from 2·13 to 2·90 These varying statements, copied into the various text books and dictionaries of chemistry, leave one desirous of preparing the compound, in doubt as to the correct data to accept as proof of the purity of the product.

Gmelin (Cavendish edition, vol. VII, p. 339) gives several of the methods used for preparing bromoform. Löwig first prepared it in 1832 by distilling bromal (tri-brome acetaldehyde) with excess of solution of potassium hydrate. The watery distillate was decanted from the bromoform, and the latter dehydrated by sulphuric acid. His product is reported as having a specific gravity of 2·13, and must have been impure.

Dumas is stated to have first obtained it pure and recognized its composition, by distilling alcohol or acetone with excess of aqueous bromide of lime. The bromoform was shaken with sulphuric acid, separated and then treated with calcium chloride. This is the process, it is believed, that is generally followed in preparing the commercial article.

Lefort obtained it by gradually adding bromine to a solution of one part of potassium hydrate and one part of wood spirit, kept cool, until the liquid became colored. The bromoform which goes to the bottom is purified over calcium chloride which retains the undecomposed wood spirit. L. Reuter (*Ph. Zeit.*, 1890, p. 5, see AMER. JOURN. OF PHARMACY, 1890, p. 89) made use of the same process and reports the product as a colorless liquid, sp. gr. 2·8, boiling point 150° C. It seems almost superfluous to state here that absolutely pure methylalcohol yields neither chloroform, bromoform nor iodoform, and that the amount of bromoform produced by this method is but a measure of the acetone or other ketones existing as impurities in the alcohol used. In confirmation of this statement, see *Watt, Chem. Diction.*, Supplement II, p. 324, also *Archiv der Pharmacie*, 1887, p. 376.

More recently Fritz Günther has proposed the following process: Acetone is mixed with 10 parts by weight of 20 per cent. soda solution in a flask connected with a reversed condenser. Bromine is gradually added in very small quantities, through a funnel tube until bromoform ceases to be formed, the temperature being maintained during the operation by means of a water-bath at 50° C. 1·9 grm. acetone was said to yield 6·7 grm. bromoform, about 81 per cent. of the theoretical yield (*Archiv der Pharmacie*, 1887, 378).

No mention is here made as to the character or purity of the product. In my hands satisfactory results were not obtained with this process. Pure acetone will not mix with 20 per cent. soda solution, and on agitation therewith, even at as low a temperature as 50° C.

it, on separation, is considerably darkened and resinified. Tried on an experimental scale neither the yield nor product were satisfactory, and hence this process was abandoned.

The following modification of Dumas process was adopted, the quantities given being those found convenient for experimental purposes.

Four ounces of marble lime were slaked and then mixed with one quart of water, and the milk of lime thus made transferred to a flask connected with an inverted condenser. A funnel tube is passed through the cork and reaches below the surface of the liquid. In order to obtain mechanical agitation so as to keep the lime dispersed through the liquid, a small glass tube was run to near the bottom of the flask, and extending through the cork was attached to a rubber atomizer bulb. By pressing this bulb sufficient air was forced into the mixture to keep it thoroughly agitated, thus supplying the place of the mechanical agitator of the manufacturer. Four ounces of acetone was added in portions, one-half being added at once and the remainder gradually during the operation. The contents of the flask are maintained at a temperature of 45° to 50° C., slightly below that of the boiling point of acetone, and bromine is gradually added in small quantities through the funnel tube, the mixture being thoroughly agitated as each portion is added. When the reaction is completed and the further addition of bromine yields a yellow color, a sufficient quantity of milk of lime is added to render the solution decidedly alkaline and distilled at once. The bromoform, although boiling at a much higher temperature than water, comes over in the first portion of the distillate. The aqueous portion of the distillate usually contains considerable acetone, and may be returned to the flask and used in a subsequent operation.

The bromoform obtained was repeatedly washed with water, separated and treated with calcium chloride and then distilled. I was surprised on attempting to fractionate the liquid to find that a portion of the distillate was obtained below 100° C., a fraction being collected between 90° and 100° C. On agitating 5 cc. of this fraction with 20 cc. water in a stoppered graduated cylinder, but 1 cc. separated, the remainder being dissolved. The aqueous portion separated, possessed the odor of acetone, and yielded iodoform, with iodine and potassium iodide in an alkaline solution. The heavy oily liquid possessed the odor and taste of bromoform, but the small amount

remaining precluded any further investigation. The fractions obtained between 100° and 140° C., being small in quantity, were mixed, and 5 cc. agitated with 20 cc. of water but 2 cc. remained undissolved. The aqueous portion likewise gave the iodoform reaction.

The presence of acetone in the bromoform after repeated washing with water is worthy of notice, and shows the necessity of fractionally redistilling the product. Richter (*Organic Chemistry*, p. 161) states that "acetone in the presence of caustic soda combines with chloroform, yielding *acetone chloroform*

$$(CH_3)_2C\begin{matrix}OH\\CCl_3\end{matrix}$$

It seems not unlikely that under similar conditions a corresponding compound may be formed with bromoform.

The fraction distilling at 143° to 148° C. showed a sp. gr. of 2·8645, and that collected at 148° to 151° C. had a gravity of 2·9082. These fractions were exposed on a recent cold morning, and at 9°–10° began to cloud, and when the thermometer marked 8° crystals began to appear, and at 6° C. a mass of crystals had formed in each. These were quickly transferred to a funnel, a small layer of absorbent cotton having been placed in the angle of the funnel and the liquid portion allowed to drain. The funnel was now brought in-doors and the crystals allowed to melt, the first portion that escaped from the funnel was collected separately and the remainder was collected in a perfectly dry, clean vial, and is believed to be chemically pure bromoform. It showed the following characters: specific gravity 2·900 at 15° C., boiled steadily at 147° to 148° C, and became crystalline at 6° to 8°, and a firm, solid mass at + 4·5° C. These temperatures were obtained with a thermometer corrected at Yale.[1]

The lower boiling fractions showed no signs of any crystals at 0° C.

The liquid remaining in the flask contains considerable calcium bromide. An attempt was made to recover the bromine therein as

[1] Since writing the above, Prof. Maisch has called my attention to the results reported by W. H. Perkin in Journal of the Chemical Society, Proceedings, 1884, p. 533, viz: spec. grav. 2·90246 at 15° C.; melting-point 7·8°, and boiling-point 120·3° (pressure 330 mm.). The boiling-point stated is evidently a mistake, possibly a misprint.—G. M. B.

bromoform. Sufficient milk of lime was added to render the liquid decidedly alkaline, acetone was added and then chlorine gas was passed through as long as bromine was indicated by the reddening of the liquid as each bubble of gas escaped, agitation being continued as before. The liquid was then distilled and the heavy liquid separated and washed showed a gravity of 2·22. This was treated with calcium chloride and then fractionated and yielded also considerable of the lower boiling fractions. The fraction distilling at 144° to 149° C. showing a gravity at 15° C. of 2·8938 was exposed to a temperature sufficiently low to crystallize and the crystals separated after melting, yielded a liquid, sp. gr. 2·8963 at 15° C.

Care must be taken to add the bromine in small portions and to have the contents of the flask decidedly alkaline or there will be formed more or less mono-brom acetone a serious contamination of the product. This compound is a very powerful irritant, a few drops escaping in the room so irritates the eyes and nostrils as to render the atmosphere unendurable. As its boiling point, 140° to 145° C., approaches nearly that of bromoform it cannot be separated by fractionating alone. In experimenting with the process of Günther, above mentioned, the writer was unfortunate enough to obtain some mono-brom acetone greatly to the discomfit of himself and other occupants of the room. The contaminated product was treated with solution of sodium carbonate, which removed but slightly the troublesome compound. It was then agitated with lead oxide, water was added, the whole thoroughly shaken and thrown in the flask and redistilled. The resulting distillate washed and then fractionated yielding an unobjectionable product.

Bromoform like chloroform is a solvent for caoutchouc, gutta-percha, fats, oils, resins, essential oils, sulphur, phosphorus and iodine. It is miscible or soluble in chloroform, ether, alcohol, carbon bisulphide, methyl alcohol, acetone, amyl alcohol, benzol and benzin and is but very slightly soluble in water. It is very difficult to inflame, but its vapor, like that of chloroform, colors the flame of a Bunsen burner green. Mixed with alcohol it burns with a smoky flame colored green on the edges and giving off acid fumes. It is easily decomposed by light and should be kept in amber-colored vials and not unlikely the decomposition as in chloroform could be prevented by the addition of a small amount of alcohol.

Bromoform suitable for medicinal purposes should answer the following requirements: a colorless volatile liquid having a characteristic odor and a penetrating sweet taste, specific gravity 2·86 to 2·90, and should vaporize without leaving any residue at 147° to 150° C. A few drops evaporated from a watch crystal or filter paper and the vapor inhaled should not irritate the eyes or nostrils. Agitated with sulphuric acid no color should be imparted to either liquid. Treated with liquor potassa no coloration should be produced. On agitating with distilled water, the water separated should not show an acid reaction to test paper, nor yield a precipitate with silver nitrate nor on adding it to a weak ammoniacal solution of silver nitrate and allowing to stand, should a metallic mirror be formed.

INTERFERENCE OF MERCUROUS SALTS IN DETECTING SILVER SALTS.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 83.

Read at the Pharmaceutical Meeting, January 20.

At the November Pharmaceutical Meeting a note was read on the above subject, in which the fact was brought out that in testing qualitatively solutions containing silver and mercurous salts, the silver chloride was not always dissolved in the ammonium hydrate, and then of course could not be reprecipitated on addition of nitric acid. While this method is not used quantitatively, still it is of importance to know under what conditions a qualitative test may fail. In the present paper approximate results are given with the following solutions of known strength:

	Per Cent.		Per Cent.
I.	$AgNO_3$ 1	and $Hg_2(NO_3)_2$	1·35
II.	" 1	" "	2·70
III.	" 1	" "	4·05
IV.	" 1	" "	5·40
V.	" 1	" "	6·75
VI.	" 1	" "	9·45
VII.	" 1	" "	10·00
VIII.	" 0·2	" "	0·27
IX.	" 0·2	" "	1·35
X.	" 1	" "	5.40 with $Pb(NO_3)_2$ 1 per cent.
XI.	" 1	" "	10·00 " 1 "

5 cc. of these solutions were precipitated by addition of 5 cc. dilute HCl, the precipitate washed with cold water (in X and XI also with boiling water), 5 cc. water of ammonia poured over the precipitate which had been loosened from the filter by use of a glass rod, the filtrate returned to the filter and allowed to run through again; the filtrate was then acidified with HNO_3. This test is called the Regular test. The black residue, after thorough washing with water, is removed as completely as possible from the filter (by using a jet of water), nitric acid added, the mixture evaporated to a very small bulk, diluted with water and dilute hydrochloric acid added; this test is called the Residue test. Speaking now of solutions I to VII, inclusive, the Regular tests for silver rapidly became fainter until in No. IV a decided turbidity appeared, while in VI and VII only a faint turbidity was noticeable. The Residue test, on the other hand, increases in quantity of precipitate as the Regular test decreases; in solution I the two tests are nearly alike, showing that using the mercurous and silver nitrates in about equal quantities, only one-half of the silver chloride is dissolved by the ammonium hydrate, the other half remaining in the residue.

To ascertain if more dilute solutions give different or more favorable results, VIII and IX were made by diluting I and V with four volumes of water; the results did not differ much from those obtained with the stronger solutions. In VIII the Regular and Residue tests were of about equal intensity, while in IX the Regular test gave only a very faint turbidity.

To examine the influence of lead salts solutions X and XI were prepared; it will be noticed that they correspond to IV and VII with addition of 1 per cent. $Pb(NO_3)_2$. The Regular and Residue tests did not differ materially from those obtained with IV and VII; this refutes the statement previously made that in the presence of lead salts, the silver test was not interfered with.

From these experiments it is shown that in the presence of mercurous salts the regular test for silver is *never* in accord with the quantity of silver salt present, and that if the proportion of mercurous salt be to silver salt as 6 or more to 1, then the silver may easily escape detection; hence it is recommended to test the ammonia residue as well as the ammonia solution for silver.

PRESCRIPTION OWNERSHIP.

By Joseph W. England, Ph.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, January 20.

A prescription may be defined as a general order drawn upon any pharmacist for certain specified drugs, in certain specified quantities, to be prepared by recognized methods of pharmaceutical procedure. It is issued as an official order to obtain certain remedies necessary to carry out a quasi-contract, *i. e.*—the relieving or curing of a patient of a bodily ailment. Such an order is legally issued only by authorized officials or physicians, who have qualified themselves for such work, by becoming graduates in medicine and registrater of a State Medical Board.

A patient consulting a physician receives for a consideration—what? A medical examination and medical directions, one of which latter is the taking of certain drugs properly prepared. The patient is not competent to do this any more than he is to prescribe for himself, so the physician gives him an official order or prescription upon the pharmacist.

A prescription having been received by the pharmacist, he marks it with certain marks of identity, such as the number, date and year, and labels it, when compounded, with similar markings, together with the directions and the physician's name, for the purpose of future identification.

This official order differs in nowise from any other official order. Universal custom, that great mother of human laws, requires that it be retained by the party upon whom it is drawn, as prima facie evidence of its execution.

A claim that a prescription is a formula, and, as such, property for which the patient has given due compensation is untenable, for the reason that they are not identical. A formula, in the accepted meaning of the term, is a recipe of a product yielding constant, uniform results on being used. A prescription is an experimental recipe, which may or may not yield the desired results, even in the hands of a physician, and whose use by unskilled hands is fraught with the gravest possibilities. Medicine is not yet an exact science, any more than human beings are exact structures. A prescription is but a part of the medical treatment and not the whole of it, and

the treatment of every sick person must of necessity vary with the personal idiosyncrasies of each case.

To whom, then, does the prescription legally belong? To the physician? Certainly not. He has been paid for *all* services rendered. To the patient? No; for in his recovery to health he has received *all* that he paid his medical adviser for. To the pharmacist? Yes; by every right of custom and law, provided he has accepted it under certain conditions. If the patient makes a request for its return on presenting it, the pharmacist has one of two lines of action before him. He must either refuse to compound it under such conditions, or, express a willingness to compound it and give a duplicate copy. If the latter proposal be refused, he should return the original prescription without compounding. On the other hand, if the prescription is committed to his hands with no primary request for its returnal after being filled, and he has affixed his marks of identity and compounded it, he should retain the original copy as legal evidence that he has prepared such a prescription.

As showing the legal value of a prescription it may be of interest to state that Mr. Robert England informs me, he has been subpœnaed in three cases within the last three years to produce certain original prescriptions for the purposes of first, To prove attendance in a suit for medical services. Suit was won. Second, To prove that a physician used drugs for malpractice. Physician convicted; and, third, To prove that a medical student illegally practised medicine. In this latter case, the patient dying and the student being unable to give a certificate of death, the case was examined by the Coroner, and when confronted with the prescriptions confessed guilty. In each instance, however, the legal authorities returned the prescriptions, thus tacitly admitting their ownership.

But this whole question of prescription ownership, to my mind, is essentially one of law, and viewing it from that standpoint, it presents some most interesting features. I have been fortunate in securing for this afternoon's meeting an expression of opinion from that eminent authority on civil law, Mr. Richard C. McMurtrie, of this city.

He writes me as follows:

BULLITT BUILDING, January 15, 1891.

Dear Sir: You ask who is the owner of a prescription? The physician who writes it, the patient for whose use it is written, or the apothecary to whom it is handed to compound?

Evidently the only dispute can exist in a case in which the physician and the patient have parted with the possession of the paper, and it has lawfully come into the hands of the apothecary, at the instance of the patient.

The universal practice appears to me to point where the title is for all purposes but one. I presume it is the custom to refill a bottle with a prescription indicated on the label. The patient is not required to purchase a new prescription every time he wishes the order filled—and this appears to me plain, from the consideration that he could secure this by copying the paper before using it.

Moreover, he has paid for the composition and skill required for that purpose, and the delivery to the apothecary is for a particular object, and there is in that transaction nothing implying a transfer of property in anything by the patient to the apothecary.

But the practice certainly is for the apothecary to retain the documents. I presume no one ever heard of a prescription being returned with the dose to the patient.

It is obvious there is nothing indicative of a sale or transfer of title on that footing in this transaction. There is something analogous in respect of a check. The return of these instruments arises out of distinct considerations. Accepted bills are never returned to the drawer if paid.

Then there is a consideration which I consider conclusive, seeing that the thing is open to a contract, and the parties have chosen to make none. If under this view of the case the usage is not of itself conclusive, I think the apothecary has the right to retain, to warrant himself, if a question shall arise, as to correctness of conduct.

I may add—the claimant must always show his title—if the title be in equipoise he must fail.

It also occurs to me that this paper is merely a substitute for a verbal direction, and no doubt there are multitudes of verbal orders filled that *might* be written.

On the whole, I should think there ought to be no doubt that the apothecary may, if he sees fit and is foolish enough to run the risk, put the paper in the fire. There can be no half-way measure, he either owns it absolutely, or not at all. There can be no duty to produce it for inspection, or to give copies, while it would be silly to refuse to do so when reasonably demanded.

It is very unusual in this country to look to the consequence of a rule. It may be well to do so. If the patient is the owner, he may at any time within six years demand the paper, and if it is not surrendered sue as for a tortious conversion of his property. If he can't do this he certainly has no title. I would ask if Executors ever inquired for prescriptions given his testator; if they belong to the testator, they are assets. R. C. McMURTRIE.

ON THE PREPARATION OF SUPPOSITORIES.

By H. C. Archibald, Ph.G., M.D.

This subject is one on which pharmacists hold divergent views. Some, especially the old-time class, are wedded to the fusion process; a few who are sufficiently skilled can turn out a tolerably presentable suppository with the spatula and pill-tile. But the vast

majority I have come in contact with in recent years are satisfied that the proper way to make them is by cold compression, and from an experience of over 35 years in the manufacture of this class of remedies, I am satisfied that the time is not far distant when the advantage to be derived from the use of proper machinery for moulding suppositories will be universally acknowledged.

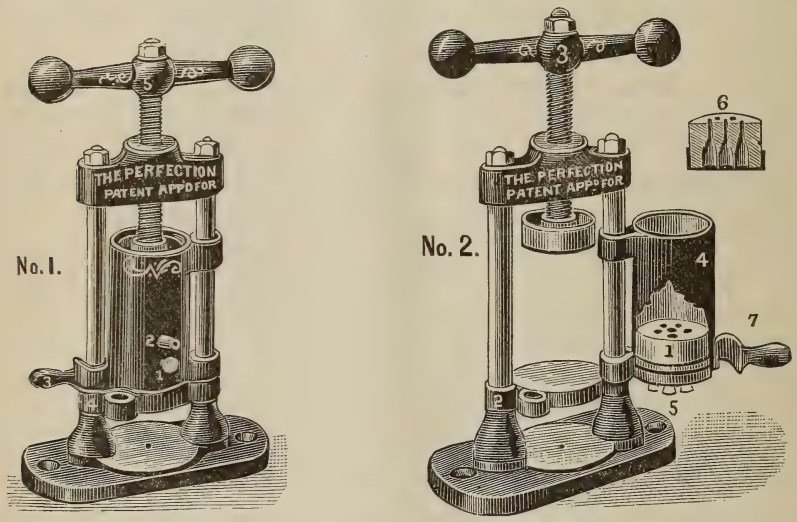
While in the dispensing business the patience was often sorely tried with the suppository prescription. The customer frequently was in a hurry; sometimes the case was urgent, and yet the inevitable ¾ to 1 hour had to pass by before they could be safely sent out in summer, and often a box of cotton was all there was to show by the time it reached the patient when sent by mail.

In the Spring of 1879 I perfected my first machine of 2 moulds, which was described by Mr. E. T. Ellis, in the AMERICAN JOURNAL OF PHARMACY, 1879, p. 184. Afterwards, in 1883, I made a larger and better one of 3 moulds, to which I added urethral and nasal suppositories in 1885. This machine has served an excellent purpose; it has educated thousands to what, in the writer's opinion, is the only correct method of making a suppository—*i. e.*, cold compression. But these machines require a certain amount of adaptability and familiarity with the workings—same as a type-writer, for instance—or the art of spreading a plaster. Now, judging by some of the letters received, one might think many of the writers wished a machine that would work itself, while others desired to make 3 or 6 suppositories, in place of 1 a minute. So I again directed my attention and thought to the subject, and the result is the following suppository machine which will meet all desiderata, and is so simple that the errand boy can work it as well as the proprietor, after the mass is prepared.

The internal structure of the machine is quite simple, and is readily explained by figure No. 2. It consists simply of a cylinder swinging in a frame, in which the die or mould is placed. The mass, previously prepared, is thrown into this cylinder, which at this time is open, as in fig. 2. The cylinder being closed, as in fig. 1, the screw pressure is applied until all resistance is overcome. Before opening the bed-plate at 4, fig. No. 1, the screw should be loosened by half a turn; then throw the bed-plate back, and again gently turn the screw until the suppositories drop out. After securing these, close the plate and proceed in the same manner until the cylinder is

emptied of the mass. The small cylindrical pieces which force the suppositories from the moulds need not be lost; they should be returned to the cylinder at the last working for conversion into suppositories. In removing or changing the moulds screw 1, fig. No. 1, which holds the mould in position, should always be slackened.

In making urethal or nasal suppositories, remove the cap at 2, fig. No. 1, and screw on the small tube, taking care to have the die in the cylinder covered with a brass disc, which is furnished. The mass is then simply put into the cylinder as before, pressure applied, and the suppositories cut into any length desired.



No skill is required to work this machine, which is perfect, reliable and easily manipulated, and for the large amount of service attainable is reasonable in price. It is scarcely necessary to mention that the mass of cacao butter and medicinal ingredients must be properly mixed.

With the small machine, which has 3 moulds of the 15 and 30 grain sizes, from 300 to 500 suppositories can readily be turned out in an hour, and with the larger one about double the number. The simplicity of a contrivance like this, I think, will be generally appreciated by pharmacists as being saving in time, labor and money, and as doing away with the dread, felt by many, of prescriptions for suppositories during the busy hours or at night time.

915 Dickerson Street,
Philadelphia, January, 1891.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Creolin-Pearson.—A very elaborate analysis of this preparation by M. Pfrenger, can be summarized as follows: Phenols, 12·67; hydrocarbons, 44·94; organic bases, 2·76; sodium, 1·45; resin, 32·45; sulphur, 0·248; chlorine, 0·14; water (by difference), 5·342. The phenols consist of traces of carbolic acid, smaller quantities of *m*-xylenol and *o*-xylenol, in the main of ortho- and meta-cresol. The hydrocarbons are mixtures of small quantities of the higher homologues of benzol (boiling between 160° and 190° C.) with naphthalene *a*-methylnaphthalene, acenaphthene and anthracene. The bases belong largely to the chinoline-group. The emulsifying-property of the preparation is due to the presence of resin-soap.—*Archiv der Pharm.*, 1890, 701–713.

Birch-wood creasote contains the following phenols: Guaiacol and creasol (making up the bulk of the phenols); cresol and xylenol (in smaller quantities); phenol (carbolic acid) was not positively identified.—M. Pfrenger, *Archiv der Pharm.*, 1890, 713–719.

Test for Vanillin.—Vanillin in powder or in alcoholic solution, mixed with a small quantity of thiophene and concentrated sulphuric acid, gives upon addition of alcohol a deep green or blue-green coloration. Wood contains vanillin as an incrustating substance; this may be proven by moistening wood with a mixture containing one or two drops thiophene, 20–30 drops alcohol and an equal volume of concentrated sulphuric acid, after a short time a beautiful green color develops. Of various aromatic substances, vanillin was the only one to produce the above reaction.—Anton Ihl, *Chemiker Ztg.*, 1890, 1707.

The Volatile Alkaloid of Ipecacuanha (Amer. Jour. Pharm., 1889, 78) has been further studied by its discoverer, Dr. E. M. Arndt, establishing its identity with *choline* (trimethyloxethylammonium hydrate, $N(CH_3)_3(C_2H_4.OH)(OH)$). In the estimation of emetine, this volatile body is likely to cause errors; it is known that in preparations of ipecac containing acids more alkaloid is found than in preparations in which no acid was used; this is explained by the emetine being present in the ipecac in a soluble form, while the choline is present in insoluble form, but easily rendered soluble by use of acids.—*Apotheker, Ztg.*, 1890, 780.

Examination of Ipecac.—1. *Qualitative.* A small quantity of the powdered drug is mixed with milk of lime, dried and extracted with chloroform; the chloroformic solution is agitated with acidulated water, the aqueous solution concentrated, mixed with concentrated sulphuric acid and molybdate of ammonium should produce at once a red color changing to green. 2. *Quantitative.* 10 gm. of the powdered ipecac are intimately mixed with 5 gm. sodium carbonate and 1 gm. crystallized ferric chloride, the mixture digested for one hour with 100 gm. 60 per cent. methyl alcohol in a water-bath with inverted condenser; it is then filtered and evaporated to remove the alcohol (at this stage the choline or its decomposition products are volatilized), the residue taken up with 50 cc. very dilute water of ammonia and this mixture agitated with 25 cc. chloroform. The chloroform solution is agitated with slightly acidulated water, and the latter solution titrated with Mayer's reagent (each cc. corresponds to 0·0189 gm. emetine); 5 to 5·5 cc. of the reagent should be necessary for the completion of the reaction, indicating an alkaloidal strength of at least 0·945 per cent. emetine.—Dr. E. M. Arndt, *Apotheker Ztg.*, 1890, 781.

Estimation of mercuric chloride in solutions, pastilles and sublimate gauze.—In the absence of alkaline chlorides, solutions of mercuric chloride containing about one gram in a litre are estimated as follows: 100 cc. are thoroughly agitated with 0·1 to 0·2 gm. magnesium oxide, a few drops of potassium chromate solution added and titrated with $\frac{n}{10}$ solution of silver nitrate. Each. cc. $AgNO_3$ corresponds to 0·01355 gm. mercuric chloride. In solutions containing *alkaline chlorides* or in *pastilles* two determinations are necessary: In one the total chlorine is estimated as above; in the other the solution is evaporated to dryness in a porcelain capsule, then gently heated for some minutes, finally applying a strong heat to volatilize the mercuric chloride; after cooling the residue is dissolved in water, potassium chromate added and the solution titrated with $AgNO_3$. The difference between the two titrations gives the silver nitrate solution corresponding to the mercuric chloride. In *sublimate gauze* the mercuric chloride (and alkaline chloride) is extracted by macerating 50 gms. of the material with 500 cc. water, filtering and using 200 cc. for the total chlorine estimation, also 200 cc. for the alkaline chlorides as just described; the difference will give $AgNO_3$ solution necessary for 20 grams of the material.—Dr. J. Bongartz, *Apotheker Ztg*, 1890, 791.

Detection of resorcin and thymol.—In a test tube are mixed potassium or sodium nitrite, gypsum and sodium bisulphate in approximately equal quantities; these are moistened with water and the solution to be tested added and heat applied. In the presence of thymol the mixture becomes chrome-red in color; in the presence of resorcin chrome-green, while in the upper part of the tube are to be noticed bright-red drops. The mixtures must preserve their acid reactions. These tests are very delicate and permanent for considerable time. Attention is also called to the pleasant fruity odor of the thymol-nitrite.—H. Bornträger (*Ztschr. f. analyt. Chemie*) *Pharm. Ztg.*, 1890, 768.

Sulphaldehyde C_2H_4S, obtained by the action of hydrogen sulphide upon acetaldehyde, forms an oily liquid of disagreeable odor, solidifying at —8° C., melting again at —2° C. Treatment with acids polymerizes the preparation, a solid trisulphaldehyde (or thioparaldehyde) of the formula $(C_2H_4S)_3$ resulting. Some of the obtainable commercial preparations are mixtures of aldehyde and thioparaldehyde (Trommsdorff) boiling at 45–50° C. It is more energetic than paraldehyde, although its action at first is slower, owing to its insolubility.—*Pharm. Ztg.*, 1890, 761.

Antipyrine; new method of preparation.—According to Dr. Knorr's patent, antipyrine is made by the condensation of ethylic aceto-acetate and phenylhydrazine and methylating the condensation product. C. F. Böhringer & Son have patented a process in which β-halogenbutyric acid or its ethers are condensed with phenylhydrazine, the resulting methyl-phenylpyrazine changed by weak oxidizing agents, like mercuric oxide, into dehydromethyl-phenylhydrazine which finally, by methylating, is converted into dehydrodimethyl-phenylhydrazine=dimethylphenylpyrazolon or antipyrine. The preparation crystallizes from toluol in beautiful plates, which have the melting point 113° C., are easily soluble in water and alcohol; in dilute, acidulated solutions, sodium nitrite produces a beautiful emerald green color. These reactions would indicate the identity of the two preparations.—(*Südd. Apoth. Ztg.*) *Pharm. Ztg.* 1890, 784.

Ceratum flavum salicylatum.—2·0 powdered salicylic acid are triturated with 5·0 expressed oil of almonds and added to a melted cerate consisting of 62·0 expressed oil of almonds and 31·0 yellow wax; heat is applied until the salicylic acid dissolves, then the

cerate is allowed to cool somewhat and 0·5 each of the oils of lemon and bergamot incorporated and poured into proper moulds.—Scheerer, *Oester. Ztschr. f. Pharm.*, 1890, 631.

Pine-spirit or Pine-vapor, used as a spray in purifying the atmosphere of rooms, is made as follows: 70·0 oil of pinus sylvestris, 8·0 oil of juniper berries, 5·0 oil of rosemary, 2·0 each of the oils of lavender and lemon, 1·0 oil of bergamot and 1000·0 alcohol are allowed to stand in a moderately warm place for several days, filtered and then bottled. A more pleasant aroma is obtainable if to the above be added 200·0 pine twigs and 500·0 additional alcohol and distilling after allowing to stand for a few days.—Scheerer, *Oester. Ztschr. f. Pharm.*, 1890, 632.

Arsenic in commercial acids.—G. Buchner calls attention to the fact that commercial hydrochloric and sulphuric acids at present contain large quantities of arsenic. An examination of a sample of sulphuric acid disclosed the presence of 131 grams As_2O_3 in 100 kilograms of the acid; in a sample of hydrochloric acid 592 grams As_2O_3 were found for 100 kilograms. 50 grams of the sulphuric acid and 10 grams of the hydrochloric acid contain a lethal dose of arsenious oxide.—*Chemiker Ztg.*, 1891, 13.

Ferricyanide of potassium.—Dr. G. Kassner publishes a new method for the preparation of this valuable chemical which allows of a cheaper production, and therefore more extended use. By heating calcium plumbate and potassium ferrocyanide together and passing CO_2 over the heated mass the following reaction takes place: $Ca_2PbO_4 + 2K_4Fe(CN)_6 + 4CO_2 = K_6Fe_2(CN)_{12} + K_2CO_3 + 2CaCO_3 + PbCO_3$. Treating the mass with water dissolves the ferricyanide and carbonate of potassium, the former crystallizing after concentrating the solution, the latter remaining in the mother-liquor; the insoluble portion consists of the carbonates of lead and calcium, which can be used in regenerating the calcium plumbate.—(*Oester. Chem. u. Techn. Ztg.*) *Chem.-techn. Central-Anz.*, 1890, 511.

Alkaloidal assay of narcotic extracts.—2 gm. extract are dissolved in 8 cc. water, 2 cc. water of ammonia added, thoroughly agitated with 40 cc. of a mixture composed of 15 cc. chloroform and 25 cc. ether, and set aside. (This mixture of chloroform and ether is lighter than the extract solution; by taking 20 cc. chloroform and 20 cc. ether a solvent is obtained which is heavier than the extract solution; these mixtures are recommended because no emulsions are formed by

agitating with the solution of the extract.) After half an hour 20 cc. of the solvent are removed and allowed to evaporate; the residue is dissolved in *very little alcohol*, 5 or 6 drops of cochineal tincture added and the alkaloid titrated with $\frac{n}{100}$ hydrochloric acid. Each cc. of the $\frac{n}{100}$ acid corresponds to atropine 0·00289; hyosciamine, 0·00289; strychnine, 0·00334; strychnos alkaloids (strychnine + brucine) 0·00364. The method is applicable to the assay of extracts, fluid extracts and tinctures (after 20 cc. have been evaporated to 10 cc.); it is claimed that an assay can be made in one hour or in even less time.—O. Schweissinger and G. Sarnow, *Pharm. Centralhalle*, 1890, 771–775.

The Alkaloids of Delphinium Staphisagria have been studied by Ch. Kara-Stojanow (*Phar. Ztschr. f. Russl.*, 1890). By slow evaporation of the ethereal solution of the crude alkaloids, *delphinine* separates in beautiful crystals, next *delphisine*, and *delphinoidine* remains in the mother liquor. Delphinine forms colorless rhombic crystals, melting at 191·8° C.; has the formula $C_{31}H_{47}NO_7$; does *not* give any color reactions; the nitrate and sulphate form microscopic crystals, all other salts are amorphous. Delphisine, after purification, forms small needle-like crystals, having the formula $C_{31}H_{50}NO_7$, which is to be confirmed; it is readily soluble in chloroform and gives no color reactions. Delphinoidine is obtained from the syrupy liquor by precipitating with petroleum ether; it has the formula $C_{25}H_{42}NO_4$, forms amorphous salts, and is dissolved by sulphuric or phosphoric acids with a brownish color, the solution having an emerald green fluorescence. In addition to these, four amorphous alkaloids were obtained from the alkaline solution which had been exhausted with ether, by agitation with benzol, then with chloroform; the benzol solution, as well as the chloroform solution, after addition of petroleum ether, gave amorphous precipitates, while the solutions on evaporation left amorphous residues; the quantities were too small to make very thorough studies.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Preparation of Glucosides.—(1) The decoction of the plant may be boiled (to one-half) with litharge, filtered and concentrated into a thick syrup. But this method does not always give good results, as the long exposure to the air while boiling may give rise

to products of decomposition. (2) Having defecated a decoction of the plant by neutral acetate of lead and filtering, the glucoside may be precipitated by sub-acetate of lead, in the form of a plumbic compound; and may be isolated by diffusing the precipitate in distilled water, or preferably in alcohol, passing a current of sulphuretted hydrogen, boiling, filtering and concentrating rapidly *in vacuo*. Another method is to digest the precipitate with water, and add diluted sulphuric acid in just sufficient quantity to precipitate the lead; then proceed as before. (3) When a free glucoside exists in a plant nearly free from tannin, the plant may be digested with alcohol; filter, evaporate the alcohol and crystallize. This is the method with *strophanthin* and *ouabain*. (4) The "lime process," recommended by Tanret consists in treating the pulverized plant with milk of lime for 24 hours, when the mass is put into a displacement apparatus. The glucoside may now be precipitated by a reagent, coagulated by ebullition, or taken up by an appropriate solvent. This method is used for *vincetoxin* and *condurangin*. (5) When the plant contains much tannin, or when the production of sulphuretted hydrogen is to be avoided, precipitate the decoction by sub-acetate of lead, mix the precipitate with slacked lime and dry it in a water-bath; the powder, introduced into a displacement apparatus, is treated by alcohol, whose evaporation reveals the glucoside. *Pambotanin* has been made in this way. Concerning solvents, I may say that, whilst the alkaloids require such substances as benzin, ether, chloroform, etc., the glucosides dissolve only [? editor] in alcohol and water. Some of the latter have a remarkable affinity for water. Under the action of weak mineral acids the glucosides decompose and form new bodies. The object of this paper is to put young chemists upon their guard against the errors resulting from the use of certain reagents, such as picric acid, iodide of potassium and mercury, and tannin, said to give characteristic results with the alkaloids, as they likewise precipitate a certain number of the glucosides.—M. Bocquillon-Limousin, *Répert. de Phar.*, Nov. 10, 1890.

Characters of Glucosides.—Certain glucosides, such as amygdalin and solanine, contain nitrogen. Many others, such as æsculin and arbutin, are tertiary combinations. Some of them, like caïncin have a distinctly acid reaction. Others are basic, and, like the alkaloids, are precipitated by potash; Tanret's vincetoxin

affords an example of this kind. Hence, we see that Kobert was in error when he stated that when the decoction of a plant gave acid reactions, the presence of a glucoside was demonstrated. Some of the glucosides may be precipitated with picric acid; others do not show this reaction. Some of them, like vincetoxin, coagulate under the influence of heat. Most of the aqueous solutions of the glucosides, like those of saponin, are persistently frothy. There remain but two characteristic reactions: (1) Decomposition by mineral acids and reduction by Fehling's liquor after such decomposition: (2) Precipitation by a solution of molybdate of ammonium, lightly acidulated with hydrochloric acid.—M. Bocquillon-Limousin, in the *Répert. de Phar.*, Nov. 10, 1890.

Active Principle of Bread-Crumb.—M. Barnouvin writes to the *Répert. de Phar.*, Dec. 10, that although pharmacologists tell us the reason why we use bread-crumb in making Sydenham's White Decoction, viz., that it contains an acid substance, they do not tell us what the substance is. After trying, in vain, various solvents, the author subjected the product of a decoction of bread-crumb to Uffelmann's reagent (phenol and perchloride of iron) and obtained the characteristic yellow coloration of lactic acid. M. Barnouvin considers this fact as having a certain amount of interest on account of Dr. Hayem's recent statements concerning the use of lactic acid in the treatment of green diarrhœa in children. He thinks that the good effects of Sydenham's decoction may be due to the presence of lactic acid in the bread-crumb used in its preparation.

Antiseptic Power of Salol.—At the November meeting of the Paris Society of Pharmacy, a note from M. Lacroix was read, in which the author described his researches on the antiseptic properties of salol. His conclusions are that the products of the decomposition of salol have this power, and that it is impossible to develop the pyogenic bacillus in the urine of persons who had ingested this substance. Such urine, placed in sterilized tubes with the bacillus, and subjected to heat for three days, underwent no change.—*Répert. de Phar.*, Dec. 10, 1890.

Analysis of a Specific for Gout.—At the same meeting M. Barillé presented the qualitative results of his analysis of a popular remedy for gouty troubles. He found the mixture to contain iodide of potassium, benzoate of sodium, tincture of squill, tincture

of vanilla and essence of wintergreen. M. Ferrand remarked that the wintergreen present could not have been derived from *gaultheria procumbens*. M. Martindale observed that it was extracted from *betula lenta*.

Solubility of Beta-Naphthol with Boric Acid. — At the November meeting of the Paris Society of Biology, M. Anotta reported that while beta-naphthol has a solubility of only 20 cgm. per 1,000 in pure water, it will dissolve in the proportion of 70 to 80 cgm. per 1,000 in water saturated with boric acid. The presence of naphthol in a boric acid solution adds sensibly to its antiseptic power.—*Répert. de Phar.*, Dec. 10, 1890.

Examination of Sub-Nitrates of Bismuth.—M. Schulzé found that the various samples examined, contained sub-carbonate, sub-chloride and free hydrate of bismuth, and free water. In seven sealed samples from as many manufacturers, the amount of water averaged 23 per 1,000; the amount of sub-carbonate of bismuth present was 203 per 1,000. In five samples, the average amount of sub-chloride was 42 per 1,000. The amount of carbonic acid present was ascertained by the use of Yvon's ureometer. The chlorine was measured by Volhard's method, in which the sub-nitrate is dissolved in a nitric acid liquor, leaving the chlorine. To find the amount of nitric acid present, the author used Eder's process, which he considers the best. He does not describe it except to say that it requires the use of Kipp's carbonic acid apparatus.—*Répert. de Phar.*, Dec., 1890.

PILULA FERRI PROTOCHLORIDI.[1]

By James B. McLaren.

Prescriptions for pills of protochloride of iron have been pretty common of late. Usually the excipient is left to the discretion of the dispenser, but in several instances recently I have seen anhydrous lanolin prescribed for this purpose.

Probably this excipient has been suggested by the paper read before this Association by Mr. Millar, in which he recommended lanolin as an excipient for potassium permanganate pills and other similar substances.

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[1] Read before the Edinburgh Chemists' Assistants' Association; reprinted from *Phar. Jour. and Trans.*, Dec. 20, 1890, p. 553.

I made a set of pills with anhydrous protochloride of iron and anhydrous lanolin, and kept them under observation. They were rolled in liquorice powder. When first made the pills were fairly hard and looked quite satisfactory. In the course of a few days, however, they became quite moist and very unsightly externally, at the same time assuming an olive-brown color. If the pill be cut in two, it is seen that internally the mass is still unchanged, but the softening gradually penetrates deeper into the mass till the whole becomes quite pasty in consistence.

I made a second set of pills and coated them well with sandarach varnish, but this appeared to have little effect in preventing the change.

As the result of some experiments I would suggest that these pills should be made with some absorbent powder, such as liquorice or althæa, and beat into a mass with a small quantity of some inert extract. The following formula, I find, does very well:

Anhydrous protochloride of iron,	3 grains.
Powdered liquorice,	1 grain.
Extract of liquorice,	1 grain.

Mix to make one pill.

The only objection to this method is the size of the pill, but this is counterbalanced by its better keeping properties.

TABLE OF ATOMIC WEIGHTS.

(Issued December 6, 1890.)

By request of the Committee of Revision and Publication of the Pharmacopœia of the United States of America, Prof. F. W. Clarke, Chief Chemist of the United States Geological Survey, has furnished a Table of Atomic Weights, revised upon the basis of the most recent data, and his latest computations. The Committee has resolved that this table be printed and furnished for publication to the professional press. The Committee also requests that all calculations and analytical data which are to be given in reports or contributions intended for its use or cognizance, be based upon the values in the table. It would be highly desirable that this table be adopted and uniformly followed by chemists in general, at least for practical purposes, until it is superseded by a revised edition. It would only be necessary for any author of a paper, etc., to state that his analytical figures are based upon "Prof. Clarke's Table

of Atomic Weights, of December 6, 1890," or some subsequent issue.

This table represents the latest and most trustworthy results, reduced to a uniform basis of comparison, with oxygen = 16 as starting point of the system. No decimal places representing large uncertainties are used. When values vary, with equal probability on both sides, so far as our present knowledge goes, as in the case of cadmium (111·8 and 112·2), the mean value is given in the table.

The names of elements occurring in pharmaceutical, medicinal, chemicals, are printed in talics :

Name.	Symbol.	Atomic weight.	Name.	Symbol.	Atomic weight.
Aluminum, . . .	*Al*	*27·*	*Molybdenum*, . .	*Mo*	*96·*
Antimony, . . .	*Sb*	*120·*	Nickel, ...	Ni	58·7
Arsenic, ...	*As*	*75·*	*Nitrogen*, . . .	*N*	*14·03*
Barium, ...	*Ba*	*137·*	Osmium, ...	Os	191·7
Bismuth, ...	*Bi*	*208·9*	*Oxygen*[4], . .	*O*	*16·*
Boron, ...	*B*	*11·*	Palladium, . . .	Pd	106·6
Bromine, ...	*Br*	*79·95*	*Phosphorus*, . .	*P*	*31·*
Cadmium, ...	Cd	112·	Platinum, . . .	Pt	195·
Caesium, ...	Cs	132·9	*Potassium*, . . .	*K*	*39·11*
Calcium, ...	*Ca*	*40·*	Rhodium, . . .	Rh	103·5
Carbon, ...	*C*	*12·*	Rubidium, . . .	Rb	85·5
Cerium, ...	*Ce*	*140·2*	Ruthenium, . .	Ru	101·6
Chlorine, ...	*Cl*	*35·45*	Samarium, . . .	Sm	150·
Chromium, . . .	*Cr*	*52·1*	Scandium, . . .	Sc	44·
Cobalt, ...	Co	59·	Selenium, . . .	Se	79·
Columbium[1], . .	Cb	94·	*Silicon*, ...	*Si*	*28·4*
Copper, ...	*Cu*	*63·4*	*Silver*, ...	*Ag*	*107·92*
Didymium[2], . .	Di	142·3	*Sodium*, ...	*Na*	*23·05*
Erbium, ...	Er	166·3	Strontium, . . .	Sr	87·6
Fluorine, ...	F	19·	*Sulphur*, ...	*S*	*32·06*
Gallium, ...	Ga	69·	Tantalum, . . .	Ta	182·6
Germanium, . . .	Ge	72·3	Tellurium, . . .	Te	125·
Glucinum[3], . . .	Gl	9·	Terbium, ...	Tb	159·5
Gold, ...	*Au*	*197·3*	Thallium, . . .	Tl	204·18
Hydrogen, . . .	*H*	*1·007*	Thorium, ...	Th	232·6
Indium, ...	In	113·7	Tin, ...	Sn	119·
Iodine, ...	*I*	*126·85*	Titanium, . . .	Ti	48·
Iridium, ...	Ir	193·1	Tungsten, . . .	W	184·
Iron, ...	*Fe*	*56·*	Uranium, ...	U	239·6
Lanthanum, . . .	La	138·2	Vanadium, . . .	V	51·4
Lead, ...	*Pb*	*206·95*	Yterbium, . . .	Yb	173·
Lithium, ...	*Li*	*7·02*	Yttrium, ...	Yt	89·1
Magnesium, . . .	*Mg*	*24·3*	*Zinc*, ...	*Zn*	*65·3*
Manganese, . . .	*Mn*	*55·*	Zirconium, . . .	Zr	90·6
Mercury, ...	*Hg*	*200·*			

[1] Has priority over Niobium.

[2] Now split into Neo- and Praseo-Didymium.

[3] Has priority over Beryllium.

[4] Standard, or basis of the system.

PILL COATING.

By D. Hughes Davies.

Although the process of pill coating is not of a very remote date, the demand for coated pills is far greater at present than for the uncoated ones, and I consider that chemists would be doing rightly in giving this subject more attention than it has as yet received.

There may be various objections to having pills coated, but now the age of elegant pharmacy is getting ripe, anything of a nice outward appearance, and not of an unpleasant taste, is of far greater value in the eyes of the public than the old fashioned article, and I think that the remark, "A white cloak covereth a multitude of sins," holds good in this instance.

I am not prepared to state that pill coating is such an easy matter as some have volunteered it to be, but regard the turning out of a pill with a thorough good polish on it, as a difficult task, until the process has been thoroughly mastered, but after that it is comparatively easy to supply the customer with a pill having quite as beautiful a polish as any machinery can turn out. When a batch does not turn out properly and the culprit is taxed, a remark often heard behind the dispensing department is, "Oh! but there's a lot of knack in coating pills, you know," and I may say that there is a lot of truth in that. However, with a little practice everything is overcome. The inability of chemists in some instances where pills are directed in prescriptions to be coated has been the cause of losing good customers. One may try his utmost to explain that the coating has nothing to do with the pill; it is very seldom the customer is enlightened to his own satisfaction.

There are various ways of coating pills, but the first I was ever able to perform was the tolut. and creta gall., which consists in dissolving ʒiij. of residue from making syrup tolut. in ʒiss. of ether, varnish the pills with this solution, and when dry rub over with a little powdered French chalk; there are, however, improvements upon that process which I will try and define.

(1) *The Gelatin Process.*—I will not make any comments upon the many methods of gelatin coating I have tried, but will simply define the one with which I have obtained by far the best results, viz: make the solution from

Gelatin,	1 oz.
Water,	8 ozs.

Dissolve at a gentle heat, then add the white of an egg, and heat until the albumen coagulates, strain through flannel into a water bath kept at a low temperature, add ʒij. glycerin, ʒij. S.V.R., and acid. boric. gr. vi.

A beautifully clear solution is thus obtained; the clearer the solution the better the polish. When gelatin coating is carried out on a small scale, it is the usual custom to coat the pills singly, but I have adopted another plan and find it answer equally well and occupy considerably less time.

I have a rounded piece of thin wood with a thick layer of cork stuck round the edge, and in the centre a small hole, through which I have a little ferrule, which enables me to place the concern on a small iron peg fastened in a wooden stand.

The cost of making the whole turn out would amount to about ninepence. It is convenient to have three or four boards at hand; the stand, of course, would be adaptable to any of them. I have the boards with good needles firmly fastened in the cork to the number of six, twelve, twenty-four and forty-eight. Now attach the pills to be coated to the points of the needles and dip in the solution, taking care not to keep them in too long, as a thick coating is undesirable. Place the board with the pills on back on the peg, revolve in a gentle manner to render the coating even, and give it an occasional turn round. By doing the coating in the evening the pills are ready to be taken off the needles and stored away in bottles the next morning.

(2) *Pearl Coating.*—To do this successfully several conditions are of great importance, without attention to which the French chalk will fail to shine. Care must be taken in the selection of a proper excipient for working the mass, for although pills when pearl coated are not within view of the naked eye, they nevertheless must be properly made to be properly coated.

Glycerin being hygroscopic is not an excipient that should be used.

The pills ought to be as nearly round as possible and moderately hard and dry; it is best to keep them exposed on trays for at least a day before the coating is proceeded with. Should the mass be crumbly the condition may be considered to be one of the most bitter enemies of successful coating; the operation will necessarily be a failure, as the pills will most likely crack, and when that takes

place the attempt may be given up. Another difficulty that has to be overcome is with pills containing essential oils. Unless these are varnished previous to the coating the oil will work through and spoil the appearance. It is best to dilute the pill varnish in common use to half strength and allow the pills a day's rest before clothing in white.

I use two covered gallipots and a round tin box in the process. The pots should be perfectly smooth, and have well-fitting lids, and should be large enough to hold double the quantity of pills for coating. The tin corresponds in size to the pots.

Place some French chalk in the tin and the pills in one of the pots, damp with a solution. The one I use is equal parts of mucilago acaciæ, syr. simp. and aqua; too much solution should not be used. A 2 drachm measure is convenient for the purpose. The pills should all be damped, but if too much solution be used too much chalk is taken up. Now turn them out of the pot into the tin containing the chalk, shake sharply and empty out on to a proper receptacle (I use the lid of a card-board box), keep moving and separate the loose chalk. They are now ready for the polishing pot, being the second gallipot, which should be kept as polisher only.

Repeat the operation, but this time removing as much of the loose chalk as possible before using the polisher, never forgetting that these small things are the tedious puzzles of pill coating. Repeat the operation once again and it is complete. It is necessary to give particular attention to the washing of the pots between each course, and to keep the polisher perfectly dry. I generally after washing and wiping the pot hold it over a spirit lamp and polish out with a soft cloth.

With close attention to the preceding remarks pill coating can be mastered after a few experiments.

I had intended to dwell upon sugar and keratine coating but will not at present trespass on the valuable space of the journal, but sincerely trust that these few lines may act as a stimulus for further papers in this direction, viz: the practical part of the trade.—*Phar. Jour. and Trans.*, Jan. 10, p. 597.

Injections of pyoktanin were observed by Dr. Lindstrœm to cause a diminution of gonorrhœal secretion, without, however, lessening the pain. The strength of the solution varied from 1 to 4 parts of pyoktanin in 1,000 parts.

A CHEMICAL PROBLEM.[1]

By W. Lloyd Williams, A.I.C.

In September of the present year a friend wrote me as follows:

℞	Ammonii chlorid.,	℥j.
	Sodii bibor.,	℥ij.
	Sodii bicarb.,	℥ij.
	Acid carbolici,	24 grs.
	Aquæ,	ad ℨ vj.

The above is the form for a lotion which always goes black on being kept, even when put in a glass-stoppered bottle. Can you explain it?

The reply to this query forms the subject matter of this short note.

It has probably been noticed by each one present that when solutions of salicylate of sodium and an alkaline bicarbonate are mixed and kept for some time a blackening occurs, and reasoning by the letter of the inquiry and the light of experience I conjectured that the coloration might be traced to some action of the sodium bicarbonate upon the phenol. To test the value of this conjecture I made up the lotion according to the prescription and watched its behavior.

I was speedily undeceived; in the course of some four and twenty hours a distinct change was perceptible, but the direction of the change was not in accordance with the symptoms exhibited by the salicylate mixture.

The tint gradually assumed by the lotion is of a bluish-purple color, that of the salicylate mixture proceeds through yellow and brown to inky black.

Besides, it is stated that there is no reaction between alkaline carbonates and phenol, and I find no coloration attends an admixture of sodium bicarbonate and phenol, nor yet of borax and phenol.

I next put together the borax, soda, phenol and water. Beyond the development of a faint yellow tint no change was observed. The passage of a considerable volume of air did not intensify the

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[1] Read before the Chemists' Assistants' Association; reprinted from *Phar. Jour. and Trans.*, January 3, p. 592.

tint, and no change in color attended the passage of carbon dioxide through a solution of borax and phenol, whence I concluded that CO_2 was in no way answerable for the phenomenon.

Having to a certain extent disposed of the soda salts, I felt free to introduce the chloride of ammonium, and my next step was to make a solution containing that compound, bicarbonate of sodium and phenol. No change was noticeable here for a fortnight, but at the expiration of that time a faint difference in tint could be detected and it has gradually increased in intensity. Meanwhile, I was pursuing my inquiry, and amongst other things I tried the effect of passing free ammonia into an aqueous solution of phenol. Here I observed the change in color which I was seeking; the solution commenced to darken two days after I had conducted the experiment, and behaved in a fashion corresponding with the development of color in the original prescription. I repeated the experiment and kept the solution in the dark; the only difference was that the coloration was slightly retarded.

I had now arrived within measurable distance of an explanation of the phenomenon, the coloration is caused by the action of free ammonia upon the phenol.

The origin of the ammonia is sufficiently obvious. We all know that it is set free from its salts by the action of an alkali, and sodium bicarbonate and borax, I need hardly remind you, are both alkaline.

I had not anticipated that ammonia would be more freely developed by the action of borax upon sal-ammoniac, than by the action of sodium bicarbonate upon that salt, but the ammoniacal odor is much more marked, and the action upon phenol is more prompt in the former than in the latter case.

In conclusion, I formulate the proposition that the darkening in color is due to the action upon phenol of the ammonia liberated from the ammonium chloride by the joint action of borax and sodium carbonate.

One word as to the color. It is not black. It appears black after long standing when viewed by reflected light, but by transmitted light the bluish-purple tint is readily seen.

The mechanical part of these experiments was carried out for me by Mr. A. Gunn, in the experimental laboratory at Galen Works, New Cross.

MINUTES OF THE PHARMACEUTICAL MEETING.

JANUARY 20, 1891.

The President being absent, Mr. W. McIntyre was called to the Chair. The minutes of the last meeting were read, and no corrections being required, they were approved.

After the introduction of strangers, donations to the library and cabinet were received, as follows:

Year-Book of Pharmacy for 1890; just received from the British Pharmaceutical Conference; it is similar to the Proceedings of the American Pharmaceutical Association, containing the report on the progress of Pharmacy.

Ten specimens of iron ores, presented on behalf of Mr. Wayland P. Young.

The fruit of Schinus Molle, by Professor Maisch from Professor Herrera; it is known as Arbol del Peru in Mexico, and is cultivated in California and Texas as an ornamental tree, called *pepper tree*, all parts of the plant partaking of a peppery character.

The Committee appointed under the resolution, passed at the last pharmaceutical meeting, consists of Geo. M. Beringer, Prof. H. Trimble, Dr. C. B. Lowe, Jos. W. England and Wm. McIntyre, and had issued a circular to the members, alumni and students of the College, and to the pharmacists of this and neighboring cities, calling attention to the objects of these pharmaceutical meetings.

Professor Maisch read a paper upon *Solanum carolinense*, by Mr. G. A. Krauss, of Memphis, Tenn., as a continuation of the one on the same subject, read at the November meeting.

Mr. Beringer read a paper upon *Bromoform*, alluding to its use in whooping-cough and discussing some of the difficulties of preparing it.

Prof. Remington said that from the results reported the method of purifying by freezing appeared to have been successful.

Mr. J. W. England read a paper on the *ownership of the prescription*.

Dr. Lowe referred to instances in which unpleasant consequences and results entirely different from those expected had occurred, and the physician had stated that the prescription was improperly compounded, when examination showed that it was properly prepared. He declined always to compound a prescription unless he could retain the original.

Mr. Boring said that if a person asked for the prescription it was best to give it, for the more you objected the more valuable would it be considered, and to refuse was generally to lose a customer. Prof. Maisch stated that in most countries of Europe it was the custom sanctioned by law that the prescription must be returned with the medicine if this had been paid for. Prof. Remington said he thought the doctor did not own the prescription, since he had been paid for it; the apothecary did not, as he had not paid anything for it at all, and that the patient had paid for it and it was his; but that by courtesy of the owner the apothecary is the trusted custodian of the prescription, and the less that the question of ownership is discussed the better for the apothecary. Dr. Kaye stated that in his opinion pharmacy was the handmaid of the physician and that the prescription was only an order on a pharmacist to prepare for some one a certain remedy as the doctor might direct, and that order should only be yielded up by his direction.

Prof. Maisch said that it was strange that a subject, which had so long been in contention in this country, should never have been regulated by legal enactment, or tested by direct action in court. Dr. Weidemann said his practice was to give the original prescription if it was insisted on. The Secretary stated that the late Hon. Wm. A. Porter said it was the duty of the apothecary to hold it, it was his only security in case trouble should arise in relation to the compounding of it.

Mr. McIntyre stated that Prof. Maisch, years ago, said that physicians far more frequently gave verbal than written orders for the renewal of prescriptions; that when a physician ordered in writing, that a prescription should not be repeated, he would not repeat it, but if it was printed on the blank that the prescription should not be repeated he paid no attention to the notice, in case the patient applying for the renewal, stated that it had been ordered by the physician verbally.

Mr. Moerk read a paper supplementary to the one read at the November meeting, on the effects of *mercurous salts upon the detection of silver* with the customary tests.

Dr. Archibald exhibited a new *suppository mould*, so arranged that beautiful suppositories can be readily prepared by compression, the manipulation of the apparatus not requiring any skill.

A query was propounded whether *Carron oil* should be prepared by means of Linseed or Cotton-seed oil; several replied immediately that Linseed oil gave the better results.

Questions relating to the composition of *Whitworth's liniment*, also called *Red Bottle*, and to *Aristol*, were referred, the former to Mr. McIntyre, and the latter to Mr. Beringer.

In answer to a question, what was meant in a prescription calling for *Bimuriate of Quinine*, reply was made that probably bimuriate of quinine and urea was the salt intended.

Mr. Webb said he had been greatly interested in the meeting, which was more than ordinarily instructive, and felt glad to see so many more present.

On motion adjourned.

T. S. WIEGAND,
Registrar.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

An Illustrated Encyclopædic Medical Dictionary, being a dictionary of the technical terms used by writers on medicine, and the collateral sciences in the Latin, English, French and German languages. By Frank P. Foster, M.D., editor of the New York Medical Journal, with the collaboration of Wm. C. Ayres, M.D., Edward B. Bronson, M.D., Chas. Stedman Bull, M.D., Henry C. Coe, M.D., Andrew F. Currier, M.D., Alex. Duane, M.D., Simon H. Gage, M.D., Henry J. Garrigues, M.D., Chas. B. Kelsey, M.D., Russell H. Nevins, M.D., Burt G. Wilder, M.D. Vol. II, New York: D. Appleton & Co. 1890. 4to., pp. 753 to 1534.

This stately quarto volume of about 800 pages, printed in double column, commences with the word *cacothanasia*, and closes with *fasay*, thus embracing about three letters of the alphabet. While the encyclopædic character of the work may, to some extent, be assumed from the fact mentioned, it is only on

careful examination of the contents that the immense amount of labor bestowed upon the collection, and the critical sifting of facts can be appreciated. In the first place it must be stated that the work is not limited to the four languages mentioned upon the title page, but the Italian and Spanish synonyms are generally given. The etymological derivations from the Greek or other languages are indicated, and the vernacular names of plants, drugs and medicines have been arranged in their alphabetical order. The cross references are so numerous and appear to have been so systematically carried out that it will be practically impossible to turn to the dictionary without finding the information sought for, either directly under the heading consulted, or by reference to some other heading. The scope is indicated by the statement that not only the terms used in medicine are to be considered, but also those of the collateral sciences, and this object is quite liberally interpreted. Thus, for instance, in the case of the generic name of a medicinal plant the derivation of the word is given, a brief explanation of the botanical characteristics or relations of the genus, the synonyms in the different languages, and then, in alphabetical order, the names of the different species employed medicinally in different parts of the world with notes of their habitat, and properties, and of the drugs and pharmacopœial preparations, in case the drug is, or was formerly recognized by the Pharmacopœias. Since the synonyms, botanical and pharmaceutical, are also fully considered, it is evident that the information given under one title is quite comprehensive. Referring to a case in point, we turn to the word china (cinchona) where we find the Pharmacopœial and commercial names of the different varieties of cinchona bark, now or formerly in use on the continent of Europe; the German names of the cinchona trees, the medicinal preparations of the bark used in Europe, the different varieties of china root (smilax), etc., the whole occupying six columns. Information of a similar character, but necessarily more extensive, is met with under the title of cinchona which fills eleven columns. Medicinal chemicals, their derivatives and allied compounds, zoölogical and mineralogical terms, and, as a matter of course, the technical terms of medicine and surgery receive analogous treatment.

It will be seen from the foregoing that the work before us is, indeed, encyclopædic in character, and from careful examination of the contents, we find the information correct and reliable. One curious typographical error, which occurs on page 968, has escaped the scrutiny of the proof-reader; one of the German synonyms for chimaphila is rendered "hornhaut" instead of "harnkraut." The former is the German for cornea, and is correctly given in the latter place. A number of illustrations have been added, and serve to render descriptions, etc., clearer. Owing to the necessarily reduced size, the figures of a few plants are less satisfactory in this respect. The clearness of the types and the entire typographical arrangement are very inviting; they are in keeping with the amount and quality of the labor expended upon the work by the editor and his co-laborers.

A Standard Dictionary of the English Language. New York: Funk & Wagnalls, publishers.

We have received advance sheets of this work, which will soon be published, forming a quarto volume of over 2,100 pages. When complete, it is stated that

it will contain about 50,000 vocabulary words more than in other dictionaries, and that no new word is admitted until it has been passed upon by well-known philologists. But aside from this feature there are several others which are of especial usefulness. In indicating the pronunciation, use is made of what is known as the scientific alphabet of the American Philological Association, and in the case of disputed pronunciation, those preferred by other authorities are likewise given. The definitions are arranged in such a manner that the most important one, now in use, is placed first and is followed by others, including obsolescent and obsolete ones. When such definitions are followed by quotations, the author is not merely quoted, but also the book and page are given. The addition of synonyms and antonyms will doubtless prove of good service. In fact, the plan appears to have been well conceived and matured for a work aiming high, and for which, in the various departments, the services of contributors of established reputation have been secured. The list price of the dictionary when issued will be $10, but a discount will be allowed to advance subscribers.

Year-Book of Pharmacy, comprising abstracts of papers relating to pharmacy, materia medica and chemistry, contributed to British and foreign journals from July 1, 1889, to June 30, 1890, with the transactions of the British Pharmaceutical Conference at the twenty-seventh annual meeting, held at Leeds, September, 1890. London : J. & A. Churchill, 1890. 8vo. Pp. 551.

Proceedings of the American Pharmaceutical Association at the thirty-eighth annual meeting held at Old Point Comfort, Va., September, 1890. Also the constitution, by-laws and roll of members. Philadelphia: Published by the American Pharmaceutical Association. 8vo. Pp. xxiv and 840.

Reports of the meetings of the two associations were published in our October number of last year. The meetings were held during the two first weeks of September, and the annual publications are now ready, that of the British Conference having been issued during the first half of January, while that of the American Association will be distributed February 3. Aside from the minutes and the papers read, most of which have been republished, either entire or in abstract, in various pharmaceutical journals, the abstracts of papers relating to pharmacy and allied sciences, called by the one publication the "The Year-Book of Pharmacy," and by the other the "Report on the Progress of Pharmacy," are prominent features of both volumes, and for reference to the pharmaceutical literature of the past year will retain their value permanently. The British volume is accompanied by a portrait group, produced by the Meisenbach process, of the officers of the Conference in 1889, and is adapted as a frontispiece to the volume for that year. The American volume contains as frontispiece the portrait of Professor Painter, who died a year ago, while President of the Association.

Report of the Proceedings to the Illinois Pharmaceutical Association at its tenth annual meeting, held at Quincy, August 13, 14 and 15, 1889, and at its eleventh annual meeting, held at Kankakee, August 12, 13 and 14, 1890. 8vo. Pp. 251.

Brief reports of the proceedings at the two meetings were published in the October numbers of our two preceding volumes.

OBITUARY.

Henry Bowman Brady died at Bournemouth, England, January 10, in the fifty-sixth year of his age. He was the son of Henry Brady, surgeon, of Gateshead-upon-Tyne, was educated at schools of the Society of Friends, became an apprentice in pharmacy in 1850 at Leeds, and in 1855 started in business for himself in Newcastle-on-Tyne, laying the foundation for the firm of Brady & Martin, from which he retired in 1876. Mr. Brady was, for many years, a member of the Council and of the Board of Examiners of the Pharmaceutical Society of Great Britain, and was one of the founders and original members of the British Pharmaceutical Conference, holding the office of Treasurer from 1864 to 1870, and of President in 1872 and 1873. Prominent among his contributions to pharmaceutical literature are the papers on microscopical research in pharmacy, and on the micro-chemical examination of extract of flesh, which he and the late Henry Deane presented to the Conference during the years 1864, '65 and '66. His chief scientific work was a report on Foramiferæ forming Part XXII of the zoölogical reports on the scientific results of the voyage of H. M. S. Challenger which was officially indicated in 1884 as being "the largest section which has been published up to the present time." During his travels in various countries of the different continents, Mr. Brady visited North America several times, and in 1871 was present at the meeting of the American Pharmaceutical Association at St. Louis, then presenting from his friend, the late Daniel Hanbury, a very interesting historical paper "on the exports of Virginia, A.D. 1610." The deceased was honored by receiving from the University of Aberdeen the degree of LL.D. in 1888, and by being placed upon the roll of honorary members by many scientific societies, among them by the American Pharmaceutical Association and by the Philadelphia College of Pharmacy.

Notice of the decease of the following graduates of the Philadelphia College of Pharmacy has been received:

Ella Amerman, class 1888, died January 11, in Philadelphia, where she had been under medical treatment for several months. She was born at Danville, Pa., November 27, 1860. After graduation she opened a pharmacy in Scranton, and was quite successful in business until compelled to relinquish it in the fall of last year, owing to her impaired health.

William G. Baker, class 1842, died at Lancaster, Pa., December 28 last. He learned the business in Philadelphia, and for the last 45 years was engaged in the drug business in Lancaster.

Samuel Levin Dilks, class 1868, died January 15, of Bright's disease. He had been in business for several years at Sixth and Pine Streets, in Philadelphia.

J. Estell Evans died at Bridgeton, N. J., January 4, aged 51 years. For a number of years he was in the employ of Wm. R. Warner & Co.

Anthony J. Olmstead, class 1835, died in Morristown, N. J., January 30, 1888. After graduation he carried on a wholesale business in drugs and dyestuffs, from which he retired in 1856, devoting the remainder of his life to agriculture, horticulture and to natural history.

THE AMERICAN
JOURNAL OF PHARMACY.

MARCH, 1891.

ON THE ASSAY OF OPIUM.

By Wm. T. Hankey.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 84.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 17.

It was observed when making comparative assays of powdered opium by the U. S. P. and Squibb's processes, that the latter always yielded higher results to the extent of ½ to 2½ per cent. This difference appeared to be in greater part due to the presence of calcium meconate, which was precipitated in the latter process along with the morphine. It has been suggested by Charles M. Stillwell[1] in 1886 to dissolve the morphine obtained by the Squibb process by treatment with hot absolute alcohol, weigh the insoluble residue and deduct it from the total in order to arrive at a true result. This method was tried in a number of instances, but was found to require a considerable amount of time as well as absolute alcohol.

At the suggestion of Prof. Trimble, I divided a sample of morphine obtained by the Squibb process into two equal portions. One portion was ignited to constant weight and the ash estimated. The other portion was washed with hot absolute alcohol, the insoluble residue ignited and the ash found to weigh the same as that obtained from the first portion, showing that the absolute alcohol extracted nothing that would yield any ash on ignition: this was verified by igniting a portion of the morphine recovered from the absolute alcohol.

Another sample of morphine was taken which had been obtained from powdered opium, assaying 15·75 per cent. by the Squibb pro-

[1] *American Chemical Journal*, vol. 8, p. 295.

cess and 14·40 per cent. by the U. S. P. process. The entire amount of morphine obtained by the Squibb process was divided as before, into two equal portions. One portion was ignited and the ash found to weigh ·010 gm., which would be ·020 gm. for the entire quantity. The other portion was washed with hot absolute alcohol and the insoluble portion dried to constant weight in air-bath at 80° C., when it weighed ·046 gm., which would be ·092 gm. for the entire quantity. Assuming that the insoluble portion was meconate of calcium $Ca(C_7H_2O_7).H_2O$ (Mol. wt. 255), its ash, after ignition, would be calcium oxide CaO (Mol. wt. 56). Since 100 parts of calcium meconate represent 21·96 parts of calcium oxide, it is only necessary to multiply the amount of calcium oxide found by 4·55 to get the amount of meconate.

In the above instance, ·092 gm. of calcium meconate was found by treating the morphine with hot absolute alcohol; and 0·20 gm. of calcium oxide was found by igniting a part of the same morphine ·020 × 4·55 = ·091. Deducting ·092 and ·091 gm. from 15·75, the per cent. of morphine found we obtain, respectively, 14·83 and 14·84 per cent., figures which are sufficiently close to be entirely satisfactory.

Several different samples of powdered opium were obtained and assays made of each by the U. S. P. and the Squibb processes. The morphine obtained by the latter process being subsequently submitted to the treatment as described above with the following results:

No.	Per Cent. of Morphine by Squibb Process.	Ash of Morphine obtained by Squibb Process, consisting of CaO.	$CaC_7H_2O_7.H_2O$ Calculated from Weight of Ash, Squibb Process.	$CaC_7H_2O_7.H_2O$ Found by Treatment with Hot Absolute Alcohol, Squibb Process.	Per Cent. of Pure Morphine by Squibb Process, after Deducting $CaC_7H_2O_7.H_2O$.	Per Cent of Morphine by U. S. P. Process.
I	14·70	·024 Gm.	·109 Gm.	·110 Gm.	13·60	13·40
II	12·05	·013 "	·059 "	·059 "	11·46	11·30
III	13·62	·014 "	·064 "	·063 "	12·98	12·50
IV	14·90	·037 "	·170 "	·170 "	13·20	12·84
V	15·75	·020 "	·091 "	·092 "	14·84	14·40
VI	16·35	·049 "	·223 "	—	14·12	14·02

The morphine obtained from the different samples by the U. S. P. process was found to yield only a trace of ash on ignition.

It will be noticed that after deducting the meconate of calcium the Squibb process still shows a larger yield of morphine than the U. S. P. process indicates.

In conclusion it may be stated that it has been deemed preferable by many to use the Squibb process with the modification as suggested by Stillwell instead of the U. S. P. process, as it does not require as much time to carry out, and it gives a larger yield of morphine.

I would suggest that the morphine obtained in opium assays by Squibb's process, instead of being treated with hot absolute alcohol, as suggested by Stillwell, be ignited at a high temperature, care being taken to apply sufficient heat to convert the calcium meconate into calcium oxide, the ash weighed as calcium oxide and the amount of calcium meconate estimated by multiplying the weight of the ash by 4·55. The weight of the meconate of calcium is then to be deducted from the weight of the impure morphine leaving the true amount of pure morphine.

Dr. Squibb has suggested that the morphine by his process be purified by solution in calcium hydrate solution. This, however, is not so convenient or accurate as the purification by absolute alcohol and, as I have determined by experiment, not to be compared with the method above given.

BIMURIATE OF QUININE.

By George M. Beringer, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 17.

A query submitted at the last Pharmaceutical meeting asked for information regarding the composition and manufacture of this salt. Attention has recently been directed by a manufacturer of pharmaceutical preparations in Philadelphia to the advantages possessed by the hydrochloric acid salts of quinine over those of sulphuric acid. Increased solubility, larger percentage of alkaloid and better assimilation of a hydrochloric acid salt being the advantages claimed, and this it is supposed has suggested the query.

Beurmann and Villejean in L'Union Pharmaceutique, for August, 1890, call attention to the value of bichlorhydrate of quinine for subcutaneous injection. They state "that bichlorhydrate is the most soluble salt of quinine; it is as rich in alkaloid as the

monochlorhydrate; its solution in distilled water may be preserved without change; it can be employed without any preliminary precautions, and is sufficiently concentrated to permit the injection of 50 to 75 cgm. of active salt. There is accordingly no need of multiplying the injections, which, however, do not produce anything more than a slight pain, and do not give rise to any accidents, either local or general." A number of prominent physicians connected with the Paris hospitals are cited as attesting to the results obtained.

The solution recommended for use is: Bichlorhydrate of quinine, 5 gm.; distilled water q. s. to make 10 cc. (Druggist's Bulletin, September, 1890, page 320.)

A sample of that supplied in this city was examined by the writer. It was in the form of an amorphous powder, strongly acid to moistened test paper, and readily soluble in less than two parts of water at the temperature of the atmosphere. One gramme heated on the water-bath for 2 hours lost but ·002 gm. and after 4 hours but ·004 gm. One gramme, on being treated with acidulated silver nitrate solution, yielded ·690 gm. silver chloride corresponding to 17·55 per cent. hydrochloric acid. Precipitated with soda, and the precipitate collected and washed with distilled water saturated with freshly precipitated quinine, it yielded 81·3 per cent. of alkaloid.

A prominent manufacturer of quinine salts was interviewed on this subject, and kindly offered to make an examination of the product. He subsequently wrote me as follows: "The sample of bimuriate of quinine contains:

	Per Cent.
Quinine,	81·0
Hydrochloric acid,	17·5
Water,	1·5
	100·0

Heated on the water-bath for 2 hours it lost only 0·2 per cent. of hydrochloric acid, showing it to be a stronger combination than the books indicate. It is very soluble in cold water. We have made some which contains 18·3 per cent. of hydrochloric acid, or very nearly the theoretical quantity."

The term normal quinine hydrochloride has been applied to this product by several writers in contradistinction to the so-called basic

hydrochloride, the hydrochlorate of quinine of the pharmacopœia. In the writer's opinion, the proper title for the latter should be quinine hydrochloride, and for the acid salt quinine bihydrochloride.

A. Clermont (Year Book of Pharmacy, 1888–84) states *normal hydrochloride of quinine* $C_{20}H_{24}N_2O_2,2HCl$ is readily obtained in solution, either by mixing equivalent solutions of normal quinine sulphate and barium chloride, or by adding an equivalent of hydrochloric acid to a solution of basic quinine hydrochloride. The solution obtained by either process when evaporated to dryness below 100° C. yields the normal salt.

In my opinion the following is the best method of preparing this salt :

Quinine, precipitated, washed and dried at a temperature not exceeding 50° to 52° C. (120°–125° F.), ...	37·8 gm.
Hydrochloric acid, sp. gr. 1·16, ...	22·82 gm.
Water, ...	60 cc.

Mix the acid and water, add the quinine, filter if necessary, and carefully evaporate to dryness.

Schorlemmer (Chemistry of Carbon Compounds, page 478) states *normal quinine hydrochloride* does not crystallize well, and is decomposed by water into the basic salt and free acid. By adding platinic chloride to its solution the double salt $C_{20}H_{24}N_2O_2(HCl)_2 + Pt_2Cl_4 + H_2O$ is obtained, as a pale yellow precipitate, which on standing changes into orange-red crystals.

ON TINCTURE OF NUX VOMICA.

By Alfred B. Taylor.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 17.

It has been suggested that Tincture of Nux Vomica should be made by dissolving the solid extract in alcohol. Would such a change in the Pharmacopœia be desirable?

An affirmative answer to this query would at first sight appear to be the proper one, and it might be thought to be an improvement on the present official process. Since the Pharmacopœia directs that the tincture shall contain two grains of dry extract in each 100 grains of tincture, and the extract can be readily obtained, much time and trouble would be saved by the change.

The tendency of modern pharmacy is towards greater accuracy

and precision, and all processes having these objects in view deserve favorable consideration.

The Pharmacopœia of 1880 has been severely criticised for giving directions that the tincture should contain 2 per cent. of dry extract, and it has been argued that this provision was given as a test, and that any tincture which contained 2 per cent. of dry extract of Nux Vomica was official without regard to its containing any of the proper alkaloids; and on the other hand, it was not official if it did not contain 2 per cent. of extractive matter, regardless of its alkaloidal strength.

The virtues of this tincture depend perhaps entirely upon the amount of alkaloids contained therein, without any reference whatever to the amount of extractive matter; and since the Pharmacopœia has said nothing about these alkaloids, it has not set up any standard by which this preparation is to be judged.

The Pharmacopœia of 1870 directed the tincture to be made by percolation, and of the strength of 8 troy ounces to two pints, leaving it entirely to the skill and judgment of the pharmacist as to whether his drug was exhausted or not. In the Pharmacopœia of 1880, in order to more fully insure the exhaustion of the drug, the direction was given that each 100 parts of the tincture, when prepared according to the formula, should contain 2 parts of dry extract; this direction was given not as a standard nor as a test of the strength of the tincture, but simply as a guide to the pharmacist, to show whether his drug had been properly exhausted. It took for granted that he would use a good quality of Nux Vomica, such an article as would be recognized by the Pharmacopœia; and if he did so, and carefully followed the directions, he would get a good preparation. This was a step in the right direction, but it did not go far enough. The methods of assaying Nux Vomica were not as well known in 1880 as they are at present, and it is probable that in the next Pharmacopœia an assayed or standardized preparation of Nux Vomica will be introduced.

If a weaker menstruum than that which is official should be used, the amount of extractive matter would be larger, and consequently it would contain a smaller percentage of alkaloids, even supposing that the whole of the alkaloids were extracted, which is not probable. Hence the guide that the tincture should contain two per cent. of dry extract is not applicable to any extract not prepared strictly according to the Pharmacopœia.

As appears from recent investigations upon this subject, the various extracts of Nux Vomica found in the market differ very greatly in quality, some containing the proper amount of alkaloids, while others, and these the great majority, contain considerably less, and some not any.

From these considerations it is clearly evident that no extract which is not prepared according to the U. S. Pharmacopœia should be used for making the tincture, and no pharmacist is justified in using for this purpose, an extract of the preparation of which he is ignorant, unless he assays it and finds it to contain the proper amount of alkaloids.

I therefore have no hesitation in saying that the proposed change is not desirable.

NOTES ON PRACTICAL PHARMACY.

By Joseph W. England, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 17.

The following notes on practical pharmacy have been the result of the writer's experience, mainly in the direction of preparation of the officinal galenicals. The question as to how far a pharmacist is justified in going in an alteration or modification of an officinal formula, is, I think, best answered in this way: To the extent in which there is no alteration of therapeutical action, diminution in strength, nor decided change in obvious physical properties. It goes without saying that the therapeutical activity of the drug should remain unchanged or else the preparation will not represent the drug from which it is made, and that the strength should be maintained or else unreliability will result. Just to what extent the physical character of a preparation may be modified is dependent upon the circumstances of each special case; as to whether the pharmacopœial process is particularly faulty, or whether it will not yield the results claimed for it, or whether it can be improved without cost to its therapeutical value and strength of drug.

Compound Chalk Powder.—This new officinal powder, for the extemporaneous preparation of chalk mixture, can be improved in its making by adding oil of cinnamon directly to the powder, and making the mixture up with water, as needed. To each troy ounce add 4 minims of the oil of cinnamon. Criticism has been made upon the large amount of sugar in this powder—one

half. As the mixture is most largely used for diarrhœa or intestinal relaxation, accompanied with acidity, often the result of food fermentation, the use of any sugar would seem to be therapeutically objectionable, as it merely increases the fermentation. A much better plan would be to replace all the sugar with powdered acacia. Further, in view of the mild astringent influence of cinnamon water, it is better to make the mixture up with all cinnamon water instead of equal parts of it and water, as directed by the U. S. P., '90. Save the use of a small quantity of syrup ($\frac{1}{16}$), the British Ph. recommends the former.

The officinal mixture contains 100 grains of powder to the fluid ounce. It is too weak and should be, at least, 2 drachms to the fluid ounce.

Some physicians use chalk, powdered cinnamon, acacia and water. This does not make as elegant a preparation as the officinal, but the tannic acid in the powdered cinnamon adds greatly to its therapeutical value.

Weighing Iodine.—It is, of course, inadmissible to weigh iodine directly upon metallic pans, and paper decomposes so quickly on contact with it, that the pans underneath are also attacked. In the absence of glass or horn pans, the best substitute is paraffin paper.

Sodium Bromide.—Through a prominent firm of manufacturing chemists, I have learned of an apparent inconsistency in the percentage of sodium chloride permitted by the present Pharmacopœia in this compound. Under bromine the officinal maximal limit of free chlorine is 3 per cent., while under sodium bromide the maximal limit of sodium chloride is also 3 per cent., which, of course, is inconsistent. The error probably arose in following too closely the German Pharmacopœia, which makes the maximal limit of chloride in NaBr 3 per cent. But no notice was taken of the fact that American bromine always contains more free chlorine than German bromine, and, since the manufacturers have no practicable method of separating the chlorine in its entirety, the maximal limit of chloride in sodium bromide should be made not less than 5 per cent.

Wine of Antimony.—Physicians complain that the officinal wine of antimony is entirely too weak in tartar emetic. The first editions of the Pharmacopœia made it 4 grains to the fluidounce. The

present edition makes it 1·8 grs.; a reduction of 55 per cent. The writer has furnished a satisfactory preparation by averaging the two extremes and making it 3 grains to the fluidounce.

Ammonia Water Containers.—The best method for preservation of ammonia water in containers that the writer has found is a common cork, covered with a piece of cheese cloth, and this covered with a piece of paraffin paper. An ordinary glass stopper is totally insufficient to prevent some of the vapor from escaping, while the dark coloration, produced by contact of the ammonia with cork tissue alone renders the use of corks objectionable.

Spirit of Camphor.—The officinal dilution in alcoholic strength of 20 per cent., with water, is inadmissible for the reason that when it is prescribed with volatile oils, turpentine, soap liniment, etc., as is often done in making stimulating liniments, there is precipitation of camphor, or rather, a deficiency in the amount dissolved that would have remained in solution had the spirits of camphor been made with strong alcohol, as in the U. S. P. '70 formula.

Spirits of Peppermint and Spearmint.—The officinal formulæ of these two preparations can be improved by macerating the herbs with alcohol, filtering and dissolving the oils in the filtrate. It is needless to say that filtration without the presence of dissolved oils is much more rapid than with their presence. Turbidity in these spirits, arising from undissolved oils or more probably from traces of resinified oil, can be removed by agitating the liquid with long narrow strips of a sheet of filtering paper and filtering. Sometimes the addition of a small quantity of precipitated phosphate of calcium is also necessary.

Compound Tincture of Lavender.—This preparation which has been very largely replaced by the increasing popularity of compound tincture of cardamom, can have its officinal formula improved by exhausting the drugs with the menstruum first, and then dissolving the volatile oils in the percolate. By this means the drugs are more readily exhausted and the preparation more quickly made.

Solution of Magnesium Citrate.—For causing effervescence, a very elegant substitute for the acrid potassium bicarbonate is Merck's sodium bicarbonate "in crusts." It gives a pleasant saline taste to the preparation, instead of the usual bitter, acrid one.

Compound Syrup of Hypophosphites.—Glycerin in the proportion

of two fluidounces to the pint greatly increases the therapeutical value of this preparation.

Ammonium Carbonate.—Therapeutists agree that the diffusible stimulant action of ammonium carbonate is best represented in the hard clearly-crystalline variety, and that the effloresced product is for practical purposes therapeutically valueless by comparison.

This is why many physicians in their prescriptions specify the "clear" or "crystalline" variety. They have found the effloresced powder valueless.

Why ammonium carbonate effloresces on exposure to air is easy of explanation when we remember its chemical composition of acid carbonate and carbamate—a dehydrated normal carbonate—and that the latter readily absorbs water and carbonic acid gas (from the air) to become an acid carbonate.

How best to prevent this change has always been a most difficult question. For this purpose I have been using for the last five or six months an expedient which has answered admirably. It consists simply in placing medium-sized lumps of the salt in a museum or fruit jar (glass top), preferably upon a porcelain or glass support, to keep them from touching the bottom of the container, and then adding a small quantity of stronger ammonia water and closing. The ammonia gas neutralizes the carbonic acid gas in the air of the container, and the salt remains hard and densely crystalline. I here present for inspection some ammonium carbonate over four months old preserved by this method.

A CARBOY ROCKER.

By J. F. Stevenson.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 17.

Having for many years felt the necessity for a better means of supporting a carboy while pouring a liquid from it, it occurred to the writer to adopt a method or principle which had not previously been used. The methods usually employed depend upon the suspension of the carboy, upon opposite sides, at a point slightly above the centre of gravity and carboy cradles, trunnions, and other means have been used for the purpose of carrying out this principle.

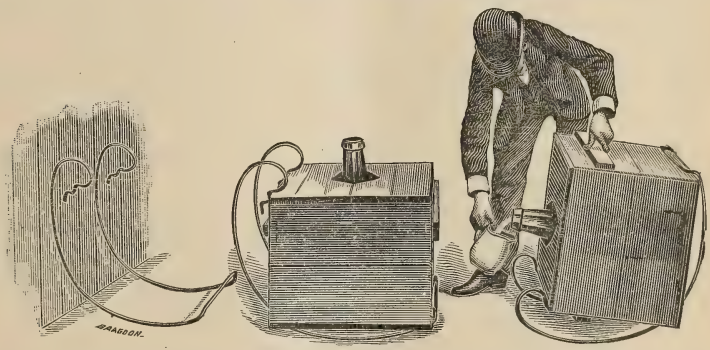
These methods have not produced results which are thoroughly

satisfactory; the cradles being cumbersome and requiring two persons to lift the carboy into the cradle.

The use of trunnions is objectionable, because it necessitates the defacing and weakening of the sides of the carboy.

It occurred to the writer to take a steel rod about fifteen feet long and to bend it into the shape of a pair of parallel bows joined at one end; after carefully tempering the steel so as to secure the maximum of rigidity, toughness and elasticity, the carboy rocker, as it is now termed, was ready for trial.

In order to put the Carboy Rocker into actual use, say for drawing oil of vitriol from a loaded carboy, the carboy is tilted first on its bottom edge, and then raised along this edge, until it rests on the bottom corner (a carboy is easily held in this position by one person), one of the arms of the rocker is now grasped, and the con-



necting brace of the rocker inserted under the elevated bottom edge, the carboy is then carefully lowered into its original position, when the angles of the front part of the bows will usually slip into their places on the top of the carboy, through the elasticity of the steel springs, without further adjustment.

The advantages shown that this apparatus possesses, is simplicity of construction, durability (as it is practically indestructible) and cheapness; the curves are so adjusted as to cause the carboy, when not in use, to assume a safe, upright position, and at the same time the upper portion is curved so as to project above the top of the carboy sufficiently, so as to permit the draining of the last drop from the carboy when it is inverted.

Collodion of Salol, useful in acute rheumatism, is obtained by dissolving salol 4, in ether 4, and adding to collodion 30 parts.—*Rép. de Phar.*

PREPARATION OF UNGUENTUM HYDRARGYRI.

Editor AMERICAN JOURNAL OF PHARMACY:

In my examinations of the various works on pharmacy published, I have failed to discover a formula like that by which I have prepared mercurial ointment for the last five years. In view of the great saving of time, it may be of general interest to the profession. By this formula the mercury can be extinguished *inside of fifteen minutes*. It is as follows:

Mercury, 8 parts.
Mercurial ointment, 1 part.
Petrolatum, 1 part.
Lard, 6 parts.

The formula will work better with all petrolatum instead of lard, and so prepared, the mercury will be incorporated more quickly, and the ointment never turn rancid.

Please state in your valuable journal if there is any objection to its use. Yours, etc.,

CHARLES E. KING.

CINCINNATI, February 9, 1891.

[NOTE.—The editor can see no objection in substituting petrolatum for a portion of lard, as recommended in the formula given above. The Pharmacopœia directs equal weight of lard and suet; and a firmer consistence would result if in the above formula a similar course was followed.]

Carpaine is the name of a new alkaloid, discovered by Dr. M. Greshoff, in the leaves of Carica Papaya. The fruit and the milky juice of the Papaya plant contain only traces of it; the leaves 0·25 per cent. (calculated on the dry substance). It is very bitter; limit of detecting this taste, 1 : 100,000. It responds to all the alkaloidal group reactions; yields Prussian blue by Lassaigne's N test; is alkaline to red litmus; has no color reactions of its own, with Fröhde's reagent; melting point, 115° C.; crystallizes in "needles." Physiological experiments with it are very desirable. (Mededeelingen uit 's lands plantentuin, Batavia, 1890).

Dr. Greshoff is director of a newly erected laboratory for chemico-pharmaceutical investigations into the value of plants growing in Dutch East India. The laboratory is situated in the beautiful botanical garden at Buitenzorg, Java. J. B. N.

PHARMACEUTICAL NOTES.

ABSTRACTS FROM THESES.

Collodium stypticum.—Noticing that the pharmacopœial preparation deposits a sediment containing tannin, John S. Mack, Ph.G., suggests the following formula, which will yield an efficient and clear preparation. For preparing one fluidounce dissolve 65 grains of tannin in a vial containing a mixture of 91 minims of alcohol and 306 minims of stronger ether, pass through a small filter contained in a well-covered funnel, wash the filter with a little of the same menstruum, dissolve in the filtrate 8½ grains of guncotton, set aside for a few days, and decant from any undissolved particles.

Syrup of Eriodictyon, if prepared according to the "National Formulary," causes in quinine mixtures precipitation instead of keeping the quinine in suspension. This is obviated by dispensing with the solution of potassa, and manipulating as follows, as suggested by Edward P. Sheafer, Ph.G.: Prepare from ½ ounce of yerba santa, by maceration with cold water, 6 fluidounces of infusion; add to this a solution of 4 drops each of the volatile oils of lemon, cloves and sassafras in ½ fluidounce of alcohol; filter through purified talcum; add to the filtrate 13 troy ounces of sugar; dissolve without heat, and add through the filter previously used enough water to make the product measure 16 fluidounces.

Tinctura Vanillæ is obtained of a beautiful deep brown color and representing the aromatic properties of the drug in a very satisfactory degree, by modifying the menstruum and manipulation directed by the Pharmacopœia, Chas. P. Hendrickson, Ph.G., suggesting the following: Reduce to a uniform powder 10 parts of vanilla, cut into small pieces, by beating it in a mortar, in small portions, with 10 parts of rock candy; mix this uniformly with 75 parts of sand, previously washed and dried; pack the mixture firmly in a cylindrical glass percolator, and then obtain in the usual manner by maceration and displacement, 100 parts of tincture, using a menstruum composed of 50 parts alcohol, 15 of glycerin, and 35 of water.

Tinctura Gentianæ composita, it is suggested by Francis W. Cook, Ph.G., should be prepared with a stronger alcoholic menstruum, to avoid the deposition of an unsightly precipitate, which takes place in the pharmacopœial tincture. The materials sug-

gested are: Gentian, 8 parts; bitter orange peel, 4 parts; cardamom, 2 parts; water, 21, and alcohol 65 parts.

Glycerin, of which eight different samples were examined by Edwin A. Prior, was found to be practically pure. A sample of so-called *mineral glycerin* was found to have a density of 0·866, and judging from its behavior with alkalies, alcohol, ether, chloroform, benzin and benzol, was simply a handsome paraffin oil.

A PROXIMATE ANALYSIS OF THE BERRIES OF HORSE NETTLE.

(*Solanum carolinense* L., order *Solanaceæ*.)

By Harry Kahn.

Growing in sandy places, in pastures and sometimes in cultivated grounds in Virginia, the Carolinas, as far north as Pennsylvania and west as far as Iowa, horse nettle may be found. The root is perennial, while the hollow, erect, armed stem is annual, growing to a height of from one to two feet. Its leaves are from four to six inches long, ovate oblong, acute, sinuated-toothed or angled, have a roughish white stellate pubescence, and are prickly along the midrib (Gray, *Manual of Botany*, *339*). Petioles from ½ to 1½ inches long. Racemes lateral, opposite and often larger than the leaves. The flowers which appear in June, July and August have a pale blue or white corolla and a five-parted aculeate calyx.

The berries ripen in October; are two-celled; from ¼ to ⅓ inch in diameter; of a lemon yellow or greenish yellow color (Darlington, *American Weeds and Useful Plants*, 1859, 254). When fresh they have a rank wild odor, but when dried this is changed to a pleasant aromatic; they have a slightly bitter taste, with a tingling aftertaste.

According to Porcher (quoted by Maisch in American Journal of Pharmacy, **61**, 552), these berries have some reputation among the negroes of South Carolina as an aphrodisiac. Valentine obtained good results from the juice in tetanus. A tincture of the same has recently been used with much success by J. L. Napier (*Virginia Medical Monthly*, Sept., 1889. Smead: *Notes on New Remedies*, *351*), as a remedy for epilepsy. Hare in his "*Epilepsy: its pathology and treatment*," also recommends the use of horse nettle berries.

The analysis of the drug is not as complete as might be wished,

it having been impossible to carry out a very extended investigation on account of the limited amount of material at hand. The well-known scheme suggested by Parsons (Prescott's *Organic Analysis*, 1887, *408;* AMER. JOURNAL OF PHARMACY, 1880, p. 210; *Pharmaceutical Journal and Transactions* (3) 10, *793*) was in the main followed, but the details were modified.

(1) A volatile oil, (2) a fixed oil, (3) an acid resin, and (4) from a "Prollius liquid" extract evidence of an alkaloid were obtained. The latter being present in such a small quantity its isolation was not attempted.

(1) The volatile oil has a very characteristic odor and a specific gravity less than 1·000. (2) The fixed oil was separated from the chloroform extractive by treating the extractive with a small quantity of petroleum spirit, filtering and evaporating off the spirit. This oil is of a green color, has a bland taste, and is easily saponified by alkalies, forming a light green soap, which is readily soluble in water. When eight drops of the oil were placed in a watch glass over white paper, and two drops of sulphuric acid added, at first a brown color was observed, afterwards strings of black beginning to appear. On stirring, the whole turned black except the edge, which was seal brown. Nitric acid in the cold has no effect, but if three drops of the oil and two of the acid be placed in a small test-tube and heated to boiling a brown color will be observed. With an aqueous solution of silver nitrate a white precipitate was obtained. (3) The resin was extracted from the drug in part by the chloroform and in part by the 80 per cent. alcohol. It is of a light yellow color, and is soluble in the alkali hydroxides.

Nitrogen corresponding to 14·45 per cent. of albumen was found, of which some was soluble in water, but the greater part was dissolved by sodium hydroxide.

The percentages of the above-mentioned constituents together with those of the substances common to all plants will be found in the following summary:

	Per Cent.
Ash,	6·68
Volatile oil,	3·22
Fixed oil,	9·75
Resin,	2·81
Waxy matter,	1·85
Organic acids and allies,	4·18

	Per Cent.
Glucose,	1·30
Extractive (containing alkaloidal matter),	18·36
Gum,	3·02
Colored extractive and albuminoids,	9·57
Inert coloring matter,	1·73
Starch and allied substances,	6·69
Sodium hydroxide extractive,	12·30
Cellulose,	15·85
Loss,	2·69
Moisture in fresh berries,	77·79

UNIVERSITY OF MICHIGAN SCHOOL OF PHARMACY,
February, 1891.

For constituents of the root-bark and of the leaves of the horse nettle, see papers by G. A. Krauss, in AMER. JOUR. PHARM., 1890, p. 602, and 1891, p. 65.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

PREPARATION OF BROMOFORM.—A simple process, described by M. Denigès, in the *Bull. de la Soc. de Phar. de Bordeaux*, consists in treating acetone by a solution of hypobromite of soda, a method similar to that of Suillot for iodoform and to Sadtler's process for chloroform. M. Denigès makes a mixture of 100 ccm. of each, soap-maker's lye and distilled water, adding 20 ccm. of bromine. The reaction terminated, he adds, with agitation, a sufficient quantity of acetone (about 10 ccm.) to cause the disappearance of the yellow coloration of the solution of hypobromite of soda. A nearly colorless liquid layer of bromoform appears. After washing, the bromoform may be separated in a nearly pure state. A pure article is obtained by rectification, saving the product which passes over between 148° and 152°. Theoretically, the product should be 53 parts of bromoform to 100 parts of bromine, but we get only 35 parts, or 60 to 70 per cent. of the theoretical product. The loss is due to the formation of the bromide and bromate of soda simultaneously with the hypobromite.—*Répert. de Phar.*, Jan. 10.

SALOL IN INFANTILE DIARRHŒA.—The doses given by Dr. Moncorvo (Rio Janeiro) are thus stated in *Nouv. Rem.*, Jan. 8: The amount given in 24 hours may be varied from 15 cgm. to 2 gm., according to the gravity of the case. The medicament is well borne by children of all ages, and the physician has observed no toxic

phenomena from its use. Gases resulting from intestinal fermentation do not further appear after its ingestion, and colic and vomiting soon cease. The intestinal flux soon moderates and disappears under the influence of salol.

Cutaneous Absorption of Lard and Vaselin.—M. M. Adam and Schoumacher (*Rev. de méd. vét.*), prepared ointments of lard and varied quantities of hydrochlorate of strychnine, which they applied (without friction) to the shaved scalps of dogs. An ointment of 8 gm. of lard and 5 cgm. of strychnine produced no toxic symptoms; one of 50 cgm. of strychnine determined slight hyperæsthesia; one of 2 gm. of the salt, to 8 gm. of lard brought about a tetanic attack within 3 minutes, in a dog weighing 5 kilogrammes; he died in 20 minutes. A dog of 36 kilogrammes died in 12 hours. With ointments containing 2 gm. of strychnine and 8 gm. of vaselin, the authors observed no signs of intoxication.—*Répert. de Phar.*, Jan.

Innocuousness of Strontium Salts.—In a paper read before the *Société de Biologie* (Paris, Dec. 13, 1890) Professor Laborde stated that the salts of strontium were not toxic, even when given for relatively long periods of time. They produced diuretic effects, however, and these have been substantiated, clinically, by Professor Sée, who used the lactate and the tartrate of strontium. Care should be taken to obtain pure salts for clinical use. Dr. Laborde thought that strontium exercised a preservative action upon organic tissues, liquids and excretions. He said that the contrast between the extreme toxicity of baryta and the harmlessness of strontia constituted an interesting fact for chemists, which must revolutionize current notions that chemical relationship decides any analogy in toxic or other physiological action.

Salicylate of Mercury as a Surgical Dressing.—In a report to the *Société de Chirurgie* (Paris, Dec. 27, 1890), M. Vacher said that the obstacle to use of this salt in the manner described lay in its insolubility. He overcame this by causing the salicylate of soda to react upon the bichloride of mercury. The double decomposition gave rise to salicylate of mercury and chloride of sodium, and the latter salt added to the solvency of the former. The solution thus obtained has no irritating properties. Dr. Vacher used solutions of 1 to 1,000 of the salicylate of mercury, which he prepared in accordance with the following formula: Corrosive sublimate, 1 gm.; salicylate of soda, 2 gm.; distilled water, 1,000 gm.

Solutions of 1 to 5,000 may be prepared by adding to the above, four times its weight of water. The author used salicylate of mercury (as an antisyphilitic) both hypodermically and by the mouth. For internal medication he gave 15 to 20 gm. daily of the 1 to 1,000 solution. For subcutaneous injections he gave a 1 to 100 solution, prepared as above, so that 1 ccm. would represent about 1 cgm. of salicylate of mercury. The injections did not cause pain or abscess.

Copper Colorations of Vegetables.—At a meeting of the Paris Society of Pharmacy, Dec. 3, 1890, a paper by M. Mestre was discussed, in which the author claimed that the copper colorations existing naturally or artificially in vegetables, are perfectly harmless. He said that there was often less copper in colored conserves than in many unsuspected aliments, and the copper was found only in conditions of difficult solubility. In colored peas the average proportion of copper present was 7 cgm. to ½ kilogramme, but he had found as much as 21 cgm. The average quantity in beans was 56 mgm.; the maximum quantity was 99 mgm. Bread, he stated, contains an average of 5 mgm. of copper per kilogramme, and wheat 5 to 10 mgm Preparations of pork contained 51 mgm., and those of geese 35 cgm. Chocolate contained 36 mgm. The conclusions of the author were that people might use and abuse the privilege of employing colored vegetables without feeling toxic effects from the copper contained in them.

Arsenical and Antimonial Stains: Their Differentiation.—Azotized solutions of molybdate of ammonia have long been used in searching for arsenic, but no one seems to have applied its reaction for the differentiation, in toxicology, of spots made by arsenic from those made by antimony. While it may be said that the arsenio-molybdate and the phospho-molybdate of ammonia present identical characters, we know that no trace of phosphoric compounds can exist in stains of arsenic or antimony furnished by Marsh's apparatus, it is proper to affirm the presence of arsenic when we obtain crystals of arsenio-molybdate of ammonia in the manner about to be described. The suspected spots, brought together in a porcelain capsule, are treated with 3 or 4 drops of pure nitric acid, which will dissolve either arsenic or antimony. The solution is heated for a few minutes and, on removal, treated with 4 or 5 drops of molybdate of ammonia in azotized solution.

Even if there be but traces of arsenic present ($\frac{1}{50}$ to $\frac{1}{100}$ mgm.) a yellow precipitate is formed, which, under the microscope, shows stellar forms with triangular branches disposed in rectangular fields. Antimony gives no analogous result with the molybdic reagent. In the present state of science, this reaction seems to be the most sensitive and the most characteristic for arsenic. The molybdic reagent is made as follows: Dissolve with gentle heat, 10 gm. of molybdate of ammonia and 25 gm. of nitrate of ammonia in 100 ccm. of water. Cool and add slowly, with agitation, 100 ccm. of pure nitric acid having a density of 1·20. Place on a water-bath for ten minutes, cool, and set aside for forty-eight hours. Filter through paper washed with diluted nitric acid and keep in glass stoppered bottles.—*Compt. rend., Répert. de Phar.*, Jan. 10.

To Solder Metals to Glass and Porcelain.—M. Cailletet lately communicated to the *Société de Physique* a process for the above, which he thought would be valuable to chemists. The tube or piece to be affixed is first covered, by means of a brush, with a thin coating of chloride of platinum, mixed with oil of chamomile. The oil is volatilized with gentle heat and the tube heated to a dark red color, when it takes a metallic lustre. It is then placed in a copper bath and the negative pole of a battery attached, when it will soon be covered with a very close-fitting, adherent, malleable plate of copper. In this condition, the glass or porcelain tube may be soldered with tin to iron, copper, platina, etc. The resistance offered by fixtures treated in this way is very great. M. Cailletet tested them in boilers having a pressure of 300 atmospheres. Nitrate of silver may be used instead of chloride of platinum, but the latter is preferable.—*La Nature; Nouv. Rem.*, Feb. 8.

Transference and Vitrification of Photographs.—A pulverized, vitrifiable color is mixed with gum arabic and water and spread uniformly upon a piece of somewhat thick rag paper. This is dried, and, 12 hours before it is used, it is passed quickly through a solution of oxalate of iron and again dried. It is then pressed and exposed to the solar ray under the photographic negative whose image is to be transferred to porcelain. The leaf is now placed for a few moments in distilled water and is then pressed firmly upon the porcelain object, which is then placed in water. The paper becomes slowly detached, leaving the impression. The object should be carefully dried, and may then be vitrified in a furnace.—*Rev. sci.; Nouv. Rem.*, Feb. 8.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Ichthyol-preparations, which can be removed by washing with water, are proposed by Unna (*Monatsh. f. Derm.* 1891, No. 2): Ichthyol 40, starch 40, cold water 20, saturated albumen solution 1–1·5; the starch is moistened with the water, the ichthyol carefully incorporated and lastly the albumen solution added. The last addition is made to prevent the deposition of the starch.

Ichthyol with carbolic acid: Ichthyol 25, carbolic acid 2·5, starch 50, water 22·5; the first two ingredients are dissolved in the water with the aid of a gentle heat, allowed to cool and the starch incorporated.—*Pharm. Centralhalle*, 1891, 70.

Hungarian Opium.—Dr. A. Deir obtained (by the method of Terier and Flückiger) from 340 capsules sixteen grams opium (dried over H_2SO_4); it appeared as a light-brown, brittle mass, resembling lactucarium, of much stronger odor than the Asiatic opium. A qualitative examination after Dragendorff revealed the presence of morphine, narcotine, codeine, narceine, thebaine and meconic acid; meconine was not found. Water extracted 66·64 per cent.; the morphine, by Flückiger-Squibb's process, equalled 16·24 per cent.—*Rundschau*, 1891, 67.

To remove paint and varnishes, which resist the action of strong lye, Dr. Stockmeier recommends a mixture of water of ammonia, two parts, and turpentine, one part; this applied to the surface to be cleaned will, after a few minutes' action, enable the paint to be removed by use of cotton waste or similar material.—(*Bayr. Gen. Ztg.*), Rundschau, 1891, 72.

Reaction of cocaine hydrochlorate.—This alkaloidal salt, if mixed with a small quantity of calomel and then moistened with water or simply breathed upon, gives rise to a blackening of the mixture. This property is noticeable also under some conditions with pure atropine; in this case heat is necessary, or a mixture of alcohol and water to produce the blackening; cold water or breathing upon such a mixture will not develop the coloration. The alkaloid cocaine does not give this test, but only its hydrochlorate.—E. Schell (*Els.-Lothr. Journ. d. Pharm.*), *Pharm. Ztg.*, 1891, 55.

The detection of resin in beeswax is best effected by E. Schmidt's modification of Donath's test: 5 grams of the wax are heated for one minute to the boiling point with 4–5 times its

weight of crude nitric acid, an equal volume of water is then added and the mixture supersaturated with ammonia; if the liquid be now poured off from the separated wax it should, if the wax was pure, have only a yellow color; but if the wax contained as little as one per cent. of resin, the liquid will be of a red-brown color, due to the formation of nitro-derivatives of the resin-constituents.—Dr. H. Röttger, *Chemiker Ztg.*, 1891, 45.

The red coloration of carbolic acid has been the subject of a very elaborate investigation by E. Fabini, the results of which are that the coloration is due to the action of hydrogen peroxide upon metal containing carbolic acid in presence of ammonia; H_2O_2, metal and NH_3 *must be present* to produce the color. The quantity of metal necessary is very small, one part of Cu or Fe in 180,000 is sufficient for the red coloration, while one part of Cu or Fe in 300,000 or one part Pb in 65,000 is sufficient to show change in the acid; of NH_3 one part in 10,000 will be quite sufficient. The appearance of the color is explained by the formation of ammonium phenylate (by absorption of NH_3 from the air), which, with the metallic salt present in the carbolic acid, forms a metal-phenylate, which in turn is acted upon by H_2O_2 producing the coloring principle and liberating the metal. Copper sulphate with ammonium phenylate gives a green precipitate of cupric phenylate; the latter, upon the addition of H_2O_2, produces at once (with effervescence) the red coloring matter. This is soluble in alcohol reprecipitated upon addition of water, upon drying forming a black, brittle substance which has the property of coloring carbolic acid; 1 : 300,000 will still impart a faint red color. The coloring matter is *entirely* organic, being absolutely free from metal, is volatile, and colored blue by concentrated H_2SO_4.

The action of metals upon the formation of the red color can be illustrated by the following experiment: 10 cc. liquefied carbolic acid are placed in a test tube, ½ drop ammonia, a few drops H_2O_2 solution added and the mixture gently warmed. If the acid is free from metals, no coloration is produced; if now a bright knife blade be introduced into the mixture, blood-red streaks will flow from it after a very short time.

The occasionally noticeable, sudden coloration of carbolic acid is ascribed to elevated temperatures—this favoring the action previously explained.—*Pharm. Post*, 1891, 2, 25, 41 and 61.

The volatile oil of mustard.—In the AMER. JOUR. OF PHARM., 1888, 556, the presence of carbon disulphide in unadulterated oil of mustard was noticed. Recently Paul Birkenwald proved that the action of acid potassium sulphate (one of the decomposition products of myronate of potassium) upon the oil will produce CS_2; also that if the seed be distilled with steam under pressure, decomposition of the oil may take place with formation of CS_2.

The yellowish brown flocculent precipitate that forms in the oil, especially upon exposure to light or air gave the following analytical results I, compared with those from pure oil II:

	C.	H.	N.	S.	O.
I.	44·28	5·67	13·09	21·74	15·22 (by difference)
II.	48·49	5·05	14·14	32·32	

Comparing these results it would seem that the oxidation of the oil is accompanied by the separation of carbon and sulphur, probably as CS_2.

If in the distillation of oil of mustard a copper condensing-worm be used, there is often deposited a compound of copper, which after washing with alcohol approximates the formula Cu_2S,C_3H_5CNS, a combination of the oil with cuprous sulphide.

Myronate of potassium, $C_{10}H_{18}KNS_2O_{10}$ in its decomposition by ferments, breaks up without uniting with elements of water; while all other glucosides unite with water under the condition named. The author, however, found that, while myronate of potassium dried over H_2SO_4 agreed to the above formula, by heating it carefully to temperatures not exceeding 100° C., almost enough water was lost to equal one molecule, and it is, therefore, probable that the formula of the anhydrous myronate of potassium is $C_{10}H_{16}KNS_2O_9$, and that in its decomposition H_2O is necessary as in the case of all other glucosides. This would make the rule absolute that H_2O is essential to the decomposition of all glucosides.—*Pharm. Ztschr. f. Russl.*, 1890, 737, etc.

GRANULAR EFFERVESCENT POWDERS.[1]

By HEDLEY PATTINSON.

Let us look at the theory of granulation first. It is the citric acid in the mixed powder which is the chief factor in the process of granulation, assisted to a small extent by the moisture in the sugar.

[1] From a paper read before the Chemists' Assistants' Association, Newcastle-on-Tyne; *Phar. Jour. and Trans.*, February 7, 1891, p. 712.

A glance at the formula ($H_3C_6H_5O_7 \cdot H_2O$) will show that water is present. This is given off in heating, and the moisture thus obtained partially forms a syrup with the sugar, which acts as an adhesive agent during the melting process. The object aimed at is to apply only sufficient heat to cause adhesion and at the same time to lose as little CO_2 as possible during the process. Care must also be taken not to raise the temperature too high, as the preparation would then be rendered much less freely soluble. Before looking on the different methods of granulation I would say that effervescent preparations in this form are gaining popularity year by year. In a pleasant draught an unpalatable drug may be taken, its nauseousness being corrected by that pleasant, sharp taste due to the presence and escape of carbonic acid gas. The popularity of such preparations as gran. effervescent antipyrin, citrate of caffeine, lithia, sulphate of soda, etc., is in itself sufficient proof that they are preferred to the ancient manner of a pill, powder or bitter draught. Again, when taking a dose of caffeine, for example, the effervescing draught in itself acts, and independent of the presence of the active ingredient, produces a soothing and good effect upon the patient.

Three methods of granulation have been advocated. (1) To make the mass into a tough paste with S.V.R., press the mass through a large meshed sieve and dry quickly. (2) To heat the dried ingredients together until a temperature between 200° and 220° F. is reached, stirring well all the while to form granules; then by means of suitable sieves separating the granules and preserving in well-closed bottles. The foregoing, as will be perceived, is the pharmacopœial method To both of these processes experience shows there are objections. The objections to the first may be readily seen, inasmuch as it is an expensive and comparatively poor method. In the official process I have found a large amount of waste, as it is impossible to get all the base and active ingredients into granular form, the large proportion of powdery product mixed with the granules giving the preparation an inelegant and "saline" appearance. To follow the directions of the B.P., the granules of perfect form are to be separated from the powdery product. But is it not possible that the active ingredient—or a large percentage of it—may be contained in this part of the preparation?

The process, I venture to say, which beats the two foregoing, is that of heating quickly, with manipulation, the ingredients till the

mass becomes pasty. This pasty portion is lifted up, at intervals of a few seconds, to the top so as to allow all the powder to come into contact with the bottom of the granulating tin used. It is then pressed through a wire sieve of convenient sized mesh. The granules are received on white paper and dried in a warm room on suitable trays. By this method we have no S.V.R. used, neither have we a superabundance of powder mixed with our granules. Care, of course, must be taken to apply a certain amount of heat to prevent too great a loss of CO_2, otherwise our product would be deficient in effervescence. A little experience in manipulation is soon obtained and as much as 50 per cent. of active ingredients can readily be incorporated. The B.P. sodii tart. effervesc. may be taken as a typical example of the medicaments. I need not go over the details of manufacture again, but will compare it with that popular article which seems to be sold cheaper and of more inferior quality year by year. I refer to what is known as citrate of magnesia.

Magnesia in this preparation is frequently entirely absent, and such phrases as "so-called" or "known to the public as," sometimes omitted altogether from the labels. The same may be bought of grocers, etc., outside of pharmacy, nicely flavored with lemon, vanilla, etc., in divers colors. As an example of what pleases the public, the following is the composition of a preparation boldly styled citrate of magnesia:

Acid. tartaric.,	37 parts.
Sodii bicarb.,	41½ parts.
Sugar,	21 parts.
Magnes. sulph. exsic.,	½ part.

The above compound, sold under the name of citrate of magnesia, was not even in granular form, but retailed under that name and sold in the simple form of a saline. In the words of one of our weekly journals, "Never use good stuff and remain careless of details in the struggle for existence."

Two prosecutions occurred about a year ago in reference to granular effervescent citrate of magnesia, the special adulteration being lead to the extent of ·37 grain per pound. Scientific evidence having been given to the effect that commercial citric acid invariably contained a minute quantity of lead, the stipendiary on consideration dismissed the case, but without allowing costs.

In the same year a chemist in Greenock was prosecuted under

the '72 Adulteration Act for selling as magnes. cit. an article alleged to be adulterated with sodæ carb., ac. tart., sugar, and sodæ sulph. Again, evidence was given for the defence to the effect that the substance sold was what is known and sold in commerce as magnes. citrate. Medical evidence was also given to the effect that when a medical man prescribed magnes. cit. he meant the article as sold by defendant, simply an effervescing salt, chiefly for the tartrate of soda found during effervescence. The authorities in this case also dismissed the case. Since then the advance made in the manufacture of effervescent preparations has been indeed rapid, and the past year has the distinction of adding to the official list four new effervescent salts, three of them granular. (See this JOURNAL, January, pp. 14, 15.)

THE MELTING-POINT OF PARALDEHYDE.

BY P. W. SQUIRE.

Paraldehyde, like oil of anise and many other liquids, may be cooled without agitation to a temperature far below its real freezing-point, and then may suddenly set into a solid mass, the temperature at the same time rising to the melting-point of the crystals, providing that the reduction of temperature has not been carried so far that the heat evolved during solidification is insufficient to raise the mass to its initial melting-point. If, however, the liquid be stirred while it is cooling, or a paraldehyde crystal be dropped into the liquid while just at its crystallizing-point, then the freezing-point of the liquid and the melting-point of the crystals will almost coincide.

The melting-point of "absolute" paraldehyde does not seem to have been determined with any degree of certainty, as the generally accepted figure, 51° F. (10·5° C.), is too low. The melting-point of the crystals obtainable from various samples appears to be modified by the presence of impurities in the liquid from which they are crystallized. Two years ago the best commercial sample examined in our laboratory began to crystallize at 50° F., but was not wholly solid above 48°, this latter being also the temperature to which the thermometer suddenly rose after the liquid had been cooled below its freezing-point and then stirred. Several other samples showed no sign of solidification above 44° F., and obviously contained both aldehyde and acid. We find now that paraldehyde from the same

source as the sample first mentioned gives a still higher melting-point than before. The bulk solidifies at 52° F., and, by separating the crystals which first form, it is comparatively easy to obtain a fraction with a melting-point of 53° F. This is the highest figure yet noticed; and even now we do not know that this is "paraldehyde absolute." By systematic fractional crystallization of a large quantity of material, a still higher melting-point might be obtained.

As the solid polymer "metaldehyde" is almost insoluble in paraldehyde (except while heated), it is probable that the higher the melting-point the purer the compound; but any sample which passes the other tests, and conforms to the B. P. standard of "beginning to congeal at 10° C." ("with agitation" being understood), should be sufficiently pure for all practical purposes.—*The Chemist and Druggist*, 1890, p. 852.

COMBINATION OF CAMPHOR WITH PHENOLS.[1]

By E. Léger.

Camphor and the phenol are melted together in the calculated proportions in closed vessels. Under these conditions, compounds are formed which decompose easily under the influence of heat, or when treated with solvents or with alkalies. That definite compounds are formed is, however, shown by the fact that the liquid products contain their constituents in molecular proportions, and that in those cases where they crystallize the composition of the first crystals is the same as that of the last. The addition of phenols to alcoholic solutions of camphor reduces the rotatory power of the latter to one-half. The compositions of the various products were determined by means of the polarimeter, and the method will be described in detail subsequently.

Phenol monocamphoride, $C_6H_6O,C_{10}H_{16}O$, is a colorless liquid, which crystallizes only at about — 23°; sp. gr. at about 0° = 1·0205; $[\alpha]_D = +20°$. *Phenol hemicamphoride*, $2C_6H_6O,C_{10}H_{16}O$, a colorless liquid which does not solidify at — 50°; sp. gr. at 0° = 1·040; $[\alpha]_D = +10·5°$. It combines with camphor to form the monocamphoride; if mixed with excess of phenol, the latter dissolves,

[1] *Compt. rend.*, 111, 109-111; reprinted from *Jour. Chem. Soc.*, December, 1890, p. 1427.

but when the liquid is cooled to — 25°, it separates distinctly into phenol hemicamphoride and phenol. *Resorcinol monocamphoride*, $C_6H_6O_2,C_{10}H_{16}O$, forms large, thin, hygroscopic, rectangular lamellæ, which become liquid when mixed with a small quantity of water, and are decomposed by a large quantity with separation of camphor. It melts at about 29°, but can remain for a long time in superfusion at 15°; rotatory power in alcoholic solution, $[\alpha]_D = + 22{\cdot}5°$. *Resorcinol dicamphoride*, a syrupy, colorless liquid, which forms large, hexagonal crystals at 0°; sp. gr. at 15° = 1·0366; $[\alpha]_D = + 25{\cdot}9°$. *α-Naphthol camphoride*, $C_{10}H_8O,C_{10}H_{16}O$, is a slightly colored, syrupy liquid, which does not solidify at — 16°, and is not decomposed by water; sp. gr. at 0° = 1·0327; $[\alpha]_D = + 10{\cdot}5°$. It dissolves α-naphthol, which separates in short, rhombic prisms (Wyrouboff). *β-Naphthol camphoride*, $3C_{10}H_8O,5C_{10}H_{16}O$, a liquid very similar to the preceding compound, sp. gr. at 0° = 1·0396; $[\alpha]_D = + 22{\cdot}5°$. It dissolves β-naphthol, which separates from it in somewhat large, tabular crystals. *Salicylic camphoride*, $C_7H_6O_3$, $2C_{10}H_{16}O$, a white, nacreous mass of long, thin, microscopic needles, which melts at about 0°, and is only partially decomposed even by boiling water. Its rotatory power in alcoholic solution is $[\alpha]_D = + 27{\cdot}3°$.

Salol seems to form a similar compound, but its composition has not yet been determined. Salol crystallizes from salol camphoride in bulky, irregular crystals of the rhombic system, and some measurements of these by Wyrouboff are given.

OXIDATION OF ECGONINE.[1]

By C. Liebermann.

It has been shown by Einhorn that when anhydroecgonine is heated with hydrochloric acid it yields tropidine; it seemed probable, therefore, that ecgonine and tropine would give the same oxidation products under the same conditions, an assumption which is shown to be correct by the author's experiments.

When ecgonine (100 grams) is oxidized with chromic acid and sulphuric acid in the manner described by Merling (*Annalen*, 216, 329), a brown, syrupy acid is obtained; on boiling this product with alcohol, there remains a considerable quantity (about 18 grams) of tropinic acid, identical with the compound obtained by Merling by

[1] *Ber.* 23, 2518; reprinted from *Jour. Chem. Soc.*, December 1890, p. 1449.

the oxidation of tropine, and the alcoholic filtrate, on evaporation, yields a brown, semi-crystalline mass, from which an acid of the composition $C_7H_{11}NO_3$ can be isolated without difficulty.

Tropinic acid, $C_8H_{13}NO_4$, melts at 253° with decomposition (Merling gives 220–240° as the melting-point), and is very readily soluble in water, but very sparingly in alcohol, and insoluble in ether and benzene; it decomposes carbonates, and seems to be a monocarboxylic acid. The *barium* salt, $(C_8H_{12}NO_4)_2Ba$, and the *calcium* salt $(C_8H_{12}NO_4)_2Ca$, are very hygroscopic; the *zinc* salt crystallizes in colorless needles, and the *lead* salt is soluble in water. The *silver* salt is very readily soluble in water, and is unstable. Tropinic acid is immediately oxidized by potassium permanganate, even in the cold. The *hydrochloride*, $C_8H_{13}NO_4,HCl + H_2O$, is crystalline, and melts below 100° with decomposition; the *aurochloride*, $C_8H_{13}NO_4,HAuCl_4$, crystallizes in golden prisms, and the *platinochloride* is very readily soluble. The formation of tropinic acid from ecgonine affords fresh evidence of the close relationship existing between ecgonine and tropine.

The acid, of the composition $C_7H_{11}NO_3$, referred to above, separates from water or alcohol in well-defined crystals, melts at 117–118°, and is readily soluble in alcohol; it decomposes carbonates and forms soluble salts, but it does not reduce potassium permanganate like tropinic acid. The *silver* salt, $C_7H_{10}NO_3Ag$, is very readily soluble in water. The *calcium* salt, $(C_7H_{10}NO_3)_2Ca$, and the *barium* salt, $(C_7H_{10}NO_3)_2Ba$, crystallize in needles. The *hydrochloride* is a crystalline, deliquescent compound. About 14 grams of this substance are obtained by the oxidation of 100 grams of ecgonine.

TEST FOR THE DETECTION OF SESAME OIL IN OLIVE OIL.[1]

By J. F. Tocher, A.I.C.

I had occasion a short time ago to examine some oils, and while so engaged I failed to find a published reliable test for the detection of sesame oil in smaller quantities than 10 to 25 per cent. The U.S.P. test is not reliable below 20 per cent., and serves principally as a distinctive test between sesame and olive oils. Considering the liability of olive oil being readily adulterated with sesame oil, I

[1] Read January 14, at the evening meeting of the Pharmaceutical Society, in Edinburgh; reprinted from *Pharm. Jour. and Trans.*, Jan. 24, p. 638.

applied myself to the task of obtaining a more satisfactory test for the latter. I have been successful in finding one, which, although it cannot rank with the silver test for cotton seed oil, still enables one to detect with rapidity and ease 5 per cent. of adulteration, while 1 per cent. can be detected by exercising a little care in the manipulation. I found that the acetic acid extract from sesame oil, which I was examining for another purpose, mentioned in my next note, turned blue or bluish-purple when boiled with HCl, in which a few grains of pyrogallol had been dissolved. The same experiment was tried with sesame oil itself, using equal parts of the pyrogallol solution with the oil, with the result that the pyrogallol solution turned purple. I treated olive oil in a similar manner and found it to give only a faint yellow coloration. Almond, rape and ground nut oils gave no color, while sunflower oil turned the solution a very faint blue, and cotton seed oil imparted a very light red. It now occurred to me that this behavior of sesame oil with HCl solution of pyrogallol might be utilized for its detection in olive oil. Accordingly solutions of sesame oil in olive oil of various percentage were prepared and the test applied. The following are the results obtained upon treating olive, sesame and other oils with hydrochloric acid solution of pyrogallol and boiling:

Pure Olive: faint yellow.	Almond: colorless.
Sesame: deep purple.	Ground Nut: colorless.
20 p. c. Sesame: purple.	Cotton Seed: very faint red.
10 p. c. Sesame: purple.	Sunflower: faint olive.
5 p. c. Sesame: faint purple.	Rape: colorless.
1 p. c. Sesame: very faint purple.	Oleic Acid: faint red.

I obtained the best results by applying the test as follows, viz: Prepare a solution of pyrogallol in pure hydrochloric acid (ʒss. to ʒj.). Measure half an ounce of this solution into a wide-mouthed test-tube provided with a cork, and add half an ounce (an ounce if the proportion of sesame oil be small) of the oil to be tested. Shake vigorously and then set aside for about a minute to allow the oil and acid to separate. Draw off the supernatant liquid by means of a pipette, and boil the hydrochloric acid solution for about five minutes, when, if sesame oil be present, the color of the solution will have changed to purple. The color does not appear at once, but develops on boiling for a short time. When viewed by transmitted light the color is wine red to purple, and by reflected light it

is blue, which is best observed by pouring the solution into a small porcelain basin. When the purple solution is allowed to stand for some time a small purple deposit takes place. It has not yet been examined, but it has the appearance of a dye. It would be interesting to determine what this substance is, because the pyrogallol reaction with sesame oil points probably to the presence of still another constituent in the oil other than the one I am now about to describe.

ISOLATION OF ANOTHER SUBSTANCE FROM SESAME OIL.

By J. F. Tocher, A.I.C.

In the "Pharmacographia" it is stated that "sesame oil contains an extremely small quantity of a substance, perhaps resinoid, which has not yet been isolated. It may be obtained in solution by repeatedly shaking five volumes of the oil with one of glacial acetic acid. If a cold mixture of equal weights of sulphuric and nitric acids be added in like volume, the acetic solution acquires a greenish-yellow hue. * * * The oil itself being gently shaken with nitro-sulphuric acid takes a fine green hue, as shown by Behrens in 1852, who pointed out that no other oil gave the same reaction. * * *" I have made an examination of this extractive from sesame oil, having had three objects in view, viz:

(1) To find, if possible, a reaction more delicate than that given in the "Pharmacographia," which would suit as a test for the detection of sesame oil. (2) To ascertain whether the reaction caused by nitro-sulphuric acid was due to a constituent in the extractive, as implied in the "Pharmacographia." (3) To separate the resinoid substance said to be present.

How far success has followed me in the first-mentioned can be judged by those who apply the test described in my former note. Regarding the second an affirmative reply has to be given, for when a little of the extractive was brought in contact with $H_2SO_4 + HNO_3$ on a porcelain slab, the acid mixture acquired a fine green color, changing to a bright red. The third and principal object, the examination of the extractive for the purpose of separating the resinoid substance, was one in which I entered by no means sure of success, but the following will indicate to what extent the object has been attained.

Flückiger and Hanbury state that five volumes of oil should be taken with one volume of glacial acetic acid to obtain the solution giving the reaction with nitro-sulphuric acid. I found that if I desired to obtain a reasonable quantity to experiment upon, five to one was not the proportion to use. I therefore measured out ten volumes of oil and seven volumes of acid, and shook vigorously from time to time, and then set aside for the acid to separate. The acid was then drawn off into a porcelain basin and placed over a water-bath, in order to drive the acid completely off. The residue was gelatinous, transparent and amber-brown in color. It was at this stage that the pyrogallol reaction, formerly described, was obtained. A small quantity of the gelatinous extract was now treated with diluted potash and warmed. No result was obtained by doing so, but when the solution was vigorously shaken and then allowed to stand for some time, it was found that a white deposit had taken place. In the meantime, I had found that the extract was partially soluble in hot alcohol, and that when diluted with distilled water, a deposit also took place there. A little of this deposit was placed under the microscope, when small crystalline needles were observed, which served to indicate the probability of the separation of the constituent I was in search of.

The amount was so small that no examination could be made, and there being no evidence against the supposition that the crystals might simply be those of myristic, palmitic and other known acids contained in sesame oil, I again concentrated my attention on the deposit obtained by saponifying the extract. The remainder of the gelatinous extract was therefore treated with warm dilute potash, shaken from time to time vigorously and set aside for twelve hours in a conical test glass, in order to collect the deposit. The supernatant fluid was siphoned off and the deposit washed several times with distilled water. It was now boiled in dilute HCl, collected on a filter, washed until the washing ceased to give an acid reaction and then dried in a water oven. The substance was found to be soluble in alcohol. It was therefore dissolved in hot alcohol and set aside to crystallize. Long crystalline needles were formed in the course of a few hours which, when collected, washed and dried, melted at 116–118° C. Subsequent recrystallization was resorted to, in order to ascertain whether the melting-point was constant. The substance again melted at 117–118° C. It was found to be soluble

in benzine, turpentine, carbon disulphide, and, of course, alcohol and glacial acetic acid, very soluble in chloroform, insoluble in water and alkalies and also hydrochloric acid, and decomposed by sulphuric and nitric acids. It was quite neutral to litmus and other indicators. It gave no reaction with HCl solution of pyrogallol, proving that it was not the cause of the purple color which formed the base of the new test. Nitro-sulphuric acid, however, gave a green and then bright red color, similar to that obtained on treating the gelatinous extract with the same reagent, and corresponding to the U.S P. test for sesame oil. On treating the alkaline liquor from which the substance had deposited with HCl solution of pyrogallol, the purple color was at once obtained. The new substance may therefore be considered as the cause of the color described in the U.S.P., but not of pyrogallol coloration. The gelatinous extract would appear from the foregoing to be a mixture of substances and not a simple resinoid body, as one would infer from the "Pharmacographia." In fact, the great proportion of the extract is simply oil, the substance which I have been able to separate forming a very small proportion, indeed.

The following is a comparison in a tabulated form between the properties of the new substance and those of oleic acid:

With nitro-sulphuric acid: New substance green, then bright red; oleic acid, brownish.
With nitric acid: New substance, green, then yellow.
With pyrogallol solution: New substance, no reaction; oleic acid, faint red.
With sugar and sulphuric acid: New substance, brownish; oleic acid, brown, afterwards bright violet.

Neither stearic, palmitic or myristic acids gave any definite color with the foregoing reagents. It will be observed that oleic acid is mentioned as giving a violet color with sulphuric acid and sugar, which fact I have not yet seen stated. It is very charcteristic of oleic acid.

With the collection of facts I have here recorded, I now turned my attention to what the percentage composition, and from that the formula, of the substance might be. I therefore proceeded to prepare more of the substance, in order to perform a combustion. Half a gallon of the oil was used in the extraction of the substance and from that I obtained a yield of crystals equivalent to ·04 per cent.

The method employed was that formerly described, and I may

here state certain precautions which I found it necessary to take in order to obtain crystals of a constant melting-point. The acetic acid extract may be said to be satisfactory when it is firm, gelatinous and dark brown. If the extract is liquid, too much glacial acetic acid has been used. It may be mentioned in passing, however, that the extracts from cotton seed and olive oils are liquid and yellow in color. Regarding the precautions to be taken after the deposit has been collected, it was found that after treating with HCl, washing and drying, an oily stain had been imparted to the filter paper, indicating the presence of oleic or other acids, as the substance does not melt at the boiling-point of water. In that case, the substance had to be repeatedly treated with KHO, etc., in order to remove the last trace of foreign matter, and less trouble was experienced in crystallizing.

The combustions were performed in the usual way with CuO, using a filter pump as an aspirator at the close of the operations, taking the precaution, of course, of inserting an apparatus for drying, etc., the air previous to being used. The following are the results:

No. 1. Amount of substance taken, ·2483 gram. Result, ·2781 gram CO_2 = ·0758 C. ·1239 H_2O = ·0137 H. No. 2. Amount taken, ·1851 gram. Result, ·2028 gram CO_2 = 0555 C. ·0890 gram H_2O = ·0099 H. No. 3. Amount taken, ·2065 gram. Result, ·2355 gram CO_2 = ·0642 C, and ·1010 gram H_2O = ·0112 gram H. The following, therefore, are the percentages found:

	I.	*II.*	*III.*	*Mean.*
C,	30·50	30·02	31·08	30·53
H,	5·54	5·35	5·42	5·43
O (by diff.),	63·96	64·63	63·50	64·04
	100·00	100·00	100.00	100·00

The hydrogen has been pretty constant, but the carbon rather variable (maximum has been 1 per cent.), but the results are constant enough to warrant one in saying that the substance does not correspond to any known constituent in sesame oil. To arrive at its formula, it only remained for me now to determine the molecular weight of the substance, which I tried by one method, but owing to the small quantity remaining at my command, I did not obtain concordant results. Time has also been against me, having only had five days at my disposal after the completion of the above experiments, that time being quite inadequate to commence anew to pre-

pare another crop of crystals. I had pledged myself, moreover, to give these short communications at this meeting, and have endeavored to do so, incomplete as one of them is, promising that should success attend further experiments to give the results at a future meeting.—*Phar. Jour. and Trans.*, Jan. 24.

ANALYSIS OF PEPTONES[1]

By A. Denayer.

The author considers the method of precipitating the albumose-peptone, as recommended by G. Bruylants, inaccurate, since mucilage is precipitated by ammonium sulphate solution. He recommends the following method for the complete analysis of peptones: *Mucilage:* 1–2 grams of peptone is treated with water and precipitated with Mayer's potassium mercury iodide solution (49·801 grams potassium iodide, 13·546 grams mercuric chloride, 1,000 cc. water), filtered, washed, concentrated to a few cc., saturated solution of ammonium sulphate added, and the mixture heated to boiling, whereby the mucilage is precipitated. The precipitate is washed by decantation, then with ammonium sulphate, and, lastly, rapidly with cold water; the double iodide is separated with boiling alcohol, and the mucilage, with adhering ammonium sulphate, is weighed. The ammonium sulphate is determined, and its weight deducted. *Albumose-peptone:* 1–2 grams of peptone is treated with 5 cc. of water, the mucilage and albumose precipitated with ammonium sulphate, and the precipitate weighed, from which is deducted the weight of mucilage and ammonium sulphate. *Peptone:* 1–2 grams of substance is dried in a vacuum at 60°, whereby the substance swells up, and is then washed with 95 per cent. alcohol. The residue is dissolved in a few cc. of water, and an excess of sodium phosphotungstate added. The precipitate, consisting of mucilage, albumose and peptone, is weighed on a tared filter. It is then incinerated, and the weight of the ash, as also the weights of the mucilage and albumose, deducted from that of the whole precipitate, the difference being peptone. *Unchanged substances*, consisting of amido-bases, fatty acids, and amido-acids, are determined in the alcoholic extract. Taurine, dextrose and gly-

[1] *Chem. Centr.*, 1890, i, 1084; from *Revue Internal. Scientif.*, 3, 168; *Jour. Chem. Soc.*, 1890, p. 1351.

cogen are insoluble in alcohol, and are determined by the difference between the determined substances and 100. The water, mineral matters, and insoluble substances are determined according to Bruylants' method (*loc. cit.*). The author adds the following analyses:

	Peptone from albumin of cleaned meat.	Peptone from egg-albumin.	Peptone prepared directly from meat.
Peptone,	37·675	34·700	25·857
Albumose,	31·300	53·350	15·964
Mucilage,	—	—	9·826
Unchanged products,	5·525	5·930	29·972
Mineral matters,	8·285	1·025	19·386
Water,	10·250	4·625	—
Insoluble,	9·965	3·980	—

NEW REACTIONS OF ALBUMINS.[1]

By C. Reichl.

The author has previously (1889) called attention to the color reactions obtained by treating the albuminoïds with alcoholic benzaldehyde or salicylaldehyde in presence of dilute sulphuric acid and ferric sulphate, and has now elaborated his previous experiments and extended them to other aromatic aldehydes.

Reaction with Benzaldehyde.—The blue condensation-product obtained on mixing egg-albumin, benzaldehyde, dilute sulphuric acid, and ferric sulphate, gives an absorption-band in the spectrum near D; apparently it is a compound of a base with sulphuric acid, for, on adding an alkali to the solution, the blue color disappears with formation of a brownish-white precipitate, which dissolves in acids, again forming a blue or bluish-green solution. The precipitate dissolves in alkalies, yielding a yellow solution. The ferric sulphate plays the part of an oxidizing agent, since dilute nitric acid, mercuric oxide, and other substances which readily part with their oxygen, may be substituted for it. This reaction of albumin appears to be due to the scatole-group contained in it, since scatole itself gives a bluish-violet coloration when similarly treated.

Reaction with Salicylaldehyde.—When the solid albuminoïd is moistened with a 0·5 per cent. alcoholic solution of salicylaldehyde,

[1] *Monatsh.*, 11, 155–165; *Jour. Chem. Soc.*, 1890, p. 1350.

the alcohol allowed to evaporate, and the substance treated with a little dilute sulphuric acid containing ferric sulphate, colored products are formed. Egg-albumin and blood-albumin, blood-fibrin, and caseïn give a bluish-violet; legumin, a brownish-violet; vegetable fibrin, a brownish-yellow; and sheep's-wool and skin, violet-blue compounds. After some time, the solid mass dissolves, forming a solution having the same color. The bluish-violet solution obtained from egg-albumin shows an absorption-band in the spectrum between C and D, and contains a base which may be precipitated by alkalies. In order to recognize albumin in solution by this test, the liquid is mixed with a drop of the alcoholic solution of the aldehyde, an equal volume of concentrated sulphuric acid added, cooled, without shaking, and finally a few drops of ferric sulphate are poured in. According to the strength of the solution, a blue or violet zone is sooner or later formed. Salicylaldehyde gives a similar blue or violet solution when treated with scatole. The oil from *Spiræa ulmaria* gives the same reactions with the albuminoids as salicylaldehyde, but the color is not so intense.

Reaction with Anisaldehyde.—Egg-albumin, vegetable-albumin and caseïn give a violet coloration; blood-albumin and sheep's wool, a violet-red; blood-fibrin, a blue; legumin, a brownish-violet coloration. The violet solution from egg-albumin gives an absorption-band between D and F. Alkalies precipitate a base which is apparently a scatole compound.

Reaction with Vanillin, Piperonal, Cinnamaldehyde and Furfuraldehyde.—All these substances give colored products with the albuminoïds and similarly colored products with scatole.

The aromatic aldehydes, in presence of sulphuric acid and ferric sulphate, give colored condensation-products with phenols, but these have an acid character, and unite with bases to form new colored compounds. It consequently follows that in albumin it is the scatole-group which furnishes the colored compounds above described. The production of these substances forms not only a very delicate test for albumin, but may be used conversely as a test for the presence of aldehydic compounds in wood, in resins, and in ethereal oils.

Injections of ichthyol have been found of value in the treatment of gonorrhœa and gonorrhœal cystitis. Dr. Köster (*Wiener Med. Presse*, Novbr., 1890) has used a one-per-cent. solution of the ammonium compound for the purpose stated, giving the injection two or three times daily.

MUSK.[1]

A recent French official report furnishes some interesting information with regard to the exact habitat of the musk deer and of the trade routes by which the valuable drug is brought into commerce. According to this authority the musk known in the European markets as "Tonquin" would be more correctly described as "Yunnan" musk, since its geographical origin is not the French territory of Tonquin, but the province of Yunnan, in the extreme south of the Chinese Empire. When it finally succumbs to the commercial spirit of the West, there is every prospect that the centre of the musk trade may be shifted from Shanghai to Calcutta, Rangoon or Hanoi, or that these three centres may divide the business between them. At present, however, the musk of Yunnan is nearly all brought by a long and difficult overland route to Shanghai, the commercial centre of the drug. As the crow flies, Shanghai is 1,400 miles distant from the western parts of Yunnan, where the best musk is collected; Hanoi, in French Tonquin, is only about 400 miles off, and is easily accessible by the Red River route, while to Rangoon there are about 750 miles to travel in a straight line, and to Calcutta 1,000 miles. Yunnan musk, the report says, has been brought into commerce by the present trade route ever since the commencement of the sixteenth century, the chief places of collection in Yunnan being known as Ta-li, Yao-chow and Mien-ning—all in the western part of the province. That portion of Yunnan is exceedingly mountainous, and in it the musk deer are still found in comparatively large numbers, in spite of the energetic manner in which the creatures are pursued by the musk-hunters.

A few years ago persistent reports were circulated in our markets that the Chinese Government had strictly enjoined a prolonged close season for the musk deer, and musk prices advanced partially upon the strength of those rumors; but it is doubtful whether such an order, even if it were issued, could have been effectively enforced. Yunnan, we may here observe, is one of the principal Chinese opium-growing provinces, and, according to European travellers who have traversed these parts, vast fields of poppy are cultivated everywhere, in spite of the stringent regulations issued by the Central Government altogether forbidding the cultivation of the drug in

[1] Abstract from *The Chemist and Druggist*, Nov. 22, 1890, p. 716.

China. If, then, opium-growing is suffered with impunity, it is not likely that any regulations would seriously avail against the hunting of the musk deer. Besides Yunnan, the provinces of Sse-chuan and Kwei-chow also produce musk; but the product of these two provinces is said to be of a very inferior quality, and the Chinese themselves, who consume musk for many more purposes than the Europeans, will have none of it. According to Mr. Hosie, in his work on Western China, the musk deer is rather plentiful in Sse-chuan; and other writers also assign to the animal a rather more extensive habitat than does the French writer. The only other musk besides that of Yunnan, says the latter, used by the Chinese themselves is musk from Thibet, known in Europe as cabardine musk.

Two distinct varieties of cabardine musk are known in European trade, viz: the so-called China cabardine, and the Russian cabardine, which reaches London by way of Siberia. It is probably to the former and more valuable variety that the writer refers, as the Russian cabardine musk is collected much farther north. The quantity of musk which the deer (known to the Chinese by the name of Tshan Tse) furnishes, varies according to its age and the season when the musk is obtained. With somewhat superfluous simplicity, it is stated that "the operation of cutting off the musk-pouch is fatal to the animals;" and it is also affirmed that there is an idea that if the deer is killed before the operation the musk is lost. How this can be is not explained, though it would be interesting to know how the musk deer is induced to allow itself to be caught alive to submit to the operation. In the Chinese musk-hunt illustrations, moreover, which are found inclosed as advertisements in the Shanghai musk caddies, the animals are often represented as being killed by arrows shot from a distance, and this is evidence towards the supposition that the pods are not taken from live animals. The best musk is yielded by well-fed deer from five to six years old, and it should only be taken in the spring or summer, as at other seasons it is not in good condition.

From the three trade centres in Yunnan, which we have enumerated, the musk-pods are brought to Yunnanfu, the capital of the province, where they are bought up by merchants from the province or Kiang-si, who make a specialty of this article, and carry it to Shanghai and Canton, the two principal markets. Shanghai is by far the

most important centre, and the musk is brought thither by way of Chung-King and Ichang, on the Yang-tse River. Canton receives its modest quota by way of Pai-sse. In Yunnan already three grades of musk are distinguished in the market, the first (Ki-tan-ko) having locally ranged from 58*s.* to 62*s.* per oz. in value last year; the second (Pan-tsi-kwan-yu) from 52*s.* to 55*s.* 6*d.* per oz.; while the third consists of adulterated pods (Maoko), which have no fixed market value. In Shanghai there are three native houses who share the bulk of the musk trade between them, and who are believed to command a capital of about £25,000 each. Musk is liable to several small local duties on its way from Yunnan to Shanghai. In the first place, there is an entrance duty, amounting to about 2*d.* per oz., at the boundary of each prefecture or administrative district through which the musk is carried; but on these duties drawback is allowed if the musk is exported. Next there is the li-kin duty of 10*d.* per oz., which must be paid when the musk reaches Shanghai or Canton; and finally there is an export duty of about 2½*d.* per oz. levied by the Chinese maritime customs. Last year the value of musk exported from Shanghai to other Chinese ports was estimated at £12,000, and that of musk shipped from Shanghai to foreign countries at £56,400. From Canton £265 worth of musk was exported to Chinese ports, and £776 worth abroad. But Pekin, the Chinese capital, receives, in addition to this, about 600 caddies of musk every year for pharmaceutical purposes, the article being held in high repute among the Chinese as an antispasmodic, a cholera specific, and a remedy against sores and ulcers.

FERMENTATION AND COMPOSITION OF CRANBERRY JUICE.[1]

By E. Mach and K. Portele.

Cranberry juice was allowed to ferment with yeast for nine days, either without further addition or with addition of grape must, and the alcohol determined. The results show that the juice will not ferment, and that this is caused by a substance present in the juice, and not in the skin, etc., of the berries. Similar results were obtained when a mixture of cranberry juice and must (equal vols.)

[1] *Landw. Versuchs-Stat.*, 38, 69–78; reprinted from *Jour. Chem. Soc.*, December 1890, p. 1455.

was left to ferment; after 14 days, there was no sign of fermentation. With cranberry juice (1 part) and must (2 parts), fermentation began in 9 days, and in 14 days 3·88 per cent. of alcohol was formed. Löw (*J. pr. Chem.* [2], 19, 312) showed that cranberries contain benzoic acid, and pointed out that this might be the reason that they do not decay for so long, and the author's experiments confirm this view. Neither oxalic, succinic, tartaric, nor salicylic acid is present.

The sp. gr. of cranberry juice from Bozen and from Hall varied between 1·0521 and 1·0661.

The following numbers show the amounts of different constituents in grams per litre of juice of cranberries, examined in 1888, from (A) Bozen, and (B) Hall:

	Invert-sugar.	Total acid as malic acid.	Benzoic acid.	Tannic acid.	Nitrogen.	Ash.
A. Fresh berries—						
(*a*), 26th Sept., . . .	92·00	19·11	—	2·24	0·12	2·98
(*b*), 6th Oct., ...	79·20	18·04	0·862	—	0·11	—
Soft berries—						
(*c*), 13th Nov., . . .	118·00	19·92	—	—	—	—
B. (*d*), healthy, fresh, and hard, 14th Nov., . . .	90·20	18·84	0·638	—	0·101	—
(*e*), soft and dried up, 14th Nov., ...	116·70	20·55	—	—	—	—

Juice from (*d*), examined later (21st March, 1889) contained invert-sugar 73·80, total acid 22·33, volatile acid (as acetic acid) 3·25, alcohol 1·04, and ash 3 64 grams per litre. Juice from (*e*) contained, on 10th December, 1889, invert-sugar 41·10, acid 34·18, benzoic acid 0·759, volatile acid 15·20, and alcohol 3·42 grams per litre. The ash of (*a*) contained phosphoric acid 3·11, and potash 47·64 per cent.

Malic and citric acid may be present in considerable quantities.

Claassen found that the bitter substance present in cowberry leaves was identical with arbutin (Amer. Jour. Phar., 1885, 321); in a subsequent examination of American cranberries, he could not detect arbutin, but found a substance (oxycoccin) which gave similar reactions to arbutin (Amer. Jour. Phar, 1886, p. 321-325).

The fruit and leaves of *Arctostaphylos Uva ursi* do not contain benzoic acid. The arbutin which is present has no preservative action. Cranberry leaves contain no benzoic acid.

MINUTES OF THE PHARMACEUTICAL MEETING.

FEBRUARY 17, 1891.

On motion of Mr. McIntyre, Mr. W. B. Thompson was called to preside. The minutes of the last meeting were read, and no corrections having been asked for, they were approved.

The Proceedings of the American Pharmaceutical Association, whose last meeting was held at Old Point Comfort, Va., were presented to the college library by Prof. Maisch, the permanent Secretary. For this volume the college returned its thanks.

A paper upon the *Assay of Opium*, by Mr. W. T. Hankey, of the present senior class of our college, was read; its reading elicited remarks from different persons. Prof. Trimble said that the Pharmacopœia process does not exhaust the opium, that the process of Dr. Squibb does, but that the yield is always in excess, and it has been shown that this is due to the meconate of calcium, which contaminates the morphine; this, when treated as recommended by Mr. Hankey, gives a result that is satisfactory.

Mr. England read some *pharmaceutical notes.* Prof. Maisch asked why Mr. England preferred to make the *spirit of peppermint* in the way indicated, since filtering after maceration with the coarsely powdered leaves, as directed by the Pharmacopœia, obviated the difficulty arising from a waxy matter which renders the freshly-made spirit cloudy and will not filter out through paper alone. Crude pure oil, quite recently distilled, will dissolve clear in from 1 to 3 parts of alcohol of ·835, but an addition of more alcohol will usually cause a cloudiness; after careful rectification, oil of peppermint will yield clear solutions with alcohol in all proportions.

Mr. Beringer read a paper upon *Bimuriate of Quinine*, and in answer to an inquiry as to the strongest solution that could be made, replied that the best solution was one of 50 per cent. and useful for hypodermic use.

Mr. McIntyre, to whom had been referred the query relating to *Whitworth's liniment*, gave the following from Dick's Encyclopædia:

℞.

Oil of thyme,	4 drachms.
Tincture of myrrh,	2 ounces.
Tincture of camphor,	2 drachms.
Compound spirit of lavender,	2 ounces.
Alcohol,	8 ounces.

(All fluid measure.)

Mix.—25 drops, 2, 3 or 4 times a day.

Red Bottle, Whitworth's (from an old recipe book.)

Opium in powder,	120 grs.
White castile soap,	60 grs.
Camphor,	1 tr. oz.

Oil of origanum, ... 1 f℥
Oil of caraway, ... 2 f℥
Alcohol, ... 12 f℥
Mix, macerate with occasional agitation 7 days, and filter.

Mr. Robt. England gives the following formula, furnished by the late Dr. Jas. Bond, who originally introduced it:

℞
Stronger water of ammonia, } . . . . . āā ℥ij
Olive oil, ... }
Tincture of opium, ... ℥ij
Oil of cinnamon, } . . . . . āā ℥iij
Oil of sassafras, }

From these formulas it will be seen that they must not be confounded as they are so entirely different: one intended for internal use, and the others for liniments and quite active.

Mr. A. B. Taylor read a paper on *Tincture of Nux Vomica.* Mr. McIntyre said that the long and very satisfactory use of the tincture as made by apothecaries from nux vomica, by the old method, showed that this yields trustworthy results.

Prof. Remington said that this subject was brought before the meeting probably in consequence of the late suit held in New Jersey against a druggist of Atlantic City, he having sold tincture of nux vomica containing an average amount of strychnos alkaloids, but not the requisite amount of extractive. Suits had been instituted, both in this country and in Great Britain, against druggists for selling spurious preparations, the instances showing ignorance on the part of those bringing suit, in the selection as test cases of nux vomica merely for a deficiency of extractive matter, and in Great Britain of lac sulphur which is often required to mix readily with water, and then contains calcium sulphate, this impure product being sometimes preferred for the reason stated. Nux vomica would yield different amounts of extract with alcohol differing in strength, a larger percentage of extractive being dissolved by a more aqueous menstruum; and it had even been testified in the case alluded to, that the extractive matter of nux vomica could be taken up without dissolving any alkaloid. The amount of extractive was therefore no criterion of the strength of the tincture, and the directions of the Pharmacopœia had merely been intended as a guide for the pharmacist indicating the exhaustion of the drug, which, with alcohol of the strength directed, would yield about ten per cent. of extract.

Professor Maisch stated that shortly after the publication of the Pharmacopœia of 1880 he had directed attention to the variable quality of extract of nux vomica due to difference in the alcoholic strength of the menstruum, and that therefore the tincture should never be prepared from the extract, unless the latter had been made in strict conformity with the Pharmacopœia. An *aqueous extract of nux vomica* contained a relatively large amount of extractive, and small amount of alkaloids, so that its dose was four times that of the alcoholic extract. Prof. Maisch also called attention to a published account of the testimony given in the suit, in which it was reported that the only medicinal activity of the drug resides in the alkaloids, and that the

extractive matter had absolutely no medicinal effect whatever; and he argued that if such be really the case, a tincture of uniform strength, representing nux vomica, should be made from the alkaloids strychnine and brucine, by dissolving them in some fixed proportion in alcohol.

Mr. Beringer said that he had just finished 200 ounces of tincture of nux vomica, which yielded 2·58 per cent. of extract, and would have to be considerably reduced to make it 2 per cent. as directed by the Pharmacopœia.

Professor Maisch alluded to an experiment made a number of years ago when for a special purpose he prepared extract of nux vomica with strong alcohol, and on evaporating a portion of the tincture in a sand-bath, which was not kept at a uniform temperature, found a portion of the alkaloids had crystallized on the sides of the dish.

Mr. Stevenson, of Pittsburg, was introduced by Professor Remington, and exhibited an improved apparatus for emptying carboys, consisting of a pair of steel rockers joined at one end; he read a paper on this *carboy rocker*, and illustrated its utility by applying it to a carboy, moving this about and tilting it so as to empty its contents.

Mr. Beringer exhibited an improved method of attaching the glass tube to the outer case of the Liebig condenser. It cannot well be described without a drawing.

The following query was submitted: How can this prescription be best compounded—

Liq. plumbi subacetatis,	f℥ss
Ext. Opii., }	āā gr. iiss
" belladonnæ, }	
Ol. theobromæ,	gr. xl

M. s. a. ft. suppos. vi.

One member suggested that the liquid be concentrated by evaporation, and then the extracts added, and this mixture incorporated with the cacao butter. Another suggestion was that a small quantity of some absorbent power be added, and that probably for each suppository one grain of powdered althea root would be sufficient.

The meeting then adjourned.

T. S. WIEGAND,
Registrar.

EDITORIAL.

American Pharmaceutical Association.—The time is fast approaching when this Association will assemble in its thirty-ninth annual meeting in the city of New Orleans, the day announced being Monday, April 27, at 3 o'clock P. M. This will be the second meeting of the Association since its organization, which is held south of Virginia and Kentucky, the previous one having been at Atlanta, in November, 1878. Those who were present on the latter occasion well remember the attractiveness of Southern fields and forests at a time just prior to the beginning of winter, which induced a number of the visitors to continue their journey still farther south to Florida. This year the members attending the meeting will have the opportunity of seeing Southern fields and forests clad in beauties of spring. It will be the earliest date at which an annual meeting has yet been held, just two months earlier than the meeting of 1889,

which took place in San Francisco. As the latter was well attended from all sections of the United States, taking into consideration the great distances and the time required, so will doubtless the next meeting witness assembled a large number of members from the Eastern, Middle and Western States, in addition to those coming from Louisiana and the neighboring Southern States. The Committee on Arrangements, of which the Local Secretary, Mr. A. K. Finlay, is Chairman, has been at work and outlined a plan by which it is intended to combine pleasant recreation and profitable business. In a circular issued by the committee, it is stated that "New Orleans at that season of the year presents many attractive features, aside from the interesting things to see, which can only be noticed in our quaint old city. You will never regret the time spent in our midst."

The Committee on Transportation, appointed at Old Point Comfort, has been hard at work, and Mr. Alexander has informed us, that he has succeeded in securing for the district of St. Louis, and through Mr. Hogan for that of Chicago, the round trip for a single fare. Negotiations in the other districts were still pending, but expected to be concluded shortly. Propositions for membership have begun to make their appearance at the office of the Secretary of the Committee on Membership. The committees of the different Sections have been quite active, and essays and subjects for profitable discussions will not be lacking. In fact, the prospects for a successful meeting are very encouraging.

The Author of the first Pharmacopœia of the United States of America.—In our volume for 1884, pp. 483–491, we republished in full that little work possessed of historic interest, a copy of which had been loaned to us for the purpose by Dr. Chas. A. Heinitsh. The author of that Pharmacopœia was Dr. Wm. Brown, of whose life, however, we could learn nothing at that time. More recently attention was again called to the above work in the November number, 1890, of "Christian Culture," published at Lancaster, Pa., and this has elicited a biographical sketch of Dr. Brown from one of his descendants, Posey S. Wilson, residing at Denver, Col., which was published in the same periodical, January 1891, p. 8, and from which we make the following abstract:

Dr. William Brown was born in 1748, as the son of Rev. Richard Brown, who had settled near the stream of Bull Run, and was the son of Gustavus Brown, a Scotch physician and surgeon, the latter having come to Virginia when a young man, where he made an enviable reputation as a physician, and was a friend of the Thorntons, Washingtons, Lees, Fairfaxes and Alexanders. William was taught by a private tutor at his father's house, and later was sent to Edinburgh, where he finished his academic education, attended medical lectures, and returned to Virginia to practice his profession in the vicinity of Alexandria, where he intermarried with the Alexander family. When the war of independence came on he offered his services, and, although but twenty-eight years of age, soon rose to a responsible position, having charge of the hospital at Lititz, where he compiled the first Pharmacopœia.

There is little to be said, of popular interest, in the life of a physician, even in time of war. In peace the members of this noble profession are called upon to "set their breast against the thorn," as Tom Hood expresses it; their sacrifice of personal comfort and wishes is constant; their charities innumerable, and their humanity as freely extended to the poor as the rich.

In war these things still follow them; and, in addition, they must go into any danger that may present itself, as gallant as any soldier, and that, too, without the sustaining sense of the compensation of glory for them who die for home and country.

Dr. Brown's services and qualities raised him to the position of Physician-General to the hospitals of the United States, which would at the present time be equivalent to Surgeon-General of both the Army and Navy.

The public services of Dr. Brown told even on his vigorous constitution, for he died at the comparatively early age of forty-three years. He is buried, together with his wife, previously a Miss Alexander, and their daughter Helen, in the quiet old family burying-ground of the descendants of John Alexander —a younger son of the Earl of Sterling—for whom the town of Alexandria was named. It has been stated that, out of his tender love for his little daughter, who had preceded him in death by some seven years, he requested that her body should be disinterred and buried by his side in his own grave. On his tombstone is the following inscription:

IN MEMORY OF
WILLIAM BROWN, M.D.,
Formerly Physician-General to the Hospitals of the
United States, who died on the 11th of January, 1792, in the 44th year of his age,
This tablet is inscribed
by
his affectionate and afflicted widow.
His zeal and fidelity as a patriot;
his patience, diligence and skill as a Physician;
his benevolence, courtesy, and integrity as a man
secured him
the applause of his country,
the honor and endowment of his profession,
the respect of the wealthy,
and
the veneration of the poor.
Let
the grateful witness of his virtues in domestic life
and
that as a husband, father and master,
he was tender, instructive, and humane;
that he lived without guile, and
died without reproach.

This is the daughter of
Dr. William Brown, who lies by his side,
HELEN BROWN,
Died 27th April, 1785, aged 5 years and 15 days.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Missouri Botanical Garden. 8vo. Pp. 165.

This handsomely illustrated volume contains a biographical sketch of Henry Shaw, who established the botanical garden at St. Louis; his will, deed for the endowment of a school of botany, inaugural exercises, etc. Under the guidance of Professor Wm. Trelease, both the garden and school will doubtless become important factors for the study of the science of botany in the United States.

Text-Book of Hygiene. A comprehensive treatise on the principles and practice of preventive medicine from an American standpoint. By George H. Rohé, M.D., Professor of Obstetrics and Hygiene in the College of Physicians and Surgeons, Baltimore, etc. (second edition). Thoroughly revised and largely rewritten, with many illustrations and valuable tables. Philadelphia and London: F. A. Davis. 1891. 8vo. Pp. 421. Price, $2.50.

Hygiene is gradually developing into one of the most important branches of the medical sciences. The work now before us is a trustworthy exponent of what has been accomplished in this direction; or what is known in regard to the numerous agencies influencing the health of mankind, such as air, water, food, soil, sewage, dwellings, clothing, contagion, etc., and the means for preventing disease, like quarantine, antiseptics, disinfectants, etc. The work is tersely written. The statements are clear and to the point, without being encumbered by prolixity. It is a work that seems to be well adapted to the wants of the student, and for awakening an interest, where it does not already exist, into deeper inquiries into the ultimate causes of disease, and the correct means of preserving health.

First Annual Report of the State Dairy and Food Commissioner of Wisconsin. 1890. 8vo. pp. 114.

The report was made to Governor Hoard by the Commissioner, H. C. Thom, and refers to dairy products and to articles of medicines and of food, or used in the preparation of food.

Proceedings of the Iowa State Pharmaceutical Association, held at Des Moines, February 12 and 13, 1890. Eleventh Annual Meeting. 8vo. Pp. 134.

An account of the meeting will be found on page 200 of our last volume.

Proceedings. Ninth annual meeting of the Massachusetts State Pharmaceutical Association, held in Brittan Hall, Haverhill, June 18–20, 1890. Pp. 209.

A brief report of this meeting will be found on page 427 of our last volume. A pamphlet of 24 pages has been added, giving the proceedings of a special meeting of the same Association, held in Boston, Dec. 2, at which the subject of co-operation was discussed, and a committee of fifteen was appointed relative to the organization of a corporation.

Proceedings of the Michigan State Pharmaceutical Association, at its eighth annual meeting, held at Saginaw, Sept. 16–18, 1890. Pp. 95.

One of the papers read at this meeting, viz: "On the iodine absorption of essential oils as a criterion of purity," by H. W. Snow, was published in our November number. The officers of the Association for the present year are D. E. Prall, Saginaw, president; Chas. A. Bugbee, Cheboygan, secretary; Wm. Dupont, Detroit, treasurer; and Henry J. Brown, local secretary. The

next meeting will be held in Ann Arbor, in October next, the date to be fixed by the Executive Committee.

Proceedings of the National Wholesale Druggists' Association, in convention at the Arlington Hotel, Washington, D. C., Sept. 29 to Oct. 3, 1890. Pp. 271.

The next meeting will take place in Louisville, at a date to be fixed by the Committee on Entertainment. Daniel Stewart, Indianapolis, is president; A. B. Merriam, Minneapolis, secretary, and S. M. Strong, Cleveland, treasurer for the present year.

Commentar zum Arzneibuch für das deutsche Reich (Pharmacopœa Germanica, Editio III). Von Dr. Bruno Hirsch und Dr. Alfred Schneider, Göttingen. Vandenhoeck & Ruprecht.

Commentary to the German Pharmacopœia, etc.

In our December number we have noticed the appearance of the first two fascicles of this excellent commentary; we have now before us six additional issues, pages 129 to 448, which bring the work to mentholum in the same commendable manner as indicated in our previous notice.

Recherches sur le Strongle Paradoxal. Thèse, etc., par Marie-Eugène Daniel. 4to. Pp. 51.

Contribution à l'étude anatomique des Polygalacées. Thèse, etc., par Charles Jules Feuilloux. 4to. Pp. 43.

Two theses from the Paris *École Supérieure de Pharmacie* for the diploma of pharmacien of the first class. The former is a monograph of the paradoxal strongylus, a worm which has been repeatedly observed in man, and which, besides other names, is known as St. longevaginatus, *Diesing*. The other thesis treats of the anatomy of five commercial varieties of krameria, and of three species of polygala, including senega root, and four impurities and adulterations of this drug. Both works are illustrated with cuts representing the microscopical structure of the objects under investigation.

Heredity, Health and Personal Beauty. By John V. Shoemaker, A.M., M.D., Professor of Materia Medica, Pharmacology, Therapeutics and Clinical Medicine and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia, etc. Philadelphia and London: F. A. Davis, Publisher. 1890. 8vo. Pp. 422. Price, cloth, $2.50; half morocco, $3.50.

In the introduction we are told that the aim of the work was to impart some information strictly limited to the non-scientific world. Yet the author has found it necessary to take notice of several recent essays in regard to the inheritable effects of the use and disuse of vital parts by an organism, and in relation to the heredity of congenital characters and of acquired characters. Several statements, and more especially conclusions arrived at in a work by August Weismann on "Heredity and Kindred Biological Problems," are frankly criticised, the author expressing his views, in connection with the subject-matter of his work, by stating that "If men and women did not mate for love and money and a thousand other motives than with reference to the qualities of their descendants, but, like the domesticated animals, were bred for various qualities, we could make great musicians, painters,

mathematicians, generals or athletes, at pleasure, unchecked save by the occasional effect of ataxism. Although this will never be, we may yet clearly perceive, if we but observe closely, with minds divested of prejudice, the working of the indicated law, which, as it has ever done, holds important sway at all times and in all places on earth."

It must be understood at the outset that the work is not a treatise on evolution; yet from its title it can be plainly seen that questions and facts must be discussed which are likewise involved in the former theory. Refraining from abstruse discussions, the author endeavors to elucidate the relations of causes and effects, regarding health and beauty in man, and drawing his illustrations from the savage and the cultured, and from all conditions of society, reaches his conclusions in a persuasive and convincing manner. It is impossible to enter into details in this place; reference must be had to the work itself; but it should be stated that all questions involved are discussed with frankness and delicacy combined.

The subjects of the thirty-seven chapters may be briefly summarized as follows: Laws of health, life and growth; man's spiritual and physical place in nature; phenomena of evolution; environment, training, gracefulness, walking, dressing, bathing; the aspect, cosmetic care and treatment of the face, hands, feet, nails, hair, etc.; food, clothing, ventilation, and three chapters on cosmetic articles, medicated soap and household remedies. The make-up of the work is quite attractive.

Staunton, Virginia; its past, present and future. By Armistead C. Gordon. With illustrations from photographs, by Edmund Berkeley. Designed, illustrated and printed by the South Publishing Co., New York.

The work, which is very handsomely illustrated, the text being historical and descriptive, is issued by the Staunton Development Co., whose Eastern office is in Philadelphia, D. Z. Evans, Jr., agent.

Some experimental Tests of the Pasteur Filter. By L. E. Sayre and V. L. Kellogg. Pp. 7.

Reprint from the Transactions of the Kansas Academy of Science, 23d annual meeting.

The Treatment of the Morphine-disease. By J. B. Mattison, M.D., Brooklyn, N. Y.

Reprint from the *Therapeutic Gazette.*

Abnormal intra-thoracicair-pressures and their treatment. By Chas. Denison, A.M., M.D., Denver, Col.

This is the president's address at the seventh annual meeting of the American Climatological Association; reprinted from *The Sanitarian.*

VARIETIES.

Malic acid lozenges have recently found considerable favor in England as a remedy for sore throat and bronchial cough. They are reported as efficient not only in excessive secretion of mucus and cough, but also in catarrhal conditions of the bowels and in hæmorrhoids.—*Jour. Am. Med. Assoc.*, Jan. 10, 1891.

THE AMERICAN
JOURNAL OF PHARMACY.

APRIL, 1891.

THE OPIUM ASSAY QUESTION.

By Alfred Dohme, Ph.D.

Perhaps no chapter of Pharmaceutical Chemistry has received more attention and been more discussed than that of opium and its analysis. Scarcely a journal appears nowadays that does not contain an article or two upon how opium can "best" be assayed and just how the method of Prof. X— or Mr. Y— is inaccurate and unreliable. There is a certain sameness about articles written about opium assaying—a sameness that becomes monotonous in course of time and causes the reader to become perplexed, if not disgusted, as the result of a perusal of them. Invariably the author picks all other methods to pieces and then proposes an "original new" method which gives better agreeing results and is much more easily manipulated than any yet proposed. As a matter of fact, we possess not a single accurate and exact method of analysis of any plant or of any of its organic constituents. Plant analysis, as Dragendorff aptly remarks, has not yet reached the stage which enables us to say, without an interrogation point at the end of our sentence, that this plant contains just so much of that constituent and no more. Plant analysis is as yet synonymous with approximate analysis, and until our knowledge of the chemistry and physiology of plant life and growth has advanced considerably beyond its present status, it is doomed to continue to be approximate analysis. Hence, no method is accurate as, for instance, is the determination of sulphuric acid as barium sulphate, or of hydrochloric acid as chloride of silver, and if one of them does give better agreeing results and such as are nearer the mean of those obtained by all

other methods, this is due most probably to the fact that in this particular method the sources of error are more nearly counterbalanced than in the others. It was, hence, from a purely impartial and critical standpoint that I undertook to compare several of the most prominent methods for assaying opium.

Those decided upon were the methods of Flückiger, Squibb and of the U. S. Pharmacopœia—being virtually the ammonia versus the lime method. The drugs examined were Smyrna opiums from the houses of Merck and of Gehe & Co., the former having been ordered and received by myself while still at the laboratory of Geh. Rath Fresenius at Wiesbaden during the past summer, and the latter kindly given me by my instructor, Professor Flückiger, here at the laboratory. Both samples were finely powdered and dried at 80° C. for five hours. All three methods were begun at the same time and the directions for each closely followed throughout. In both cases the determination by the U. S. P. method was completed long ere the others were, while Squibb's method, due to its more frequent washing and slower filtering, took up the most time. Just at this point I should like to protest against the impracticability and uselessness of weighing liquids, which so often is found in methods of plant analysis and nowhere else. As I see the matter there is not one point in its favor, unless perhaps, that it is an inherited custom, while there are certainly many points against it. Firstly—it occupies more time; secondly—accurate balances are not arranged for weighing liquids, and inaccurate balances (or moderately accurate balances, as their owners would probably prefer to term them) certainly make the weighing less accurate than measuring; and thirdly—weighing, even on accurate balances, is seldom, if ever, more accurate than measuring with graduated glassware which every druggist does, or at any rate, should possess. The U. S. P. method, besides being the shorter, required less attention and care than the other methods and, as the figures will show, gave the most satisfactory results. As this is all that is required of a method of analysis I can see no reason why the present officinal process should be altered, for no other now in use is more exact and at the same time as practical. The morphine obtained in every experiment with the U. S. P. method was undoubtedly the whitest and purest of all the crystals obtained by any method. There was less washing necessary than in either Squibb's or

Flückiger's method and at the same time the filters and crystals upon them were beyond any question of a doubt the purest and whitest. Here follow the figures:

	Merck Opium.	Gehe Opium.
Flückiger,	9·52 p.c.	13·95 p.c.
Squibb,	11·67 p.c.	16·52 p.c.
U. S. P.,	11·44 p.c.	15·00 p.c.

As these figures show, Flückiger's method gave the lowest and Squibb's the highest results, which facts are, however, very easily explained and as follows: in Flückiger's method the result depends very much, if not entirely, upon the amount of shaking that is done, as Dieterich has conclusively shown, and as I only shook for about half an hour steadily, with continued shaking at intervals of ten minutes for two hours more, it is very probable that all of the morphine did not separate out. The high figures obtained by Squibb's method are undoubtedly to be explained by the impurity of the resulting products, which fact could readily be detected by the naked eye, as they were invariably very dark colored. Despite all the washing that they were subjected to, they never once were even approximately near being colorless and besides invariably dissolved in lime water only in part and gave as a result a very dark colored solution. It was found that continued washing would not remove the impurities, for long before the crystals and filter paper showed any signs of becoming decolorized, the wash water ran through absolutely pure and colorless. In both cases the morphine obtained by the U. S. P. method dissolved completely in lime water and gave a pure, limpid, clear solution, while that obtained by Flückiger's method, although it gave a colorless solution in lime water, yet left a small residue amounting to several milligrams and consisting of narcotine, as did the residue obtained in Squibb's method. This would indicate that in the presence of alcohol and water, the ether does not completely dissolve all of the narcotine.

MORPHINE PICRATE.

Inasmuch as this salt of morphine had not yet been described, and the similar salt of strychnine is practically insoluble in water and hence enable us to determine the alkaloid as strychnine picrate, it was made by treating a solution of morphine hydrochlorate with a slight excess of picric acid, in the hope that it, too, might prove to be insoluble and thus facilitate somewhat the method of deter-

mining morphine. Recrystallized from alcohol it crystallizes in groups of fine yellow needles arranged most peculiarly in the shape of warts, which grow one along-side of the other and hang from the surface of the liquid looking much like plaits of hair. The salt melts or, better, decomposes without detonation at 157° C. It differs from the corresponding salt of strychnine, however, in not being insoluble in either water or alcohol as determinations of its solubility gave the following results:

In distilled water at 13° C.—15·6975 grams of a saturated solution yielded 0·031 grams of morphine picrate (dried at 100°) which gives a solubility of 1 part in 500 parts of water.

In absolute alcohol at 13° C.—7·2422 grams of a saturated solution yielded 0·009 grams of morphine picrate (dried at 100°) which gives a solubility of 1 part in 800 parts of alcohol.

This being the case it is, of course, impossible to make use of the salt as a means of determining morphine.

Laboratory of Prof. Flückiger,
University of Strassburg,
February 17, 1891.

THE CHEMISTRY OF OPIUM.

By Alfred Dohme, Ph.D.

At the instigation of my esteemed instructor, Prof. Flückiger, I undertook to study the phenomena which present themselves when opium is dialyzed. When the investigation was first begun the prime object in view was to determine, if possible, to what cause the acid reaction of aqueous extract of opium was due and how morphine was combined in the drug. As the work progressed it was decided to study the relative quantities of the chief constituents of the drug and, if possible, then draw conclusions in regard to how these are combined in nature in the same. In how far this has proven successful the conclusions will show; suffice it to say here that the work was a very long drawn out and laborious one and not one of the results obtained with the ease which one is accustomed to in inorganic analysis. As is the case in every operation with drugs and plants of any kind, the numerous coloring matters, gums, resins and the many other amorphous sub-

stances of which we have but little definite knowledge save that they exist to worry the chemist, very much hindered the work in many respects. Dialysis was chosen inasmuch as by means of it it was hoped that all of the looked-for constituents would pass into solution while little or none of the undesired would follow suit. Besides this no operation was to be performed with the opium which might change the nature of combination of its various constituents. It had been observed by Flückiger that there is, in all probability, enough sulphuric acid present in opium to combine with nearly all of the alkaloids present. Whether or not, however, it is sulphuric acid or meconic acid that is in excess and hence free, as yet remained an open question. It is certainly very probable that if it were a question of which acid would first and most readily be neutralized by the bases, that sulphuric acid would be the one, although mass action might cause some of the meconic acid to be in combination at the expense of sulphuric acid. With this aim in view 50 grams of finely powdered opium were rubbed together with distilled water and the paste washed completely into a dialyser consisting of an oval gutta-percha ring covered with heavy parchment paper and immersed in a dish containing about five litres of distilled water. This was allowed to stand covered thus for nearly three months, the water being changed about twice a week. Even at the expiration of this time, sulphuric acid and alkaloids could be detected in the dialysate and as my time here was limited and the semester was rapidly drawing to a close, it was decided to finish the operation more expeditiously by exhausting the opium remaining in the dialyser with cold water. This last extract was treated separately although exactly in the same way as the greater portion. While this operation was quietly progressing, a complete analysis of the ash of opium (the same as was used for dialysis) was made in order thus to get a definite idea of the mineral constituents of the drug. Accordingly, 20 grams of finely powdered opium were carefully and gradually ignited in portions in a platinum dish. It was found very difficult to completely incinerate the drug, so that even after heating the dish to a bright red heat the resulting ash was quite dark, in fact nearly black. It was found very advantageous at this point to treat the mass with a little cold water and evaporate this off on a water-bath and, finally, again carefully heat and glow it over a free flame. By repeating this operation several times an ash was obtained which was very

nearly pure white in color. When weighed it yielded 3·89 per cent. of the original substance:

Platinum dish + ash, ... = 61·6052 gr.
" " alone, ... = 60·8281 gr.

Hence, ash alone, ... = 0·7771 gr.
and 20 : 0·7771 = 100 : x whence x = 3·89 per cent.

A complete analysis, the details of which it would be useless to enumerate here, gave the following results, these being expressed in per cent. of the ash weighed:

	Per Cent.
SiO_2,	11·14
P_2O_5,	8·07
SO_3,	28·39
Fe_2O_3,	1·98
CaO,	9·04
MgO,	8·31
K_2O,	30·19
CO_2, HCl and not determined constituents,	2·88
	100·00

The dialysate was next evaporated down in portions to about two litres upon a water-bath and the resulting deposit, consisting of coloring and other organic matter, as well as some calcium meconate, removed by filtration. The filtrate reacted acid to litmus and in it were detected morphine, narcotine, narceine, codeine, sulphuric and meconic acids. It was next acidified with hydrochloric acid, and after heating on the water-bath was treated with a boiling solution of barium chloride in excess. After standing over night the resulting barium sulphate was filtered off and washed out with hot water containing hydrochloric acid until it was white. It was then dried, ignited and weighed and yielded, with the portion that was similarly treated separately, the following figures:

Portion I—$BaSO_4$, ... 2·9236 grams.
Portion II— " . . . . . 0·3920 "

Total, ... = 3·3156

Equivalent to { 1·3945 grams H_2SO_4, or 1·1384 " SO_3 }

The filtrate from this precipitate was neutralized and precipitated in the cold with ammonia which was added in slight excess. After standing for several days the precipitated alkaloids were filtered off

and the filtrate again made ammoniacal and left stand, when more alkaloid was precipitated. This was continued until the resulting filtrate no longer gave a reaction for alkaloids. The various precipitates were then filtered off and dried at 80° C. to constant weight and regarded as the total alkaloids of the opium taken. They were then treated for several days with an excess of lime-water until this took up no more alkaloid. The remaining alkaloids were then filtered off, washed with slightly ammoniacal cold water and dried at 80° C. They were then weighed and regarded as narcotine. The results obtained are given below:

Porcelain dish + alkaloids (total), ... = 24·3023 gr.
" " alone, ... = 14·0465 gr.

Hence, total alkaloids found, ... = 10·2558 gr.

Narcotine (weighed on tared filter), ... = 4·3631

giving as the final result:

Morphine, 5·8927 grams { equiv. to 11·79 per cent.
Narcotine, 4·3631 " { " to 8·73 " "

The other alkaloids present in opium, such as codeine, narceine, papaverine, etc., were not considered separately as they, in all probability, play the same rôle with respect to the acids present as does morphine.

In a separate experiment with the same opium, which was dialysed in the same manner as that just described, the dialysate was shaken with amyl alcohol, the latter then separated and shaken in a separating funnel with a solution of sodium hydroxide for half an hour, and the alkaline layer separated as before. This was then acidified and a few drops of it, when brought in contact with a drop of a solution of ferric chloride, gave a beautiful wine-red color, thus showing the presence of meconic acid. Inasmuch as experiments with morphine and narcotine meconates had shown that neither of these are taken up by amyl alcohol, it follows that the free acid in the dialysate was meconic acid.

CONCLUSIONS.

(I) That the free acid in aqueous opium extracts is meconic acid.

(II) That the silica in opium is present in the form of sand, and that the lime is most likely combined with phosphoric acid, while the magnesia and potash are probably combined with organic acids and some sulphuric acid.

(III) That there is more than enough sulphuric acid present in

opium to combine with all of the alkaloids present save narcotine; for the 5·8927 grams of morphine, narceine, codeine, etc., found, require only 1·0133 grams of sulphuric acid to form the salts $(C_{17}H_{19}NO_3)_2\ H_2SO_4$, etc., whereas there were found in all 1·3945 grams of sulphuric acid; and

(IV) That hence, morphine, narceine, codeine, etc., are contained in opium combined with sulphuric acid as sulphates, while narcotine, at best only a feeble base, is combined in part, at least, with meconic acid, of which there is also some present uncombined in the drug.

In conclusion, I should like to take this occasion to thank Prof. Flückiger for the kind assistance and advice I obtained from him while working in his laboratory, and also Mr. J. E. Gerock, his excellent and kind assistant.

LABORATORY OF PROFESSOR FLUCKIGER,
UNIVERSITY OF STRASSBURG,
February 17, 1891.

KOCH'S LYMPH AND ITS DILUTIONS.

BY JOSEPH W. ENGLAND, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, March 17.

There is probably no remedy of modern times which has excited such widespread interest in medical circles and amongst the laity as the lymph or liquid introduced by Dr. Robert Koch, of Berlin, for the treatment of tuberculous conditions. The reasons for this interest are plain, in view of the difficulty of treatment, general fatality and wide distribution of the disease, and any remedy which promises relief is destined to receive a welcome royal. Indeed, such is the demand for a cure that, with the advent of a new remedy, the wish being father to the thought, greater properties are often claimed for the agent than by the discoverer himself. This is notably true of Dr. Koch's lymph.

The lymph has been used but limitedly in this country, for the reason that it has been very difficult to procure, and, if procured, it has been in limited quantities only. In Europe its use has been quite extensive, more especially in Germany. As to its exact therapeutical value, medical opinion is somewhat divided. It is generally admitted, however, that its introduction will open up a new world of therapeutical possibilities, in directing general

attention to medication with micro-organisms and their products and, for that reason alone, it is most valuable. Whether it will be of permanent service in relieving tuberculous conditions, time and trial only can tell. Its best field of usefulness seems to be in lupus and in the early stage of tuberculoses. In the advanced stages it is positively contra-indicated, as is also, in the opinion of some physicians, its use as a means of diagnosis.

The word "lymph" is a misnomer. It does not stand (in this connection at least) for the lymphatic fluid of the body, as might be supposed. It is a reddish-brown, viscid, glycerin-and-water solution; having a heavy narcotic odor, somewhat resembling that of opium, miscible with water in all proportions; neutral in reaction; reasonably permanent on exposure to air; sp. gr.[1] 1·150; and, in stronger solutions, becomes turbid upon the addition of alcohol.

With a *neutral* 10 per cent. solution, neither mercuric chloride, potassio-mercuric iodide, nor iodine and potassium iodide gave any precipitates, platinic chloride gave a yellow precipitate; silver nitrate gave a white precipitate, which, on boiling with strong nitric acid was partially dissolved; leaving a whitish residue entirely soluble in AmHO, and a yellow solution; barium chloride, and ferric chloride exerted no change; Fehling's solution showed no evidence of glucose, but its addition gave the pure violet reaction of albuminoids (which will be referred to later); lead oxyacetate solution gave a white precipitate soluble in excess; the flame test revealed sodium and not potassium.

If, however, following L. Reuter,[2] we use a slightly *acid* (HCl) 10 per cent. solution of the lymph, we get a heavy reddish-brown precipitate with iodine and iodide of potassium; likewise a precipitate with platinic chloride, and a faint one with potassio-mercuric iodide. Mercuric chloride causes no precipitation. Ferrous sulphate solution, slightly acidulated with H_2SO_4, yielded no precipitate on standing, indicating the absence of gold salts. This experiment was subsequently confirmed by adding auric chloride to the neutral solution, as well as to the acid. In both cases precipitates were formed.

[1] My experiment confirms the figures of Mr. Henry Campbell, in Brit. Med. Jour. 1891, 76.—J. W. E.

[2] Pharm. Ztg., 1890, 747, vide A. J. P., 1891, 19.

As regards Mr. Reuter's view "that the lymph is a neutral solution of the hydrochlorate of an alkaloidal body, possibly a ptomaine," since auric chloride, and iodine and potassium iodide solutions each gave precipitates with the acid solution, the statement seems doubtful, since solutions of iodine and potassium iodide, mercuric chloride, and potassio-mercuric iodide—all alkaloidal precipitants—do not precipitate the *neutral* solution. Further, Brouardel and Boutiny's test for ptomaines (of potassium ferric cyanide and ferric chloride), fails to reveal their presence.

Strong nitric acid by the "contact method," or the dilute acid solution placed in a very narrow tube and the upper part heated, showed the absence of albumen. The absence of peptones was indicated by the Biuret test (of $KHO,CuSO_4$ in *very dilute* solution, etc. Red or pink color, in the absence of albumen).[1] With the Biuret test,[2] however, the pure violet color of albuminoids (with no tinge of pink or red), was produced, just as it had been previously obtained with Fehling's solution.

To summarize, then, there are present sodium chloride, water, glycerin and albuminoids, the latter probably in the form of certain micro-organisms or their products, or both, and proteids. If the lymph is made by "culture" and there are proteids present for the growth and development of the colonies, it would presuppose that the finished product should also contain peptones, but the chemical reaction for peptones is negative. It seems, then, probable that the peptones, necessarily present if the "culture" has contained proteids and micro-organisms, have been removed by precipitation with sodium chloride or some peptone precipitating compound and filtered. Hence, the negative result for peptones with the Biuret test in the finished product. It is probable, also, that the proteids have likewise been removed; leaving a saline, watery, glycerin extract of the micro-organisms, or their products, or both.

The lymph used in the above examination was obtained by the Philadelphia Hospital through Minister Phelps, U. S. Minister at Berlin, and was kindly furnished me by Dr. D. E. Hughes, Chief Resident Physician of the Philadelphia Hospital.

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[1] Clinical Diagnosis, Jaksch and Cagney, p. 211.

[2] It may be of interest to state that the Biuret test, in the absence of albumen, produces a red or pink color when peptones are present; a violet color when albuminoids exist, and a reddish-violet color if there be present both albuminoids and peptones. Albumen alone gives a blue color.

The usual dose of the pure lymph is from $\frac{1}{10000}$ cc. to $\frac{1}{1000}$ cc., administered hypodermically, but the lymph itself is never used. In its place is employed one of three solutions—a 10 per cent., a 1 per cent., or a $\frac{1}{10}$th of 1 per cent. solution. The medium strength is in greatest demand. The weakest strength is used for children. If a solution becomes turbid on standing it is unfit for use.

For the purpose of administration, Dr. Koch has devised a special hypodermic syringe, having a rubber-bulb and a stop-cock at one end, to which is attached a glass tube ground at both ends (one end for the bulb attachment; the other for the hypodermic needle), having graduated upon it 1 cc. in ten subdivisions. This syringe is also very convenient with which to make the solutions.

All apparatus used in preparing the dilutions should be first thoroughly washed with a solution of carbolic acid ($\frac{1}{2000}$), and the syringe cleansed first with absolute alcohol and then with the carbolized solution. For making the latter use boiled, distilled water.

The formulas of the several solutions are as follows:

LYMPH SOLUTION NO. 1.

Lymph, ... ½ cc.
Carbolized water ($\frac{1}{2000}$), ... 4½ cc.

With a pipette of 1 cc. capacity (graduated into $\frac{1}{10}$) measure ½ cc. of the lymph, and deliver it into a 5 cc. measure. Wash pipette twice with the diluting liquid, add the washings to the lymph contained in the graduate and dilute the whole to 5 cc.

Label: Lymph Solution No. 1. (10 per cent.)

Each $\frac{1}{10}$ cc. equals, ... $\frac{1}{1000}$ cc.
Or 1 cc. equals, ... $\frac{1}{10}$ cc.

LYMPH SOLUTION NO. 2.

Lymph Solution No. 1, ... ½ cc.
Carbolized water ($\frac{1}{2000}$), ... 4½ cc.

Mix as before.

Label: Lymph Solution No. 2. (1 per cent.)

Each $\frac{1}{10}$ cc. equals, ... $\frac{1}{10000}$ cc.
Or 1 cc. equals, ... $\frac{1}{1000}$ cc.

LYMPH SOLUTION NO. 3.

Lymph Solution No. 2, ... ½ cc.
Carbolized water ($\frac{1}{2000}$), ... 4½ cc.

Mix as before.

Label: Lymph Solution No. 3. ($\frac{1}{10}$ of 1 per cent.)

Each $\frac{1}{10}$ cc. equals, ... $\frac{1}{100000}$ cc.
Or 1 cc. equals, ... $\frac{1}{10000}$ cc.

As regards the method of administration of the lymph, a letter by Dr. Libbertz accompanies it. Mr. Frank X. Moerk has kindly translated it as follows:

DIRECTIONS FOR USING LYMPH.

The lymph can be kept for a long time without decomposing. The dilutions, however, speedily spoil and become turbid; turbid solutions must not be used. To prevent decomposition of the dilutions they must be heated to boiling, after each opening of the container. Dilutions made with phenol solutions do not require this treatment.

The remedy is to be used subcutaneously, preferably between the shoulder blades or the hips. The injections are best made with Koch's syringe, sterilized by rinsing with absolute alcohol; abscesses by this procedure are positively prevented. In using an ordinary Pravaz's syringe, sterilize it as completely as possible by repeated washing with absolute alcohol; in this case, however, abscesses are not as certainly prevented.

The progress of the body temperature must be observed before the injection as well as after it. It is necessary to take the temperature every three hours for at least one day before the injection, and to provide for its continuance during the course of treatment. The injections should be made in the early forenoon, so that the effect on the temperature, noticeable after a few hours, may be followed the same day.

For the first injection 0·1 to 0·2 cc. of the 1 per cent. dilution should be used; in the following days the dose is carefully increased; if fever above 38·5° C. (101·3° F.) follows, the dose (previously given?) is repeated or even omitted; if no fever or a slight one follows, the dose may be increased 0·1 to 0·2 cc. of the 1 per cent. dilution. When the dose has reached 1 cc. (1 per cent.) or 0·1 cc. (10 per cent.) it may, with proper observation of the temperature, be increased from 0·1 to 0·2 cc. of the 10 per cent. dilution. As a rule, the *daily* dose should not exceed 1 cc. of the 10 per cent. dilution; only in exceptional cases is it necessary to increase to 2 cc. of that dilution. The injections are then repeated with intervals of one or more days until the symptoms disappear.

In the treatment of lupus (if not very extensive) adults may be injected at the first with 0·1 cc. (10 per cent.) solution, the injection to be repeated when necessary. This is also the case in articular, bone and glandular tuberculosis.

The proper comparison of the lymph can only be guaranteed if the lymph be obtained directly from the undersigned.

[SIGNED] DR. A. LIBBERTZ.

HEUCHERA AMERICANA, *LINNÉ.*

BY JOSIAH C. PEACOCK.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 85.

This subject was taken up at the suggestion of Prof. H. Trimble, and was worked under his instructions. The root used was collected

in the vicinity of the Falls of Schuylkill, Philadelphia, Pa. A collection of the root was made in the early part of July, 1889, and subjected to proximate analysis in December of the same year. The following constituents were found:

	Per cent. amount.
Fat, wax and caoutchouc,	·65
Gallic acid (trace) and resin,	·56
Tannin (5·55 per cent.), glucose (3 per cent.) and phlobaphene (?),	20·72
Glucose (6·09 per cent.), saccharose (3·17 per cent.), mucilage and tannin (·26 per cent.),	9·84
Albuminoids (1·5 per cent) and extractive soluble in dilute alkalies,	3·50
Calcium oxalate (1.2 per cent.) and extractive soluble in dil. hydrochloric acid,	4·85
Starch,	4·67
Moisture,	8·08
Ash,	6·14
Cellulose, lignin and loss,	40·99
Total,	100·00

The absolute alcohol extract was completely soluble in hot water, but the aqueous solution so obtained almost immediately deposited a heavy red-brown precipitate, which amounted to over one-half the total extract. The solution in water was red before and after this deposition. The corresponding extract of root collected in October was reddish-yellow, soluble in cold water, giving a solution of the same color, and was permanent for a reasonable time. The tannin was determined in the clear supernatant liquid; the color was carried down in the precipitate of the gelatin compound. This tannin gave with ferroso-ferric salts a dark blue precipitate. No phlobaphene was found in the alkaline (NaOH) extract. Starch was determined in a separate portion of the material.

Tannin.—To ascertain the amount of this constituent, several collections of the drug were made at different seasons of the year, and the estimations made while the material was fresh, that is, on the day following the collection. The method of procedure was to make a decoction of the drug, to precipitate the tannin in this with gelatin in the presence of alum, to dry and weigh this precipitate after washing it with boiling water to remove alum, and to take 54 per cent. of this as the equivalent of this tannin in gallotannic acid. The average of three closely agreeing results was used. All the

decoctions were of a light chocolate color, with a slight fluorescence, and of a radish-like odor; but varied in the strength of their acid reactions. The filtrates from the precipitates of the gelatin compound were in all cases clear and colorless. In the following chart, the first column marked "moist" indicates the percentage of tannin found in the drug as collected. That marked "dry," in the second column, indicates the percentage of tannin calculated for the absolutely dry drug. The third column indicates the percentage of moisture found.

Time of collection.	Per cent. of tannin.		Moisture.	Starch calculated for absolutely dry.
	Moist.	Dry.		
July 1, 1889,	—	—	—	5·17
May 1, 1890,	2·41	9·33	74·18	
June 20, 1890,	3·98	10·68	62·74	
June 25, 1890,	4·16	12·75	67·38	
August 6, 1890,	5·18	17·91	71·08	
October 5, 1890,	4·73	19·66	75·95	4·64
January 15, 1891,	6·91	13·65	49·40	
March 10, 1891,	4·63	14·75	68·60	13·62

The lot of June 20th was collected from plants that had not bloomed; around these were found plants that were in bloom. The collection of June 25th consisted of roots from plants that had flowered, as the calyx remnants were found, and the inner whorls were absent. No special influences were connected with the May, August and October drug. The roots gathered on January 15th were dug from frozen ground and had been under snow for some time. The leaves were adhering. The lot of March 10th was also dug from frozen ground but had not experienced recent snow.

For the examination of the tannin, some of the drug was exhausted with commercial ether, the solvent recovered by distillation; the extracted matter dissolved in water, fractionally precipitated with lead acetate, the first precipitate rejected, the others washed, suspended in water and decomposed by hydrogen sulphide, the lead sulphide removed by filtration and the tannin solution concentrated by distillation under reduced pressure. The concentrated solution was shaken several times with stronger ether, separated and distilled to dryness under the above conditions. The material so obtained

was dark brown, porous, very slowly soluble in cold, readily in hot water; these solutions were strongly acid. Cold water containing a small amount of ammonia readily dissolved it giving a dark red solution, from which an excess of acetic acid precipitated a dark brown substance.

A one per cent. solution reacted as follows:

Gelatin, ...	reddish yellow precipitate.	Ferric chloride, . (acid)	dark green precipitate.
Tartar emetic, . . and with	same.	Ferric chloride, . (neutral)	dark blue precipitate.
Ammon. chloride,	same.	Ferric acetate, . .	same.
Lead acetate, . .	drab precip.	Ferrous sulph., .	no change.
Copper acetate, .	brown precip.	Fehling's solution,	reduced.
Ammon. molybd, and nitric acid,	dark green precipitate.	Silver nitrate, . .	no change; when boiled reduced to metallic state.
Lime water, . . .	dark purple precipitate.	Copper sulphate, .	no change.
Uranium acetate, .	red brown precipitate.	and with Ammon. hydrate,	dark brown precipitate.
Potass. bichrom.,	dark brown precipitate.	in excess.	

Gallic Acid.—The moist roots, finely cut, macerated with stronger ether, yielded to this solvent but a small amount of extract, which when treated with water showed this acid to be present as follows: In roots collected, in warm weather, faint traces, and in those gathered in colder seasons more, although at no time amounting to more than distinct traces. The same treatment of the July, 1889, lot, at the present time, showed considerable to be present.

Starch.—This constituent was determined in the original drug, and all of the three estimations, mentioned above, were carried out at the same time. The great difference in amount between October and March drug was also noticed under the microscope. That collected in March showed the cells loaded with starch granules, while in that collected in October the cells were almost free from starch.

WHAT IS ARISTOL, AND HOW IS IT MANUFACTURED?

By George M. Beringer, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, March 17.

The search for a substitute for iodoform, possessing similar antiseptic properties, but devoid of its disagreeable odor, has enriched our materia medica with several other valuable iodine products, such as iodol, soziodol and bismuth sub iodide. Recently attention has

been directed to the iodine products of the phenols, resulting in the introduction in practice of an iodine compound of thymol under the proprietary name of Aristol. And it has also been discovered that similar products may be produced with phenol, naphthol, resorcin, salicylic acid and carvacrol. It must, however, be borne in mind that none of these contain so large a percentage of iodine as iodoform, and to possess equally valuable properties must in a measure depend upon the known antiseptic value of their organic bases.

The exact composition and mode of manufacture of aristol has not been published by the manufacturers, they contenting themselves with the statement that it was an iodine derivative of thymol and differed from the formulas and products published by various investigators.

J. Messinger and G. Vortmann, who first reported upon these iodine derivatives of the phenols (*Ber.*, xxij, 2012, see *Journal Chem. Society*, 1889, 1150), stated that their product, obtained by adding a solution of iodine in potassium iodide to a solution of thymol in potassium hydrate, was a brownish-red amorphous compound having the *composition of di-iodo-thymol* ($C_{10}H_{12}I_2O$). This compound, they state, retains its color many months when preserved in the dry state in the dark, but decomposes on exposure to light or moisture with the liberation of iodine into a yellow compound, an iodine derivative, most likely of dithymol. This yellow substance is also formed when the brownish-red compound is boiled with water, aqueous alkalies or sulphites or thiosulphites. The same writers subsequently proposed the adoption of this reaction for the volumetric estimation of phenols,[1] and state that one molecule of thymol requires four atoms of iodine for complete precipitation, a

[1] The process given for phenol is as follows: One molecule of phenol requires 6 atoms of iodine. 2 to 3 gm. of phenol is dissolved in solution of NaHO using at least 3 molecules NaHO. It is diluted to 250 to 500 cc. and 5 or 10 cc. of this solution is taken in a flask maintained at about 60°; then $\frac{n}{10}$ iodine solution is added until a dark yellow solution is obtained, which on shaking forms a bright red precipitate. After cooling the solution is acidified with dilute H_2SO_4 and diluted to 250 to 500 cc., filtered and an aliquot portion (100 cc.) titrated with $\frac{n}{10}$ sodium thiosulphate solution by which excess of iodine remaining is determined. The amount of iodine used $\times$ factor $\frac{93.78}{759.24}$ = 0.123518 gives the quantity of pure phenol.

For Thymol: Iodine precipitates from alkaline solution of thymol a red

statement which is confirmed by my experiments. Dr. F. Goldman (*Apoth. Zeit.*, 1890, 45; also, AMER. JOURN. OF PHARMACY, 1890, 129) states that aristol or *di-iodo-dithymol* is made by the action of a solution of iodine in potassium iodide upon a solution of thymol in sodium hydrate. The same statement is made by Dr. Eichhoff (*Pharm. Journ. and Trans.*, 1890, Febr., page 601).

The writer could find no published chemical examination of the commercial aristol, and several other iodine compounds with thymol are possible. And, as the precipitate obtained by adding iodine in potassium iodide solution to an alkaline thymate solution was so different, it became necessary to make some examination of the article supplied under that name before answering the first part of this query.

An original package of that supplied by the "Farben Fabriken" Company of Elberfeld was obtained, and upon examination showed the following characteristics: a pale yellowish red amorphous powder, easily soluble in ether, chloroform, benzene and petroleum ether, and less soluble in alcohol. It was insoluble in water, but yielded to that liquid a slight trace of chloride. Heating it on the water bath it became lighter in color and at 65° C. it gave off sufficient iodine vapors to blue a piece of filter paper moistened with starch solution. On heating at 100° C. for 4 hours it lost 6·4 per cent. and after 6 hours 7·4 per cent. It darkens at 124° to 126° C., shrivels into a dark mass at 134° to 136° C. and fuses at 158° C., and yielded on incineration nearly one per cent. of ash, which reacted for sodium chloride.

1 grm. intimately mixed with pure calcium oxide, and a combustion made thereof, yielded, upon precipitation, ·745 grm. silver iodide, corresponding to 40·25 per cent. of iodine. A combustion

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brown flocculent precipitate whereby for 1 molecule thymol used 4 atoms of iodine are required. The used quantity of iodine is $\times \frac{149{\cdot}66}{506{\cdot}16} = 0{\cdot}2956772$.

Process 0·1 to 0·3 grm. thymol is dissolved in NaHO (4 mols. for each molecule of thymol) treated with $\frac{n}{10}$ iodine solution. The solution acidified and the remaining iodine determined as in the phenol investigation.

β-naphthol gives under similar conditions a dirty green precipitate, and is determined by the same method. The factor is likely $\frac{143{\cdot}66}{379{\cdot}62} = 0{\cdot}37843106$.

The alkali used must be nitrite free.—*Chem. Zeitung*, 1890, page 291.

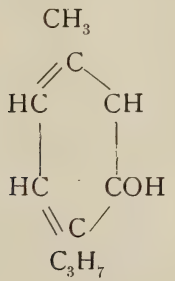
made with sodium carbonate yielded ·777 grm. silver iodide corresponding to 41·98 per cent. of iodine. Heating ·2 grm. in a sealed tube with silver nitrate and nitric acid (Carius' method) ·155 grm. silver iodide was obtained corresponding to 41·87 per cent. of iodine.

On repeating the experiments of Messinger and Pickersgill (*Ber.* 23, p. 2761, see *Jour. Chem. Soc*, 1890, 1403) and reducing aristol by dissolving in ether and adding solution of potassium hydrate in alcohol and then zinc dust gradually in small quantities and boiling on the water-bath in a reflux apparatus, and finally boiling off the alcohol, maintaining the bulk of the liquid by the addition of water; the liquid thus obtained was filtered from the excess of zinc, acidulated with sulphuric acid, and extracted with ether. The product was purified by redissolving in alcohol, and yielded a compound possessing a peculiar odor of thymol almost phenol-like. It gave no reaction with ferric chloride, and although impure corresponded fairly well with the properties assigned to *dithymol.*

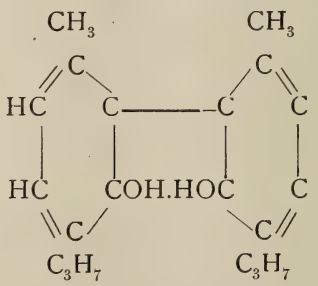
Dithymol was first obtained by Dianin (see *Jour Chem. Society*, 1882, 130), by treating thymol with neutral ferric chloride or sulphate or ferric alum, the reaction being represented by the equation

$$2C_{10}H_{14}O + Fe_2(SO_4)_3 = C_{20}H_{26}O_2 + 2FeSO_4 + H_2SO_4$$

The relation between thymol and dithymol is graphically represented by



Thymol.



Dithymol.

Goldman (loc. cit) states that aristol is di-iodo-dithymol $C_{20}H_{24}O_2I_2$, containing 45·8 per cent. of iodine. Accepting his formula, there should be, by calculation, 46·15 per cent. of iodine. But the manufacturers drying the product at a low temperature to prevent decomposition, there must be some water retained, and the loss on heat-

ing on the water-bath, determined above as about 6·4 per cent., must be due mainly to water. Allowing two equivalents of water to be in combination, there would be present 6·14 per cent. of water and 41·96 per cent. of iodine, figures that closely agree with the results obtained by me, the average of the three determinations of iodine being 41·36 per cent. From these experiments we are compelled to accept the statement that aristol is a biniodide of dithymol, in which the hydrogen of the hydroxyl groups is replaced by iodine and is represented by the formula $C_{20}H_{24}I_2O_2.2H_2O$.

A formula based upon the experiments of Messinger and Vortmann would be:

Thymol,	15 gm.
Soda,	20 "
Iodine,	50·8 "
Potassium iodide,	66·4 "

The thymol and soda are dissolved in 250 cc. water. The iodine and potassium iodide in 1,000 cc., and gradually added to the first solution, continually stirring. The precipitate is collected, washed and dried. The precipitate obtained by this formula was at first of a purple-brown color, but while drying gradually became lighter in color, until when dry it was of the same yellow-red color as the commercial article. The filter on which the precipitate was collected and dried was stained with iodine. The filtrate gave no indication of free iodine, and a portion acidulated and extracted with ether yielded no thymol, showing that the reaction was complete. It is not believed that this is the process adopted by the manufacturers, as it requires the use of a large amount of iodide of potassium and iodine. The greater portion of the latter being lost in the drying of the precipitate.

The following formula is offered as an economical process:

Thymol,	15 gm.
Soda,	20 "
Iodine,	6·35 "
Potassium iodide,	8·3 "
Solution of chlorinated soda, a sufficient quantity.	

The thymol and soda are dissolved in 250 cc. of water. The iodine and iodide of potassium are also dissolved in 250 cc. of water and the two solutions mixed, resulting in an opalescent solution with a dis-

tinct green tint, the slight precipitate first formed being redissolved. Solution of chlorinated soda is now added gradually while stirring until no further precipitation is produced, and a slight excess is indicated by the odor. About 650 to 700 cc. will be required. The precipitate, a light red brown in color, is collected, washed and dried, by spreading on bibulous paper in a suitable room where it can be protected from the light, at a temperature not exceeding 50° C. The filtrate showed the absence of iodides in any quantity, and a portion acidified and extracted with ether yielded no thymol. The yield by this and the preceding formula was about 29 grm., corresponding in color, melting point and solubilities with the aristol in the market and closely approximating the theoretical yield 29 285 grm. calculated from the formula $C_{20}H_{24}I_2O_2.2H_2O$.

The thymol used in this formula must be free from essential oil or thymene or there is produced some iodoform in the reaction which remains as a contamination of the finished product. As most of the commercial thymol contains a small portion of hydrocarbon it must be first purified, which is easily accomplished by percolating the powdered thymol with a small quantity of purified benzin which dissolves of course a portion of the thymol as well as the thymene, but it can be recovered by evaporation of the solvent and used for other purposes. The solution of chlorinated soda used should contain no excess of chlorinated lime, and in its preparation for this purpose, it is advisable to use an excess of sodium carbonate as an excess of this latter salt does not affect the product.

In Répertoire de Pharmacie, 1890, page 355, M. Louis Boulé furnishes the following formula for the preparation of aristol: Crystallized thymol, caustic soda and potassium iodide each 5 grams, dissolved in 50 cc. of water and then poured into 250 cc. concentrated solution hypochlorite of soda. It will be observed on calculating the quantities used that there is an insufficient amount of iodine supplied by the potassium iodide to furnish a product of the above composition. In the absence of sufficient iodine a certain amount of the thymol combines with the chlorine. Upon adding solution of chlorinated soda to an alkaline thymate solution there is precipitated a compound of a pinkish tint soluble in ether, alcohol and chloroform and precipitated from its alcoholic solution by water. The filtrate from this precipitate yields but a slight trace of thymol upon acidifying and extracting with a solvent. A similar

product is obtained by passing chlorine into an alkaline solution of thymol until there is a decided excess of chlorine.

These are evidently chlorine compounds with thymol, most likely a dithymol compound, and worthy of further investigation.

ANTIKAMNIA.

By F. W. Haussmann.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, March 17.

Samples of this new antipyretic, for which extravagant virtues have been claimed, were recently distributed among a number of physicians by a St. Louis firm. Its basis is stated to be an amido derivative of benzol, which differed from the numerous recently introduced organic antipyretics and anodynes by leaving no ill after-effects. Headache, neuralgic afflictions, rheumatism, etc., were claimed to be beneficially influenced by the specific, and the above statements have induced a number of physicians to prescribe the article.

Several peculiarities in its physical condition, especially its taste and behavior to solvents, gave rise to the suspicion that a mere mixture of several compounds was under examination. It occurs in a white, dry powder, resembling antipyrine to some extent, without odor and of a somewhat burning taste. When thrown into water or placed on the tongue a slight effervescence is observed. About 50 per cent. of it is soluble in cold water, and both the physical and chemical behavior prove this to be mainly bicarbonate of sodium.

The solution effervesces strongly with dilute acids and when a drop is held in the flame of a Bunsen burner, the characteristic yellow sodium color is observed. The acid, which produces the effervescence stated when thrown into water, is believed to be tartaric, as the tests for the latter answer readily.

Phenol compounds, such as salicylates or antipyrine, are not present, neutral ferric chloride giving no color reaction. The portion left undissolved by water, was already from its physical peculiarities suspected to be antifebrin or acetanilid. Chemical examination readily proved this to be the case. When heated with caustic potassa or soda in the presence of chloroform the characteristic isonitrile odor is developed. Heated with strong nitric or sulphuric

acid the odor of acetic acid is evolved or if an addition of alcohol is previously made, that of acetic ether.

Alkaloids, especially caffeine, which was at first suspected, were not found, no reagents giving any indication.

We may sum up the compound to have about the following composition:

Antifebrin or acetanilid,	47 parts.
Bicarbonate of sodium,	50 "
Tartaric acid,	3 "

Incidentally may be mentioned, that the mixture can be prepared for about 10 cents per ounce, for which the manufacturers charge $1.10.

POLARIZATION WITHOUT A POLARIZER.

By P. H. Van der Weyde, M.D.

To the Editor of the American Journal of Pharmacy:

Under this heading, Mr. H. M. Wilder published in The American Journal of Pharmacy the announcement that he "accidentally made a quite useful discovery." It appears that the study of one of the most interesting branches of physics, the polarization of light, has thus far been lamentably neglected, as proved by the fact that this announcement is now going round the press without remark or comment (see Scientific American Supplement, No. 793, and other scientific papers) wherefore I may be allowed to give to your readers the following items of information.

The discovery that certain regions of the atmosphere polarize the sunlight was made by Arago in 1809; he went further, and determined the regions of maximum and minimum polarization, the latter he found 11½° above the sun a little before sunrise and a little time after sunset, and also 11½° above the opposite point of the heavens, while the maximum polarization takes place in a circle or belt situated exactly 90° from the sun as centre.

As the position of this polarized circle of light is continually shifting with the position of the sun, and is only sufficient for practical purposes when the mirror of the microscope reflects the light from this belt, microscopists found difficulty to obtain sufficient light from it, and it never came in use; in consequence, it appears at present to be entirely forgotten.

As soon as I came in possession of a polarizing microscope, 50

years ago, I tried to make use of this then well-known property of the atmosphere, but soon gave it up for reason of the loss of time involved by the continual readjusting of the position of the instrument, and especially by the want of sufficient sky surface to which most residents of large crowded cities are subject. I therefore devised in its place a very cheap, steady and reliable polarizer, consisting of a piece of plate glass, ground and blackened at the back surface, and attached under the stage at the angle for maximum polarization which for reflection from plate glass is 56½°. This device is equally good by night or day, clear or clouded sky, the only precaution is to place the microscope in such a position that the light reflected by this fixed mirror is directed through the axis of the tube. It is as good a polarizer as a large Nicol prism, and far better and more available than the blue sky.

Hagenbach observed that not only the light of the blue sky is polarized, but also that light which the sun sends through such layers of air as are between distant mountains and our eyes. The polarization is especially strong when the background is dark and the intervening layers of air not too small. When the distant mountains become indistinct by the action of the reflected light of the intervening layers of air, the mountain may again be very distinctly seen, when a Nicol prism or analyzer is placed before the eye piece of the telescope. He tested this by looking during a clear day at the Alps from such a great distance that they could no more be distinctly seen, even by a telescope; they became at once clearly and sharply defined, when he placed a Nicol prism before the eye piece, or even before the naked eye, rotating the prism until the proper position was obtained.

It is unfortunate that in clouds and fogs no polarization takes place, otherwise a Nicol prism would enable us to make our vision penetrate in certain directions. Experiments have been made, but, of course, without success.

Polarization of Pure Water.—It was suspected that water, when pure enough, would polarize the light according to the same laws as the pure blue atmosphere; this was found to be actually the case by Soret, who experimented in the pure blue waters of the Swiss lakes, using for that purpose a tube, with a piece of plate-glass fixed water-tight on the lower end, while the upper end carried a Nicol prism. It is essential in this experiment that the

lake is so deep that the bottom cannot be seen, and also that the surface is smooth, as otherwise the solar rays do not enter the water parallel. When the sun does not shine on the water the polarization is very imperfect, as then the light enters it from many different sides, and even when the sun shines the polarization is imperfect for the same reason, because light enters it from various directions, while the blue atmosphere is only illuminated by the great luminary, the sun.

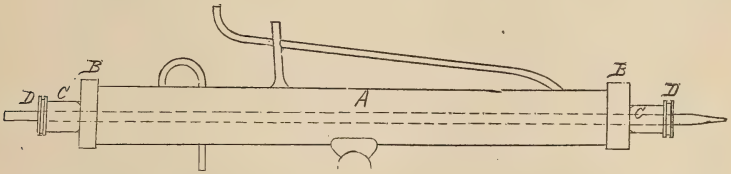
Wheatstone's Polar Clock.—A very ingenious application of the polarization of the well-defined regions of the blue sky has been made by Wheatstone in his so-called Polar Clock, by which the hour of the day may be ascertained by observing in the blue sky, in the direction of the celestial North Pole, the atmospheric polarization and its amount. The instrument consists of a tube placed parallel to the terrestrial axis, so as to give it a fixed direction in space not influenced by the earth's rotation. It is fitted at one end with a double image prism, as an eye piece, and has at the other end, directed to the North Pole, a small hole covered with a thin plate of selenite, of which, when looking through the prism, two images may be seen of opposite color. This double image prism is capable of rotation, and carries an index, which points the hour marked on a half circle. As the maximum plane of polarization is always seen 90° from the sun, the index will point to the right hour, when, by rotating the prism, the position is obtained showing no color in the two selenite images seen. Of course, the prism must be fixed once for all in the right position by trial, and when once properly placed, the solar time may be found without making use of the sun itself, and even when the sun is invisible, either behind a cloud or below the horizon, during the twilight morning or evening; then the hour may be found by the observation of the illumination of the atmosphere, because the shifting polarization moves with the sun and may be observed when only the blue sky at the North Pole is illuminated by the solar beams, while the sun itself may be still under the horizon, as is the case one or two hours before sunrise or as much after sunset.

Boric Acid in Constipation.—Dr. Platan, of Berlin, suggests the insufflation into the rectum of a pinch of boric acid, to relieve constipation. The results are said to be excellent even in severe cases in which mechanical measures have failed.—*Med. News*, Feb. 7, 1891.

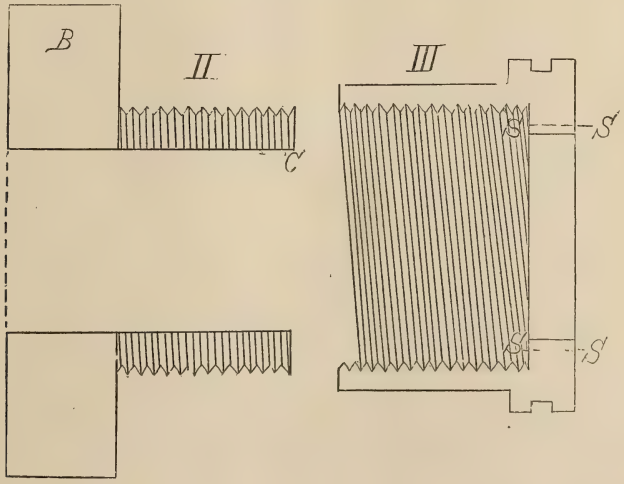
AN IMPROVEMENT IN LIEBIG'S CONDENSER.

By George M. Beringer, Ph.G.

Every one who has worked with the ordinary Liebig's condenser is familiar with the difficulty of making a water-tight connection between the glass tube and the cork and also between the outer metal tube and the cork. In the condenser shown the cork is replaced by a stuffing-box like arrangement at each end.



The condenser consists of the usual metal tube A with inlet and outlet tubes for the water supply. To each end of the tube is soldered a heavy metal reducing shoulder B to which is attached a short metal tube C, the diameter of which is slightly larger than the condensing tube of glass used. A screw thread is cut on the outside of this tube and the metal cap D is cut with corresponding thread.



It has a small shoulder or ledge at the head where the pressure is applied to the packing. Fig. III, S.

The glass tube being placed in position, a layer of packing is

wrapped around it at the places of exit through the small tube C attached to the shoulders. The ball lamp wick used for alcohol lamps I have found to make an excellent packing. The caps are now screwed down so as to impinge on the packing and tightly compress it in the shoulder of the cap and against the glass tube making a water-tight connection.

Figs. II and III are full-sized representations of the arrangement of the ends of the tube and of the cap.

BENZOIN AND PREPARATIONS OF BENZOIN.

ABSTRACTS FROM THESES.

Of seven commercial samples of benzoin examined by Luther G. Harpel, Ph.G., two specimens, Nos. 2 and 3, consisted of distinct tears of Siam benzoin not agglutinated by darker colored resin. No. 7 contained very few white tears, but a large proportion of fragments of bark and other vegetable matter. The remaining specimens were amygdaloid benzoin in which the amount of bark was smaller than in No. 7, but was not estimated, and in which the tears varied more or less in amount and size. The amount of benzoic acid was determined by Scheele's process with lime, and by the process of Bucholz with sodium carbonate, using alcohol for dissolving the benzoin as suggested by Stoltze. The test for cinnamic acid was made with potassium permanganate added to the acids after having been liberated from the lime solution, the odor of benzaldehyde being produced in the presence of cinnamic acid. The following table gives the results obtained.

Samples	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Scheele's process,	8·00	7·00	8·00	4·00	8·6	4·7	3·00 p.c.
Stoltze's "	8·25	7·50	7·75	4·00	9·00	5·00	3·00 p.c.
Bitter Almond Odor,	strong	none	none	decided	decided	strong	strong

Adeps benzoinatus of good quality is obtained by following one of the three methods described below, as suggested by John N. Prass, Ph.G. Concentrate upon a water-bath 1¾ fl. oz. of tincture of benzoin; to the residuary thick liquid add in small portions and incorporate well 16 oz. of lard; digest the mixture in a water-bath for about two hours until the alcohol has been driven off; strain through cotton flannel and cool. Or two parts of benzoin in No. 40 or 60 powder is incorporated with 100 parts of lard, the mixture

heated on a water-bath for about an hour and strained as before. A third method consists in thoroughly mixing 15 parts of lard with 1 part of *benzoinated oil*, which is prepared as follows:

Macerate benzoin in coarse powder, 1 oz., with ether 3 fl. oz., until dissolved, filter, add 3 fl. oz. of castor oil, shake well, remove the ether by evaporation or distillation, and add sufficient castor oil to make it measure 4 fl. oz.

Syrupus benzoini.—Rub tincture of benzoin 1 fl. oz., with magnesium carbonate 120 gr., and sugar 1 oz., then triturate with 8 fl. oz. of water, filter, add 12 troyounces of sugar, and dissolve with the aid of a gentle heat. When first made the syrup is of a somewhat lighter color than syrup of tolu; but upon straining it becomes of a golden yellow, slightly tinged with green. Its flavor is agreeable vanilla-like and preferable to that of tolu. It may be prepared extemporaneously from:

Soluble tincture of benzoin, which is obtained as follows: Mix 3 fl. oz. of alcohol with 8 oz. of glycerin; dissolve in this liquid upon a water-bath, 1½ oz. of benzoin; add 6 fl. oz. of water and set aside until cold; decant from the precipitated resin the milky liquid; triturate this with 120 gr. of magnesium carbonate, filter, and pass through the filter sufficient of a mixture of one volume of alcohol and two of water to make the whole filtrate measure 16 fluidounces. It forms a yellow or light brown liquid of an agreeable odor; and by mixing one measure of it with three measures of simple syrup, will yield a pleasantly flavored syrup which, however, is not equal in color or in balsamic properties, to the syrup prepared by the preceding formula.

Syrupus benzoini compositus has been prepared from the pharmacopœial compound tincture of benzoin by Harry H. Swainbank, Ph.G., and has been prescribed by several physicians who found it quite beneficial, particularly in combination with stronger expectorants, like ammonium chloride, etc., with which a very agreeable and efficacious cough syrup may be prepared. The syrup is best made from the tincture with the aid of magnesium carbonate, by mixing 30 gr. of the latter with 2 fl. drachms of the tincture, adding 2 fl. oz. of water, filtering, washing the filter with sufficient water to make the filtrate measure 2 fl. oz., and dissolving in this 3 troyounces of sugar. Thus prepared the syrup is clear, of a dark amber color, and has a pleasantly bitter and aromatic taste.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

The adulterations of powdered mace generally consist in the addition of Bombay mace or of other vegetable material (leguminous fruits) colored with turmeric. The presence of the latter is revealed by the finding of starch cells under the microscope, pure mace not containing starch. Bombay mace may be detected by boiling the suspected sample with alcohol and filtering through a white filter; in the case of pure mace the filter is stained a faint yellow, but in the presence of Bombay mace the filter, especially the edge, is colored red; if the quantity of the adulterant is very small the coloration shows only after drying the filter. Another and more delicate test is to add Goulard's extract to the alcoholic filtrate; with pure mace only a *white* turbidity is occasioned, but in the presence of Bombay mace a *red* turbidity or precipitate, dependent upon the quantity, is obtained. Turmeric will give a similar reaction, but the following test will decide upon the presence of turmeric or Bombay mace; a strip of filtering paper is saturated with the alcoholic solution, the excess of liquid removed by pressing between filtering paper and the strip drawn through a cold saturated solution of boric acid; if the adulterant was Bombay mace the paper remains unchanged while in the presence of turmeric the paper changes to orange or even brown. The addition now of a drop of potassium hydrate solution to the strip causes a blue colored ring, if turmeric is present, or a red ring in presence of Bombay mace.—Dr. Hefelmann, *Pharm. Ztg.*, 1891, 122.

Styracol, the cinnamic ether of guaiacol, is the successor of benzosol (Am. Journ. Pharm., 1890, 444) as a remedy for phthisis. It is claimed that styracol is readily decomposed, when taken internally, into cinnamic acid and guaiacol, the latter being the remedial agent. The new compound is made by mixing equal molecules of guaiacol and cinnamyl chloride, allowing to stand for two hours and then warming upon a water-bath; extracted with boiling alcohol, the styracol separates, on cooling, in long needles which, purified by recrystallization from alcohol, melt at 130° C. This substance is not likely to be more successful than benzosol because, as Sahli has proven, guaiacol acts directly upon the stomach; whereas benzosol is only decomposed into its components—guaiacol and benzoic acid—in the intestines.—Dr. A. Haas, *Südd. Apoth. Ztg.*, 1891, 55.

Phenerythen is the name proposed for the red coloring principle formed in the liquefied portions of carbolic acid (Am. Jour. Pharm., 1891, 133) in presence of minute traces of metal ; by percolating red carbolic acid with benzin, the coloring matter can be removed, the purification being a mechanical one by displacement.—E. Fabini, *Pharm. Post*, 1891, 105.

Linden-oil, obtained from the seeds of Tilia parvifolia, *Ehrh.*, var. intermedia, *D. C.*, which contain about 58 per cent., has properties that should warrant its extraction on a large scale. In color and taste it is equal to the best olive oil ; it is a non-drying oil and will not become rancid ; exposed to low temperatures (— 21·5° C.) it does not congeal.—C. Müller, *Pharm. Ztg.*, 1891, 97.

Pyroxylin.—It may happen that in the making of this substance the nitrating of the cotton is excessive, yielding a product insoluble in the mixture of alcohol and ether ; to remedy this Dr. Weiss advises macerating in water of ammonia for 24 hours, expressing and again macerating for 24 hours in water of ammonia ; after washing and drying a pyroxylin is obtained yielding a very satisfactory collodion.—*Pharm. Ztg.*, 1891, 113.

Absorbent cotton.—An examination of a number of samples of absorbent cotton (treatment with ether in a Soxhlet's extraction apparatus) proved the presence of fatty acids and resinous matter, in all samples, varying from 0·5 to 1·15 per cent. Investigation disclosed that to meet popular favor the cotton, after having been freed from fat and resinous matter, was again passed through a soap solution and then through dilute acid ; this precipitates upon the fibre a small quantity of fatty acids, which give to the cotton the pure white color and the peculiar feel. Extracting several samples of carefully prepared absorbent cotton with ether, a residue of resinous nature was obtained which in no case exceeded 0·16 per cent.; this represents constituents of the cotton insoluble in boiling dilute alkali or else is a product of the action of alkali upon cotton. The following is suggested as a requirement of absorbent cotton : 20 gms. extracted with ether should, after the evaporation of the ether, leave a residue, dried at 80° C., weighing not more than 0·03 gm.

In this investigation the materials used in bandaging (mull and cambric) were also included and these were found to give to ether

less than 0·15 per cent. resinous matter, indicating that these materials are not subjected to the soap and acid treatment.—Dr. A. Link, *Phar. Centralhalle*, 1891, 101.

Aseptic Eye-water—Franke recommends adding to 10 gm. of solutions of cocaine or atropine *two* drops of a one per cent. solution of mercuric chloride; this will keep these solutions aseptic for years. —(Wiener M. Bl.) *Phar. Centralhalle*, 1891, 109.

Soap-analysis—J. Pinette proposes the following simple method: 2 grams are dissolved in boiling neutral alcohol, any residue must be further examined. To the solution are added a few drops phenolphthalein and, in case an alkaline reaction is indicated, titrated with $\frac{n}{10}$ sulphuric acid; the neutralized solution is diluted with water to 100 cc., and transferred to a burette holding 230 cc., and graduated in 0·5 cc. to 200 cc., after cooling, 10 cc. normal sulphuric acid are added and the burette filled to the highest mark with a mixture of equal volumes of ether and petroleum-ether. The stopper is inserted, tied down, and the burette gently agitated until the fatty acids are dissolved; when the contents have completely separated, the volume of each layer is noted. To determine the fatty acids 25 cc. of the ethereal solution is removed with a pipette evaporated, dried and weighed. To determine the alkali in combination with fatty acids 25 cc. of the acid aqueous solution is removed and the excess of sulphuric acid determined by titration with $\frac{n}{10}$ sodium hydrate.—(*Chem. Ztg.*) (*Ztschr. f. Nahrungsm. Unters. u. H.*,) 1891, 27.

Cantharidin is Professor Liebreich's remedy for tuberculosis, administered by hypodermic injections. The solution used is made as follows: 0·2 gm. cantharidin and 0·4 gm. potassium hydrate (0·3 gm sodium hydrate) are warmed with 20 cc. water in a water-bath until solution is effected; this solution is diluted with warm water and after cooling made up to one litre. Cantharidin $C_{10}H_{12}O_4$ is the anhydride of cantharidic acid, $H_2C_{10}H_{12}O_5$, and in the above solution exists as cantharidate of potassium (or sodium) $C_{10}H_{12}K_2O_5$. The initial dose represents 0·1 mg. cantharidin which is gradually increased to 0·6 mg.; the remedy as yet has only been used in affections of the larynx and is easily tolerated by the system. Professor Fränkel, upon whose patients the experiments were made, emphasizes the statement that the bacilli become scarcer and thinner

under the treatment. Its action depends upon inducing a serous transudation in the diseased parts.—*Apotheker Ztg.*, 1891. 122.

Naphthalin-Camphor.—30·0 naphthalin and 10·0 camphor are melted by aid of a steam-bath and poured into suitable moulds or containers.

Perfumed Naphthalin-Camphor.—300·0 naphthalin and 100·0 camphor are melted and the following added: Coumarin 0·2, nerolin 0·2, nitrobenzol 1·0.

Soap plaster with salicylic acid.—850·0 white soap plaster and 50·0 filtered yellow wax are melted together, allowed to cool a little and 100·0 finely powdered salicylic acid incorporated; spread upon shirting.

Extract of malt with cod-liver oil.—50·0 moderately warmed malt extract are triturated with 50·0 cod-liver oil added in small portions so as to insure thorough admixture; if the preparation becomes too thick add a small quantity of water.

Glycerin-gelatin, a basis for suppositories, bougies, etc., may be made either hard or soft. *Hard:* 25·0 gelatin are covered with 70·0 distilled water, allowed to stand a few hours, 50·0 glycerin added and warmed in a steam bath until the mass weighs 100 0. *Soft:* 15·0 gelatin, 45·0 distilled water and 50·0 glycerin are proceeded with as before.

Kola-liquor.—250·0 roasted kola-nuts, in moderately fine powder, 2·0 powdered cochineal, 100·0 arac and 3330·0 corn-spirit (90 per cent.) are macerated for 8 days, filtered and a boiling hot solution of 4500·0 sugar in 3500·0 water added. Flavor with 3 drops oil of bitter almonds. This liquor is very sweet; for a more palatable preparation the sugar quantity may be reduced to 3000·0.

Ferrated Cod-liver oil.—1·0 medicinal soap is dissolved in 60 0 warm distilled water and 17·0 solution of oxychloride of iron diluted with 30·0 distilled water added; the precipitate is washed first by decantation, later on a filter, until the washings cease to react with silver nitrate. The precipitate, dried as much as possible by pressing between filter paper, is triturated with 100·0 cod-liver oil and warmed on a water-bath until dissolved; filter after cooling. The preparation is a clear, dark-brown oil which contains about 0·5 per cent. metallic iron.

Lavender salts.—A wide-mouth, ground-stoppered bottle is filled with cubes of clear ammonium carbonate; the interstices are filled with the following solution: 10·0 lavender oil, 5·0 spirit of ammonia and 85·0 alcohol.—E. Dieterich, *Pharm. Centralhalle*, 1891, 134.

Gentisin.—This yellow crystalline substance from gentian by boiling with hydriodic acid is demethylated forming *gentisein* $C_{13}H_8O_5$ which crystallizes with $2H_2O$ in fine straw-yellow needles; these become anhydrous at 100° C. By boiling gentisein with acetic anhydride and anhydrous sodium acetate a triacetyl derivative is formed, crystallizing in large, lustrous, white needles easily soluble in glacial acetic acid, difficultly soluble in alcohol. From these results gentisin $C_{14}H_{10}O_5$ is the methyl ether of gentisein $C_{13}H_5O_2(OH)_3$, and the formula can be written $C_{13}H_5O_2(OCH_3)(OH)_2$.—Von Kostanecki, *Schwz. Wochensch. f. Pharm.*, 1891, 59.

Estimation of arsenic in acids.—M. Kretzschmar recommends, in case of hydrochloric acid, to add sodium carbonate to 20 gm. acid largely diluted with water until a faint acid reaction remains. Then render alkaline with ammonia, add some yellow ammonium sulphide, supersaturate with C. P. hydrochloric acid and precipitate As_2S_3 by H_2S, warming the solution; this precipitation, which in other methods requires 15–24 hours, is complete in 2 hours. The As_2S_3 is thoroughly washed, dissolved by use of KOH and bromine water, made slightly acid with HCl and then H_3AsO_4 precipitated by addition of ammonia and magnesia mixture; weigh as $Mg_2As_2O_7$.

In the case of sulphuric acid, S. Prauss dilutes 10 cc. with water and generates hydrogen by addition of pure zinc. The evolved gases are passed for 2 hours through standardized nitrate of silver solution; at the end of this time the undecomposed silver nitrate is estimated volumetrically by sulphocyanate of ammonium. 12 molecules silver nitrate are decomposed by one molecule As_2O_3. The results agree closely with those obtained by gravimetric methods.—*Chemiker Ztg.*, 1891, 299 and 300.

Depilatory powder.—A harmless remedy is made containing strontium sulphide; this has the advantages over the sulphides of arsenic, calcium and barium, in not being poisonous, in being permanent and that in its application H_2S is not evolved. It is patented in Germany under the name "Antikrinin."—*Chemiker Ztg.*, 1891, 227.

Iodopyrine (*iod-antipyrine*) and *iod-acetanilide*.—These two iodine derivatives, made by the Chemische Fabrik in Hoechst a. M., have been examined physiologically by E. Munz, who finds the last mentioned entirely inert, possibly on account of its insolubility. The first retains the action of antipyrine and possesses additionally the therapeutic action of iodine as an alkaline iodide; taken internally it is decomposed in the stomach into iodine and antipyrine. Iodopyrine forms colorless, lustrous, prismatic needles; melting at 160° C. It is tasteless and odorless and difficultly soluble in water and alcohol.—(*Prager Med. Wochenschr.*) *Oesterr. Ztschr. f. Pharm.*, 1891, 110.

Lycopersicum esculentum.—The tomato fruit has been chemically examined by G. Briosi and T. Gigli. On an average the fresh fruit contains: Seeds 10·9 per cent., pulp 85·4 per cent. and skin 3·7 per cent. The pulp can be separated into a yellow juice and a red residue, which is tasteless after washing; the juice on an average has the specific gravity 1·0217 and contains levulose, citric acid (0·4 to 0·65 per cent. of the juice), albuminoids and ash which is composed of 60 per cent. potassium salts. Minute traces of alkaloid are indicated; tartaric acid could not be detected. The red residue will impart its coloring matter to ether, alcohol, chloroform and aqueous alkalies. The alcoholic solution is not changed by ferric chloride, dilute acids or alkalies; on addition of strong nitric acid a transient blue color is produced; the residue on evaporating the alcoholic solution becomes blue by adding sulphuric acid; the coloring matter resembles that of saffron.—*Chemiker Ztg.*, 1891, 205.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for The American Journal of Pharmacy.

Solutions of Active Medicaments.—At the Feb. 4th meeting of the *Société de Pharmacie de Paris*, M. Petit proposed that medicaments like aconitine, digitalin, strophanthin, etc., be prepared in 1 to 1000 solutions. Alcohol being necessary to the conservation of such preparations, and being, at the same time, lighter than water, M. Petit proposes to bring the liquid to the proper density by the addition of glycerin. The proportions to use for making a glycerized alcohol having the same density as water are given as follows; Glycerin (D=1·250 at 15°), 333 ccm.; distilled water, 147 ccm.;

alcohol at 95°, 520 ccm. This liquor gives the same results, measured or weighed. One gram, or 1 ccm. of it, corresponds to 50 drops, thus permitting of the administration of one-fiftieth of a milligramme of active principle.

Resopyrin.—M. Portes described at the Feb. 4th meeting of the *Soc. de Phar. de Paris*, a new composite made by Dr. Roux from antipyrin and resorcin. He made 1 to 3 solutions of these substances and mixed them in like proportions with their equivalents. The resultant crystals appeared in the form of oblique prisms with rhombic bases. They were colorless, soluble in 100 parts of alcohol and in ether and chloroform. They were nearly insoluble in water, and were odorless and almost tasteless, saving a slightly sharp impression upon the tongue.

Preparation of Hypnal, or Monochloral-Antipyrin.—In an article in the *Bull. de la Société des Pharm.*, No. 9, 1891, M. Demandre writes that pharmacists may easily prepare this compound for their own use. He gives the following method: Make a solution of 47 gm. of chloral in 50 gm. distilled water; make a solution of 53 gm. of antipyrin in the same quantity of distilled water; mix these solutions and place the liquor in a funnel provided with a stop-cock. An oily liquid falls from the aqueous mass; this portion is drawn into one capsule and the water into another. In about 24 hours the oily liquid is found to have become almost wholly transformed into a mass of transparent rhombic crystals. A few smaller crystals have formed in the centre of the aqueous liquor. The mother liquors are now drained off from both crystalline formations and the crystals mixed together. The latter are then dried between sheets of filtering paper, or under a bell-glass in the presence of sulphuric acid.

Oil of Strophanthus.—The seeds of Strophanthus hispidus give 24 per cent. of a greenish yellow or greenish brown oil, having a density of 0·9247 at 21° (according to Fischer), and 0·925 at 15° (according to Helbig). It has a faint "narcotic odor." It easily saponifies with potash. It contains 92 per cent. of fat acids, which melt at 44° and solidify at 38°. The co-efficient of saponification is 179 5 With concentrated sulphuric acid it gives a brownish green viscous mass. With nitric acid it becomes emerald green. With fuming nitric acid it gives a green coloration, passing to reddish

brown, changing again to greenish yellow.—*Ann. di. Ch. e di Farm.*; *Répert. de Phar.*, March 10.

Preparation of Tincture of Iodine.—M. Benoit writes as follows in the *Arch. de Phar.*, March 10: We know that paintings with long-prepared tinctures of iodine are often painful from the start; but tinctures made by the cold process in the proportions given by the Codex have no immediate action when applied to the skin, so that, in acute bronchitis, for example, the derivative influence of the preparation takes place too late. Hence, I believe that, instead of trying to avoid the production of hydriodic acid in the making of this preparation, it is preferable to induce it. For this, we must renounce the cold processes, and dissolve the iodine in a water-bath, taking care not to apply the heat longer than will be necessary for effecting a complete solution. As to the use of iodide of potassium to facilitate the dissolving of the iodine, it should be rejected as constituting a regrettable modification of the formula of the Codex.

Extemporaneous Preparation of Kino.—Kino, 6; water, 9; glycerin 9; alcohol, 36. *Boll. Farm.*; *Répert. de Phar.*, March 10.

Sulphoricinic Acid and Sulphoricinates.—Sulphoricinate of soda (the excipient below named) is made by making sulphoricinic acid exactly neutral with soda. It adheres well to the skin and is said to give good results in ulcerative laryngeal tuberculosis, ozena and diphtheria. Sulphoricinated Phenol is made by dissolving with a little heat 40 gm. of pure phenic acid with 100 gm. of sulphoricinate of soda. Weaker solutions may be made. It is applied as a paint in diphtheria. Sulphoricinated Naphthol: Sulphoricinate of soda, 100 gm.; naphthol β, 10 gm.; dissolve; two tablespoonfuls are added to a litre of water. The resultant emulsion is used as a wash in ozena. Sulphoricinated Creosote: Sulphoricinate of soda, 100 gm.; creosote, 15 gm.; this may be used pure or an emulsion may be made with water, for a wash in laryngeal tuberculosis. Sulphoricinated Salol: Sulphoricinate of soda, 100 gm.; salol, 15 gm.; may be used pure or mixed with water (2 tablespoonfuls per litre) as a wash for ulcers.—P. Yvon in *Le Progrès méd.*, Dec. 13, 1890.

Ointments Containing Large Proportions of Extracts or Salts.—In the *Jour. de Phar. d'Anvers*, Feb., M. Vindevogel rec-

ommends that 2 gm. of pulverized gum tragacanth be added for each gram of the water employed in dissolving the salt of extract. After trituration, the fatty body is added. A homogeneous ointment of good consistence and adhering to the sides of the mortar, may thus be easily made. The gum may even be added after the mixture of the fatty substance with the extracts. Concerning the above, the editor of the paper cited says that the incorporation of the gum might be an obstacle to the absorption of the medicaments by the skin, on account of the amount of bassorin present in tragacanth.—*Répert. de Phar.*, March 10.

ON THE VERATRUM ALKALOIDS.[1]

By Dr. S. C. Pehkschen.

In an essay presented to the medical faculty of the University of Dorpat, the author reports the results obtained from his researches on the alkaloids of cultivated and uncultivated Veratrum album and also of commercial specimens of V. album and V. viride. The yield of crude alkaloid varied very much; from the uncultivated rhizome of V. album (obtained from Thuringia) 0·57 per cent. was obtained, from commercial V. album 0·66 per cent., and from the cultivated rhizome (from Bamberg, Bavaria) 0·29 per cent. or only about one-half the amount present in the uncultivated rhizome. Of the alkaloids present, it may be said that the cultivated rhizomes contain relatively more veratroidine and the rhombic crystals (pseudojervine?), while the uncultivated contain a larger proportion of jervine. Veratrum viride yielded only about 0·08 per cent. crude alkaloid, which by qualitative tests was found to be composed principally of jervine with very little veratroidine, while the rhombic crystals (pseudojervine?) were absent.

The method finally adopted for extracting the alkaloids was as follows: 4 kilos of the powdered rhizome were macerated for six days with 16 kilos of 85 per cent. (volume) alcohol, expressed and filtered (the filtrate had an acid reaction due probably to jervic acid); the residue was treated a second time as above with alcohol, and to insure thorough extraction a third time, but now with the addition of 100 cc. 99 per cent. acetic acid to the alcohol. From

[1] Translated and abridged by F. X. Moerk, from *Pharm. Zeitsch. f. Russland*, 1890, pp. 339, 353, 369, 385, 401, 417 and 433.

the united filtrates most of the alcohol was recovered by distillation under reduced pressure, to the remaining thin extract were added 3–4 volumes hot distilled water, the resin separated by filtration and the coloring matter removed from the filtrate by agitating with 4 or 5 portions of ether. The aqueous liquid was next made alkaline with sodium bicarbonate, extracted with 4 or 5 portions of ether, and afterward with chloroform, until Mayer's reagent failed to produce a turbidity with an aqueous solution of the chloroform residue. Under the microscope the ethereal residue was seen to consist of tufts of crystalline needles, through which were scattered some rhombic crystals; the chloroform residue was amorphous and of a dark yellow color. Both of the residues were colored yellow, orange and, finally, brown-red with concentrated sulphuric acid. The crude alkaloids obtained from the different specimens of V. album were mixed and dissolved in 10 per cent. acetic acid, agitated with ether to remove coloring matter, etc., following the process outlined above in the extraction; after repeating this purification, the alkaloids were separated by first treating with absolute ether, which removed the veratroidine with a little jervine; the insoluble portion, dissolved in absolute alcohol, was set aside to crystallize; there appeared, first, individual rhombic crystals which were removed, and later, small needle-shaped crystals arranged like glands (jervine); by the addition of HCl to acid reaction, and setting aside a further quantity of hydrochlorate of jervine was obtained. The mother-liquor from this formed, on evaporation, a brown amorphous mass, of which a portion was soluble in benzol; this solution, by addition of petroleum ether, yielded a colorless flocculent precipitate found to consist of a mixture of veratroidine and jervine. The portion insoluble in benzol was treated with 10 per cent. acetic acid, filtered, the filtrate made alkaline with sodium carbonate and extracted with chloroform; the latter solvent upon evaporation left a yellow amorphous mass. The reactions of this, possibly, a fourth alkaloid (Wright and Luff's veratralbine) are: with concentrated H_2SO_4 yellowish-green; with Froehde's reagent yellowish brown; with concentrated HNO_3 reddish-yellow; evaporated to dryness on a water-bath with fuming HNO_3 and addition of alcoholic KOH, a dark yellow coloration; melting point 281°C.; the addition of a small quantity of veratroidine causes at once the color reactions of Wright and Luff's

veratralbine. The yield, however, was so small as to prevent further investigation at the time.

The ether-soluble alkaloid (mixture of veratroidine and jervine) was dissolved in absolute alcohol, acidified with a slight excess of HCl and the jervine hydrochlorate allowed to crystallize out; the mother-liquor was diluted with water, agitated with ether, until the ether was free from color, the aqueous solution rendered alkaline with sodium bicarbonate and again agitated with ether until all of the alkaloid was removed. The residue from this ethereal solution (veratroidine) was a pale yellow amorphous mass, yielding a colorless powder, the yield was 0·06 per cent. of the rhizome taken.

Veratroidine (dried at 58° C.; at higher temperatures, 75–78°, it already becomes dark colored) has the formula $C_{32}H_{53}NO_9$ (determined by ultimate analysis, analysis of its gold and platinum salts, by a determination of the molecular weight by Raoult van't Hoff's method, and by neutralization with HCl and H_2SO_4). It is soluble in absolute alcohol in almost any proportion, easily soluble in acetic ether, amyl alcohol and carbon disulphide, in 10·5 parts 80 per cent. alcohol, 9·1 parts absolute ether, 5·9 parts chloroform, 13 parts benzol and 790·2 parts petroleum ether; from none of these solvents could it be obtained crystallized. It melts at 149·2° C., and is optically inactive. The sulphate has the formula $(C_{32}H_{53}NO_9)_2 H_2SO_4$ and the hydrochlorate $C_{32}H_{53}NO_9HCl$; none of its salts could be obtained in crystals. Color reactions with concentrated acids: H_2SO_4 first yellow, passing through orange to cherry-red, the solution having a green fluorescence; HNO_3 momentarily a red color, afterwards lemon yellow; HCl pale red, on moderate warming decolorization, but upon boiling for a few minutes, a permanent cherry-red (one year's standing did not change the color). Froehde's reagent yellow, afterwards dirty brown. Vanado-sulphuric acid yellow, violet, finally, cherry red. Seleno-sulphuric acid, red. Dilute HCl produces a beautiful red color, best results attainable with an 11 per cent. acid. Differences between veratrine and veratroidine: (1) With concentrated H_2SO_4 veratrine produces a yellow color, changing on addition of bromine water to a beautiful purple; with veratroidine, a brownish yellow color; (2) Veratrine evaporated upon a water-bath with fuming nitric acid leaves a yellow residue changing to violet or red on addition of alcoholic KOH; veratroidine forms a dark yellow solution; (3) The veratrine reaction:

concentrated H_2SO_4 and sugar causing the play of colors yellow, dark green, blue and finally violet is not obtained with veratroidine. Both of these bodies evaporated with zinc chloride solution (1 : 30) give a red color. Veratroidine in its reactions and solubilities closely resembles veratralbine and cevadine.

Alkaloid obtained in rhombic crystals (Pseudojervine ?)—Purified by recrystallization from strong alcohol, the yield was only 0·006 per cent.; dried at 110° C., it was found to agree to the formula $C_{29}H_{49}NO_{12}$ (by same determinations as under veratroidine). Dried at 100°C., it is soluble in 4·1 parts chloroform, in 101 parts 80 per cent. alcohol, in 184 parts absolute alcohol, in 372 parts benzol, in 1,021 parts absolute ether and in 10,876 parts petroleum ether; by evaporating these solutions rhombic crystals were obtained, excepting the chloroform solution which gave concentrically arranged needles. It melts at 259·1° C. and is optically inactive. No color reactions could be obtained with this base, but if the minutest quantity of veratroidine or jervine is added, color reactions agreeing with Wright and Luff's pseudojervine are gotten. The hydrochlorate $C_{29}H_{49}NO_{12}HCl$ and the sulphate $(C_{29}H_{49}NO_{12})_2\ H_2SO_4$ are easily soluble in water, alcohol and ether, differing from the base itself.

Jervine.—Purified by recrystallization from absolute alcohol it forms snow-white crystalline needles; dried at 100° C. it has the formula $C_{14}H_{22}NO_2$ (determined by ultimate analysis, and by the determination of chlorine in the hydrochlorate, and of sulphuric acid in the sulphate.) Pure jervine dried at 100° C. is soluble in 16·8 parts absolute alcohol, in 60·5 parts chloroform, in 180 parts 80 per cent. alcohol, in 268·4 parts absolute ether, in 1658·7 parts benzol, difficultly soluble in water, acetic ether and carbon disulphide, and insoluble in petroleum ether; from all of its solutions it is obtained in well-formed needles. Jervine melts at 237·7° C. and is slightly lævogyre. Color reactions: It differs from veratroidine especially in the first two tests; concentrated HCl dissolves it without color, gradually becomes red and upon boiling dirty yellow; concentrated H_2SO_4 and sugar give a pretty violet, changing to blue, the depth of color depends upon the quantity of jervine taken (this test resembles that for veratrine); evaporated with fuming HNO_3 on a water-bath and adding to the residue alcoholic KOH a dark yellow color is obtained (veratrine gives violet

changing to red); concentrated HNO_3 dissolves colorless, becoming red and, after a short time, yellow; Froehde's reagent yellowish-green; concentrated H_2SO_4 yellow, yellowish-green, and after some time dark green without fluorescence. Jervine forms a neutral hydrochlorate $C_{14}H_{22}NO_2.HCl2H_2O$, and an acid sulphate $C_{14}H_{22}NO_2.H_2SO_4H_2O$.

Veratroidine and the rhombic crystals possess sternutatory properties, while jervine does not. Physiological experiments made by Prof. Kobert upon dogs or cats and frogs established the lethal dose (by subcutaneous injection) for 1 kilo weight of these animals. Veratroidine: dogs or cats, 0·9 mg.; frogs, 9 mg. Rhombic crystals: dogs or cats, 1·2 mg.; frogs, 3 mg. Jervine: 4 mg. for dogs and cats while 80 mg. for frogs were without any apparent action. 0·03 mg. veratroidine per kilo injected directly into the blood vessel of a dog produced marked reduction of the pulse rate.

THE MEDICINAL USES OF FLOWERS.

By P. L. Simmonds, F.L.S.

Among the various parts of plants which are used in medicine, flowers play no insignificant part in different countries. Besides those which are recognized in pharmacy, a great number are popularly employed. It may not be uninteresting to enumerate some of these and to give a few details concerning them. Flowers have their uses also as food substances, as important sources of perfumery, and as dyes, but it is for their alleged medicinal properties that we would regard them here.

The strobiles of the female flowers of the *hop* are valuable for their aromatic, tonic and mild narcotic properties.

The *Damask roses* are grown for medicinal purposes. Before the bud is about to open, the bottom, or "heel" as it is termed, is cut off, and the top dried and preserved, to make either infusion or conserve of roses. The Provence rose (*R. gallica*) is said to be astringent. The flower of the hollyhock (*Althæa rosea*) is mucilaginous and demulcent and officinal in Greece. Those of the marsh mallow (*Althæa officinalis*) are much used in France under the name of "Guimauve." The red flowers of *Grislea tomentosa* are considered an astringent tonic.

The dried stigmas of the *Crocus* are also of importance. Saffron has been highly prized from a remote period as a condiment, perfume and dye. It is largely produced in France, and other parts of Europe, and is also grown in some parts of Asia, China, Japan and Tunis. The stigmas are the only useful product of the flower, the rest being waste, and of these it takes some 70,000 to produce a pound of saffron. It is used for coloring and flavoring food, and even for dyeing morocco leather, but the price is too high to admit of its extensive use as a dye. About 280 cwt., valued at £58,000, are imported into India. Cake saffron is made of the florets pressed together with mucilage.

As a medicine, in small doses, saffron is considered stomachic, and is prescribed in fevers; in large doses, it stimulates the nervous system.

A species of saffron is obtained from the Cape Colony, the produce of *Lyperia crocea.*

The cusso (*Hagenia abyssinica*) furnishes a well known anthelmintic, and the flower heads of species of *Artemisia* act as a vermifuge.

An infusion of lime or linden flowers (*Tilia europæa*), drank as tea, is reputed to be a cure in chronic epilepsy. They are used in France in the form of a tisane, and the distilled water is considered an antispasmodic.

The flowers of *Malva sylvestris*, and of other species, are emollient, and an infusion of the petals is given as a demulcent.

Narcissus is vomitive, and a decoction of broom flowers (*Genista scoparia*) is diuretic.

Violets are considered purgative, but a conserve of the flowers with sugar has a grateful flavor for covering nauseous medicines.

The whole plant of *Viola odorata* is sold in a dry state in all the bazars of Bengal, and is given in infusion as a diaphoretic in fevers. In large doses it nauseates and often produces vomiting. The Romans had a wine of violet flowers, and it is said they are still used in the preparation of sherbets. The flowers of some species are diaphoretic and laxative.

The Turks prepare a cooling drink from the flowers of *Nuphar luteum.*

The flowers of *Anthemis nobilis* form a useful stomachic, antispasmodic and tonic in dyspepsia and general debility.

The balausta flowers of the pomegranate are rich in tannin and gallic acid, and can be used as an astringent.

The flowers of *Urena lobata*, of Brazil, are used as an expectorant in dry and inveterate coughs.

The shoe flower (*Hibiscus Rosa-sinensis*) is used as a tonic in China, and as a dye for silk.

The dried blossoms of the Chu-lan plant (*Chloranthus inconspicuus*) are classed amongst medicines in China, but they are rather used to scent the tea of commerce than for pharmaceutical purposes.

The dried flowers of *Hemerocallis graminea* and of *Lilium bulbiferum* are of considerable repute as a medicine in pulmonary affections and tonic of the kidneys; also largely employed in cooking, as a tonic or relish with meat dishes. They are usually twisted into lengths of 4 or 5 inches; the color is of a dark brownish-yellow, covered by a whitish bloom.

The dried red flowers of *Carthamus tinctorius* in China are a stimulant sedative, and also used to cause abortion. They are a component in the manufacture of rouge.

The dried flowers of a honeysuckle, which resemble tobacco in odor, are used in China in cases of rheumatism.

The buds of *Cassia Sophora* are considered to be a tonic and astringent.

The flowers of *Chrysanthemum album* and *C. flavum* are taken for flatulency.

There are many other flowers used medicinally in China, but as only their native names are given, it is impossible to identify them.

The flowers of *Paronychia argentea* are used in Morocco as a diaphoretic nd for abdominal pain.

The flowers of *Calotropis gigantea* are considered digestive, stomachic, tonic and useful in catarrh, asthma and loss of appetite.

The sweetly scented flowers and other parts of *Ipomæa bona-nox* are among the medicines supposed to have some merit as remedies against snake-bites.

A poultice of the flowers of *Melia Azedarach* is applied to relieve nervous headaches, and has the reputation of being useful to kill lice and to cure eruptions of the scalp.

The flowers of *Ocimum Basilicum* possess stimulant, diuretic and demulcent properties.

The flowers of *Quassia amara* are infused in wine or water as a stomachic, every part of the tree being bitter.

From the flowers of *Thibaudia Quereme* an aromatic tincture is prepared in Peru as a remedy for toothache.

In Goa, Portuguese India, the flowers of *Eleusine coracana* are prepared and much esteemed in chest complaints and debility. Many natives live upon them alone prepared in some way.

In India with the flowers of *Erythrina indica*, the juice of which is unctuous and aromatic, they prepare a syrup much employed in affections of the chest.

With the flowers of *Cassia fistula*, a purgative syrup, known as gut-kand, is made, which is considered a febrifuge.

The flowers of *Vitex trifolia* are prescribed with honey in cases of fevers, accompanied with vomiting and severe thirst.

The Nagassar flowers (*Mesua ferrea*) are obtained in the bazars of India, in a dried state, being used in medicine as a stimulant, astringent and stomachic, as well as esteemed for their fragrance. The grandees of Ava are said to stuff their pillows with the dried anthers of the flowers on account of their fragrance. The flowers and leaves are regarded, in Bengal, as antidotes to snake-bites. Dried in powder the flowers, with butter and sugar, are used as an astringent in hemorrhoidal discharges. The flowers when distilled yield an attar.

The flowers of *Michelia Champaca* are of a yellow, sometimes deep orange color, and exquisitely fragrant. They are highly esteemed by the Hindoos, especially for the use they make of them in their religious ceremonies.

Flowers, as we have thus seen, are much used in medicine, but they are also employed, in some instances, as an article of food. It is rarely that we find the corolla of a plant serving any other purpose than as a temporary protection for the reproductive organs within. But for a flower to secrete more than half its weight of sugar, and thus become an article of economic value, and even of commerce, is most remarkable; of this we have an instance in the flowers of an Indian tree, species of *Bassia*.

Some flowers attract birds and bees by their nectar, others repulse them by their stupefying odor. The Persian insect powder of commerce consists of the florets of the disk of different species of *Pyrethrum*, collected before the seed is fully formed. The flowers of *Tansy* are also said to have a stupefying effect on insects. The caucasian and Persian flowers, usually called Guirila, although first employed, are no longer now of commercial importance. The cultivation is chiefly carried on in Dalmatia and Montenegro. The trade centres in Trieste, where about 12,000 cwt. are sold yearly, at the price of about £11 a cwt. The unground flowers are much preferred, as the powder is greatly adulterated. From one Russian port, Poti, this insect powder used to be exported to the value of £7,000 a year.

GINSENG.

Aralia (Panax) quinquefolia.

The following references to articles upon this medicinal plant may be useful to readers of your journal:

Belknap's History of New Hampshire (1792), Vol. III, p. 121.

William's History of Vermont (1809), Vol. I, p. 85.

Bird's History of the Dividing Line between Virginia and South Carolina (original MS. 1729–1733), new edition, 1866. Vol. I, p. 161; Vol. II, pp. 13, 16, 67.

Mauray and Fontaine's Resources of West Virginia (1876), p. 139.

Kalm's Travels, Vol. III, p. 114.

Michaux's Travels, pp. 207–11.

Talbot's Travels, p. 314.

Fortune's "Yeddo and Peking," p. 281.

Hough's U. S. Forestry Reports: Vol. I (1877), p. 385; Vol. II (1878–9), p. 374.

Mason's Year-Book of Facts (London 1877), p. 34.

Transactions American Institute, 1870–1, p. 612.

Paxton's Magazine of Botany 1837, p. 169.

Gardeners' Chronicle, 1856, p. 196; 1891, p. 50.

Horticulturist, 1847, p. 101.

Gardeners' Monthly, 1881, p. 214.

Country Gentleman, 1877, pp. 88, 295; 1878, p. 308.

American Agriculturist, 1881, p. 378; 1886, p. 255; 1890, p. 645.

New York Independent, 1891, p. 34.

Scientific American, 1891, pp. 19, 69.

Scientific Farmer, 1878, p. 148.

A. A. CROZIER.

Washington, D. C., March 16, 1891.

MINUTES OF THE COLLEGE MEETING.

PHILADELPHIA, March 30, 1891.

A stated meeting of members of the College was held, this day, in the Hall, Chas. Bullock, presiding. This being the annual meeting, reports of officers and standing committees were received. The Editor submitted his annual report, which was on motion accepted; the following is an abstract of the report:

During the year just terminated 85 original papers were contributed. This number has been exceeded four times only during twenty years. Nine members of the College contributed 32 papers. Seventeen authors, not members, furnished 37 papers. Abstracts from 30 theses, from foreign journals prepared especially for this Journal, together with reviews and notices prepared by the Editor, and selected essays, constituted the balance of the literary matter. Thirty of these papers were read at the Pharmaceutical meetings. An increase in attendance, and interest in these meetings is very apparent, stimulated doubtless by the efforts of the committee who have taken the subject in hand. Whilst the College bestows a number of prizes for original work and investigation, which yield good result, the Editor is of opinion that members of the College and employers might arouse effort in their assistants, and students by

aiding and encouraging a desire to perform such work. The Editor expresses his many obligations to contributors and correspondents.

The Chairman of the Publication Committee referred to the regularity in issuing the Journal, and to the Reports of the Business Editor and of the Editor, which supplement his statements.

The Report of the Librarian states that, besides the journals received as exchanges, about 75 volumes have been added to the library since the last statement, and calls attention to the fact that space and shelf room are insufficient, and also notes that the use of the library is growing more extended with each recurring year.

The Report of the Curator, after referring to the satisfactory condition of the museum, acknowledges the contributions from Messrs. Rosengarten & Sons, and Messrs. Powers & Weightman of some very interesting specimens of chemicals.

The Board of Trustees, through a committee of that body, appointed to consider an amendment to the By-law on Life Membership recommend to the College the following :

Chapter viii after Article 4th.

"Any member not in arrears for annual dues, who shall pay to the Treasurer of the College in one payment, such a sum as will amount to $50 after allowing a credit of $2 for each annual contribution heretofore paid shall, become a life member, and shall be exempt from all further dues."

On motion, the report was accepted, and action thereon necessarily deferred until the next meeting of the College.

The President presented a certificate of award, and a medal of honor bestowed upon this College for the exhibit made by the Philadelphia College at the French Exposition of 1889.

Prof. Maisch announced the death, on March 23, of Chas. C. Spannagel, an apothecary of this city, and a member of this College.

Mr. Krewson informed the members of the death of Edward Gaillard, also an apothecary of Philadelphia, and member of this College, which event occurred this day, March 30, 1891.

On motion, the Committee on Deceased Members were requested to take cognizance of these events.

Prof. Maisch referred to the fact of the Maryland College of Pharmacy being about to reach its semi-centennial or fiftieth anniversary, April 17, next, and of the accord and good relation always existing between that Institution and this College, and offered the following resolution, which was on motion duly accepted : "That a Committee of three be appointed by the President to convey in suitable words of congratulation to the faculty and members of the Maryland College, the sentiment of this College on this occasion."

The President appointed Prof. Maisch, Prof. Remington, and Mr. Alonzo Robbins, to constitute the Committee.

Prof. Maisch referred also to a similar anniversary (the 50th) of the Pharmaceutical Society of Great Britain, occurring May 27, next, and offered the following preamble and resolution, which was on motion adopted:

WHEREAS, The Pharmaceutical Society of Great Britain will celebrate, on May 27, next, the fiftieth anniversary of its organization ; therefore, be it

Resolved, That the Philadelphia College of Pharmacy offers its hearty

congratulations on the completion of the fiftieth year of existence of the Pharmaceutical Society of Great Britain.

Resolved, That the officers of this College transmit these congratulations to the Pharmaceutical Society of Great Britain, coupled with our wishes for the continued usefulness of the Pharmaceutical Society in its endeavors to render excellent service to mankind by earnest labors for the elevation of Pharmacy.

It was, on motion, resolved that an engrossed copy of the above, properly attested, be sent to the foreign society from this College.

An election for Officers and Trustees of the College, and of Standing Committee for the year ensuing being ordered, resulted as follows :

President—Chas. Bullock.

Vice-Presidents—Robt. Shoemaker, William J. Jenks.

Treasurer—William B. Webb.

Corresponding Secretary—Dr. A. W. Miller.

Recording Secretary—William B. Thompson.

Librarian—Thos. S. Wiegand.

Curator—Jas. W. England.

Publication Committee—Henry N. Rittenhouse, James T. Shinn, Charles Bullock, Thos. S. Wiegand, John M. Maisch.

Editor—John M. Maisch.

Trustees for 3 years—Gustavus Pile, Wallace Procter, W. Nelson Stem.

On motion, meeting adjourned.

WILLIAM B. THOMPSON, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

MARCH 17, 1891.

On motion of Mr. Webb, Mr. Wm. McIntyre was called to the Chair.

The minutes of the last meeting were read, and it was stated that in the formula for *red bottle liniment*, the quantities given on page 154 for oil of origanum, oil of caraway and alcohol, should read *fluid ounces* in place of fluid drachms.

The calendar of the British Pharmaceutical Conference, the Consular Reports to the Department of State, and the Toner lectures of the Smithsonian miscellaneous collections, were received for the library, and the thanks of the College for the same were returned.

A paper on *Alum root*, by Mr. J. C. Peacock, of the present Senior Class, was read and referred.

Prof. Trimble said that Heuchera americana, growing at our own doors, yielded a drug almost as rich in astringent matter as any imported, and could be gathered here at the time when the astringent matter is in greatest proportion ; this was a very important consideration as had been shown by the paper published two years ago relative to geranium.

Mr. England read a paper upon *Koch's lymph*, which has been attracting so much attention in the public mind in its remedial powers over consumption. In reply to a question as to its efficacy, it was stated that there had not been time enough to determine its curative merits, but as a means of diagnosis it was undoubtedly of great value. Inquiry was made about *Dr. Roussel's remedy*, which was stated to be generally considered as being sterilized olive oil and eucalyptol. Attention was also drawn to the distinction in their actions,

one acting by antisepsis, and the other by destruction of the microbe through using up its food supply. Dr. Kane thought that it was in the same train of experiment as that of Dr. Jenner in vaccination being a preventive of small-pox. Mr. Brown said that he had paid considerable attention to the detection of bacilli as a means of determining the character of disease; many who examined the sputa of sick persons were unable to discover the bacillus, failure being due to the instrument used not being suitable for the work, for which an immersion objective should be used. Regarding the staining of these objects, Mr. Brown said he used a diluted solution of borax, drying, coloring with fuchsine and counterstaining blue.

A paper on *aristol* by Mr. Beringer was read, giving a method of its preparation. The paper was accompanied with samples of the product. In reply to a question as to its cost, he stated that he had not figured that out, but that it was much inside of the price of the foreign-made article.

Prof. Remington inquired to what extent the *National Formulary* is made use of by physicians and pharmacists; his own opinion was that it was the most largely used formulary that had been published for a very long term of years, and that it was a great advantage for pharmacists to bring it to the attention of physicians as it would tend to secure greater uniformity in the use of special preparations.

The following prescription had been presented at the last meeting:

Liq. plumbi subacetatis, ... ℥ss
Ext. Opii., } . . . . . āā gr. iiss
" belladonnæ, }
Ol. theobromæ, ... ℥iss
M. ft. suppos. vi.

Replies as to the best method of compounding had been received from two pharmacists, one of whom suggested ℥ss lanolin to be used in place of as much butter of cacao, and the other advised the concentration of the lead solution and the increase of the butter of cacao.

Inquiry had been made as to *what extent physicians use the Pharmacopœia;* this was replied to by Mr. W. McIntyre, by some very interesting tabulated statistics, covering 1,000 consecutive prescriptions.

These had been written by 78 physicians in Philadelphia, and called for 386 different drugs or preparations, the total number of items in these prescriptions being 3,393, or on an average a trifle over 3⅓ items for each prescription. Of the drugs ordered, there were 275, or 71·24 per cent. of the total number, recognized by the U. S. Pharmacopœia; 76, or 19·69 per cent. of the whole, published in the National Formulary, the AMERICAN JOURNAL OF PHARMACY, or other readily accessible publications; and only 35, or 9·07 per cent. of the total number, consisted of proprietary, trade-marked and similar preparations. Regarding the proportion of each class to the total number of 3,393 specifications, it had been ascertained that pharmacopœial articles had been ordered 2,979 times, equal to 87·80 per cent. of the total number; non-pharmacopœial and non-proprietary articles 273 times, equal to 8·05 per cent., and proprietary and trade-marked preparations 141 times, equal to 4·15 per cent. of the total number of items.

During the same period, in which these prescriptions had been put up, there had been calls, by customers, without prescriptions, for what are known more

generally as patent medicines, resulting in sales of such for internal use 81 different articles in 1,198 calls, and for external use 45 articles were the basis of 680 sales. Of patented and trade-marked preparations, physicians have used fifteen different articles in forty-six orders.

Several members expressed their gratification at this favorable showing which was greatly to the credit of the physicians who had written these prescriptions, and were evidently not in favor of secrecy in medicinal preparations, but adhered to the Pharmacopœia as a code, and made use of non-pharmacopœial articles—with very few exceptions—only in case the formulas were accessible to all pharmacists.

Mr. Thompson inquired what number of these preparations were his own make, and what number had been purchased ready made? To this Mr. McIntyre replied that all the articles denominated as officinal were his, as far as it was possible to make them, except certain chemicals, or unless he might accidentally be out of some one when he would have to purchase.

Professor Maisch presented some specimens for the museum given to him by our fellow member, Mr. Charles A. Heinitsh, of Lancaster, who has had them for many years, and they represented articles of trade now very rare, viz: *Sir James Murray's fluid camphor*, *Tutia* or prepared tutty (impure oxide of zinc) and *terra sigillata* with the manufacturer's stamps still quite clearly marked on them—the thanks of the College were voted for them to Mr. Heinitsh.

To the query what is *antikamnia*, a reply was given by M. F. Haussmann in a paper read and referred for publication.

After some further discussion, the meeting adjourned.

T. S. WIEGAND,
Registrar.

EDITORIAL.

The meeting of the American Pharmaceutical Association, in New Orleans, will be held in the Washington Artillery Hall, where also room has been secured for the exhibition of articles of pharmaceutical interest. The headquarters of the Association will be at the St. Charles Hotel, where ample accommodations will be provided for the visiting members, at the reduced rate of $3 per day. The Illinois Central Railroad has granted to the members going over their road from either Chicago or St. Louis, tickets for the round trip at a single fare. An analogous liberal concession has been made from Cincinnati by the Queen and Crescent line. For other sections of the country, from which reduced fares could be obtained, the usual convention rates have been allowed, being one fare going, at the same time obtaining from the ticket agent a convention certificate; the latter must be signed in New Orleans by a member of the committee, designated for the purpose, and a return ticket over the same route may then be purchased at one-third regular fare. For members from the Eastern and Central Atlantic States, desiring to travel in a body, it has been proposed, to leave Washington on Thursday, April 23, at 11.10 P.M., by way of the Chesapeake and Ohio Railroad to Cincinnati, arriving there Friday evening; and then to take the Queen and Crescent Line, stopping on the following morning for a few hours with the view of visiting Lookout Mountain, and reaching New Orleans Sunday morning at 8 o'clock.

The meeting promises to be a large and profitable one; we have learned from

several sections in the South that it will be well attended from that part of the country; and while the various states from which members are usually present at the meetings will be well represented, we have also information of projected participation in the proceedings from localities from which heretofore delegates and members could not be present.

OBITUARY.

Charles Christian August Spannagel died suddenly at his residence in Philadelphia on the morning of March 23. He was born at Vlotho, Westphalia, November 16, 1839, as the son of Assistant Judge C. A. Spannagel, and received his first elementary education in a private school. When in 1850 the father became Director of the District Court, at Siegen, Westphalia, Charles entered the schools in that city until in March, 1857, he commenced his apprenticeship in pharmacy with W. Ricke, Apothecary in Oeynhausen, until September, 1860 Subsequently he served as assistant in several pharmacies, and during 1863–64 as military pharmacist in the House of Invalids in Berlin, at the close of which service he continued his studies at the University of Berlin, where Professors Berg and Braun were his instructors in botany and pharmacognosy, Dove in physics, and Schneider, Bammelsberg and Sonnenschein in different branches of chemistry. In December, 1865, he graduated, passing the state's examination with the grade "very good." During the Austrian-Prussian war, in 1866, he acted as field apothecary. He first came to the United States in 1869; but his military service not having been completed at the beginning of the Franco-German war in 1870, he returned to his native country, and was attached as field apothecary first to the 14th army corps, and subsequently to the second field hospital of the third army corps, receiving several medals of honor for faithful service. After the close of the war in 1871 he returned to Philadelphia, and soon after entered into partnership with Mr. G. Radefeld in purchasing the store 1607 Ridge Avenue. His partner dying in the following year, he conducted the business on his own account until the time of his death, maintaining for himself a well-deserved reputation for integrity and reliability. For a number of years his health was impaired from a complication of diseases; calcification of the cardiac valves terminated his life unexpectedly after a brief illness. The deceased was never married; his nearest relatives, the aged parents and his brothers, reside in Germany. He was a member of the Philadelphia College of Pharmacy, and of the American Pharmaceutical Association.

Professor Herod D. Garrison, M.D., died in Chicago, February 23, of Bright's disease, in the fifty-eighth year of his life. He was born in Dearborn County, Indiana, was educated at the Marietta College, Ohio, and studied medicine in Cincinnati. Subsequently, he was engaged in the drug business in Chicago, the store being destroyed in the great fire in 1871. For a few years he held the chair of materia medica in the Chicago College of Pharmacy, when in 1878 he went to Europe, having been appointed honorary commissioner to the Paris exposition. After his return he was again called to one of the chairs in the college named before, teaching physics and chemistry until he resigned last summer. At various times he had also been connected with other institutions as lecturer on chemistry. A widow and three children, the son being a physician, survive him.

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MAY, 1891.

REMARKS ON THE MERCANTILE ASPECTS OF THE BUSINESS OF PHARMACY—ELICITED BY A QUERY PROPOSED FOR THE PHARMACEUTICAL MEETING.

By William B. Thompson.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, April 16.

Every individual affected by the conditions, which at present disturb the trade interests of the Apothecary, has been compelled, it may be said, to seriously consider the effect, and to form some conclusions from the causes. There are those who seem willing to abide the slower processes of time, and circumstances to produce favorable change, but such are regarded as anti-progressive, whilst he who can, or believes that he can, by some reasonable and practical method, arrest the result, by thwarting, or checking the operations of that cause, is the man for the emergency.

One whose business life has extended over the average experience has certainly been afforded opportunity to acquire business wisdom. It is not uncommon, however, to observe instances of management marked by the absence of the simplest precepts of mercantile rule, and unfortunately for the credit and the welfare of our craft these instances are to be found largely in the establishments of the Apothecary's.

The present general condition is not, however, the result, so much of individual omission as it is that of other circumstances which may be considered. There was a better day than the present for the trade of the Apothecary. This was before the era of ranks overcrowded and of relentless competitive struggle. It was a day

of better instincts in trade methods and of a more liberal exercise of mercantile honor. The tradesman, then, in protecting the honor of his confrère, sustained the moral of his trade and shielded his own honor. There was no written compact or agreement, but there was a sort of moral law which was scrupulously kept and upheld. As a consequence the interests of trade were then better protected and a spirit of the corps pervaded all. Now, the rougher experience is marked by an entire absence of these advantages and the time-honored maxim of "live and let live" is echoed back by selfish demand of let me live, only.

As a merchant of a former day the Apothecary maintained his vocation with respect. He gave no heed to arts which characterize the methods of his competitors of to-day, his business era stood in no need of it. The illumined bottles of his window, a traditional insignia of his craft, were the only advertising aid to which he resorted. There was but little disposition to question his terms or prices, his integrity of dealing was undoubted, and when the value of his service was to be demanded the science of his business stood foremost in the consideration. So far as the arts of trade were requisites for success he had not need for such resort, and he could securely repose upon the accredited value and dignity of his pursuit rather than risk its debasement by any questionable method.

But we live in a day, and time wholly different, a vast change having been wrought in these later years in the quiet precincts of the older Apothecary's shop. The growth of trade, with its ceaseless effort and widely extended competition, has left the old landmark far back in the dim past, and obscure though it may be to some of us, and antiquated withal, yet there lingers around and about it a halo of reverential and respectful memory.

If the query proposed simply seeks to learn whether the Apothecary needs a better mercantile education, the answer must be equally simple, and in the affirmative, but if the inquiry be extended so far as to include the methods of that education requisite to meet the needs of the present time then the scope of reply is made more comprehensive.

On one point we may readily agree, and it is this. That there certainly never before existed, in our experience, a period, in the history of the trade, in which the elements of difficulty, and discord, or in which a demoralized condition so widely extends as at present. It

is to seek some solution of this, or to wisely apply some remedy to the evil, that our efforts must be directed—we can hardly hope to enter the arena, and by one stroke summarily remove the cause—those who are wedded to fixed ways, however erroneous, are not to be at once diverted, nor can hope to successfully remonstrate, but we can meet the coming Apothecary upon the threshold of his business career, and indicate the way to a wiser course of procedure.

Those of us here who are more closely associated with the Apothecary in the character of apprentice or novitiate, can readily perceive from observation what advantage would naturally accrue to him in starting upon a career of business, to possess a liberal mercantile training, especially such as would enable him to meet the requirements set before him. Our recruit for pharmaceutical rank, we know, comes mainly from the middle class of society, here the necessity for a maintenance calls him early into the field of labor, and even a full opportunity to acquire a knowledge of his chosen pursuit is cut short. This alone would be greatly to his detriment, but in the time allotted until his majority is reached there is really no period in his career when he can prepare himself specially, in mercantile education. This must be acquired if at all by dint of his own exertion, under the appreciation of its necessity, as an essential part of his general training, but time and opportunity being both lacking he essays duties and tasks unprepared. It is true, he learns to buy, and sell, and observe the simple methods of such procedure, but he scarcely estimates the importance of applying judgment and observation to his practice. In his own sphere of transactions, although often small by comparison, it is possible for him to add to his knowledge the rules of business which lead to pecuniary reward, and to study those maxims which underlie the structure of a successful pursuit. But if we are asked to select a type of a class, which more largely than any other fails to apply the wisdom of method, and experience to the demands of a business vocation, we should point to the Apothecary.

The fact may be admitted that the dual character of the Apothecary's business has much to do with the complications of his position, and as pharmacists honoring as we should the dignified character of that calling as a profession, we must deprecate, most grievously, the close commingling of the commercial with the scientific aspects of the vocation. The former has borne the latter down, until our

pride is humbled, and the boast of a science in pharmacy seems but empty and idle, when we view the companionship which it is compelled to keep with commerce. Such result may be the inevitable consequence of the conditions which environ, and the spirit of the age, and there may be no help, or hope of extrication; but are there not some strong enough in influential example and voice to change this seeming fate, and call back to its old landmarks the *science* of pharmacy? Are there none courageous enough in the higher instincts embraced in the profession to draw a line of demarcation between the mere commerce in drugs, and their humane and beneficent application?

THE DETERMINATION OF MELTING POINTS.

By George M. Beringer, Ph. G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, April 16.

In a paper read before the American Pharmaceutical Association in 1886, Henry C. C. Maisch gives a review of most of the methods recommended for taking melting points (see American Journal of Pharmacy, 1886, page 486). Since then, several notes upon methods and various devices of apparatus have appeared in the pharmaceutical and chemical journals. Recently D. B. Dott in a paper before the British Pharmaceutical Conference (see Pharmaceutical Journal and Trans., Nov., 29, 1890, page 476) recommends taking of melting points in a small air bath, specially made for the purpose, constructed of copper, with a glass front and back. There is only one opening, that in the top for the introduction of the cork which holds the thermometer. Two brass wires, passing through the sides of the bath, support a piece of sheet asbestos. The substance whose melting point it is desired to determine is placed in a thin glass tube attached to the thermometer bulb, and the couple then placed in position well above the asbestos. The temperature is then very gradually raised and the melting of the substance is easily observed through the glass front of the bath. The results obtained, are stated to be very nearly correct and the method is especially recommended for substances having high melting points.

The plan adopted by the writer, while somewhat similar to the above, varies in several essential features. A tall plain beaker is used as an air bath. A crystallizing beaker with ground edge is

the best. This is covered with a circular piece of glass somewhat larger in diameter than the beaker. In the centre of this disk is drilled a hole about ¾ to 1 inch in diameter, to which is fitted a perforated cork for carrying the thermometer. Glass can be easily drilled with an ordinary steel drill, by using a solution of camphor in turpentine as a lubricant. The material to be examined is placed in a small glass tube, the lower end of which is drawn out, and is tied by means of thread to the thermometer bulk. The fine end of the tube should be cut or ground off at an angle of about 45°. The lower end of the small tube should not extend below the bulb of the thermometer. The height of the thermometer should be regulated so as to bring the bulb about the centre of the beaker. The heat is applied, the temperature being allowed to rise slowly, by means of a sand bath or by setting the beaker on an iron plate heated by the flame.

No one method will answer for all substances. This plan gives very uniform, and, I believe, correct figures.

It possesses several advantages, namely, being entirely of glass there is no unequal absorption of heat by certain parts; there is an entire absence of currents of air, and there is an unobstructed view of all sides of the tube so that observations as to change of color, shrivelling of the mass, charring, etc., which are especially desirable in certain organic bodies, as for example, alkaloids, can be easily made. There are no vapors as in a water bath, paraffin or acid bath to affect the compound and the vision of the observer.

SOLUTION OF SUCCINATE OF IRON.

By F. W. Haussmann, Ph. G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, April 16.

No standard formula appears to have been proposed for a solution of the above iron salt, as a search made in a number of standard works of pharmaceutical literature failed to reveal any treatise on the subject.

The salt itself, viewed from a therapeutical standpoint, appears to have no place in our materia medica. Due to its insolubility in water, chemists sometimes take advantage of its formation in the quantitive estimation of iron.

Insoluble succinates are all more or less soluble in the presence of acetates and this fact may be utilized in the preparation of an

iron solution. Succinate of iron dissolves in a strong solution of potassium acetate with a deep red color, but the resulting liquid is unstable on account of the gradual formation of oxy-acetate of iron, which is precipitated. This change may be prevented by the addition of glycerin.

The main objection, however, in preparing a solution by this method is more on therapeutical than pharmaceutical grounds, namely, the excessive amount of potassium acetate required.

Most insoluble iron salts dissolve in the presence of citrates, and this is also the case with the succinate. By employing either sodium or potassium citrate, solutions of both ferrous and ferric succinate may be prepared. To prevent confusion the respective solutions are described separately.

Solution Ferric Succinate.—Attempted saturation of succinic acid by ferric hydrate has a negative result, ferric succinate, as already mentioned, being entirely insoluble in water. If the saturation is, however, made in the presence of citrates, combination readily takes place.

The following yields a stable solution:

Succinic acid,	64 grs.
Hydrated oxide of iron a sufficient quantity.	
Glycerin,	℥ss.
Potassium citrate,	℥iv.
Water sufficient to make	4 oz.

Dissolve the citrate in the glycerin with the aid of heat, add the oxide in small portions, alternately, with a little water, stirring well after each addition. Finally, add enough water to make 4 oz., boil for about 10 minutes, allow to cool and filter. Theoretically, about 40 grs. of $Fe_2(OH)_6$ are required, but when the solution was prepared, the amount was found to be insufficient. It is best, if the acid is boiled with an excess of the iron and allowed to settle before filtration. The solution contains about 2·5 grains ferric succinate in one fluid dram. It is of a deep ruby color, ferruginous taste, acid reaction, miscible with water in all proportions, and not affected by dilute acids, but turned deep red by ammonia; sp. gr. 1·110.

The commercial salt is also rendered soluble in the presence of citrates and the solution may be directly prepared from the same. The following method yields a solution, which differs considerably in appearance from the one prepared by the foregoing method:

Succinate of iron,	80 grs.
Potassium citrate,	6 drams.
Glycerin,	½ oz.
Water sufficient to make	4 oz.

Dissolve the citrate in the glycerin with heat, add the iron salt in small portions with the required amount of water. Boil, cool and filter. The resulting solution is of a yellowish green color, resembling the elixir of quinine, iron and strychnine very much, of a ferruginous taste and acid reaction. It is miscible with water in all proportions.

The iron salt employed was prepared by precipitating solution of iron tersulphate, diluted, with a solution of sodium succinate. The salt is of a deep red color very much like $Fe_2(OH)_6$, without odor or taste. Both solutions have on 3 weeks' standing not shown any change in appearance.

Solution of Ferrous Succinate.—If succinic acid is saturated either with freshly precipitated ferrous carbonate or the saccharated carbonate and filtered, a reddish liquid is obtained of a decided acid taste and reaction. It is stable, but contains only a slight amount of the salt, insufficient to have any therapeutic value.

On the salicylate of iron solution, as proposed in Remington's Pharmacy, an attempt was made to prepare one of succinate of iron, as follows, acetate of sodium being employed to stay decomposition:

Formula:

Ferrous sulphate cryst.,	24 grs.
Sodium acetate,	20 grs.

Dissolve in ½ ounce of water and mix with a solution of sodium succinate 32 grains in ½ ounce of water.

This mixture rapidly oxidizes, precipitating ferric succinate. It may be somewhat retarded, but not prevented by an addition of glycerin. As in the case of the ferric solution, combination of the acid and iron salt takes place in the presence of potassium citrate, if saturation is made with ferrous carbonate.

Either the freshly precipitated or the saccharated ferrous carbonate may be employed. The following process, while it requires some time for completion, is perhaps the most satisfactory for preparing the ferrous solution.

Succinic acid,	55 grs.
Freshly ppted. ferrous carbonate,	54 grs.

or,

Ferri carb. saccharat.,	6 drams.
Glycerin,	½ ounce.
Potassium citrate,	2 drams.
Water,	q. s. ℥iv

The mode of operation is essentially the same as with the ferric solution. It should be allowed to stand about 12 hours before filtration. It is of a deep reddish brown color, miscible with water, of a sweetish, ferruginous taste and acid reaction; sp. gr. 1·160. It contains 2·5 grs. of the salt in one dram.

It is not the place of the pharmacist to dwell upon any possible therapeutical value of the salt or its solution, yet like all other iron compounds it may be worthy of a trial, which it apparently never received.

To the query: What is the *best* formula for making the solution? no positive answer can be given. The three methods described all yielded solutions, which so far have remained stable. If the solution is required to be ferrous, naturally the formula for the same should be used. For the ferric it must be said, that the solution prepared directly from the salt presents a more attractive appearance, but succinate of iron is seldom found in a retail pharmacy. If not obtainable, the other method may be satisfactorily employed. Perhaps a more positive answer can be given, on examining the solutions after allowing them to stand for some time, when any possible change may be noted. Which is the best formula, we are at present not able to say.

SOLANUM CAROLINENSE (*Linné*).

By G. A. Krauss, Ph.G.

III. THE BERRIES.

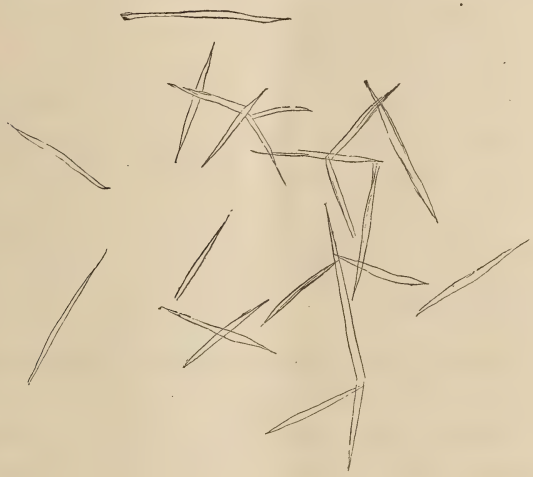
Professor Dragendorff's scheme of plant analysis was used in the following investigation on the berries of Solanum carolinense, which had almost been completed, when a paper on the same subject appeared in the Amer. Jour. Pharm., 1891, p. 126.

In the first place, an analysis of the fresh and bruised berries was made. Petroleum ether and ether extracted small quantities of an ethereal and of fatty oil, the former having a rather suffocating odor.

Alcohol extracted the moisture, became hydrated, and so dis-

solved glucose and albumen, besides the alkaloid and acid, contained in the berries. In my analysis of the root and leaves, the fact is pointed out, that the alcoholic extract of both root and leaves dissolves almost entirely in water (AMER. JOUR. PHARM., 1890, p. 602; 1891, p. 65). I likewise suggested the presence of an organic acid combined with the alkaloid, which together, caused the solubility in water. The berries contained the largest percentage of alkaloid and acid, and their separation was accomplished with less difficulty than from the root or leaves.

250 grams of fresh and bruised berries were macerated for 8 days



Solanic acid; from alcohol extract, aqueous solution acidified, agitated with ether; × 480 diameters.

in officinal alcohol, the tincture distilled in vacuo to recover the alcohol, and the residue taken up by water and filtered.

The aqueous solution, when made alkaline by ammonium hydrate, formed a crystalline precipitate, which was found to consist of phosphate of calcium. Now, it must be remembered that Mayer's reagent will not precipitate alkaloids in combination with organic acids. If Mayer's reagent be added to the aqueous solution of the alcoholic extract, but a mere cloudiness will be observed. On the other hand, decomposing the natural alkaloidal salt with dilute HCl or H_2SO_4 and then adding Mayer's reagent, will produce an abundant flocculent precipitate. To separate the organic acid, the

aqueous solution of the alcoholic extract is acidified and agitated with ether. On evaporating the ether, there will be found a mass of well-defined feathery crystals, soluble in alcohol and ether. The accompanying microscopical drawing will illustrate the appearance under an amplification of 480 diam.

After a number of experiments, I found the following process to answer best for the separation of the alkaloid: To the acidified alkaloidal extract add ammonium hydrate in excess and agitate with amylic alcohol, separate the amylic alcohol and agitate it with dilute HCl or H_2SO_4. The acid solution is evaporated over H_2SO_4. The alkaloid as hydrochloride or sulphate has the same properties as enumerated in my previous papers.

Another experiment was made with 50 gm. unbruised fresh berries to find out whether it is necessary for the extraction of the alkaloid to bruise the berries or not. After 8 days maceration in officinal alcohol, the tincture was tested for alkaloids in the way described above:

The weight of Mayer's precipitate from 50 gm. of bruised berries,	0·386 gm.
50 gm. unbruised berries,	0·305 gm.

It would seem justifiable to presume that bruising the fresh berries does not effect an increased yield.

Moisture present in fresh berries, ... 77·53 per cent.

The complete analysis was carried out with 25 gm. of dried berries:

Petroleum ether extract:		
Volatile oil,	0·220	
Wax and fat,	7·160	
		7·380
Ether extract:		
Soluble in dilute HCl (solanidine),	0·574	
Fat and resin,	1·214	
		1·788
Alcohol extract:		
Solanic acid,	0·300	
Solanine,	0·796	
Resin,	0·592	
Glucose,	0·988	
Extractive,	4·244	
		6.920

Aqueous extract:

Mucilage,	4·138	
Dextrin,	2·880	
Glucose,	0·804	
Extractive and albuminous substances,	9·286	
		17·108
Sodium hydrate extract,		11·560
Hydrochloric acid extract,		4·432
Cellulose and incrusting matter,		43·044
Ash, largely phosphate of calcium,		6·552
Loss,		1·216
		100·000

These results differ from those obtained by Kahn (AMER. JOUR. PHARM., 1891, 127) in the amount of oil, largely of volatile oil. Two comparative analyses were made:

Solanidine (?); from ether extract, dissolved by dilute H_2SO_4; × 325 diameters.

	Per Cent.	
(I) Petroleum ether extract,	7·380	
Contains volatile oil,	0·22	
Ether extract,	1 788	
		9·168
(II) Directly extracted with ether,		9·800
Contains volatile oil,	0·26	

The ether extract contained an alkaloid which was soluble in dilute HCl. The microscopical drawing will illustrate the crystals under an amplification of 325 diam.

I have already referred to the presence of an alkaloid in the ethereal extract of the root and leaves, and now confirm my previous statement, after having been able to extract a small amount for experiments. The alkaloid is soluble in alcohol and ether. It is precipitated by iodine and by Mayer's solution. It does not reduce Fehling's solution, even after boiling with dilute acid. This alkaloid appears to be *solanidine.*

The alcoholic extract contains the organic acid and alkaloid previously referred to.

The weight of the alkaloidal precipitate with Mayer's reagent, expressed in percentage of dried fruit, is 1 per cent.

The following experiment will illustrate the identity of this alkaloid with solanine:

The alcoholic extract contained 0·988 per cent. glucose.

After boiling with dilute acid, an amount of glucose corresponding to 1·784 per cent. was found.

The polariscope failed to indicate the presence of any saccharose. It, therefore, can be explained, that the alkaloid (solanine), acted on by dilute acid, was split up into glucose and *solanidine;* this glucose causing the increase in weight of Cu_2O.

The aqueous extract contains a considerable amount of albumen. It may be stated here that the solution after two days' standing contained innumerable quantities of Bacterium termo, the size of which was found to be considerably larger than ever noticed in solutions of animal albumen. Such vegetable liquids afford splendid opportunities for the study of these organisms, causing what is known as putrefaction.

The hydrochloric acid solution contained no starch and nothing reducible by Fehling's solution. Iodine caused a brown precipitate, and $HgCl_2$ a white flocculent precipitate. The cellulose and incrusting matter amounted to 43·044 per cent. Kahn's 15 per cent. of cellulose must have been obtained under different circumstances.

Summarizing the results now obtained by me, it will be fair to state, that all parts of Solanum carolinense, from root to fruit, contain the alkaloid *solanine* and probably also *solanidine*, combined with an organic acid, which seems to be new, in which case it should be called *solanic acid.*

The chemical results show that from the physiological point of view, the horse nettle might well have been expected to act favor-

ably as a remedy in epilepsy, since solanine has been recommended for alike diseases as far back as 1854. Dr. T. Otto (U. S. Dispensatory 16 edit., p. 516) found that 1 grain of solanine killed a rabbit in 6 hours.

Judging by this statement, it is not to be wondered to hear of reports of cattle feeding on the horse nettle leaves or berries being poisoned.

Laboratory, Mansfield Drug Co.,
Memphis, Tenn., April 16, 1891.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Safran Algeri (*extra*).—Under this name has appeared from a French source a substitute for saffron. It is an orange yellow powder of faint saffron odor, soluble in water, producing a solution identical in color with one made from pure saffron; under the microscope small quantities of powdered saffron can be recognized. A careful examination proved this substitute to be a mixture of Martius-yellow (dinitro-naphthol), and tropæolin 000 N.2, with a small quantity of saffron. The following method will serve for the isolation of the foreign coloring matters: To the filtered aqueous solution are added some woollen fibres; these are removed and replaced by others until no more color is extracted; the dyed fibres are washed with cold water and then warmed with ammoniacal water until the coloring matter has gone into solution; after filtering, the solution is boiled until free from ammonia and acidified with hydrochloric acid (if the solution be sufficiently concentrated a yellowish-white precipitate of dinitro-naphthol is here produced), after cooling, agitation with ether will remove the dinitro-naphthol; the aqueous solution of a red color, neutralized with ammonia and evaporated to dryness, will give on addition of sulphuric acid a bright-red color, and, upon dilution with water, a yellow solution (tropæolin).—Dr. G. Possetto, *Ztschr. f. Nahrungsm.-Unters. u. Hyg.* 1891, 45.

Empyreumatic substances in acetic acid may be removed by adding 3 per cent. manganese dioxide (or a manganate or permanganate) with the calculated quantity of sulphuric acid, allowing to stand 12 to 18 hours, then warming moderately until evolution of gas ceases

and distilling. This method is recommended as one of the stages in the purification of pyroligneous acid; the first tenth and the last twentieth only have a slight color and empyreumatic odor; the intermediate portions are free from color and foreign odor.—A. Kibitz, *Pharm. Post*, 1891, 253.

Analytical weights are recommended by A. Gawalowski to be made of the following alloy: Aluminum 80 parts, gold 8 parts, silver 2·5 parts and platinum 4 parts. This alloy has a specific gravity of 5·0, which will allow of all the weights, even the 0·5 milligram and the riders to be made of the same material. The weights are not altered in the laboratory atmosphere, they take a high polish and (the gram weights) are about twice the size of the brass weights. He also recommends the weights to be made of such shape as to do away with sharp edges and corners, so that they may easily be kept clean.—*Rundschau*, 1891, 189.

Constituents of Star-anise. The determinations of volatile oil, fixed oil and ash gave the following percentage figures:

	Volatile Oil.	Fixed Oil.	Ash.
Carpels,	6·11 5·20	1·13 1·47	2·81
Seeds,	3·00 2·40	22·9 21·7	2·46

The volatile oil consists chiefly of anethol $C_6H_4(OCH_3)C_3H_5$; with small quantities of terpenes, safrol $C_6H_3(O_2CH_2)C_3H_5$, the monoethyl ether of hydroquinone $C_6H_4(OH)OC_2H_5$, anisic acid $C_6H_4(OCH_3)COOH$, and a complex aromatic substance yielding upon oxidation veratric acid and piperonal. The fixed oil contains the usual constituents along with cholesterin and derivatives of phosphoric acid. In the aqueous extract is found protocatechuic acid and shikiminic acid $C_7H_{10}O_5$, which by nascent hydrogen iodide is converted into benzoic acid. Sugar was not found in any appreciable quantity, the sweet taste of the fruit, therefore, depending upon the volatile oil. Nitrogenous bases could not be detected.—F. Ostwald, *Arch. der Pharm.*, 1891, 84–115.

The tannin of Algarobilla (the fruit of Cæsalpinia brevifolia, *Benth.*) is a mixture of two tannins; one of which (present to the extent of 8–10 per cent.) is the glucoside of gallic acid, yielding upon hydrolysis gallic acid and sugar (dextrose); the other tannin present in much larger quantity is a tannic acid proper of the formula $C_{14}H_{10}O_{10}$, which at 100° C. easily loses two molecules of

water. The anhydrous acid $C_{14}H_6O_8$ is called ellagic acid (the formula of which is generally given $C_{14}H_8O_9$); the hydrated acid $C_{14}H_{10}O_{10}$ is called ellaggenic acid; the latter forms a penta-acetyl derivative, the former a tetra-acetyl derivative, indicating five and four hydroxyl groups, respectively, in the acids. In the fruit there also pre-exist small quantities of gallic and oxalic acids.

The tannin of Myrobalans is also a mixture of the two tannins mentioned above, although in somewhat different proportions; gallic acid in small quantity is also present. The tannins were separated by fractional precipitation with lead acetate, subsequently purified by precipitation with sodium chloride and solution in acetic ether.—G. Zoelfell, *Arch. der Pharm.*, 1891, 123–160.

Musk.—Th. Wimmel publishes the results of a recent examination of a sample of musk which contained about 25 per cent. foreign vegetable matter, chiefly starch, and lost by drying in a water bath, 51 per cent. moisture; the ash amounted to only 2·5 per cent.—Apoth. Ztg. 1891, 154.

Assay of mercurial ointment.—A moderately wide test tube is filled to within one inch from the mouth with either of the solutions: Sodium nitrate 1· and water 2·5, or magnesium sulphate 1 and water 2; these solutions must be exactly neutral. From 4–6 gms. of the ointment are next placed in the test tube and this then put in a water bath until the fat melts and forms a clear layer above the aqueous solution; the solution having a higher specific gravity than the ointment the latter will float and in melting the mercury sinks to the bottom of the tube. After the fat becomes clear a small stick is suspended in the fat and the test tube set aside until the contents become cold; by gently warming the part of the test tube containing the fat the latter can be withdrawn from the test tube, and after the removal of the stick, weighed. By the appearance of the fat some idea of its nature may be obtained. The mercury, after pouring off the saline solution, is washed several times with water, dried by putting it in crumpled filtering paper and weighed. If the mercury used was not pure the weight obtained will be deficient, as the contaminating metals will gradually unite with the fatty acids and, hence, be found in the fat. The saline solution used must not contain even traces of alkali as this would cause saponification and prevent the fat from separating out perfectly.—C. Thein, Apoth. Ztg., 1891, 172.

Ash of Kamala.—Carefully selected kamala, according to P. Siedler, will not contain more than 1·5 per cent. ash; imported kamala yields from 21·8 to 49·1 per cent. ash. By sifting, fractions are obtained containing as high as 25 per cent., and as low as 5·2 per cent. ash; high percentage of mineral matter is generally due to the method of collection, although it may be due to adulteration; the percentage of ash has notably increased in the last few years, as by sifting it is very often impossible to get the drug containing less than 14 per cent. ash. Of 45 samples examined only 3 contained less than 6 per cent.; 11 contained between 8 and 10 per cent.; the remainder contained between 10 and 83·21 per cent. ash.—*Pharm. Ztg.*, 1891, 162.

Bettendorf's reagent for arsenic.—A method for preparing this reagent, so that it can be relied upon, is to dissolve one part crystallized stannous chloride in two parts concentrated hydrochloric acid (sp. gr., 1·19–1·20); the solution is colorless, refractive and fumes strongly in the air. It can be used in the examination of all chemicals excepting the orange sulphide of antimony; to use it one gram or one cc. of the article to be tested is dissolved in 5 cc. of the reagent, a brown precipitate or coloration within 15 minutes indicates the presence of arsenic; only in two cases is it of importance to apply the test in the cold, in bismuth subnitrate and solution of ferric chloride; in all other tests, heating to the boiling point will bring about immediate reduction of the arsenic impurity to the metallic condition producing the brown color or precipitate.—Dr. H. Warnecke, *Pharm. Ztg.*, 1891, 167.

Tests of purity for phenacetine.—(1) If 2·5 gm. chloral hydrate placed in a small test tube be melted by immersing in a water bath and 0·5 gm. phenacetine added a colorless solution will result upon agitation, providing the phenacetine be pure; keeping the test tube in the water bath for 5 minutes produces no change, but longer heating (15–30 minutes) will produce a rose color. In carrying out this test it was noticed that some specimens of phenacetine gave on heating for 2–3 minutes an intense violet coloration; this was found to be due to contamination with *p*-phenetidine one of the intermediate products in the manufacture of phenacetine. Fractions of a milligram will give a very distinct coloration. As *p*-phenetidine is poisonous, producing in continued small doses serious kidney troubles, this impurity may explain the bad effects obtained in some cases with phenacetine.

(2) A dilute iodine solution is made by adding 3 drops tincture of iodine and a little potassium iodide to 200 cc. water. This reagent will also detect *p*-phenetidine, although it is not as delicate as the test above. If 0·5 gm. phenacetine be briskly agitated with 5 cc. of the reagent and filtered the filtrate will have a red color if the phenacetine contains the above-mentioned impurity. F. Goldmann modifies the last test (Reuter's) by dissolving the phenacetine in 2 cc. alcohol and warming after the addition of the iodine solution.—*Pharm. Ztg.*, 1891, 185, 192, 208.

Atomic weights.—Recent determinations of chromium, by C. Meinecke, give as a mean 51·94. K. Seubert, in his determinations of the platinum metals, finds Ruthenium, 101·4; Rhodium, 102 7; Palladium, 106·35; Silver, 107·66; Osmium, 190·3; Iridium, 192·5 Platinum, 194·3; Gold, 196·7; Krüss and Moradt find for Beryllium, 9·027.—(*Lieb. Ann. Chem.*) *Chem. Rpt.*, 1891, 65 and 77.

The manufacture of hydrobromic acid from potassium bromide and sulphuric acid can be successfully carried out as follows: 100 gm. coarsely powdered potassium bromide, and 150 cc. sulphuric acid, sp. gr. 1·41, are moderately warmed until solution is effected and then distilled. Boiling commences at 126–127° C., the temperature slowly rising to 150° C. During this time most of the hydrobromic acid distils over, by heating to 250° C. very little additional HBr is obtained. Traces of sulphuric acid are carried over in the last portions; if the bromide used contain bromate, the first portions of the distillate will contain bromine, and in the rectification of the acid, the bromine is acted upon by careful addition of sodium sulphite solution until the acid is colorless before the distillation. The first portion passing over is a dilute acid, later at 126°, an acid of sp. gr. 1·49 and containing 48 per cent. HBr distils over. Only about 1 per cent. potassium bromide escapes decomposition, and if the bromide be pure no free bromine is found in the distillate.—W. Feit and K. Kubierschky, *Chem. Ztg.*, 1891, 444.

Salicylic acid lotion.—25·0 salicylic acid, 50·0 glycerin, 925·0 dilute alcohol (68 per cent.) 5 drops oil of gaultheria and one drop each of the oils of rose and orange-flowers; dissolve and filter. This is used in the cure of dandruff, the directions are as follows: Cleanse the scalp with warm soap-water, rinse with warm water, and dry with a towel. Put two tablespoonfuls of the lotion in a wine glass, fill with warm water and apply with a sponge; after removing excessive liquid, cover the scalp for ½ hour with a cloth.—E. Dieterich, *Pharm. Centralhalle*, 1891, 147.

NOTE ON PHLOX CAROLINA.[1]

By Henry G. Greenish, F.I.C.

Inquiring a few weeks ago at one of our wholesale houses for Spigelia root, I was informed that it was scarce just then, and all that they had in their possession was a broker's sample of about 4 ounces, to which I was welcome if it would be of use to me. An examination of this sample, which I accepted, disclosed points of interest that I venture to bring under your notice this evening.

On glancing at this so-called spigelia it was at once observed that for spigelia it was a bold sample. Closer inspection showed that it differed materially in its straighter, thicker and less wiry rootlets and smoother rhizome, from which the cup-shaped scars that characterize true spigelia are absent, the lower portions of the aërial stems frequently remaining still attached. Moreover, the cortex of the root showed a decided disposition to separate from the woody column, leaving the latter as a continuous yellow thread.

These characters led me to suspect that I was dealing with *Phlox carolina*, the root of which has been substituted for that of *Spigelia marilandica* in the United States. In 1883 Professor Maisch alluded to "the fact that the spigelia sold twenty-five years ago had entirely disappeared from the market, and its place had been taken by the much smaller roots of *Spigelia marilandica* and one or more species of *Phlox*, principally *Phlox carolina*."

In response to a request from me, Professor Maisch was kind enough to send me a sample, remarking that it was what he received some years ago as *Phlox carolina*.

This root agreed with mine, and on comparing them with herbarium specimens in the British Museum, which unfortunately were mostly without roots, I have little doubt that they are correctly named.

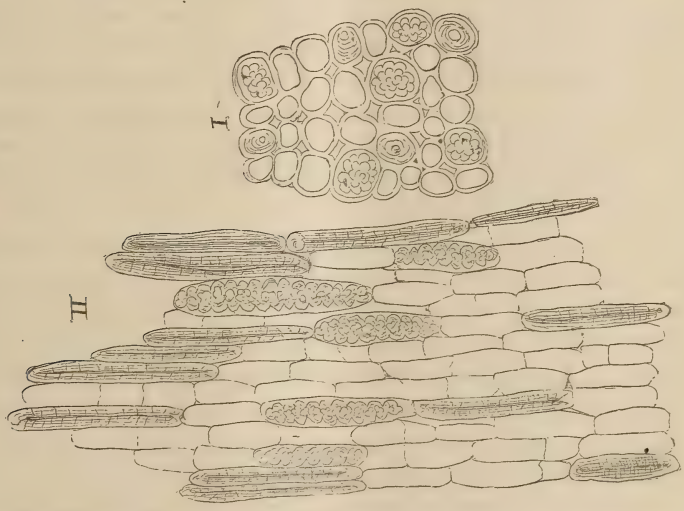
From the roots of this plant Professor Trimble isolated a red crystalline body, which he designated phloxol. This body passes into solution when the roots are digested with petroleum benzin, and thus furnishes us with another means of distinguishing phlox from spigelia.

But the most striking and interesting features of the root are those which are disclosed by a microscopical examination.

[1] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, March 11th. From *Phar. Jour. and Trans.*, p. 839.

The transverse section of a light colored, well-developed root shows a small central woody column enclosed within an endodermis and surrounded by a comparatively large cortex. In the latter portion of the section the eye is at once arrested by numerous stone-cells, and also by the presence in a number of cells of an apparently granular mass more or less completely filling them. Here and there a small fragment of red coloring matter (phloxol?) is visible.

A tangential section shows the stone-cells to be of remarkable length. It also discloses the nature of the granular masses; they are large and well-formed cystoliths. These are usually more or less cylindrical in shape, not acutely pointed, as is sometimes the case.



On treating a section with dilute hydrochloric acid, the calcium carbonate, of which they are principally composed, dissolves with effervescence, leaving the cellulose skeleton undissolved. The presence of the stone-cells and cystoliths renders the section both characteristic and interesting.

Neither of them are confined to the root, but are to be found as well in the parenchymatous tissue of the rhizome and aërial stem. Here the cystolith, varying in shape with the cell which it occupies, is frequently nearly cubical, whilst the stone-cells assume approximately similar dimensions.

A few years ago cystoliths were thought to be confined almost

exclusively to plants belonging to the natural orders Urticaceæ, Cucurbitaceæ and Acanthaceæ. Last year Radlkofer enumerated eleven orders in which they had been found, but as far as I am aware they have not been previously observed in the Polemoniaceæ, to which order *Phlox* belongs. Nor are they often observed in the root, although it was in the root of *Rhinacanthus* that I found them some years ago, an observation which Professor Russow extended to other plants of the Acanthaceæ.

If, now, this sample of *Phlox* root be carefully examined, it will be observed that some roots appear light colored, whilst others are dark, both externally and internally, suggesting the possibility of the sample consisting of the mixed roots of two or more species of *Phlox.*

The histological characters of this dark root are, however, identical with those of the pale as far as structure is concerned, but the parenchymatous cells of the cortex are seen to be more or less completely filled with a red amorphous mass. If a tangential section of such a root is stained with sulphate of aniline, the red coloring matter is deepened, the stone-cells assume a straw-yellow tinge, whilst the cystoliths are unaffected.

On carefully examining the roots of my samples one by one, in search of an explanation of this difference, and separating the pale from the dark, I found a root which had, at some period or other of its growth, been injured; the cortex had been cut through, whilst the woody column remained intact. Above the injury the root was pale, below it nearly black; thus proving the identity of the dark root beyond doubt. Further search showed that every case of injury to the cortex was accompanied by the presence in the neighboring tissue of an abnormal amount of coloring matter, and several portions of root were found, which were dark at one end and pale at the other.

I content myself now with recording these facts, I purpose cultivating the plants, if possible, and may therefore perchance be able to furnish later on an explanation of what must be regarded now simply as an interesting fact.

A NEW ALKALOID IN TYLOPHORA ASTHMATICA.

By David Hooper.

Tylophora asthmatica is one of the better known Indian drugs among Europeans, on account of the leaves being made official

in the Pharmacopœia of India, and because a chapter is devoted to it in the "Pharmacographia" of Flückiger and Hanbury. The specific name of the plant points to its medicinal activity as being an important character, although other plants in the same natural order have somewhat similar properties. The older botanical names of the plant, *Asclepias vomitoria, Cynanchum vomitorium* and *C. Ipecacuanha*, refer more exactly to the physiological action of the drug, and as the action resembles so closely that of the true ipecacuanha of Brazil, it has been recommended in medical practice as a substitute in India, Mauritius, and other countries where it grows.

The leaves have been stated to be more certain and uniform in their action than the root, and a report on an examination of them occurs in "Pharmacographia" (2d ed., p. 427). "A concentrated infusion of the leaves has a slight acrid taste. It is abundantly precipitated by tannic acid, by neutral acetate of lead or caustic potash, and is turned greenish-black by perchloride of iron. Broughton, of Ootacamund, obtained from a large quantity of leaves a small amount of crystals, insufficient for analysis. Dissolved and injected into a small dog they occasioned purging and vomiting." I have been unable to discover any further particulars of Mr. Broughton's analysis among his note-books and reports, but an alkaloid I have recently found in the roots probably constituted the crystals obtained by him from the leaves.

The roots are pale brown, very brittle and about 6 inches or more in length by half a line in diameter. They have a sweetish taste, followed by acridity. The odor of the freshly-dried root is suggestive of old brown Windsor soap.

The alkaloid is dissolved out of the inspissated alcoholic extract with water, and the filtered solution, rendered alkaline with ammonia (which causes a precipitate of the base), yields it up to ether on agitation with that liquid. Its solution in ether and alcohol are alkaline in reaction, and it is only sparingly soluble in water in a free state. It forms neutral solutions with acids, and is precipitated by all the usual alkaloidal reagents. It is crystalline when evaporated from its more volatile solvents, and forms prismatic crystalline salts with hydrochloric and nitric acids. The pure alkaloid added to a few drops of sulphuric acid is dissolved with a reddish-brown color, which changes into a red, turning to green and

finally to an indigo tint. With nitric acid the alkaloid is colored purplish-red; that which dissolves is orange colored. Hydrochloric acid forms with it a yellowish solution. Frohde's reagent dissolves it with a sap-green coloration. Sulphuric acid and bichromate of potassium form a violet-brown fluid. A solution discharges the color of permanganate of potassium, but is not affected by ferric chloride and plumbic acetate.

These reactions are not to my knowledge peculiar to any of the known alkaloids. The purplish-red color with nitric acid is similar to that obtained with buxine and pereirine, but the absence of a strong bitterness, and the different purposes to which the respective mother plants are put, do not admit of a chemical relation between these bases.

I propose for this alkaloid the name of "tylophorine," and when opportunity affords I hope to be able to give some further particulars of its chemical constitution, and, with the assistance of a medical friend, of its physiological action. The occurrence of alkaloids in the natural order Asclepiadaceæ has not been recorded, or very rarely so, but I have recently found that they are by no means absent from this family of plants.—*Pharm. Jour. and Trans.*, Jan. 17, p. 617.

ALKALOIDS AND OTHER ACTIVE PRINCIPLES FROM PLANTS GROWING IN THE DUTCH INDIES.[1]

By M. Greshoff.

I. *Carpaïne, the Alkaloid of Carica Papaya*, L.—The leaves of the papaya (*Carica Papaya*, L.) contain, in addition to the caricine and papaine discovered by Wurtz and Peckolt, an alkaloid which has not previously been prepared, and for which the name *carpaïne* is proposed. The young leaves are richest in the alkaloid, and contain about 0·25 per cent.; the sap, seeds, and roots only contain traces. Carpaine is readily soluble in alcohol, chloroform, and ether, the freshly precipitated compound being more readily taken up by the latter solvent than when crystallized, a fact which is made use of in isolating the alkaloid. It is completely separated from solutions of its salts by sodium carbonate solution, but is insoluble in potash, and cannot be extracted from acid solution. It gives precipitates with Mayer's solution, iodine, phosphomolybdic acid,

[1] *Ber.* **23,** 3537—3550; reprinted from *Jour. Chem. Soc.*, 1891, p. 334.

picric acid, gold chloride, tannin, potassium, thiocyanate, etc., melts at 115°, and sublimes partly without decomposition. Its *hydrochloride* crystallizes in beautiful, lustrous needles, and is readily soluble in water. The base even when dissolved in 100,000 parts of water, has a bitter taste, and is only poisonous in large doses, but small quantities readily kill smaller animals, the action taking place on the heart.

II. *Investigation of Indian Leguminous Plants.*—The plant known as *Derris* (*Pongamia*) *elliptica*, Benth., is largely used in Java in fishing, and appears also to be a constituent of the Borneo arrow-poison. It has exceedingly poisonous action on fish, a decoction of the roots being fatal even when diluted with 300,000 parts of water. The only active constituent isolated is a resinous substance termed *derrid*, which does not contain nitrogen and is not a glucoside; it readily dissolves in alcohol, ether, chloroform, and amyl alcohol, but is very sparingly soluble in water and potash solution. On fusion with potash, it yields salicylic and protocatechuic acids. It occurs almost entirely in the cortex of the root, but has not yet been obtained pure. Its alcoholic solution has a slightly acid reaction, and a sharp aromatic taste, causing a partial insensibility of the tongue, which remains for hours. A solution of 1 part in 5 millions is almost instantly fatal to fish. A very similar compound is found in the seeds of *Pachyrhizus angulatus*, Rich., a decoction of which is quickly fatal in a dilution of 1 : 125,000. It is probably identical with derrid, but until this has been experimentally proved it may be distinguished as pachyrhizid. It is very readily prepared from *Pachyrhizus*, which occurs in all tropical countries, as the tannin compounds, usually so difficult to separate, are not found in this plant. The seeds also contain a non-poisonous, crystalline compound, which is readily soluble in alcohol, and has at 30° the consistence of butter.

The plant *Sophora tomentosa*, L., formerly renowned as a medicine ("*Anticholerica Rumphii*"), contains a poisonous alkaloid, soluble in ether, which is contained in largest quantity in the seeds. Alkaloids have previously been found in *S. speciosa* and *S. angustifolia*, but have not been closely investigated.

The cortex of *Erythrina* (*Stenotropis*) *Broteroi*, Hassk., contains considerable quantities of an alkaloid, which may be readily isolated by Stas' method, and is easily soluble in ether. Its sulphate may

be obtained in crystals from concentrated aqueous solution. It gives precipitates with many metallic salts and with the usual alkaloid reagents; it is a fairly strong poison, being fatal to fowls in doses of 0·025 gram. A poisonous alkaloid likewise exists in *Erythrina* (*Hypaphorus*) *subumbrans*, Hassk., and is best isolated as a metallic double compound.

The leaves of different kinds of cassia are employed in Java as a remedy for herpes; they contain a glucoside which yields chrysophanic acid as a product of hydrolysis.

The leaves of *Crotolaria retusa*, L., contain considerable quantities of indican; the seeds contain an alkaloid, which is found in larger quantities in the seeds and leaves of *C. striata*, L. The base is a strong poison, and is probably closely related to the known alkaloids of other Genisteæ, such as *Cytisus*, *Ulex*, *Spartium*, and *Lupinus*.

The seeds of *Millettia atropurpurea*, Benth., contain a poisonous glucoside, the chemical and toxicological properties of which closely resemble those of saponin. The plant is also employed for poisoning fish. The cortex of *Acacia tenerrima*, Jungh., contains a bitter poisonous alkaloid, readily soluble in ether and chloroform. No alkaloid has previously been found in an acacia. The leaves of *Albizzia saponaria*, Bl., contain cathartic acid, whilst the leaves and cortex contain saponin in quantity.

The cortex *Pithecolobium bigeminum*, Mart., contains 0 8 per cent. of a non-volatile, amorphous alkaloid, which forms crystalline salts, and separates as a heavy, yellow oil on the addition of alkalies to solutions of the latter. With 100 parts of water, it forms a turbid liquid, which on warming assumes the appearance of milk, but becomes clear on the addition of an acid. The solutions have a burning taste, and give the usual alkaloid reactions. It has a strong corrosive action on the skin, and is fatal to fish in a dilution of 1 : 400,000. The same compound appears also to occur in *P. saman*, Benth.

III. *Apocyneæ containing Alkaloids, occurring in the Dutch Indies.*—The leaves, cortex, and seeds of *Melodinus lævigatus*, Bl., also contain a poisonous alkaloid, which is present in the largest quantities in the seeds (0·8–1 0 per cent.). It is decomposed by dilute hydrochloric acid, but is not a glucoside, and gives the ordinary alkaloid reactions in very dilute solutions, and with feeble oxidizing agents

in sulphuric acid solutions gives a greenish coloration, which then becomes deep blue and finally orange.

Leuconotis eugenifolia, Dec., yields a poisonous, crystalline alkaloid which is readily soluble in ether, and shows the general reactions of the alkaloids, but gives no color reactions. The cortex of *Rauwolfia canescens*, W., yields an alkaloid which gives a beautiful, blood-red coloration with nitric acid. *Rauwolfia* (*Ophioxylon*) *serpentina* and *trifoliata*, which is highly prized in Java as a drug, also contains a crystalline alkaloid which gives the same reaction with nitric acid, and its presence may be easily recognized microscopically in the various parts of the plant by this reaction. The substance recently described as ophioxylin is identical with Dulong's plumbagin, the error being caused by a confusion between *Ophioxylon serpentinum*, L., and *Plumbago rosea*, L., which, though very different plants, are both termed "Poeleh Pandak" in Java. The above alkaloid also occurs in *Rauwolfia* (*Cyrtosiphonia*) *spectabilis* and *madurensis*. All these species of *Rauwolfia* contain a brown substance also; this likewise appears to be an alkaloid, and yields a beautiful, blue, fluorescent solution in ether. It is constituent of many *Apocyneæ*.

The cortex of *Hunteria corymbosa*, Roxb., contains 0·3 per cent. of a crystalline alkaloid, which also forms crystalline salts, and gives a beautiful violet coloration with Erdmann's and Fröhde's reagents. It is a strong poison, and has a sharp, burning taste, even when diluted to 1 : 10,000. The cortex of *Pseudochrosia glomerata*, Bl., also contains a poisonous, crystalline alkaloid, and the above fluorescent compound.

The cortices of *Ochrosia* (*Lactaria*) *acuminata*, *Ackeringæ*, and *coccinea* are rich in alkaloid constitutents. Three products have been isolated, namely, a colorless, crystalline alkaloid soluble in ether, which is moderately poisonous, an alkaloid insoluble in ether but soluble in amyl alcohol, which is the best isolated as the mercurochloride, and also the above-mentioned fluorescent compound. These substances also occur in the seed and the sap. The cortex of the stem of *Ochrosia* (*Bleekaria*) *kalocarpa* contains 1·2 per cent. of alkaloids.

The seeds of *Kopsia flavida*, Bl., contain no less than 1·85 per cent. of a homogeneous alkaloid, which is soluble in ether and readily prepared pure and crystalline; it likewise occurs in *Kopsia*

arborea, Bl., the leaves of which contain in addition a fluorescent substance. *Kopsia* (*Calpicarpum*) *Roxburghii* yields quite a different alkaloid, which causes tetanus. The seeds and leaves of *Kopsia* (*Calpicarpum*) *albiflorum* contain an alkaloid, as also do *Vinca rosea*, L., and *Alstoni* (*Blaberopus*) *villosa*.

Voacanga (*Orchipeda*) *fœtida* yields a bitter alkaloid readily soluble in ether, and the fluorescent compound already frequently mentioned. *Tabernæmontana sphærocarpa*, Bl., also contains an alkaloid, and á wax-like compound, which is free from nitrogen and melts at 185°. Alkaloids are also present in *Rhyncodia* (*Cercocoma*) *macrantha* and in *Chonemorpha macrophylla*, Don, which is of interest, inasmuch as these species both belong to the *Echitidiæ*, the other members of which are free from alkaloids.

IV. *Cerbera Odollam*, Hamilt.—The sap, leaves and cortex of this plant have no toxicological action, but the seed kernel contains, in addition to a non-poisonous fatty oil, the compound *cerberin*, which has a poisonous action on the heart. It resembles thevetin, thevetosin and tanghinin, but is identical with none of them. It most nearly resembles the last-named substance, which is obtained from *Tanghinia venenifera*, Poir., the "test-plant" of Madagascar. Cerberin is free from nitrogen and crystallizes well, and although decomposed by acids, is not a glucoside. It is insoluble in water, but dissolves readily in alcohol, chloroform, acetic acid, and 80 per cent. ether, and melts at 165°. It gives a violet coloration with sulphuric acid, has a sharp, burning but not bitter taste, and is very poisonous. The seeds contain another very poisonous substance, which is readily soluble in water, alcohol, and amyl alcohol, but insoluble in chloroform, for which the name odollin is proposed. It is not precipitated by lead acetate, and gives the same color reaction with sulphuric acid as cerberin.

V. *Laurotetanine, the Active Constituent of certain Lauraceæ.*—Many of the Javan varieties of Lauraceæ contain, in addition to other not yet clearly defined bases, a crystalline alkaloid termed *laurotetanine*, which has a strong tetanic action on animals. It is contained in quantity in the cortex of the stem of *Litsæa chrysocoma*, Bl., and is sparingly soluble in ether, more readily in chloroform. It is precipitated by sodium carbonate from solutions of its salts, but readily redissolves in an excess of potash or soda, and is precipitated by the usual alkaloid reagents. The freshly prepared alkaloid

commences to crystallize after some days in stellate groups of needles; it gives a dark indigo-blue coloration with Erdmann's reagent, a pale rose-red with pure sulphuric acid, and a reddish-brown with nitric acid. A base which seems to be identical with laurotetanine is also found in the varieties of *Tetranthera*, in *Notaphœbe*, Bl.. *Aperula*, Bl., and *Actinodaphne*, Nees. It is possible, also, that laurotetanine is identical with the alkaloid discovered in 1886 by Eykmann in *Haasia squarrosa*, Z. et M., as the author has also found it in *H. firma*, Bl.

Hernandia sonora, L., and *H. ovigera*, L., both yield an alkaloid closely resembling the bebeerine obtained from *Nectandra*, whilst *Illigera pulchra*, Bl., contains laurotetanine.

VI. *The Distribution of Hydrocyanic Acid in the Vegetable Kingdom.*—The leaves of *Gymnema latifolium*, Wall., an Indian *Asclepiadea* contain large quantities of amygdalin, which can, however, only be obtained in the amorphous condition. The leaves do not contain any enzyme, and may, therefore, be distilled with water or dilute sulphuric acid without any hydrocyanic acid or benzaldehyde passing over. On the addition of emulsin, hydrolysis readily takes place.

The fresh bark of many Javan forest trees gives off an odor of bitter almond oil. It was found that *Pygium parviflorum*, T. et B., and *P. latifolium*, Miq., both contain amygdalin, which on botanical grounds was not improbable, as the species *Pygium* is closely related to *Amygdalus*.

When the fruit of certain Javan Aroides (the genera *Lasia* and *Cyrtosperma*) is cut, a strong odor of hydrocyanic acid is observed, and it was found on investigation that it is present in the free state. It also occurs in the leaves of these plant. It is found, however, in much larger quantity in a Javan tree known as *Pangium edule*, Reinw., the seeds of which, after cooking in a certain manner, are looked on by the Malays as a valuable food. If this cooking is insufficient, the seeds are a frightful poison, and are used in Javan for killing fish and insects. It was found on investigation that all parts of the tree contain free hydrocyanic acid. Thus the leaves, on distillation, yielded 0·34 per cent. which is equal to 1 per cent. on the dried leaves; in the other parts the proportion, although less, is still considerable. The amount of hydrocyanic acid is not constant, old *Pangium* leaves having been examined which only contained 0·045 per cent.

The leaves and seeds of the *Pangium* contain a substance which reduces ammoniacal silver solution and Fehling's solution in the cold, and whose solutions become dark-colored in the air. Although no crystalline compound could be obtained with phenylhydrazine, it is probably a sugar, with which the hydrocyanic acid forms an unstable compound. The seeds, which are originally white, gradually become dark, the hydrocyanic acid disappearing at the same time.

The only poisonous constituent of the genus *Hydnocarpus* is also hydrocyanic acid. The fatty oils of certain species of *Hydnocarpus* are used externally in skin diseases, their value being possibly due to the antiseptic action of hydrocyanic acid.

ON THE CRYSTALLINE ALKALOID OF ACONITUM NAPELLUS.[1]

By Wyndham R. Dunstan and W. H. Ince, Ph.D.

From the Research Laboratory of the Pharmaceutical Society.

The authors have investigated the properties of a crystalline alkaloid obtained from the root of *Aconitum Napellus* by extraction with amyl alcohol, as suggested by the late Mr. John Williams (*Pharm. Journ.* [3] xviii, 238). For a supply of the material they are indebted to the kindness of Messrs. Howards & Sons, of Stratford.

The yellowish indistinct crystals melted at 188·4° (corr.) and by crystallization from alcoholic solution were proved to be associated with a small quantity of a gummy amorphous base. On combustion the original substance gave numbers agreeing fairly well with the formula $C_{33}H_{43}NO_{12}$ which is that proposed for aconitine by Wright and Luff (*Journ. Chem. Soc.*, 1879). The alkaloid was purified by repeated crystallization from a mixture of alcohol and ether, or more readily by conversion into its hydrobromide and regeneration of the alkaloid from this salt or by regeneration from its crystalline aurochloride. It crystallizes in tabular prisms belonging to the rhombic system; the crystallography of the substance has formed the subject of a separate inquiry by Mr. Tutton. The crystals are very slightly soluble in water and light petroleum, more

[1] The substance of a communication made to the Chemical Society, March 19; reprinted from *Phar. Jour. and Trans.*, March 21, p. 857.

soluble in ether and alcohol, most soluble in benzene and chloroform. They melt at 188·5° (corr.). Contrary to the statements of previous observers, who found aconitine to be lævo-rotatory, the authors found an alcoholic solution to the *dextro-rotatory* $[\alpha]_D$ + 10·78°; the aqueous solution of the hydrobromide is, however, lævo-rotatory $[\alpha]_D$ — 30·47°. On analysis, the pure alkaloid afforded results which agreed best with the formula $C_{33}H_{45}NO_{12}$.

Two crystalline *aurochlorides* were obtained. One ($C_{33}H_{45}NO_{12}HAuCl_4$) melts at 135·5° (corr.); the other, a basic aurochloride ($C_{33}H_{45}NO_{12}AuCl_3$), melts at 129° (corr.). These compounds are obtained without difficulty, and afford trustworthy means of identifying aconitine. The alkaloid may be readily recovered from them in a pure state.

Aconitine is not appreciably affected by heating at a temperature below its melting point, but at this temperature it is gradually converted into the uncrystallizable base aconine. Prolonged boiling in aqueous solution induces a similar change, but not to the same extent, unless an alkali is present. Boiling with water acidulated with hydrochloric acid also produces decomposition of the alkaloid.

Dehydraconitine or *apoaconitine* is a base differing from aconitine by the absence of a molecular proportion of water, which was first obtained by Wright and Luff by acting on aconitine with acids. Its existence has, however, been questioned by later workers. The authors find that such a substance may be readily procured by heating aconitine with saturated aqueous tartaric acid in closed tubes, as recommended by Wright and Luff. The crystals of this substance melt at 186·5° (corr.). It forms crystalline salts, and in other respects closely resembles the parent alkaloid. The results of analyses agree well with the formula $C_{33}H_{43}NO_{11}$. Three *aurochlorides* were obtained. One ($C_{33}H_{43}NO_{11}HAuCl_4$) melts at 141° (corr.). This salt, when crystallized from aqueous alcohol, becomes a hydrate—

$$(C_{33}H_{43}NO_{11}HAuCl_4H_2O)$$

melting at 129° (corr.), isomeric with aconitine aurochloride, into which, indeed, it very readily changes. The third aurochloride is a direct compound of the alkaloid with auric chloride ($C_{33}H_{43}NO_{11}AuCl_3$); it melts at 147·5° (corr.).

An *amorphous base* was obtained from aconitine, together with benzoic acid, by prolonged heating with water in a closed tube. It

appears to be identical with the *aconine* of Wright and Luff. The same substance is formed together with a resinous substance when aconitine is heated with an alkali. Neither aconine nor its salts could be crystallized. The amorphous base, after purification, and its amorphous aurochloride, afforded analytical data agreeing respectively with the formulæ $C_{26}H_{41}NO_{11}$ and $C_{26}H_{41}NO_{11}HAuCl_4$.

A further study is being made of aconine and of the question as to the existence of other alkaloids in the root of *Aconitum Nappellus*.

ECGONINE.[1]

By U. Mussi.

The author has already (*L'Orosi*, [11], 270–277) recommended that, since the direct detection of cocaine is difficult, the products of its decomposition should be sought for in toxicological investigations. With this object, he has examined the behavior of ecgonine with various reagents. Acccording to Einhorn this alkaloid is *methyltetrahydropyridyl-β-hydroxypropionic acid*,

$$C_5NH_7Me{\cdot}CH(OH){\cdot}CH_2{\cdot}COOH,$$

and reacts both as a base and an acid; it crystallizes in colorless, lustrous, monoclinic prisms with 1 mol. H_2O, which is lost at 120–130°. It is very readily soluble in water, less easily in absolute alcohol, insoluble in ether, chloroform, and carbon bisulphide. Its solutions are neutral, and have a somewhat bitter taste. It melts at 198° with partial decomposition. With phosphomolybdic acid, it forms a yellow precipitate; with somewhat concentrated gold chloride solution, a yellow, amorphous precipitate; with platinic chloride in dilute alcoholic solution a red-brown, crystalline precipitate, $(C_9H_{15}NO_3)_2,H_2PtCl_6$, which is readily soluble in water, and loses hydrogen chloride when heated, forming the salt $(C_9H_{15}NO_3)_2PtCl_4$. With stannic chloride, mercuric chloride, tannin, and picric acid, it forms no precipitates which distinguish it from cocaine. Especially is the reaction with Wenzell's reagent (200 parts of sulphuric acid and 1 part of potassium permanganate) delicate, a clear wine-red coloration being formed which disappears only after some time.

In an experiment with a rabbit, 1·26 grams of ecgonine per kilo,

[1] *Chem. Centr.*, 1890, ii, 516—517; from *L'Orosi*, **13**, 152—158; reprinted from *Jour. Chem. Soc.*, 1891, p. 333.

of live weight was found to be fatal. After 48 hours, the entrails were divided into five parts, and each part digested several times at 60° with twice its weight of alcohol, and the extract concentrated nearly to dryness. The residue was taken up with water, and shaken several times with ether in order to extract fatty substances. The aqueous solution was precipitated with basic lead acetate, filtered, the lead removed as sulphide, the liquid again filtered, evaporated to dryness, and the residue finally extracted with a little absolute alcohol, in which the ecgonine exists as acetate and was readily detected. The alkaloid was found in the heart, blood, lungs, liver, brain and spinal cord.

Ecgonine Salts.—$(C_9H_{15}NO_3)_2Mg + 3\frac{1}{2}H_2O$, very hygroscopic plates, soluble in water, and alcohol, insoluble in ether, melting at 190°. $(C_9H_{15}NO_3)_2Ca$ is soluble in water and alcohol, insoluble in ether. $C_9H_{15}NO_3Ag$, orange-colored, decomposing readily when exposed to the light. *Ecgonine acetate*, $C_9H_{15}NO_3,C_2H_4O_2 + 2\frac{1}{2}H_2O$, needle-like, hygroscopic crystals, melting at 196°, very soluble in water and alcohol, insoluble in ether.

MINUTES OF THE PHARMACEUTICAL MEETING.

APRIL 16, 1891.

The seventh of the present series was held this day; on motion of Mr. Wm. B. Webb, Mr. Wm. B. Thompson was called to the chair.

The minutes of the last meeting were read and no corrections being required they were approved.

The secretary read the formulas for *Goddard's astringent gargle*, placed in his hands by Wm. B. Webb and L. C. Funk, both are known to have been directed by the late Dr. Paul B. Goddard.

℞

Fol. rosæ rub.,	℥ ii
Aquæ bullientis,	f℥ v
Acidi sulphurici diluti,	f℥ ss

Infuse, when cold, strain and add:

Mel. despumati,	f℥ j
Acidi tannici,	℈ ii
Aluminis,	℥ ij
Spts. vini rectif,	f℥ vi
Aqua rosæ,	f℥ vi

M.

The other formula contains pomegranate rind in place of tannin, but this is preferable.

℞

Red rose petals,	℥ii
Pomegranate rind,	℥iv
Boiling water,	f℥vi

Infuse, strain and add:

Alum,	℥ij
Clarified honey,	℥j

Filter.

M.

Mr. Beringer exhibited specimens of cantharidin and cantharidate of potassium, Liebreich's new remedy for consumption, the dose being one- or two-tenths of a milligramme used hypodermically. The specimen of cantharidin was very fine both in color and in size of crystals. They were both from the laboratory of Dr. Theodore Schuchardt, of Goerlitz, Germany.

Mr. F. W. Haussmann, Ph.G., read a paper on solution of *succinate of iron*, which was referred to publication committee.

Mr. McIntyre in reply to the query, What is syrupus roborans? said that the name was that of a proprietary article, made by a house in Louisville, Ky. The formula was given in the Western Druggist. It seems that the best way to answer this query is to submit what may be termed a skeleton formula indicating the amount of quinine and strychnine that is really desired in each dose, and adding the hypophosphites of iron, calcium, sodium, potassium and manganese in such quantities as will, when combined form an advantageous preparation. Such a formula is the following:

Hypophosphite of	Calcium	two grains	
"	Sodium	one "	
"	Potassium	one "	
"	Iron	half "	
"	Manganese	half "	
"	Quinine	half "	
"	Strychnine	$\frac{1}{100}$ "	in every teaspoonful.

This will represent a syrup of quinine, strychnine and hypophosphites similar to Fellow's (or other good makes).

To obtain equally good results the following simple formula may be followed, the manganese being the only salt omitted.

Quinine bimuriatis,	Gr xxv
Strychnine sulphatis,	Gr ½
Aquæ destillatæ,	f℥ij
Syrupi hypophosphitum cum ferro,	f℥vj

M.

Owing to the great solubility of the bimuriate of quinine and sulphate of strychnine in water, an excellent opportunity is presented to the physician of altering the dose in any manner that circumstances may indicate.

A secret preparation is claimed to contain twenty-five per cent. of cod liver oil, and is called a tasteless preparation of cod liver oil and hypophosphites; the examination of it, by two capable chemists, published some two years ago, showed it to be destitute of any oil.

The recipe of the National Formulary does not seem to give a sufficient dose

of strychnine, and that of the British Pharmaceutical Conference was also thought too weak, that of Dohme was thought to be of good proportions. The question as to the possibility of making an *elixir of pepsin, bismuth and strychnine*, which would contain all the ingredients, was replied to that it was quite possible, as citric acid would dissolve the pepsin and if just neutralized with ammonia the bismuth could be kept in solution.

Mr. Beringer read a paper upon the *determination of melting points*, describing an apparatus which he had found quite useful for that purpose; the same gentleman also exhibited an *improved spritz bottle*, using an atomizer bulb for compressing the air, and a third tube which is kept closed, while the water is flowing and opened when it is desired to cause the flow to cease.

Mr. England replied to a query relative to Adonis vernalis, that he used Bubnow's formula, viz: four to eight parts of the whole herb to one hundred and eighty parts of water. Dose, a tablespoonful every two hours.

The subject of the *better commercial education of the apothecary*, was discussed in a paper from Mr. Wm. B. Thompson. Professor Remington thought that the business in proprietary medicines would be relegated to general stores and that pharmacies proper would ignore patents. Mr. McIntyre thought we would be wrong in signing any such contract as would reduce us to mere sub-agents of patent medicine men, while we might make some arrangements with manufacturers of such goods that would be advantageous.

Mr. Beringer thought that the Alumni Association might do a very good work by securing some one who would give one or two lectures upon this subject.

There being no further business, on motion adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The *junior examinations* were held November 8, December 6, and March 7, the questions being as follows:

BOTANY AND MATERIA MEDICA.

(1) Give a full description of the manner in which cells are multiplied by division, and by free cell formation.

(2) Give definitions of the following botanical terms: Root, primary root, secondary root; also give some examples of officinal roots consisting mainly of primary roots, and wholly of secondary roots.

(3) Give a description of the structure of a dicotyledonous stem, and name the kinds of cells contained in each tissue, mentioned in the description.

(4) Define the following, and give for each two examples of officinal drugs: Rhizome, bulb, leaf and leaflet.

(5) Name two officinal *gamopetalous flowers* from different orders, giving for each the botanical name, the natural order, the habitat of the plant, description of the flower, and the medicinally important constituents.

(6) Give the botanical name of *Irish Moss*, and the habitat of the plant; describe the drug. Explain the principal botanical differences between the *Algæ* and the *Lichenes*.

THEORY AND PRACTICE OF PHARMACY.

(1) Describe the Metric System? What are the units? Why is it called the Decimal System? What advantages does it possess over all other systems? If

a piece of aluminium weighs 256 Gm. and has the specific gravity of 2·56 and loses 82 Gm. when immersed in a liquid, what is the specific gravity of the liquid ?

(2) Describe the principle of the use of Steam for heating in pharmaceutical operations. What is the difference between heating by steam with pressure and heating by steam without pressure ? Describe the apparatus used in both methods ?

(3) Define boiling point as applied to liquids. Upon what does the rapidity of evaporating *boiling liquids* depend ? Upon what does the rapidity of evaporating liquids *below the boiling point* depend ? Illustrate by a sketch.

(4) Define Distillation ; Liebig's Condenser ; Desiccation ; Comminution ; Filtration.

(5) Describe the differences in the appearance of crystallized, colloidal and scaled Salts. Give an unabbreviated officinal name for each kind of Salt and give a general method for preparing Scaled Salts.

(6) Name and describe three officinal substances obtained from the following metals : *Manganese*, *Chromium* and *Silver*, the properties of each substance being caustic and destructive to organic matter. Give the precautions necessary in compounding pills made from either of the Salts and state the best excipient for each.

CHEMISTRY.

(1) What is meant by Latent Heat ? In what changes of condition is heat rendered latent ? Give some examples of this, and state any application of these facts in practical use.

(2) What is the composition of White Light ? How could you show this statement to be correct ? What is a spectroscope, and for what purposes is it used by the Chemist ?

(3) Define Equivalence as applied to Chemical Elements. How are Binary Molecules named ? Give examples. Write the formulas of three officinal substances that are binary compounds.

(4) Write two chemical reactions for the production of chlorine. Describe some experiments illustrating the affinity of chlorine for hydrogen. How may hydrochloric acid be decomposed into its elements ? Write the formulas of three metallic chlorides.

(5) Describe the natural varieties of the element carbon. Describe the more important artificial varieties. How is *Carbo Ligni* made, and what are its uses ? How is *Carbo Animalis* made, and what are its uses ?

(6) Complete the following reactions and state in what connection they are used :

$$MnO_2 + 4\,HCl =$$
$$2\,NH_4Cl + CaO =$$
$$NaNO_3 + H_2SO_4 =$$
$$Ca_3(PO_4)_2 + 2H_2SO_4 =$$

QUESTIONS BY EXAMINING COMMITTEE.

(1) Name five officinal drugs for which strong alcohol would be the best menstruum. Name five for which diluted alcohol would be preferred. State reasons for determining why alcohol or diluted alcohol should be used.

(2) What is the chemical formula of Hydrobromic Acid ? Give the name

and strength of the officinal preparation. Give a test to distinguish between Hydriodic and Hydrobromic Acids.

(3) What is the unit of length in the Metric System? What relation has it to the circumference of the earth? State its length in inches and decimal fractions. State the equivalent in fluid ounces or pints of the unit of capacity. How is the unit of weight derived from the unit of capacity? What prefixes are used to express decimal increase of all the above units? What prefixes are used to express decimal division of all the above units? From what language are the prefixes that multiply derived? From what language are those that divide derived.

(4) What is the composition of the atmosphere? Give the proportions of its two principal constituents. Is it a chemical combination? What is its specific gravity? What does 100 cubic inches of air weigh? What pressure is exerted by the atmosphere on the surface of the earth at the level of the sea.

SPECIMENS.

Caryophyllus.	Liq. Ammonii acet.	Ammonii chlorid.
Chelidonium.	Syr. Ferri iodidi.	Zinci sulphas.
Mentha piperitha.	Tinct. Gent. comp.	Acid. boricum.
		Aqua Chlori.

OPERATIVE PHARMACY.

Granulated Salt.

Chloride of Ammonium, ... 240 gr.
Purify and granulate.

Syrup.

Fluid Extract of Ginger, ... 1 fl. dr.
Carbonate of Magnesium, ... 20 gr.
Granulated Sugar, ... 3¼ troy oz.
Water, ... 2 fl. oz.
Make Syrup of Ginger.

Mercurial Ointment.

Mercury, ... ½ oz. av.
Suet, Lard, of each, ... ¼ oz. av.
Mercurial Ointment, ... 50 gr.
Comp. Tinct. Benzoin, ... 30 drops.
Make by the officinal process.

The examination of the senior students was held at the close of March, a day being devoted to each branch.

MATERIA MEDICA AND BOTANY.

A—Ipecacuanha—Give the botanical name and habitat of the plant yielding it. Describe the manner of collecting the root. Give a full description of the physical appearance of the drug. Describe its structural characteristics. Give the percentage and some of the properties of the active alkaloid. State the distinguishing characteristics of the false ipecacuanhas occasionally met with. Give the doses of ipecacuanha as an expectorant, nauseant and emetic.

B—Geranium—Name the pharmacopœial plant and its habitat. Describe the drug, as seen in the market. Give a description of its structural characters. Name the constituents, giving the percentage of the medicinally important one. By what physical and structural marks can you distinguish the drug from

tormentil and *bistort?* From which natural orders are the three drugs derived? What is the dose of these drugs?

C—Frangula—From what plant is this drug obtained, and where is it indigenous? Describe the drug according to its physical characteristics. Explain its structural characters. How soon after collection should the drug be used, and why? Name its important principles; also its medicinal properties and dose. In what respect does an allied American drug differ from Frangula?

D—Poison Oak—To what plant is this popular name applied, and where is it indigenous? Give a complete description of the part which is medicinally employed. What proximate principles have been observed in the drug? Give some characteristic properties and reactions of the poisonous principle. How soon after collection should the drug be used and why? Name some other drugs furnished by the natural order to which the poison oak belongs.

E—Tamarind—Name the plant and its original habitat. From which country is the American market supplied. Give a description of the part of the plant used. State how this part is prepared for commerce. Describe the drug as seen in commerce. Name its constituents. Also its medicinal properties and dose. What other drugs are obtained from the same suborder of the Leguminosæ?

F—Nux vomica—Give the botanical name and the habitat of the plant yielding this drug. Describe the physical characteristics of the drug. Explain its structure, pointing out all the different layers and parts. Name the glucoside present in nux vomica. Give the total percentage of the two alkaloids and state to what extent they vary in proportion. Describe characteristic reactions of each alkaloid. Give the dose of nux vomica and of its principal alkaloid. What antidotes are used in cases of poisoning?

G—Name the *astringent extract-like drugs* of the Pharmacopœia. Give for each the botanical origin. Also the process of preparation. Describe each drug as to physical properties, solubilities and constituents. Name other similar drugs and briefly state their origin and characteristics.

H—Kamala—Give its botanical origin and the habitat of the plant. How is the drug collected? Describe its characters, including appearance under the microscope and behavior to solvents. What are its constituents and the amount of ash? How may adulterations be detected? Name the medicinal properties and dose.

I—Opium—How is the milk-juice of the poppy plant obtained and prepared for the market? How would you judge of the quality of opium without assay? Give an outline of the pharmacopœial process for morphiometric assay. State the effect of different simple solvents upon the alkaloid morphine. Also some of its tests of identity. What antidotes are recommended in cases of poisoning by Opium.

K—What effect has ferric choride upon

a) tincture of opium; *b*) tincture of aloes;
c) tincture of guaiacum; *d*) oil of cloves.

How would you distinguish between drying and non-drying fatty oils?

How would you detect the following adulterations:

a) Castor Oil in Balsam of Peru;
b) Resin in Musk;
c) Starch in powdered Tragacanth.

THEORY AND PRACTICE OF PHARMACY.

A—(1) An apothecary has two kinds of opium, one 13½ per cent., the other 16 per cent.; he desires to make 8 troy ounces of 14 per cent.; how much of the weaker kind must he use?

(2) If moist opium containing 12·8 per cent. of morphine loses 20 per cent. of its weight by drying, how much morphine per cent. will it contain when dry?

(3) A druggist, having bought ten litres of oil of lemon (sp. gr. 0·8505), wished to put it up in bottles holding one ounce avoirdupois. How many bottles would be required to hold the ten litres (no allowance being made for down weight or other losses)?

B—Give the unabbreviated officinal name, the ingredients, brief outline of process, and description of the appearance of James' Powder; Fluid Extract of Foxglove; Antimonial Wine; Hive Syrup; Huxham's Tincture; Carron Oil; Bay Rum and Brown Mixture.

C—Give the English name and synonym, the ingredients, brief outline of process and description of the appearance of Collodium cum Cantharide; Syrupus Ipecacuanhæ; Unguentum Aquæ Rosæ; Tinctura Opii Deodorata; Infusum Digitalis; Liquor Potassii Arsenitis; Oleatum Hydrargyri; Pilulæ Rhei Compositæ.

D—Describe three processes for making glycerin. What are the usual impurities found in glycerin? What are the physical and medicinal properties of the best known compound produced by the action of nitric acid on glycerin? By what names is it known in commerce, medicine and the arts? How is it used in medicine? What is the dose?

E—Give the principal test of identity for quinine; salicylic acid; veratrine; wood creasote and carbolic acid.

F—Define the following substances: Pepsin; Peptone; Pancreatin, and Ptyalin.

State the properties and uses of each substance, and name some of the forms in which the first three substances are found in commerce.

G—What is meant by Chemical incompatibility; by Pharmaceutical incompatibility, and by Therapeutical incompatibility? Give an illustration of each.

H—Criticise and correct the following prescriptions, if necessary, stating what difficulties there may be in compounding and dispensing them, and how they would be remedied:

℞
Potas. Iod. gr. iij
Quin. Sulph. gr. j
Syr. Aurant. ʒss
Aquam ad ʒij
M.

℞
Mist. Digitalis Comp. fʒij
Tinct. Gentian Comp. } āā fʒi
Tinct. Cinchon. Comp. }
Morph Sulphat. gr. x.
M. S. Two teaspoonfuls 3 times a day (in water).

℞
Liq. Ammon. Acet., fʒiv
Acidi Aceticum, fʒi
Tinct. Ferri Chloridum, fʒss
Glycerinum, fʒss
Muc. Acaciæ ad fʒviij
Sig. A teaspoonful every three hours.

I—Criticise and correct the following prescription, writing out in full Latin form the proper names of the ingredients, and write a suitable label for each; if there are any difficulties in compounding, state them:

℞

Sarah McM——.	Tr. Rhei } āā f℥iij
Morph. S. gr. i	Tr. aloes }
Amm. Mur. ℥i	Nux Vom. f℥iiss
Mist. Fuscæ, ℥iv	Glycerin, f℥i
M. S. ℥ij, in cough.	Ac. Nitrous, f℥i
	Aqua q. s. ft. f℥iv

K—Write out a prescription for a pint of 50 per cent. Emulsion of Cod Liver Oil, and describe the best process for emulsifying it.

Write out a metric prescription for one hundred pills, each to contain $\frac{1}{20}$ gr. of arsenious acid, 2 grains of sulphate of quinine, with 3 grains of iron by hydrogen, and state the proper excipients.

CHEMISTRY.

A—Describe the metal Sodium. State how it is obtained, giving any recent improvements in methods. What are the uses of the metal? Give the general tests for Sodium compounds.

B—What are the native sources of Borax? Give the chemical formulas for *Sodii Boras* and for *Acidum Boricum*. How would you prepare Boric Acid from Borax? Give the most characteristic tests for both Borax and Boric Acid.

C—What is the composition of "White Lead," what of "Red Lead," what of "Sugar of Lead?" By what simple tests can you establish the chemical nature of each of these compounds? Give the several manufacturing processes followed for the preparation of White Lead. What is the chemical composition of Goulard's solution and how is it made?

D—Mention the important alloys of Copper, stating what the components are in each case. Do the same with the alloys of Lead. What is the composition of "Fusible Metal," and what are its properties and uses?

E—What is "White Arsenic?" What are the chief ores of Arsenic and how is White Arsenic made from them? How does Ferric Hydrate act as an antidote when administered in Arsenic poisoning cases? Mention the most important tests for Arsenic in cases of suspected poisoning by this metal.

F—Give the chemical formula for *Chloroformum*, and state to what class of compounds it belongs. From what materials is it made and by what process? Give the chemical formula for *chloral* and state to what class of compounds it belongs and how it is made. What is Paraldehyde and how is it made?

G—What are Ferments and what several classes of decompositions do they bring about? Enumerate the industries based upon fermentation changes. Give the chemical reactions for the more important of these changes.

H—Give the chemical formulas of Valerianic acid and Oleic acid and of an officinal compound of each. Give the formulas of Tartaric acid and Citric acid respectively and state how you would distinguish them by both physical and chemical tests. Give the formulas of two officinal tartrates and two officinal citrates.

I—Give the formula and state the several natural and artificial sources of

Benzoic acid. Compare the graphic formulas of *Acidum Benzoicum*, *Acidum Salicylicum* and *Acidum Gallicum*. Give the graphic formulas of Naphthalene, of α-Naphthol, of β-Naphthol.

K—What are essential oils, and in what physical and chemical characters do they differ from the fixed oils? In what several groups may they be divided? What are the compounds which are formed by the oxidation of the essential oils? Give a classification of these latter compounds.

EXAMINATION BY THE COMMITTEE.

A—What officinal substances are termed Balsams? Give natural order; origin; method of collection. Describe their appearance in commerce. What constituents are common to Balsams? What adulterations are usually found in them? Name two officinal substances which are closely allied to Balsams in chemical constituents and physical properties.

B—What is a Hydrocarbon? How do Hydrocarbons differ chemically from Carbohydrates? What two Halogen derivatives of hydrocarbons are officinal? Give symbolic formula of officinal Alcohol. How many strengths of alcohol are officinal? Give specific gravity of each. Give the symbolic formula of Ethyl oxide. Give the unabbreviated officinal names of the two varieties of Ether. State the respective percentages of alcohol and ethyl oxide contained in each. Give the specific gravities of the officinal ethers at 15·6° C. What is the difference, chemically, between Petroleum-benzin and Benzol?

C—In what respect does the Alumen of the U. S. Pharmacopœia of 1880 differ from the Alumen of the U. S. Pharmacopœia of 1870? Give a chemical test to distinguish one from the other. How may the presence of iron be detected in alumen? Explain the clarification of turbid water by the addition of a small quantity of alumen. How is Alumen exsiccatum made? How does it differ from alumen? Give the name and properties of the metal contained in the compounds of the alumen.

D—Give the officinal name of the Oil of Wintergreen. Give the botanical name of the plant yielding it. From what other plant is much of the oil of wintergreen of commerce obtained? Do these two oils differ greatly in properties and composition? Give the specific gravity of the oil of wintergreen. Of what chemical compound does it largely consist? What officinal acid may be prepared from it? How may adulterations with alcohol and chloroform be detected? How may the absence of Oil of Sassafras be shown? Into what officinal preparations does oil of wintergreen enter.

E—Name three characteristic tests for Lead? What acids are used to dissolve metallic lead? Give two tests to distinguish the Salts of Copper and Bismuth. What three tests are used to distinguish between Sulphites and Thiosulphates?

F—Give the officinal preparations of Colchicum Root and Colchicum Seed. State the strength of each preparation; the menstruum used; the dose you would give of each. Describe the best process for exhausting Colchicum seed. Name the active principle. Give a test to establish its identity.

G—A flask, holding a litre, is half full of water, and an equal bulk of another officinal liquid being added, the contents weigh 1,125 grammes; what is the liquid, and what is its specific gravity?

H—What will be the appearance of the following prescriptions when com-

pounded? Would you dispense them as written? If so, how? If not, what admissible additions would be proper?

℞
Ferri et Pot. Tart. ʒss
Potassii Bromid., ʒij
Syr. Limonis, fʒiv
Aquæ ad fʒiij
M. Ft. Solutio.

℞
Collodii,
Tinct. Iodi, } āā fʒij
Aquæ Ammon.
M. Sec. art.
Sig. Use with a brush.

℞
Menthol, ʒss
Chloral Hydrat. gr. xxiv
M. et div. in chart. No. vi
S. Put one powder in a gill of hot water and use as directed.

I—Criticise the following prescription, translate it, writing out the English names in full:

℞
Morph. Acet. gr. ¼
P. Colch. gr. iij
Ft. Pil. 4 tis. horis. sum.
Mitte VI. in fol. arg. inv.

Would you dispense this as written? If not, what would be your method of procedure?

℞
Quin. Sulph. gr. i
Morph. Sulph. gr. viij
Ft. pil. No. viij
Sig. One pill every 3 hours.

Is it proper to dispense the following prescription? Criticise it.

℞
Res. Podoph. ʒi
Pulv. Aloes,
Pulv. Ipecac } āā gr. xlv
Ext. Tarax.
Spt. Ol. Menth. Pip. ʒss
Liq. Potass. q. s.
Ft. pil. No. xxx.
Sig. Two at night.

K—Criticise the two following prescriptions. State whether you would compound them. Are any of the ingredients incompatible? If so, which are? State what action takes place, if any.

℞
Plumbi Acet. gr. xxiv
Acid. Sulph. Arom., fʒij
Tinct. Kino, } āā fʒiss
Tinct. Kramer.
Tinct Cinchon. Comp. q. s. ft. fʒiv
M. Ft. Solutio.

℞
Acid. Nitric. fʒiv
Acid. Carbolic, fʒvi
M. Apply as directed.

Criticise this prescription; write out a new prescription, correcting any

mistakes that you observe in this one ; give the correct language, terminations, and quantities for a cough mixture with these ingredients :

℞

Codeine Sulphas, 2 gm.
Ac. Hydrocyanic, 8 cc.
Tr. Bellad. 30 cc.
Ext. Ipecac. Fl. iv cc.
Syr. Scillum, 30 cc.
Aqua Mint, q. s. ft. ad 120 cc.
Mix.
Sig. Two teaspoonfuls every 2 hours.

SPECIMENS.

Materia Medica.	*Pharmacy.*	*Chemistry.*	*Committee.*
Gelsemium.	Aqua Amygd. amara.	Acid. Boricum.	Calumba.
Cypripedium.	Glycerinum.	Potass. bicarb.	Mezereum.
Scilla.	Alcohol.	Potass. chloras.	Bals. Peruvian.
Azedarach.	Spir. Juniperi comp.	Sodii hyposulph.	Pulv. aromat.
Eucalyptus.	Spir. Ætheris comp.	Sodii acetas.	Tinct. Serpentariæ.
Sambucus.	Elixir Aurantii.	Ammon. chlorid.	Extr. Eucalyp. fl.
Coriandrum.	Ol. Terebinthinæ.	Magnes. sulph.	Syrup. Rhei.
Pepo.	Syr. Aurantii flor.	Zinci acetas.	Spir. Chloroformi.
Ergota.	Acid. Acetic. dilut.	Æther.	Potass. nitras.
Resina.	Liq. Sodæ chlorat.	Chloroformum.	Sodii bicarb.

OPERATIVE PHARMACY.

Suppositories.

Sodium Carbonate, ... 5 gr.
Stearic Acid, ... 10 gr.
Glycerin, ... 2 fl. dr.
Make six Suppositories.

Bacilli.

Powd. Extract of Liquorice, ... 100 gr.
Powd. Acacia, ... 15 gr.
Powd. Sugar, ... 60 gr.
Syrup of Tolu, ... q. s.
Make 18 bacilli.

Ointment.

Mercury, ... 37 gr.
Nitric Acid, ... ¾ fl. dr.
Lard Oil, ... 1 fl. oz.
Nitric Acid, ... ½ fl. dr.
Make Citrine Ointment by the officinal process.

Mixture.

Potass. Chlor. Pulv. } . . . . . āā gr. xx.
Sodii Chlor. }
Acid. Hydrochlor., ... fl ʒi.
Aquæ, ... q. s. ad fl ℥ij.
Fiat mistura, sec. art.

Plaster.

Spread a Burgundy Pitch Plaster, 4 x 6.

ANALYTICAL CHEMISTRY.

The qualitative determination of inorganic bases, and of inorganic and organic acids was required, the chemicals or mixtures being presented in powder.

Of the seventeen candidates, who had attained the grade "very satisfactory" in the examination of pharmacopœial crude drugs and in descriptive materia medica, twelve participated in the examinations for the J. M. Maisch prize, offered by Mr. J. H. Redsecker, of Lebanon, Pa., and for the prize offered by Mr. J. H. Stein, of Reading, Pa., the examinations being held April 13. In the former case, the microscopical specimens consisted of a longitudinal section of the frond of Aspidium, the cuticle of the leaf of Agave, and the transverse section of the stem of Parthenium, for the determination of the classes of plants and of the plant organs; also of sections of the following drugs for recognition: flax seed, anise fruit, juniper berries, and the roots of Sarsaparilla, Ipecacuanha, Stillingia and Apocynum cannabinum.

Of these specimens anise, apocynum, ipecacuanha and sarsaparilla were recognized each by ten candidates, while the remaining specimens were determined by a smaller number.

The other set of specimens consisted of samples of drugs occasionally met with in commerce, the character of which was to be determined with no other aid except a simple lens; the collection comprised Senega adulterated with the roots of Gentiana Catesbæi; Chicory root, cut; branches of mealy Belladonna root, longitudinally sliced before drying; Moravian Rhubarb; Psychotria emetica (offered as a substitute for ipecacuanha); Phlox carolina (substitute for spigelia); leaves of Chimaphila maculata; berries of Rhamnus catharticus and Cubeb, mixed; Anise mixed with Conium fruit, and Crocus adulterated with dried Calendula. All these drugs and adulterations were determined with the exception of the roots of blue gentian contaminating the sample of senega.

The names of the successful candidates for the degree of Graduate in Pharmacy (Ph.G.), including several having passed in the preceding year, but completed their term of service since then, are contained in the following list, which gives also the titles of the theses presented by the candidates:

Charles Frederick Alsentzer, Delaware, Proprietary Medicines.
Thomas Jennings Baker, Pennsylvania, Koumys.
Mortimer H. Baskin, Pennsylvania, Syrupus Benzoini.
Robert Wilbert Beck, Pennsylvania, Salix lucida.
James Ferris Belt, Delaware, Glycerin.
Edward Augustus Bender, Pennsylvania, Citrate of Magnesium.
John J. Bender, Pennsylvania, Peroxide of Hydrogen.
A. Stewart Besore, Pennsylvania, Acidum Sulphuricum Dilutum.
Joseph Brown Bilderback, New Jersey, Syrupus Benzoini Compositus.
Harry Bitler, Pennsylvania, Dilute Hydrobromic Acid.
Russel Thorn Blackwood, Pennsylvania, Progress in Pharmacy.
George McLeod Bowman, D. C., Natural order Rubiaceæ.
Albert Lewis Boush, Pennsylvania, Tinctures, Solid and Fluid Extracts.
Allen Webster Boyer, Pennsylvania, Phenacetin.

Franklin Nagle Boyer, Pennsylvania, Grindelia robusta.
Col. Jas. Clarkson Boyles, Pennsylvania, Liquor Plumbi Subacetatis.
William H. Breisch, Pennsylvania, Oil of Birch.
Otto Carl Bresser, Pennsylvania, Preparation of Syrups.
William Oscar Brice, S. Carolina, Tendencies in Pharmacy.
William George Bridgman, England, An Old Page of Medical History.
Harry H. Bright, Pennsylvania, Sabbath Observance.
Frank Luther Brown, Pennsylvania, Mercuric Oxide.
John Armstrong Buckner, Missouri, Ceanothus americanus.
William Beatty Bunker, Ohio, Hydrastis canadensis.
Arch Webster Burdick, Pennsylvania, Unguentum Aquæ Rosæ.
Francis James Butterworth, Pennsylvania, Syrups.
Alfred Sylvester Butz, Pennsylvania, Observation in Pharmacy.
*William James Carey, Pennsylvania, Alcohol.
William Asbury Carpenter, Delaware, Benzoic Acid.
Benson Grant Clapham, Pennsylvania, Acetic Acid.
John Halliday Cline, Pennsylvania, Cimicifuga.
William Arthur Clingan, Iowa, Tinctura Ferri Chloridi.
Levi Bennett Cochrane, New York, Pharmacy and its relations to society.
Herbert Cooper, Delaware, Preparation of Tinctures.
Frank Henry Cope, Pennsylvania, Petrolatum.
John Richard Costin, Maryland, Amylum Iodatum.
T. S. McNeilley Cunningham, Tennessee, Tannic Acid.
David Dalton, Pennsylvania, Oleates.
Edward Davis, Pennsylvania, Stramonium.
Jacob Highley Dewees, Pennsylvania, Cardamoms.
Charles B. Dierolf, Pennsylvania, To Prepare Emulsions.
Thomas Henry Dillon, Jr., Pennsylvania, Cocaine and its Salts.
Robert Lovine Dubbs, Pennsylvania, Parasites.
Edwin Stanton Eby, Pennsylvania, Emulsions.
Charles Alfred Eckles, Pennsylvania, The Antipyretics.
Walter Rowland Elliot, Pennsylvania, Menthol.
Jacob Mauger Faust, Pennsylvania, Petrolatum.
Edward Shoener Fernsler, Pennsylvania, Standardization.
John Henry Fies, Pennsylvania, Carbon.
Thomas Milton Fletcher, Arkansas, Asimina triloba.
Richard Deily Fraunfelder, Pennsylvania, Ipecacuanha.
Adelbert Porter French, Pennsylvania, Potassii bitartras.
Francis Freas French, Pennsylvania, Syrup of Benzoin.
Harry Edmund Fry, Pennsylvania, Antipyrine and Antifebrin.
Alfred Ball Garges, Ohio, Indian Hemp.
John Kistler Garland, Pennsylvania, Tinctura Cinchonæ Composita.
Frank Christian Gerlach, Ohio, Ceanothus americanus.
David Clarence Gibbony, Iowa, Natural Salicylic Acid.
Robert Glenk, Pennsylvania, Cicuta maculata.
Benjamin Mylin Good, Pennsylvania, Glucose.
Miss Jean Gordon, Ohio, Extract of Malt.
Benjamin Harvey Gorrell, Jr., Virginia, Polygonatum biflorum.
William Edgar Gosh, Pennsylvania, Syrupus Benzoini.

*Died before Commencement.

Christian Gruhler, Pennsylvania, Glycerin Suppositories.
William Henry Haake, Ohio, Cotula.
G. Washington Hackenberger, Pennsylvania, Glycerin Suppositories.
George Wyly Hackney, Pennsylvania, Thoughts on Pharmacy.
William Henry Hague, Ohio, Hedeoma.
Charles Edward Hammerquist, New York, Fluid Extract of Turkey corn.
William Tabor Hankey, Wisconsin, Sabbatia angularis.
Arthur Edward Hanson, South America, Manihots.
Frank Gast Hartman, Pennsylvania, Volatile Oils.
Henry Decora Hasson, Pennsylvania, Opium.
William Smith Heiges, Pennsylvania, Avena sativa.
Luther Samuel Henkel, Pennsylvania, Erythroxylon Coca.
Conrad John A. St. Herber, Indiana, Phosphoric Acid.
Jacob Hoch, Pennsylvania, Celastrus scandens.
Theodore Albert Hohman, West Virginia, Compressed Tablets.
Edwin Austin Horn, Pennsylvania, Manaca.
John Wallace Hough, Pennsylvania, Aqua Ammoniæ.
Charles Marcus Hudson, Maryland, Standardization.
Adam Rankin Johnson, Kentucky, Mistura Chloralis.
William Hewitt Jones, Pennsylvania, Pilocarpus pennatifolius.
Edward Francis Kessler, Ohio, Eupatorium.
James Elihu Keyes, New York, Spongia.
Grantham Arthur Kinsel, Pennsylvania, Natural Gas.
Charles E. Kitchen, Ohio, Fabiana Imbricata.
William George Kleinstuber, Delaware, Calx Sulphurata.
George Alexander Knowles, Pennsylvania, Carica Papaya.
Louis Homer Koch, Ohio, Taraxacum Officinale.
Paul Krebs, Ohio, Polygonum Bistorta.
William Austin Kulp, Pennsylvania, Pharmacist and Physician.
Edgar La Place, Connecticut, Cantharides.
Edward Lehman, Tennessee, Poison and Poisoning.
Frank Irwin Leinbach, Pennsylvania, Piscidia Erythrina.
Jonathan Knight Lippen, New Jersey, Rubus Villosus.
Alexander George Loelkes, Illinois, Ceanothus americanus.
Christian Leitner Long, Pennsylvania, Analysis of water.
Herman Ernst Lupus, New Jersey, Commercial Teas.
Irwin Breneman Lutz, Pennsylvania, Castanea.
William Dellet Lutz, Pennsylvania, Cochineal.
Frank Floyd Lyons, Ohio, Sambucus Canadensis.
Linwood Dunham McClure, Pennsylvania, Successful Pharmacists.
Philip Celestine McLaughlin, Pennsylvania, Petroleum.
W. Feinour MacLennan, Pennsylvania, Cola acuminata.
Henry Steely McNabb, Pennsylvania, Cola nuts.
Clinton Eugene Main, Maryland, Acidum Sulphurosum.
Fred. Augustus Manter, North Carolina, Borate of Cocaine.
William Arnold Markley, Pennsylvania, Salicylic Acid.
Joseph Howard Marvill, Pennsylvania, Milk Analysis.
Harry Carleton Mendenhall, Pennsylvania, Nitric Acid.
Quillas Alfred Meyer, Pennsylvania, Concerning Syrups.
Frank Miller, Pennsylvania, Acidum Aceticum Dilutum.

William Edward Miller, New Jersey, Pepo.
William Haman Miller, Delaware, Materia Medica.
James Johnson Moore, Pennsylvania, Aristol.
Guadalupe Morales, Nicaragua, Dialysis.
Ellwood George Nickum, Pennsylvania, Lanolin.
Charles Sheppard Ogden, New Jersey, Amylum Iodatum.
Josiah Comegys Peacock, Maryland, Oil of Aristolochia reticulata.
John Flemming Pentz, Pennsylvania, Pepsin.
Joseph Conrad Perry, Pennsylvania, Chian Turpentine.
Alexander Bain Petrie, Jr., Ontario, Hydrochloric Acid.
William Pfeuffer, Texas, Balmony.
Lehman Blew Phillips, New Jersey, Physostigma.
Charles Torbert Pickett, Pennsylvania, Olive Oil.
George Fisk Platt, Pennsylvania, Areca.
Wm. Henry Pratt, New Jersey, Life of a Druggist.
B. Alfred Randolph, Texas, Magnolia grandiflora.
Frederick Miller D. Raub, Pennsylvania, Æsthetics in Preparations.
Charles Hunter Raudenbush, Pennsylvania, Liquor Ferri Chloridi.
Albert George Reizenstein, Pennsylvania, Extractum Glycyrrhizæ fluidum
Charles Alexander Ridgway, Pennsylvania, Glechoma.
Samuel Jacob Riegel, Pennsylvania, Zingiber.
Arthur Raymond Rolleston, Pennsylvania, Grindelia robusta.
Henry Fry Ruhl, Pennsylvania, Repercolation.
Milton Franklin Schaak, Pennsylvania, Populus.
Franklin Benjamin Scheirer, Pennsylvania, Zinc.
Laurence Oliphant Schetky, New Jersey, Spiritus Ammoniæ Aromaticus.
Justus Schmidt, Ohio, Medicated Waters.
Allen Beecher Schminky, Pennsylvania, Syrupus Guaiaci.
Robert Burns Scott, Pennsylvania, Rock Candy Syrup.
Charles Jacob Seltzer, Pennsylvania, Hydrogen Peroxide.
Carl Whittaker Shull, New Jersey, Triturations.
Calvin Bruce Shuman, Pennsylvania, Cetaceum.
Wesley Cline Sitgreaves, New Jersey, Precipitated Chalk.
Benjamin Franklin Smith, Pennsylvania, Estimation of Morphine.
Charles Adam Smith, Pennsylvania, Latent Heat.
Harry Allen Smith, Pennsylvania, Mistura Ferri et Ammoniæ Acetatis.
Herbert Johnson Smith, Maryland, Tinctura Opii.
Edward Thomas Spencer, Pennsylvania, Tablet Triturates.
Elmer Spragle, Pennsylvania, Oleum Theobroma.
James Harvey Spruance, Delaware, Opium.
Lee Steinau, Louisiana, Phlox subulata.
Ephraim Henry Steiner, Pennsylvania, Pharmaceutic Success.
Walter Stimmel, Delaware, Salts of Oxyhydrolapachic Acid.
Louis Franklin Stoffregen, Pennsylvania, Balsamum Tolutanum.
Oliver Stout, Pennsylvania, Emulsion of Cod Liver Oil.
William Alvah Strode, New York, Scientific Pharmacy Applied.
John Geary Stroud, Pennsylvania, Pharmacy as a Profession.
Theodore Herman Strouse, Pennsylvania, Ferula Sumbul.
Harry C. Swartley, Pennsylvania, Ointments.
Joseph Henry Sweeney, Minnesota, Doctors as Pharmacists.

Chas. Leonard Thompson, Delaware, Pilular Extracts.
Maxwell Gustav Tielke, Ohio, Calendula officinalis.
John Fine Tinsman, Pennsylvania, Erythroxylon.
Joseph Harry Venn, Tennessee, Comptonia.
Samuel Albert Visanska, South Carolina, Substitutions in Pharmacy.
Robert Toomer Ward, Alabama, Tincture of Iodine.
Frank Charles Weber, Pennsylvania, Principles for a Successful Pharmacy.
Geary Augustus Weston, Pennsylvania, Acidum Nitricum Dilutum.
Oscar Kellogg Whipple, New Jersey, Ferri oxidum hydratum.
George Nixon Whitaker, New Jersey, Contention of a Pharmacist.
Frank Willett White, Kansas, Gillenia trifoliata.
John Henry Williams, Pennsylvania, Neatness in prescriptions.
Harry Wisler Zeamer, Pennsylvania, Estimation of Chlorine in Liquor Sodæ Chloratæ.
John Paul Zeller, Pennsylvania, Opium.
Albert August Zulich, Pennsylvania, Rhamnus Purshiana.

Summary of the members of the graduating class: 110 come from Pennsylvania; 13 from Ohio; 12 from New Jersey; 10 from Delaware; 5 from Maryland; 4 from New York; 3 from Tennessee; 2 each from Iowa, Kentucky, South Carolina and Texas; and one each from Alabama, Arkansas, Connecticut, District of Columbia, England, Georgia, Illinois, Indiana, Kansas, Louisiana, Missouri, Minnesota, Nicaragua, North Carolina, Ontario, South America, Virginia, West Virginia, Wisconsin; total number, 184.

The professors invited the graduating class, also the officers and trustees of the College to a reunion on Tuesday, April 21, supper being served in the museum of the College, where a few hours were spent in pleasant intercourse.

The Commencement took place at the Academy of Music on the evening of Wednesday, April 22, when President Charles Bullock conferred the degree of Graduate in Pharmacy upon the above-named candidates. The honorary degree of Master in Pharmacy was conferred on James T. Shinn, Ph.G., and Prof. Henry Trimble, Ph.G. Subsequently a Certificate of Proficiency in Chemistry was bestowed upon:

Julius Leopold Baldauf, Ph.G., Kentucky.
Louis Michael Carriat, Pennsylvania.
Richard Gaillard Dunwody, Ph.G., Georgia.
Charles Albert Waterall, Pennsylvania.

The following graduates were awarded honorable mention with the grade of "distinguished:" R. Glenk, J. Gordon, W. T. Hankey, F. F. Lyons, C. E. Main, W. R. Pfeuffer; with the grade "meritorious:" R. W. Beck, E. C. McGregor, G. Morales, J. C. Peacock, C. B. Shuman, M. G. Tielke, J. H. Venn, F. W. White. The Henry C. Lea prize, $100, for the most meritorious researches recorded in the graduation dissertation was bestowed upon J. C. Peacock, with honorable mention of R. Glenk and W. T. Hankey. M. F. Schaak was the recipient of the Materia Medica prize, a Zentmayer microscope, offered by Professor Maisch, for original histological work on an American plant. The Pharmacy prize, a gold medal, offered by Professor Remington for original pharmaceutical work was awarded to R. W. Beck, honorable mention being due to H. L. Boggs, F. H. Cope, W. T. England and T. A. Hohman. The Chemistry prize, a chemical balance, for original quantitative analysis, was earned by F. C. Gerlach, honorable mention being made of J. C. Peacock and W. T.

Hankey. The Analytical Chemistry prize of $25, offered by Prof. Trimble for original chemical work not connected with the thesis, was presented to J. C. Peacock, with honorable mention of W. T. Hankey. The J. M. Maisch prize of $20 in gold, offered by W. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was carried off by F. F. Lyons, and the prize of $20 in gold, offered by M. J. H. Stein, of Reading, Pa., for proficiency in determining the character of crude drugs, by R. Glenk, honorable mention being due, in connection with these two prizes, to J. R. Costin, J. Gordon, W. H. Hague, W. T. Hankey, G. A. Kinsel, W. G. Kleinstuber, G. A. Knowles, A. Loelkes, C. E. Main, G. Morales, J. C. Peacock, W. R. Pfeuffer, C. B. Shuman and J. H. Venn. The Operative Pharmacy prize of $25 in gold, offered by Mr. E. L. Boggs, of Charleston, W. Va., was presented to F. W. White with honorable mention of C. J. C. Boyles, A. S. Butz, T. S. M. Cunningham, R. Glenk, J. W. Hough, G. Morales, A. B. Petrie, Jr., and C. H. Raudenbush. The Theoretical Pharmacy prize, a prescription balance, offered by Mr. H. J. Maris, of Philadelphia, for the best examination in theoretical pharmacy, was carried off by J. C. Peacock, and honorable mention was accorded to J. K. Garland, R. Glenk, J. Gordon, W. T. Hankey, F. F. Lyons, W. R. Pfeuffer, L. B. Phillips, C. B. Shuman, M. G. Tielke, J. H. Venn and O. K. Whipple. The Robinson Chemical prize, consisting of a gold medal and certificate, offered by Mr. J. S. Robinson, of Memphis, Tenn., for the best examination in general and analytical chemistry was presented to W. T. Hankey.

The valedictory address to the graduating class, replete with sound advice to the young pharmacists, was delivered by Professor Sadtler. The ceremonies were interspersed with music, and closed with the distribution of the presents sent to individual graduates by their friends.

The Alumni Association of the Philadelphia College of Pharmacy tendered its 27th annual reception to the graduating class on the evening of April 20, at Association Hall. The exercises consisted of music by the Philadelphia Zither Quartette; an address by President W. Nelson Stem, Ph. G.; the presentation of the Alumni certificate of membership; the awarding of prizes; the class oration by H. C. Swartley, of Pennsylvania; a discourse on the history of the class by F. W. White, of Kansas, and on the future of its members by C. H. Raudenbush of Pennsylvania; the awarding of microscopy certification; recitation of the class poem, by E. Spragle, and of a histrionic act, entitled The Shamrock Ph. G. (?) of the P. C. P. The prizes awarded for best examinations, were as follows: General examination, the Alumni gold metal to F. F. Lyons; and certificates, viz: Materia Medica, R. Glenk; Pharmacy, J. C. Peacock; Chemistry, J. Venn; Specimens, Miss J. Gordon; General Pharmacy, H. F. Ruhl; Analytical Chemistry, C. A. Ridgeway; and Operative Pharmacy F. W. White; also for junior examination, A. W. Dowd of Nebraska.

The Albany College of Pharmacy held its commencement on the evening of March 10, when 24 candidates received the degree of Ph.G.

The Buffalo College of Pharmacy, at its annual commencement held March 24, had 12 graduates.

The Chicago College of Pharmacy held the commencement exercises of its thirtieth session, at the Grand Opera House, on March 10, when President Forsyth conferred the degree of graduate in Pharmacy upon 24 candidates.

The Cincinnati College of Pharmacy held its annual meeting February 15.

The name of Prof. J. F. Judge was placed upon the roll of honorary members, and the following officers were elected: President, H. Wrede; Vice-President, Geo. Eger; Recording Secretary, A. Meininger; Treasurer, C. Fennell; and Corresponding Secretary, W. Simonson.

The Illinois College of Pharmacy held its commencement terminating the winter course, February 24, at the Grand Opera House, Chicago, when 29 candidates received the degree of Graduate in Pharmacy.

The Maryland College of Pharmacy celebrated the fiftieth anniversary of its organization on Friday, April 17. At noon of the same day, the 39th annual commencement was held at the Academy of Music, Baltimore, when thirty candidates were graduated, and gold medals were awarded to Chas. C. Plitt (2), Chas. J. Dickinson, Thos. F. Bradenbaugh, Jas. C. Todd and Harry C. Hyde; and the junior gold medal to Harry C. Hyde. Addresses were made by Prof. Culbreth and by Rev. F. M. Ellis, D.D. In the afternoon a reception was held at the College building on Aisquith Street, and the evening was devoted to a banquet at the Eutaw House, on which occasion, besides the members and graduates of the colleges, the Mayor of the city, prominent members of the medical profession and professors of medical colleges, of the Johns Hopkins University, of the Philadelphia College of Pharmacy and the National College of Pharmacy, also representatives of the Pharmaceutical press were present. The festive table was presided over by President Louis Dohme, and toasts were offered and speeches made by a number of those present.

The Pittsburgh College of Pharmacy, at its recent annual commencement, had eight graduates.

The St. Louis College of Pharmacy had its annual commencement at Memorial Hall, March 26, when forty candidates graduated, of whom the following received prizes: The Alumni Gold Medal, Martin L. Holloway; College Silver Medal, Leo J. Beeli; Prize in Pharmacognosy, Martin L. Holloway; Theoretical Pharmacy, Leo J. Beeli; Practical, Martin L. Holloway; Microscopy, Robert E. Schlueter; Chemistry, Joseph P. Conklin. The Alumni and college prizes for Juniors was awarded to Henry J. Bass. Addresses were delivered by President Sennewald, Professor Whelpley, Professor Good, G. H. J. Andreas, Ph.G., and the valedictory on behalf of the class by Martin L. Holloway, Ph.G. We are pleased to learn that the prospects are quite favorable for the college soon being in possession of its own home.

At the annual meeting, held March 30, the following officers were elected: President, H. E. Hoelke; vice-president, E. P. Walsh; treasurer, S. Boehm; secretary, Dr. J. C. Falk; corresponding secretary, G. H. Chas. Klie. The constitution was amended making the initiation fee five dollars, the annual dues two dollars and life-membership fifty dollars. The board of trustees elected Henry Braun, chairman.

Guaiac resin possesses valuable laxative effects, according to the observations of Dr. Murrell (*Med. Press and Circular*). He has employed it in the form of lozenges prepared with black currant paste, or as a confection containing 10 grains of the resin to one dram of honey; of the latter preparation one or two drams are given three times daily.

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VOLATILE OIL OF ARISTOLOCHIA RETICULATA, *NUTTALL.*

By Josiah Comegys Peacock, Ph.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

Literature. — Bucholz (1807), *National Dispensatory*, (3d ed., page, 1368). T. S. Wiegand, (Amer. Jour. Pharm., 1845, page 10). J. A. Ferguson, (ibid., 1887, page 481). M. Spica, (*Gazzetta di Chimica* XVII, 1887, page 313–316).[1]

The following abstract from the "Journal of the Chemical Society," explains the work of the last quoted authority.

"On distilling the ethereal extract of the root in a current of steam, a yellowish green oil is obtained, heavier than water, and having an odor resembling that of camphor and valerian. This oil, after treatment with potash, is cooled by a freezing mixture, which causes the separation of a crystalline stearopten; this melts at 198°, boils at 212°, and is shown by chemical analysis and its physical properties to be borneol. No very definite product could be obtained from the oil from which the borneol had thus been separated."

Remarks.—This work was carried out in the Chemical Laboratory of the Philadelphia College of Pharmacy, under the supervision of Prof. Henry Trimble, to whom the author is indebted for many valuable suggestions. It was commenced about the middle of June, 1890.

The rhizome and rootlets were used as obtained through reliable

[1] Of old references may also be mentioned the researches of Chevallier (*Jour. de Phar.*, 1820) and Peschier (*Trommsdorff, Taschenbuch*, 1823).—Editor.

channels of the drug market. The amount of the material used was about forty-five kilograms.

The same Centigrade thermometer was used in all instances except where more than one was required, when its fellows were compared with it. The boiling points in air were taken on a sand bath; a thin test tube, containing sufficient substance to completely submerge the thermometer bulb, being used. The several temperatures stated in giving the boiling points of the oils were points at which, in the first given, the oil showed ebullition, and, in the others, increased vigor, until the highest and apparently constant boiling temperature was reached. Between these several points the temperature rose slowly.

The specific gravities were taken by means of the bottle.

The rotary powers were taken with a Wilde's polaristrobometer with the use of the sodium flame. The one hundred millimeter tube was used, as the color of the oil would not allow the use of a longer column.

The barometic pressures were reduced to 0° from the observed height of the mercury column, as a correction for atmospheric temperature, and are here stated in millimeters. All the rectifications and distillations were conducted under reduced pressure. Upon boiling the oils and the fractions in air all became darker in color, but the other physical properties remained unchanged.

By appropriate tests the oil was found to be composed entirely of carbon, hydrogen and oxygen. The combustions were made in an open tube with cupric oxide and a stream of oxygen; the vapor densities with the Victor Meyer apparatus, and the results calculated by the rule which eliminates all differences in barometric and thermometric influences and gives the density of the vapor of the substance at 0·760° mm. pressure, compared with air under similar conditions. The compounds were vaporized in a flask heated to from 40–50° above their boiling points.

Distillation.—The contused drug in quantities of about two kilograms, was macerated over night with about six litres of water, and then distilled, the volume of water being maintained by additions from time to time through the tubulure of the still. It was found when four litres of distillate had been collected that the drug was exhausted of oil. The distillate was collected in quantities of one litre, and the oil which separated from each portion was specifically lighter than that respective part of the distillate.

The oil which separated with some difficulty in very small quantity from the first litre was colorless. The second litre yielded a transparent lemon yellow oily layer constituting about one-half of the whole yield. From the third litre a greenish layer of oil was obtained in about one-fourth of the entire amount. Green oil in about the same amount was separated from the fourth litre. In the subsequent distillations the process of cohobation was employed.

The watery distillates were neutral to litmus. The oil was dried by means of neutral calcium chloride.

The yield of oil from three commercial lots of the rhizome (lot III amounting to about 25 kilograms) was as follows: (I) ·94 per cent., (II) ·73 per cent. and (III) ·61 per cent.; the average being ·76 per cent. The oil from lot III was used for most of this work.

Properties of the Volatile Oil.—In bulk the oil was of an amber or golden yellow color, in thin layers greenish yellow; odor camphoraceous and mildly valerianic; taste, camphor-like, with but little sensation of cold when air was drawn into the mouth; reaction, neutral or indistinctly acid. On exposure, in thin layers, the oil dried slowly to a varnish film.

All the different lots of oil agreed closely with this description, and all failed to separate solids at a prolonged exposure to —17° to —15° in a freezing mixture of salt and ice, or in a snow-bank over night; the only change noticed was the usual one of increased viscosity.

The specific gravity of the oil from lot I was ·9785 at 15·5°, and ·9758 at 20° C.; and from lot III ·9745 and ·9719, respectively.

The rise in the boiling point was noted as follows:

No. Oil.	Commenced.	Increased.	Brisk.	Full and Constant.	Barom. Press.
I,	163°	172°	204°	207–210°	757·7 mm.
III,	165°	179°	205°	213–214°	767·3 mm.

The rotary power was ascertained to be —4·0 in a 100 mm. tube; temperature of the oil 20·5°.

The oil is readily soluble in, or miscible with, an equal volume of ether, chloroform, benzol, benzin (boiling point 45–80°), methyl alcohol, carbon disulphide, turpentine, glacial acetic acid, bromethane, ethylene dibromide, nitro-benzol, ethyl benzoate, aniline, toluol, and olive oil; not so freely soluble in ethyl acetate; sparingly in water; almost insoluble in acetic aldehyde and in glycerin (sp. gr. 1·25); apparently miscible in all proportions with alcohol (sp. gr. ·820).

When heated with finely powdered copper nitroprusside, no change in color was noticed. Fröhde's reagent in equal quantity gave rapidly a black color which was produced slowly by sulphuric acid alone. An equal amount of five per cent. alcoholic solution of ferric chloride, at first, gave a greenish color (due to reduction of the ferric compound), the mixture gradually became dark red brown, almost black, and resinous in about an hour. The odor and taste seemed to be unchanged.

Neither alcoholic solution of ammonium sulphide nor saturated aqueous solution of sodium acid sulphite gave indications of aldehydes or of ketones. With the last reagent a cherry red color was slowly developed, but after separating and washing the oil, the taste and odor were found unchanged.

Rectification.—This was effected by a simple distillation of the oil, under reduced pressure on an oil bath, the process being continued as long as the oil distilled without decomposition. The same colors were noticed in the distillate thus obtained as in the distillation from the rhizome.

The residue in the flask at the end of the operation was red brown, resinous, acid in reaction, and solidified upon cooling. Further distillation of this residue gave only decomposition products, as the distillates so obtained boiled in air at much lower temperatures than those required for their production under the diminished pressure.

The rectified oil, consisting of the mixed distillates obtained previous to threatened decomposition, was of a greenish yellow color; camphoraceous in odor and taste, and neutral in reaction.

The specific gravity at 15·5° was (I) ·955, (III) ·9675, and at 20° C. ·953 and ·9648, respectively.

The rectified oil commenced to boil at 165°; boiling increased at 177°; was brisk at 195–200°, and constant between 207 and 208·5; barom. pressure 756·7 mm.

The rotary power of the rectified oil (temperature 25°, 100 mm. tube) was —16·5.

Rectification did not change the behavior toward the solvents mentioned before, but the rotary power indicated that the decomposition in the highest boiling portions took place at the expense of dextro-rotary substances.

Fractional Distillation.—This operation was conducted on an oil bath, and by its means the rectified oil was separated into the frac-

tions mentioned below. The many repetitions of the operation are omitted and only those temperatures which refer to final distillates are given.

Fraction.	Boiling Point.	Pressure.	Approx. Amount.
A,	74–75°	43 mm.	10 per cent.
B,	122–124°	43 "	60 "
C,	147–150°	47·7 "	20 "
D,	green and bluish fluorescent oils, and decomposition resins,		10 "

The fractions when subjected to low temperatures, as was the original oil, all behaved as the latter. All were readily soluble in glacial acetic acid, and these solutions reacted with sulphuric acid, as follows :

A, Pink, becoming brownish.

B, Pink, becoming brown.

C, Red, deepening.

This reaction of A is that given by some of the pinene groups of terpenes, according to Wallach (*Liebig's Annalen, 239*, page 1 ; also, Amer. Jour. Pharm., 1887, page 619.)

Fraction A.—Boiling point in air 157°, barom. pressure 769·6 mm. Pale greenish (in time becoming colorless, but other physical properties remaining unchanged) liquid of a peculiar penetrating, irritating, terebinthinate odor; a peculiar, characteristic taste, and an acid reaction. When blue litmus paper was held above the liquid it became red quite rapidly. Satisfactory tests were not obtained, with either wet or dry starch and potassium iodide paper, for ozone. Water agitated with the compound was subsequently found to contain acetic acid. It absorbed bromine with avidity. Specific gravity at 15·5° C., ·865. It was obtained by fractional distillation alone, and without the use of metallic sodium or zinc.

The average of two closely agreeing results of combustions made of this fraction was :

	Found.	Calculated for $C_{10}H_{16}$.
C,	88·225	88·23
H,	11·835	11·77
	100·060	100·00

Vapor density : Found 4·82, 4·84 ; calculated for $C_{10}H_{16}$, 4·71.

Fraction B.—Boiling point in air 211°, barom. pressure 763·6 mm. Pale greenish, almost colorless, liquid, having an odor and

a taste similar to those of the oil, and a neutral reaction. Sp. gr. at 15·5°, ·9849.

The average of five closely agreeing combustions was:

	Found.	Calculated for $C_{15}H_{25}O_2$.
C,	75·94	75·95
H,	10·64	10·55
O,	13·42	13·50
	100·00	100·00

Vapor density: Found 8·28, 8·27; calculated for $C_{15}H_{25}O_2$, 8·20.

Fraction C.—Boiling point in air 239–240°, barom. pressure 762·1 mm. This was a yellowish green liquid, of a buchu-like odor; warm, mildly camphoraceous taste; and a neutral reaction. Sp. gr. at 15·5°, ·9888.

The average of three closely agreeing combustions was:

	Found.	Calculated for $C_{18}H_{29}O$
C,	82·69	82·76
H,	11·07	11·11
O,	6·24	6·13
	100·00	100·00

Vapor density: Found 8·89; calculated for $C_{18}H_{29}O$, 9·04.

Fraction D.—This consisted of the green and bluish-green fluorescent oils, but, as they were easily converted into the resinous decomposition compounds always obtained in the distillation of this oil, it was not found possible to separate them by means of distillation, in a state of purity essential for ultimate analysis, nor could they be obtained in this condition by collecting the oil of the fourth litre of distillate and distilling it. In the several lots so treated only a very small amount of distillate from each was obtained above the boiling point of fraction C, and these varied in color, reaction to litmus, and to reagents—all, however, were empyreumatic, camphoraceous and specifically lighter than water.

Saponification of Fraction B.—The formula of this fraction suggesting it to be an ester, the action of alkali was tried upon it. For this purpose a portion of the fraction was heated with half its weight of potassium hydrate, in aqueous solution, in a flask attached to an upright condenser, on a water-bath at the boiling point for about two hours, frequently shaking the mixture. The contents of the flask, which consisted of two layers, were now diluted with water, and the mixture distilled, when a distillate was obtained in which was a

white crystalline camphor-like body. The distillation was continued until the water coming over was perfectly clear, and free from odor and taste.

The contents of the flask were now one layer only; this was carefully acidified with dilute sulphuric acid, the distilling flask again attached to a condenser and the process continued, when another crystalline substance was obtained along with the watery distillate. This last substance was redistilled with water vapor, when it again appeared, as before, in a crystalline form of white dazzling scales (much like benzoic acid) floating on the distillate.

This distillate possessed an acidulous but not pleasant taste and a peculiar, somewhat sour, odor, which was not like that of valerianic acid.

The crystals and also the distillate were strongly acid, and decomposed sodium and calcium carbonates giving soluble salts. The ammonium salt was also soluble. When converted into these salts the odor disappeared, but was again produced by acidifying these compounds with dilute sulphuric acid. The aqueous solution of the free acid gave with ferric chloride a bulky, flesh-colored precipitate. The solution of its neutral salts acted in the same way, but the filtrate (containing the excess of the iron compound) from the precipitate was not red. The crystalline acid substance melted to a yellowish liquid, at a temperature below the boiling point of water, probably at about 65°.

In a second attempt to prepare more of the above acid from some of the fraction containing a small amount of the terpene, the acid separated as an oily liquid, but possessed the other physical properties of the solid acid, and gave the same reaction with ferric chloride, except that the filtrate in the case of its salts was red and upon boiling gave a red-brown precipitate, the cause of which (as was proved by mercuric chloride and by the acetic ether tests) was due to acetic acid.

Another experiment with the pure fraction gave a solid acid, but the small quantity operated on did not yield sufficient to permit it being collected as a solid; no oily layer separated in this case; the distillate was found to be free from acetic acid, and in all physical properties was the same as the distillate obtained with the first crystalline acid.

It might be said by way of parenthesis that an accident prevented

the preparation of the acid in sufficient quantity to ascertain its ultimate composition.

Alcoholic Base of Fraction B.—This was the white crystalline camphor-like body distilled from the saponified fraction. It was recrystallized from stronger ether until the melting point was constant. From this solvent it crystallized in transparent plates, which melted between 199·5–200°. It was sublimable, apparently, without decomposition, condensing in feathery forms in stellate groups. It burnt with a luminous, sooty flame, and was soluble in alcohol.

The crystals were submitted to combustion, the average of two closely agreeing results was:

	Found.	Calculated for $C_{10}H_{18}O$. Borneol.
C,	77·84	77·92
H,	11·69	11·69
O,	10·47	10·39
	100·00	100·00

Vapor density: Found 5·18; calculated for Borneol, 5·33.

Acid Radical of Fraction B.—From the formula of the ester, indicated by combustion and vapor density, this crystalline acid would have the composition $C_5H_9O_2$. From the experiments it appears to be monobasic and quite freely soluble in water.

Recapitulation.—It appears from the above observations that this oil consists of

(I) A terpene, $C_{10}H_{16}$, boiling at 157°; of sp. gr. ·865; having a strong affinity for bromine: characters which ally it to the pinene group of Wallach's classification.

(II) A fraction, boiling at 211°; of sp. gr. ·9849; having the composition $C_{15}H_{25}O_2$; and which by saponification with potassium hydrate gives a camphor-like body melting at 199·5–200°; having the composition $C_{10}H_{18}O$, and other properties of borneol; and a peculiar acid substance. This fraction comprises about 60 per cent. of the oil, and it in turn consists of about two-thirds borneol.

(III) A fraction boiling between 239–240°, of sp. gr. ·9888, having the composition $C_{18}H_{29}O$; and being, apparently, a neutral or indifferent substance.

(IV) Some green or bluish-green fluorescent oil, in small quantity, which readily decomposes at the temperature necessary for its distillation under reduced pressure.

GERANIUM MACULATUM.

By Henry Trimble and Josiah C. Peacock.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 87.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

In this Journal, 1889, page 238, was published the results of a proximate analysis of this drug by Henry J. Mayers, who undertook the investigation with the object of determining the constituents as well as the amount of tannin. Bowman, this Journal, 1869, p. 193, found 13·41 and 17·25 per cent. of tannin, but Mayers found in a commercial powdered sample, from a reliable source, only 4·25 per cent., and in a sample powdered by himself 11·53 per cent. of tannin. He, as well as Dr. Edward Staples, this Journal, 1829, p. 171, reported gallic acid.

The above, somewhat conflicting results, together with the thought that the time of collection might affect the tannin strength, were the inciting causes for the following investigation.

Fourteen collections of the rhizome were made between May 1, 1889, and May 13, 1891; the locality, Fairmount Park, was the same for all but three. The rootlets and adhering earth were carefully removed and the tannin determined as soon as practicable after the collection, always within twenty-four hours. The moisture was determined at the same time. The method employed for determining the tannin was to make a decoction of the drug, precipitate with gelatin and alum, wash, dry and weigh the precipitate and calculate 54 per cent. of it as tannin. The average of three closely agreeing results was used.

Time of collection.	Condition.	Per cent. of tannin.		Moisture.
		In the moist drug.	Calculated for absolutely dry drug.	
January,	Leaves absent,	4·34	11·72	62·99
March,	Leaves absent,	3·61	12·82	71·84
April,	Before blooming,	6·76	27·85	75·73
April,	While blooming,	5·85	23·44	75·05
May,	Before blooming,	4·13	16·34	74·73
May,	While blooming,	3·22	13·38	75·94
May,	After blooming,	3·60	12·38	70·93
July,		3·63	12·41	70·75
October,		3·68	9·72	62·16

Where collections were made at the same season and under similar conditions in different years an average of the results was taken. In 1891 the plant bloomed earlier than it did in 1890, which will account for the statement of blooming in both April and May. It will be evident from an examination of the above figures that in the spring, just before blooming, is the best time for collecting the drug. It will also appear that in this plant the tannin is a storage material used in assisting the plant to bloom.

Every one of the fourteen lots gathered was tested for gallic acid by agitating the decoction with ether, allowing the separated ether to evaporate, and testing the residue.

Negative results were gotten in nearly every case, and where they were not, the evidence was only that of mere traces. Gallic acid does not exist in the plant, but is easily found in the rhizome after drying, resulting from the easily decomposable tannin. Direct extraction of the fresh rhizome also failed to show the presence of gallic acid.

EXTRACTION OF THE TANNIN.

To obtain this principle, a quantity of the dried and finely ground drug was percolated with ether, specific gravity, 0·750, the solvent distilled, the extracted matter treated with water, filtered and the tannin precipitated from the filtrate with lead acetate. This precipitate was rapidly washed, decomposed by hydrogen sulphide in the presence of water and concentrated by distillation under reduced pressure. The concentrated solution was agitated with stronger ether, which was subsequently separated and the distillation of the aqueous solution continued, under the above conditions, to dryness, a red-brown, somewhat porous mass being obtained. The ether removed considerable gallic acid.

This tannin was not completely soluble in cold, but readily soluble in hot water. Weak solutions remained permanent for a reasonable time, but a one per cent. solution rapidly deposited a red-brown precipitate which may be called *geranium red.* After this deposition the solution was red in color and reacted as follows with a number of tannin reagents:

Cobalt acetate,	purplish brown ppt.
Manganese acetate,	light " "
Uranium acetate,	dark-red color.
Potassium dichromate,	brown precipitate.

Calcium hydrate,	purplish precipitate.
Tartar emetic and Ammonium chloride,	light brown "
Copper sulphate,	cloudiness
Same and excess of Ammonium hydrate,	dark-brown precipitate.
Ferrous sulphate,	no change
Ferric acetate,	blue-black ppt.
Gelatin,	red-brown "
Ammoniacal picric acid,	red color
Lead acetate,	drab precipitate.
Copper acetate,	brown "

In almost all cases these reactions were identical with those produced by the same reagents on gallo-tannic acid.

The action of heat was tried on this tannin, as recommended by T. E. Thorpe,[1] and here as with gallo-tannic acid it was found that pyrogallol resulted.

0·200 gram of the tannin, heated to 100° C., with 2 per cent. hydrochloric acid, for several hours, yielded a solution which upon cooling deposited a dark red-brown precipitate, soluble in alcohol and reprecipitated by water and having the other properties of a phlobaphene. The filtered liquid was agitated with acetic ether, which removed gallic, but no tannic acid, and but little coloring matter. After this agitation stronger ether removed the last portions of gallic acid, but no color.

The aqueous solution was now, as originally, red in color; it was heated to remove the ether, neutralized with sodium hydrate, precipitated with lead acetate, filtered, the excess of lead salt removed from the colorless filtrate by dilute sulphuric acid, again filtered, made alkaline with sodium hydrate, filtered and heated with Fehling's solution. The precipitated cuprous oxide upon ignition yielded 0·033 grams of cupric oxide, equal to 7·42 per cent. of glucose. From the same quantity of the tannin, after treatment with lead acetate and removal of excess of lead, as above, there were obtained 2·02 per cent. of glucose, thus indicating the tannin to be a glucoside decomposable into gallic acid, glucose and geranium red.

Glycerite of Iodol is prepared by Egasse by dissolving iodol 1 gm. in alcohol 16 gm., and adding glycerin 34 gm.

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[1] Chemical News, 43, p. 109.

THE JUICE OF THE GARDEN CUCUMBER.

By William B. Thompson.

Fashion and fancy prescribe for Pharmacy as well as for other requirements of civilized life, and it is, perhaps, not wise to be too scrupulous in regard to the utility of such prescriptions, especially when skill and art can make them serve some useful purposes.

Occasionally, in our domestic Pharmacy there is an inquiry for an ointment of cucumber, and whilst the fruit is abundantly indigenous and quite familiar as an edible for the table, we seem to look to foreign sources for a supply of material out of which to fabricate a medical preparation. A Spirit of Cucumber is imported and sometimes to be found in the stock of some of the larger dispensing establishments, but when wanted it may be accessible or not, just as circumstances exist. This fact would indicate a want of thrift, and show a rather deplorable dependence on the foresight of others, but it may be explained, perhaps, on the theory that the demand is so seldom made, that but little interest is incited, and herein lies an observable fault of the average Pharmacist. An excuse for some omission is the rule, the absence of it constitutes the exception. In order, however, to be prepared for even a casual emergency, all Pharmacists may with but little trouble and expense, not worth estimating, make themselves independent of other sources of supply than that of their own stock rooms, by preparing, by mechanical pressure, the juice of the fruit when in full season, and with a suitable antiseptic added, set it aside for an indefinite preservation. Then, if ingenuity is to be an exercise of daily work (and there is always a fair reward for this when coupled with judgment), the juice may be fashioned into lotions, and lavements, and unguents, to protect the skin against the fiery rays of Sol at mountain and seaside when the outing days are in vogue; for the lady patrons are sensitive as to blemishes upon a fair complexion, and readily endorse toilet novelties.

The French Pharmacists, who seem to still excel in the nicer manipulations of extemporaneous pharmacy, pretend to have found much virtue in the juice of the cucumber as a cooling balm, and gentle remedial in some forms of dermic condition.

Readers, by referring to the pages of this Journal, will find in volume xxvi (September No., 1854), page 426, an article by Emile Mouchon, of Lyons, extracted from a French periodical, upon the

subject of a distilled spirit, and an ointment of cucumbers from which it will be seen that the subject had attracted attention from various foreign authors.

The writer of these notes, during some experiments for the purpose of observing the action of the various recognized antiseptics upon vegetable and fruit juices, included the cucumber, and was somewhat surprised to find in it or its juice one of the most tractable substances—some samples, now preserved for three years, and exhibited at a recent pharmaceutical meeting, show no perceptible change except, perhaps, in a darker coloration—the odor, taste and gravity are apparently unaltered. This, in a simple, plain way, demonstrates a fact that may be of interest or even use. It would hardly seem necessary in view of these results to prepare a spirit as suggested by M. Emile Mouchon, but to make an ointment directly from the expressed juice, and thus secure greater concentration of qualities, for it is questionable whether an alcoholic menstruum would represent *more* than the peculiar aroma of the vegetable. Of course, in concentrating the watery solution, or natural juice, in fat or lard, greater care in regulating temperature would be required. Beyond this a spirit would have no advantage or preference.

The most successful antiseptics used were boric and salicylic acids and alcohol, a decided preference being given to the salicylic acid. The proportions used in the case of the acids were 2 grains to each fluid ounce of the expressed juice ; of alcohol 8 fluid drachms to 16 fluid ounces. Either of the three agents will answer the purpose well, but the natural characteristics, in all respects, appear to be retained in better degree by the salicylic acid. As but a limited amount of the acid is dissolved it is better to allow it to remain in the juice, diffused by occasional shaking.

To those not familiar with the modern processes for the preservation of fruit-juices (those luxuries, in a pure state, of the soda fountain), it will be a matter of pleasing as well as profitable surprise to experiment a little and become aware of the very simple and easy means by which every Pharmacist may prepare these products.

Mercuric Collodion, recommended by Dr. Kaposi as a remedy for warts, is prepared by dissolving one part of mercuric chloride in 30 parts of flexible collodion. The collodion is applied with a brush once daily to the wart and around its base.—*Quarterly Therap. Rev.*, Jan., 1891.

ASSAY OF FERRIC HYPOPHOSPHITE.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 88.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

In previous papers (Am. Journ. Pharm., 1889, 326 and 386) on "The examination of officinal hypophosphites," several methods for estimating these salts were described: (1) With potassium permanganate; (2) with mercuric chloride and (3) with sodium hydrate, after oxidation with bromine; 1 and 3 are volumetric methods, while 2 is a gravimetric method. Of these methods the second one was stated to be the more likely one to be used in stores, although requiring much more time than the other methods.

In the examination of ferric hypophosphite it was found at that time that correct results were not obtainable, working under the same conditions as with the other hypophosphites and for this salt the third method was recommended. The difficulty explained already at that time, was due to the oxidation of the hypophosphite (with reduction of the ferric salt) in obtaining the salt in solution.

Recently I have made some further experiments with this method with the result that I was able to successfully estimate this hypophosphite with mercuric chloride; the details are as follows:

0·2 finely powdered ferric hypophosphite, 1·0 citric acid and 25 cc. water, are placed in a beaker and stirred for several minutes until the acid dissolves; then ammonia water is added slowly until the liquid smells strongly of it (this has for its object the decomposition of the ferric hypophosphite, the ferric hydrate entering largely into solution through the agency of the ammonium citrate present); after allowing to stand for ten minutes with frequent stirring to completely decompose the iron salt, 75 cc. of a cold saturated solution of mercuric chloride are added and then hydrochloric acid, drop by drop, stirring constantly until an almost colorless solution results and the calomel commences to precipitate (before the addition of the mercuric chloride the solution is of a brownish color, generally containing a little ferric hydrate suspended; the mercuric chloride solution causes a heavy white precipitate, which by the addition of a few drops of hydrochloric acid dissolves again, forming a brownish or greenish solution; the addition of more acid gradually produces decoloration; as soon as the liquid becomes colorless separa-

tion of calomel commences), allow to stand for one-half hour and then place for a further half-hour in a water-bath at 100° C. Collect the precipitate upon a weighed filter, wash with boiling water, dry at 100° C. and weigh. The weight of the calomel multiplied by ·088934 gives the weight of the ferric hypophosphite. With the same sample, after the details were ascertained, the following percentage figures were obtained: 97·56, 97·73 and 97·73.

With this sample similar results were arrived at in the following manner: 0·2 gm. ferric hypophosphite was dissolved in 3-5 cc. concentrated hydrochloric acid, 50 cc. water added, and heated in a water-bath for one-half hour; then add 75 cc. cold saturated solution of mercuric chloride and place in the water-bath for a further half-hour, etc., as in the previous description.

$Fe_2(H_2PO_2)_6$ requires for complete oxidation twelve oxygen atoms; one molecule of any ferric salt in its reduction to ferrous salt gives up one oxygen atom:

$$Fe_2(H_2PO_2)_6 + H_2O = 2Fe(H_2PO_2)_2 + 2H_3PO_2 + O$$

This oxygen, of course, is taken up by the hypophosphorous acid rendering it necessary to take up only eleven from the mercuric chloride; hence the weight of mercurous chloride obtained in this method must be increased by one-eleventh so as to express the hypophosphite present.

The results by this method will be high if the ferric salt be not completely reduced to ferrous salt. Working by the above directions the following percentage figures were obtained: 97·45, 97·60 and 97·56.

An estimation of the phosphoric acid yielded by oxidation with bromine (Amer. Jour. Pharm., 1889, 330) and calculating to ferric hypophosphite indicated 97·73 per cent. of the latter in the salt examined.

From these determinations it appears that the alkaline citrate prevents the hypophosphorous acid from exerting any reducing action upon the ferric salt in the time necessary for making the assay; the important point to be observed is to first allow the greater part of the reduction to take place in the cold and then to finish by application of heat. The filtrate should always be tested by heating to the boiling point, to see if the reduction is complete.

In the *Journal of the Society of Chemical Industries*, 1891, 68, is an

abstracted article by L. Amat (from *Compt. Rend.*, 111, 676–679) on the estimation of the acids of phosphorus; the methods used are oxidation with potassium permanganate (agreeing with the one proposed by me excepting a slightly lower temperature) and the mercuric chloride method in which he recommends digestion at 80° C. for 12 hours; this method as described by me gives better results by digesting for one hour, or even less, at 100° C.; a decided saving of time with complete precipitation.

FERRIC SUCCINATE.[1]

By Prof. W. T. Wenzell.

Since succinic acid in combination with the ferric radical has recently been introduced by the medical profession, as a remedy for the relief of jaundice, resulting from obstruction of the biliary duct by calculi, and with apparent success, a demand for a preparation combining efficiency and elegance has arisen. The originator of this medicine recommends the use of the hydrated succinate of iron as the preparation by which he has obtained such good results in the treatment of the affection referred to. But the preparation is unsightly and anything but elegant as a pharmaceutical product.

Ferric succinate in a hydrated state or dried, appears as a cinnamon-brown, amorphous substance quite insoluble in water. It is readily prepared by adding to a solution in water of an alkaline succinate, a solution of ferric sulphate, as long as a precipitate is obtained. In this reaction the contrary to the law first enunciated by the Saxon chemist Wenzel a half a century ago occurs: "When two neutral salts are mixed together, in solution, and a decomposition is effected, the products of the decomposition would be also neutral salts." In this instance a basic ferric succinate is produced instead of a neutral succinate, a portion of the succinic acid being liberated and remaining in solution.

The reaction takes place between one molecule of ferric sulphate

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[1] Succinate of iron having again attracted some attention as a medicinal agent, we republish this paper which appeared in the Proceedings of the California Pharmceutical Society and College of Pharmacy for 1881. It was noticed in this Journal in June, 1881, p. 318, where the formula for the solution was republished.—Editor.

and three molecules of the neutral or normal ammonium succinate, and with the assimilation of two molecules of water.

$$\underset{\text{1 mol. Ferric Sulphate.}}{Fe_2(SO_4)_3} + \underset{\text{3 mol. Ammon. Succin.}}{3\,(NH_4)_2\,C_4H_4O_4} + 2\,H_2O =$$

$$\underset{\text{Ammonium Sulphate.}}{3\,(NH_4)_2\,SO_4} + \underset{\text{Basic Ferric Succinate.}}{Fe_2O_2H_2\,(C_4H_4O_4)_2} + \underset{\text{Succinic Acid.}}{H_2C_4H_4O_4}$$

Hydrated ferric succinate occurs in the form of an amorphous precipitate, containing one molecule of water of which it is deprived on drying and converted in the basic salt $Fe_2O\,(C_4H_4O_4)_2$.

The hydrated salt is insoluble in a cold solution of succinic acid or ammonium succinate, more soluble in boiling solution, from which it separates slowly on cooling; is more soluble in citric acid and very soluble in ammonium citrate, even at ordinary temperatures. A solution of ferric succinate in ammonium citrate is quite permanent and can be mixed with succinic acid and ammonia without decomposition. An excess of ammonia merely deepens the color. The solution evaporated at a temperature not to exceed 130° F. solidifies on cooling and standing for a time in a crystalline mass. By experimental synthesis, working with exact molecular weights it was found that three molecules of ammonium citrate were required to dissolve one molecule of the precipitated ferric succinate, and from these data the following composition of the double salt of ferric succinate and ammonium citrate has been deduced

$$Fe_2O\,(C_4H_4O_4)_2,\,3\,(NH_4)_2\,C_6H_5O_7$$

and from this molecular formula a working formula for its preparation has been calculated.

Liquor Ferri et Ammonii Succinatis.—Dissolve 50 grains of succinic acid in 3 fluid ounces of water, neutralize nearly with ammonia and dilute to 6 fluid ounces. Transfer the solution to an 8-ounce bottle, add half a fluid ounce of the officinal liquor ferri persulphatis and agitate well. Transfer the mixture to a filter and wash the precipitated ferric succinate thoroughly with distilled water. Next take 89 grains of citric acid, put it into a beaker and add with stirring a sufficient quantity of ammonia water until the acid is dissolved and the solution neutral. Finally transfer the moist ferric succinate to a porcelain capsule, add the solution of ammonium citrate and dissolve, assisted by a gentle heat.

This solution, when diluted to measure 6 fluid ounces, will contain to the fluid drachm two grains of the ferric succinate $Fe_2O(C_4H_4O_4)_2$ or 5 grains of the double salt.

San Francisco, Oct. 13, 1880.

ADDITIONAL NOTE ON SOLUTION OF SUCCINATE OF IRON.

By F. W. Haussmann, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

At the last meeting, attention was called to the dark color of the sample of ferrous succinate solution, furnished in connection with the paper on this subject. The suggestion was made that perhaps the ferrous carbonate employed was not entirely free from ferric salt, hence the dark color. In the preparation of the sample, the saccharated salt had been used, and, on examination of both the solution and the above salt, ferric iron was found to be present.

To determine if such influence produced the color mentioned, a solution was prepared with the employment of recently precipitated ferrous carbonate, care being taken to prevent the formation of ferric salt as much as possible. The color of both solutions was identical, and on examination of the recently-prepared solution, little or no ferric salt was found. Hence, it may be inferred that the dark color of the sample was not due to the presence of the ferric salt. Regarding the stability of the solution, it can be said that so far it has not shown any sign of decomposition.

The Ferric Solution.—The statement was made in connection with the solution prepared from ferric hydrate, that the preparation was of a ruby color. This color gradually changes to the one prepared directly from the salt, which is stated to be yellowish green. Neither of the solutions give any indication of much change, although a slight precipitate can be noticed in the one prepared from ferric hydrate.

Golden Sulphuret of Antimony is recommended by Dr. Th. G. Davis (*Med. News*, Feb. 7, 1891) in chronic bronchial catarrh or "winter cough." It should be given triturated with milk sugar in doses of from $\frac{1}{50}$ to $\frac{1}{30}$ of a grain after meals and at bedtime; it may be administered with other remedies to quiet cough and allay fever, for instance, with tincture of aconite $\frac{1}{5}$ minim, tincture of bryonia $\frac{1}{10}$ minim, and tincture of belladonna $\frac{1}{10}$ minim, and if cough is troublesome, either codeine or chlorodyne may be given on sugar at bedtime.

FORMULAS FOR SEVERAL PHARMACEUTICAL PREPARATIONS.

By George M. Beringer, Ph.G.

Read before the Philadelphia College of Pharmacy, at the Pharmaceutical Meeting, May 19.

ESSENCE OF PEPSIN.

A product very similar in appearance and chemical composition to the various proprietary preparations sold under this title can be made by the following process:

Take of

Fresh calves rennet,	4	troy ounces
Glycerin,	4	fluid ounces
Alcohol,	2	" "
Tincture of fresh orange peel,	2	" drachms
Water,	14	" ounces
Purified talc,	1	troy ounce

Mix the rennet and glycerin, then add the alcohol, water and tincture of orange, and macerate for four or five days, with repeated agitation. Add the talc, agitate and allow to stand for an hour, or until the talc has been largely deposited. Now decant on a muslin or flannel filter, the supernatant liquid first, and finally the dregs. Then filter again through paper.

One fluid drachm of the essence with four fluid ounces of water acidulated with hydrochloric acid will easily digest 300 grs. of egg albumen in four hours at 104° F., and one fluid drachm will curd one quart of milk at 100° F. in 4 minutes.

ELIXIR OF PEPSIN AND BISMUTH.

The National Formulary furnishes a formula for this preparation, in which 128 grains of pepsin are directed to be dissolved in 4 fluid ounces of water without the addition of any acid; although, in Elixir of Pepsin, hydrochloric acid is directed to be used to dissolve the pepsin.

J. U. Lloyd, in "Elixirs," page 141, recommends a formula for elixir of pepsin, in which 2 fluid drachms of acetic acid and 256 grs. of saccharated pepsin are used to the pint. Regarding the use of acetic acid, he says, that by substituting acetic acid for the acid usually employed (hydrochloric) we obtain a simple elixir of pepsin, more compatible with certain iron salts, and with

ammonio-citrate of bismuth. He publishes a formula for elixir of pepsin and bismuth, of which one-half is this elixir of pepsin and the other half elixir of bismuth, so that the finished product contains but one grain each of saccharated pepsin and ammonio-citrate of bismuth, which is certainly too weak in pepsin to insure any digestive value.

Mr. Lloyd, speaking of the *apparent* incompatibility of pepsin and bismuth and the value of substituting acetic acid for the hydrochloric acid in the preparation of the pepsin solution says: "Thus permitting it to be mixed with the bismuth solution without precipitation of bismuth and also the apparent solution of pepsin in the presence of ammonio-citrate of bismuth. We use the term '*apparent solution of pepsin*,' for although the pepsin undoubtedly disappears it does not necessarily follow that it dissolves and remains active pepsin. Perhaps it is so modified as to be devoid of digestive value, and still remain dissolved. Upon the other hand, even if this is the case, it is barely possible that such a pepsin is only paralyzed, and that its vitality will return when it is taken into the stomach."

As the result of some experiments tried in 1880, the writer was led to use citric acid as a solvent for the pepsin and in the last edition of Parrish's Treatise on Pharmacy such a formula is published. As the citrate of ammonium formed upon neutralizing with ammonia maintained the bismuth in solution, preventing the precipitate which usually soon forms in elixirs made with hydrochloric acid, it was considered a valuable improvement, and I have continued its use since. As the saccharated pepsin in the market has increased in strength during the past 10 years it became necessary to increase the amount of acid used. The following is the formula I would suggest:

Take of

Saccharated pepsin,	640 grains
Citric acid,	120 "
Bismuth ammonio-citrate,	128 "
Stronger white wine,	8 fluid ounces
Spirit of orange,	2 fluid drachms
Sugar,	4 troy ounces
Water of ammonia, Water,	of each a sufficient quantity.

Dissolve the citric acid in four fluid ounces of water and rub up the pepsin with this solution, add the wine and gently warm at a temperature of not over 100° F. until the pepsin is dissolved. Dissolve the ammonio-citrate of bismuth in 1 fluid ounce of water, with the aid of a few drops of ammonia water, and add this solution to the pepsin solution, and then gradually add ammonia water until the solution becomes perfectly clear and neutral or very slightly alkaline. Now add the sugar, spirit of orange and sufficient water to make one pint. Filter if necessary.

This preparation contains 5 grains of saccharated pepsin and 1 grain of ammonio-citrate of bismuth to the fluid drachm, which is the strength as supplied by most manufacturers. A few, however, claim 2 grains of bismuth salt to each teaspoonful, and the above formula can be so altered. In these days of strong pepsins, I would suggest that it should be made by substituting 128 grains of pure powdered pepsin for the saccharated of the formula. Sample marked No. 2 is thus made.

SOLUTION OF MALATE OF IRON.

A proprietary article on the market states on the label that each teaspoonful contains 4 grains of ferrous malate. Upon evaporation a fluid ounce yielded but 32 grains of total residue. The iron, being determined as ferric oxide, and calculated as ferrous malate yielded less than three grains of that salt. By the odor and taste spts. frumenti was easily recognized. The preparation appeared to closely resemble the tinctura ferri pomata of the German Pharmacopœia, with the substitution of common whiskey for the alcohol and cinnamon water of the officinal preparation.

As pure malic acid cannot be obtained at such a price as to warrant its use in preparing pharmaceutical preparations, we are compelled to depend upon the natural acid of certain fruits. As sour apples were not obtainable, it occurred to the writer that cranberries would form a suitable substitute. The juice of the cranberry is stated by E. Mach and K. Portele (see AMER. JOURN. OF PHAR., 1891, page 151) to contain from 18 to 20·5 per cent. of acid. The American cranberry possibly contains not as much acid. Experiment led to the following formula yielding a product very similar to the proprietary. One quart of soft cranberries yield about 12 fluid ounces of juice.

Take of

Cranberry juice,	14 fluid ounces
Iron in the form of fine wire and perfectly clean (card teeth),	1 ounce
Alcohol,	2 fluid ounces

The iron is added to the cranberry juice contained in a suitable vessel and set aside in a warm place, being occasionally agitated for several days. It is then boiled for a half to one hour, adding water from time to time to replace the amount evaporated. Filter and wash the filter with sufficient water to yield 14 fluid ounces of filtrate, add the alcohol and again filter if necessary. This yields a reddish liquid of a slightly acid, and not unpleasant, ferruginous taste.

SYRUP OF THE HYPOPHOSPHITES WITH IRON.

By F. W. Haussmann, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

At the last Pharmaceutical Meeting, in connection with the paper on Syrup roborans, the suggestion was made to replace the lactate of iron in the officinal syrup of the hypophosphites with iron by the hypophosphite. The pharmacopœial method is open to several objections, the chief ones being the incomplete solubility of the iron salt and consequent cloudy appearance of the syrup. More complete solution may be effected by triturating the lactate with the previously heated syrup, although this method is not without objection.

In the substitution of the hypophosphite for the lactate the slight solubility of that salt is the main disadvantage. A number of trials made, to effect simple solution in the officinal syrup of the hypophosphites were without result. Partial solution does take place, but insufficient to communicate an amount of iron, which may be deemed to have any decided virtue. The results are essentially the same, if either the officinal syrup or one containing free hypophosphorous acid in place of citric acid is employed. The pharmacopœial statement, that hypophosphite of iron is rendered more soluble in the presence of free hypophosphorous acid is only true to a limited extent and can hardly be taken advantage of in the preparation of the syrup. The same may be said if citric acid is substituted.

Freshly precipitated ferric hypophosphite is by far more soluble than the dry salt and by triturating it with boiling hot U. S. P. syrup of the hypophosphites an almost complete solution may be effected.

This is, however, not stable, as some of the iron will redeposit on cooling.

If in this operation in place of the officinal syrup one containing hypophosphorous acid is employed, solubility is less complete and the green color of the iron salt destroyed.

Simple solution not being possible, advantage was taken of the solvent action of citrates upon ferric hypophosphite. The following formula is based mainly upon the one given in the National Formulary for compound syrup of the hypophosphites and if carefully manipulated, will furnish a stable and attractive preparation:

Hypophosphite of calcium,	180 grs.
" sodium,	60 grs.
" potassium,	60 grs.
" iron,	48 grs.
Citrate of potassium,	50 grs.
Citric acid,	5 grs.
Granulated sugar,	6 oz.
Water, a sufficient quantity to make 8 ounces.	

Mix the hypophosphites of calcium, sodium and potassium and triturate with 3 ounces of water, adding the citric acid to effect complete solution of the calcium salt, and filter. To the filtrate, introduced into a bottle, add the sugar.

Dissolve the iron and the citrate in 6 drachms of water with the aid of heat, filter the resulting green solution and allow to cool. The perfectly cold solution is added to the contents of the bottle and the sugar dissolved by agitation. If it be desired, lemon spirit may added to flavor.

The iron solution must be perfectly cold or citrate of calcium is precipitated and the syrup rendered cloudy. It may also be stated, that freshly precipitated iron hypophosphite requires less potassium citrate for solution than the dry salt.

Thus prepared the syrup is of a yellowish green color and agreeable taste. It contains the same amount of iron as the officinal syrup and on two weeks' standing shows no change.

The ferrous salt of hypophosphorous acid is not stable, almost immediately changing to the ferric state when in solution.

On the following type, in which a solution of ferrous hypophosphite, prepared by double decomposition was employed, several trials were made to prepare a ferrous syrup, but the finished preparation rapidly decomposes.

Ferrous Sulphate in clear crystals,	64 grs.
Hypophosphite of calcium,	40 grs.

Dissolve the calcium and iron separately in one ounce of hot water, filter and allow to cool. Gradually mix the two solutions, stirring well, filter from the precipitated calcium sulphate, and add enough water through the filter to measure 3½ ounces.

In this dissolve

Hypophosphite of calcium,		180 grs.
"	sodium,	60 grs.
"	potassium,	60 grs.

Use 5 grains citric acid to dissolve all the lime, filter and dissolve the sugar by agitation. When freshly prepared, this is of a light green color and pleasant, ferruginous taste. If means could be found to stay the oxidation of the ferrous hypophosphite, the syrup, made by this method, would be no doubt a most satisfactory preparation. None of the methods used to prevent this result, such as the employment of heat or of free hypophosphorous acid, was however successful.

The prevention of this change, the addition necessary to gain this end, presents an interesting subject for future research.

POLARIZING WITHOUT A POLARIZER.

Editor American Journal of Pharmacy.

Sir:—I can supplement the article of Dr. Van der Weyde (April number, p. 182) with the information, due to Mr. E. W. Sharp, of this city, that any glazed surface will polarize the light sufficiently for microscopical purposes, the differences observed being apparently due to the color of the reflector, black glass being undoubtedly the best. Incline your microscope as usual, convenient to you (the angle probably making very little difference), push aside (or remove) the mirror, and take the light directly from the reflecting surface, for instance, the polished top of a mahogany table—even a small

dish of water will do very well. Ordinary daylight is sufficient, although sunlight, of course, gives splendid effects, the same with lamplight.

Dr. Van der Weyde's black glass can easily be fitted (so as to be removed quickly) to the mirror-bar at a cost not to exceed one dollar; if parties are handy with tools they can do it for a few cents.

For the sake of convenience, I have fitted my analyzer to go over the eye-piece. A wooden ointment-box (not the cover), sufficiently large to just slip easily over the eye-piece, is provided with a hole in the bottom, which holds the analyzer rather tightly. This arrangement is very handy, when you, in the course of examination, want to find out whether the sections, crystals, etc., polarize at all, and then, whether it will be worth while to go to the trouble of "polarizing" in the regular way, all of which you can decide in a few seconds by merely putting the analyzer on top of the eye-piece.

Dr. Van der Weyde's remarks about the little knowledge of physics (natural philosophy) are unfortunately true. We pharmacists, as a class, are fairly well acquainted with a good many physical facts, but our *understanding* of them is lamentably deficient. We have learned somewhat to reason "chemically," but very few of us are able to lucidly explain a "physical" fact.

Yours respectfully,

HANS M. WILDER.

PHILADELPHIA, April, 1891.

A NEW TABLET MACHINE.

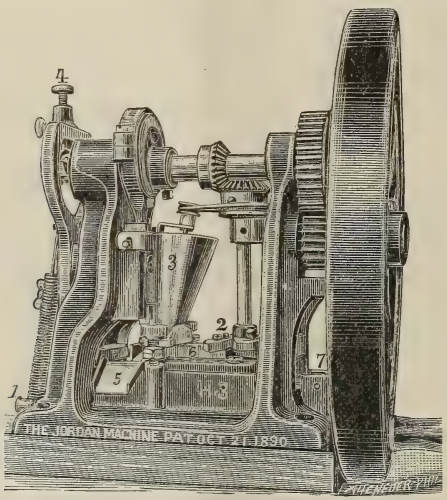
BY F. W. JORDAN, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, May 19.

The large use made at the present time of compressed tablets induced the writer to endeavor to devise a machine which would enable the retail druggist to make tablets for prescription purposes, and which would be large enough to be used during his spare time in making tablets for replenishing his stock. Nearly all the machines which have heretofore been invented have been too large and too expensive for the use of the pharmacist, and the making of tablets has therefore been mostly confined to the manufacturers. Realizing that economy of space was a prime requisite in contriving a machine for the pharmacist, every effort was made to make it as compact as

possible, and yet strong enough in all its parts to be durable and powerful enough to resist a pressure equal to five times that required.

The arrangement of the machine is readily understood from the cut; it weighs sixty pounds, occupies a counter space of six by twelve inches and stands twelve inches high; the movements are positive and automatic, having an adjustment whereby the feed can be regulated to the $\frac{1}{56}$ part of a grain, and the pressure so as to make the tablets of any degree of hardness. The feed-can being nicely adjusted on the bed-plate prevents any waste of material, and is so shaped with an inside agitator that makes the feed so posi-



tive and regular that when the machine is set for a given number of tablets, the last one will be as accurate and perfect as the first one. The bed-plate moves but a short distance and carries the bottom die under the feed-can for supplies, and to the plunger, where the material is compressed and the tablet ejected. There are four sets of dies, made of the best steel, highly polished, producing tablets well shaped, and with edges perfect as possible to make them. The fly-wheel is of sufficient diameter to make its running easy to the operator. The machine is neat in appearance being ornamented with nickel trimmings, and nicely painted in brown and gold.

In conclusion, the writer ventures to express the hope that he has

been able to devise a machine which will furnish his brother pharmacists with a means of aiding his pecuniary advancement as well as developing his professional standing, by enabling him to improve his reputation amongst physicians by showing his ability to make his own preparations, rather than confining his energies to simply selling the productions of others.

TACONY, PHILADELPHIA, PA.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

IODOFORMATED GUAIACOL.—The mixture used by M. Picot in his new treatment of tuberculosis by hypodermic injections is formulated as follows in a communication (March 3), to the *Académie de Médecine:* The basis of the liquid is sterilized olive oil and vaselin; each cubic centimetre of this excipient should contain 1 cgm. of iodoform and 5 cgm. of guaiacol. The same mixture is used in cases of pleurisy.

IODOFORMATED GUAIACOL WITH EUCALYPTOL.—At a meeting of the *Académie de Médecine* (March 10), M. Pignol gave his formula for the hypodermic treatment of tuberculosis, as follows: Sterilized oil of sweet almonds, of which each ccm. should contain 14 cgm. of eucalyptol; 5 cgm. of guaiacol, and 1 cgm. of iodoform.

PREPARATION OF MAGNESIUM HYDRATE.—M. Fleury (*Répert. de Phar.* April 10), advises pharmacists to prepare their own hydrated magnesia, and to make it as follows: Boil the sulphate of magnesium with 10 or 12 times its weight of water, adding gradually, a 15 or 20 per cent. solution of caustic soda. Ebullition should be continued for twenty minutes after the liquor shall have acquired a strong alkaline reaction, and then it should be allowed to stand for two hours. The liquid is now decanted and the precipitate washed until the water ceases to give the reaction of sulphuric acid with acidulated chloride of barium. The hydrated magnesia is then dried at a moderate temperature.

FLUORIDE OF SILVER: ITS PREPARATION AND PROPERTIES.—M. Moissan stated at the meeting of March 10, of the *Société de Pharmacie*, that this salt is not, as has been supposed, difficult of preparation. It is only necessary to effect a reaction of hydrofluoric acid upon carbonate of silver which is pure and free from

oxide. The solution should be promptly evaporated in the dark chamber. Fluoride of silver reacts upon the chlorides of the metalloids by replacing their chlorine with fluorine. The chlorides of phosphorus, silicium and boron are thus transformed into fluorides. The same action is produced with the organic compounds of chlorine, iodine or bromine. Fluoride of silver fuses at 435° C.

Solutions of Boric Acid and Corrosive Sublimate.—M. Rousseau (*Soc. de Phar.*, March 10) had occasion to prepare a solution of the above in alcohol and water, using crystallized boric acid. He observed a deposit of red oxychloride of mercury which passed to a deep brown. On using boric acid in scales, no precipitate was given. He found that the crystallized acid contained traces of borate of sodium.

Ethereal Pulverizations of Corrosive Sublimate.—The formula, as used by Dr. Talamon in the treatment of erysipelas and variolic pustulæ, is as follows: Corrosive sublimate, and citric or tartaric acid, āā 1 gm.; alcohol of 90%, 5 ccm.; sulphuric ether, q. s. to make 100 ccm. One application frequently arrests the progress of erysipelas. After the temperature has gone down, two or three pulverizations may be made daily to insure a cure.

Vinous Lemonades.—The editor of the *Répert de Phar.* (April 10,) writes as follows: Some physicians prescribe vinous lemonade, and Dr. Dujardin-Beaumetz has lately recommended it in the treatment of typhoid fever, to promote diuresis. There is no formula in the Codex for this preparation. I give below some of the formulas in use: *Formula of the Paris Hospitals*: Red wine, 250 gm.; tartric syrup,[1] 60 gm.; water, 700 gm. *Formula of the Marine Hospitals*: Tartric lemonade, 900 gm.; red wine, 100 gm. *Formula of MM. Dujardin-Beaumetz and Yvon:* Citric lemonade, 750 gm.; red wine, 250 gm. Dr. Deschamp prefers white wines for this purpose. M. Lailler, pharmacist, proposes the following: Citric syrup, 60 gm.; red Bordeaux wine, 250 gm.; essence of lemon, 1 gm.; water, 700 gm. It seems to us that the quantity of syrup above indicated is insufficient, also that tincture of lemon-peel should be used instead of the essence of lemon. So we propose the

[1] Tartric syrup contains 1 per cent. of tartaric acid; and tartric lemonade is made by mixing tartric syrup, 100 gm., with distilled water, 900 gm.—Editor.

following: Citric syrup, 100 gm.; red Bordeaux wine, 250 gm.; tincture of lemon-peel, 1 gm.; water, 650 gm.

Starch Transformed to Dextrin by Means of the Butyric Ferment.—At the meeting of March 4, of the *Société de Pharmacie*, M. Villiers stated that the above transformation could be produced without the aid of diastase. To effect this he passes steam through a mixture of starch with water, places it in a glass container and adds the butyric ferment. The mass should be kept at a temperature of 104°. On the following morning the mass is found to have liquefied and the starch is converted into dextrin; no maltose is produced. As secondary products the liquid contains a small amount of butyric acid; also a crystallized body of the same centesimal composition as dextrin, and having a rotary power very similar to that of dextrin. After its action upon the starch the butyric ferment undergoes certain morphological modifications; its organisms have no longer the form of moving rods; they become immobile and are endowed, apparently, with a sort of head.

Chatinine, Alkaloid of Valerian Root.—M. Waliszewski, a pharmacist of Clichy, has isolated an alkaloid from valerian and has named it chatinine, in honor of M. Chatin, late director of the *École de Pharmacie* of Paris. To obtain it, he removes from valerian root, by distillation, its valerianic acid and volatile products. Then he exhausts the root by decoction in distilled water, and clears the liquid with acetate of lead. The lead is eliminated by sulphuric acid or sulphuretted hydrogen. The filtered liquor is evaporated to the consistence of a soft extract, which is treated by 90 per cent. alcohol. The filtrate is distilled and the residuum is taken up with distilled water; this product is evaporated to the consistence of an extract and is treated with bicarbonate of soda and ether; the ether is washed with distilled water; the liquid is now evaporated and the residuum, which is chatinine, is treated by an acid, preferably hydrochloric. As valerian root contains an ammoniacal salt, which remains with the chatinine during the above operations, the product must be treated with 95 per cent. alcohol, in which the chloride of ammonium remains insoluble. The chatinine salts have the general characters of the alkaloids, and, like them, are precipitated by picric acid, bichloride of platinum, Valser's reagent, tannin, Bouchardat's reagent, etc.—*Union Phar.*, March 15; *Répert. de Phar.*, April 10.

Galega officinalis as a Galactagogue.—Dr. Carron de la Carrière (*Jour. de Méd.*, April) has obtained results from the use of galega, which lead him to hope for its restoration to therapeutic use. He used the aqueous extract (equal to one-fifth of the weight of the dry plant), making it from the fresh plant. The extract has a pronounced odor, is very soluble in water, is incompletely so in alcohol, and is given in quantities of 1 to 4 gm. daily, in fractional doses of 50 cgm. to 1 gm.

Toxic Action of Nickel Carbonyl.—At the meeting of March 21, of the *Société de Biologie*, MM. Hanriot and Ch. Richet stated that 30 cgm. of this substance injected into the veins of a dog caused death in one hour. Larger injections caused immediate death. Instilled into the eye, it acts as a caustic, but does not produce immediate death; it seems to be difficult of absorption. Nickel carbonyl is not easy to handle, not so much because it is an explosive, for its explosions are neither violent nor dangerous, but because its vapor gives rise to severe headaches. It acts by displacing the oxygen of hæmoglobin. But it is not yet known whether the combination formed with hæmoglobin is one in which the oxide of carbon alone intervenes, or one in which the molecular group of nickel carbonyl, as a whole, is involved.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Chloral-phenol or chloral-carbolic acid is made by triturating equal weights of chloral hydrate and pure carbolic acid; it forms a colorless, viscid liquid, specific gravity at 20° C. = 1·289; it possesses prominently the odor of chloral hydrate, has a sweet, caustic taste and placed upon the skin produces irritation and blisters. It is readily miscible with alcohol, acetic acid, amylic alcohol, chloroform, carbon disulphide and ether; in the latter case considerable heat is developed; it is insoluble in petroleum ether Its alcoholic solution with strong sulphuric acid colors the latter beautifully red. Chloral-phenol, in small quantity, coagulates albumen; an excess again dissolves it.—E. Fabini, *Pharm. Post*, 1891, 261.

Aloins.—According to researches of Groenewold the aloins from Barbadoes and Curaçao aloes melt at 140° C. and probably have

the formula $C_{16}H_{16}O_7$; the aloin from Aloe hepatica Natal melts at 210° C. (with decomposition) and has the probable formula $C_{24}H_{26}O_{10}$. G. Balster finds that the first-two mentioned aloins are reliable laxatives, administered either in pill form (with extract of liquorice) or by subcutaneous injections (in formamide solution). Nataloin administered to dogs and cats is not reliable unless given in disproportionately large doses, with the addition of alkalies, however small doses will suffice; administered to man, nataloin, even with alkalies, is inactive except in such cases where only a meat-diet is followed. Aloin is always eliminated in the fæces, seldom in the urine.

For the detection of aloin, Klunge's cupraloin reaction (Am. Journ. Pharm., 1890, 86) or a new piperidine test was used; the latter test will also distinguish between barbaloin and nataloin. The addition of a drop of piperidine to a nataloin solution produces a violet-red to a deep blue color, depending upon the quantity of nataloin; barbaloin in the same manner produces only a yellow color, by acidifying with acetic acid and agitation with acetic ether the latter will remove the yellow coloring matter (unchanged aloin), while the aqueous solution will show the violet-red color. These two tests succeed with 0·001 per cent. nataloin and 0·01 per cent. barbaloin.—(*Arch. f. exp. Path. u. Pharmakol.*) *Apotheker Ztg.*, 1891, 214.

Adulterated Carmine.—E. Donath, in examining commercial carmine, found one sample to consist of mixed lead oxide- and alumina-lakes of eosine with considerable lead sulphate, it was insoluble in ammonia; the aqueous extract showed the characteristic fluorescence of dilute eosine solutions. This sample was called "carmin ordinär," and had the appearance of an inferior product. A second sample, sold under the name of "carmin antik," could hardly be distinguished from genuine carmine; it was largely soluble in ammonia and consisted of the barium compound of red corallin, leaving nearly 75 per cent. barium carbonate upon ignition; such a preparation could be made by adding to barium chloride solution commercial red corallin dissolved in water, filtering and slowly drying the precipitate.—*Chemiker Ztg.*, 1891, 522.

Phthalic Acid is now made commercially by oxidizing naphthalene with a chromic acid mixture containing sodium chromate instead of potassium bichromate. The yield is a very satisfactory

one, from one kilo naphthalene more than one kilo phthalic acid is obtained. One molecule napthalene requires three molecules potassium bichromate and twelve molecules sulphuric acid, or six molecules sodium chromate and fifteen molecules sulphuric acid for oxidation.—Dr. H. Lüddens, *Chemiker Ztg.*, 1891, 585.

Tests to distinguish naphthalene, α-naphthol and β-naphthol.—If 0·1 gm. of these substances be added to 2·5 gm. chloral hydrate melted in a test tube they will dissolve; naphthalene colorless (this remains unchanged in the subsequent treatment) α- and β-naphthol pale yellow; the colors do not change by standing in the cold but placed in a water bath for two minutes only the α-naphthol changed to a red violet; heating for two minutes more the β-naphthol changes to blue green; heating longer in the water bath will cause an intense ruby red with α-naphthol, and with β-naphthol a pure blue color; these tests dissolve in an equal volume of alcohol giving colored solutions free from fluorescence.

II. If to the solution of these substances in chloral hydrate five drops hydrochloric acid were added α-naphthol became violet; heated in a water bath for two minutes α-naphthol became dark green-blue, β-naphthol intensely yellow; naphthalene with this test after 12 minutes' heating became very pale red.

III. If to II a small piece of zinc be added there will result with naphthalene a violet color changing to pale-brown; with α-naphthol a dark bluish-violet, diluting with water separates a coloring matter giving with alcohol a red-violet solution, fluorescing violet; with β-naphthol a dark brown color, diluting with water separates a substance giving with alcohol a yellow solution fluorescing blue.—L. Reuter, *Pharm. Ztg.*, 1891, 291.

Test for resorcin.—0·1 gm. resorcin is dissolved in 50 gm. potassium hydrate solution; upon warming a few cc. of this solution no change takes place, the addition of a few drops of chloroform or bromoform or better, a few crystals of chloral or bromal-hydrate, causes an intense ruby red color. This test was also tried with napthalene (remains unchanged, not being soluble as the alkaline hydrate solution), α-naphthol (dark blue changing to a greenish blue), and β-naphthol (transiently blue, passing into yellow).—L. Reuter, *Pharm. Ztg.*, 1891, 292.

Filicic Acid and Extract of Male-fern.—L. Reuter, examining a number of extracts of male-fern finds the filicic acid to be quite

variable in amount (from 0·3–0·7 per cent.); some of the extracts although quite efficient did not contain appreciable quantities of the acid. He quotes Dr. Poulson: "The crystallized filicic acid is absolutely inert; the amorphous acid is very poisonous and upon it depends the efficiency of the extract of male-fern." Prof. Kobert states the Russian extract is about ten times more powerful than the German, and twenty times more powerful than the French extract. 5 gm. of the Russian extract will produce dangerous poisoning-symptoms, while the German extract is given in five to eight grams doses, by Dr. Gerhardt, even 16 gms.—*Pharm. Ztg.*, 1891, 246.

Tonquinol, an artificial preparation of musk-like odor, is placed upon the market by Valentiner and Schwarz, of Leipzig; it forms a white crystalline powder mixed with needle-shaped crystals, and is stated to be made by nitrating a terpene and a xylol-sulphonic acid. The substance is especially recommended for soaps and perfumes; the alcoholic solution (1 : 50) can be diluted to any degree, differing in this respect from the artificial musk of Baur (Am. Journ. Pharm., 1890, 489). F. Eichbaum (in *Seifenfabrikant*, 1891, 154), speaks of tonquinol as not being altered in the least by exposure to air, light and alkalies; as being soluble in most solvents as fats, oils, ether, chloroform, etc. Compared with genuine musk and artificial musk Baur in price per kilo is stated: Genuine musk, $700, artificial musk $600 and tonquinol $450; in small quantities tonquinol sells at 50 cents per gram.—*Pharm. Ztg.*, 1891, 222.

Phenocollum hydrochloricum, a new antipyretic and anti-rheumatic manufactured by the Chemische Fabrik auf Actien (formerly E. Schering), is a phenacetine ($C_6H_4(OC_2H_5)NHC_2H_3O$) derivative in which the amido group (NH_2) is introduced into the acetyl radicle. It is made by action of glycocol (or amido-acetic acid CH_2NH_2COOH upon phenetidine $C_6H_4(OC_2H_5)NH_2$ one molecule of water splitting off. The compound is the hydrochlorate of amido-acet-para-phenetidine $C_6H_4(OC_2H_5)NHCH_2NH_2CO$. It is soluble in 16 parts of water at 17°C., forming a neutral solution; from boiling water it crystallizes in cubes, from alcohol in needles. The aqueous solution is precipitated by ammonium, potassium and sodium hydrates, and alkaline carbonates, the base separating with one molecule of water of crystallization; the anhydrous base melts at 100·5° C., the hydrous at 95°C. In doses of one gram it reduces fever-temperatures nearly

two degrees; in 0·5 to 1·0 gm. doses it is an excellent nervine and anti-neuralgic; the daily dose of 5· gms. gave relief in articular rheumatism after other remedies had failed. The only objection to or disadvantage of this remedy, according to Dr. Hertel, is its liability to decompose when in solution; this is noticeable in solution only two days old.—*Apotheker Ztg.*, 1891, 246.

Benzin.—Numerous complaints have been made of late regarding the difficulty in getting benzin which will stand the test for benzol (with nitric and sulphuric acids no odor resembling oil of bitter almonds should be noticeable). L. Reuter writing to Prof. Dr. C. Engler about the matter received in reply "that all crude oils, American or Caucasian, contain benzol (the former only in very small quantity) and that these oils carefully treated with sulphuric acid should be deprived of benzol." From another source was gleaned that much of the benzin of the German market was obtained as a side-product in the manufacture of compressed gas for railway coaches.—*Pharm. Ztg.*, 1891, 246 and 270.

Antikamnia, according to an analysis of Dr. Felix Goldmann, contains in one hundred parts: Sodium bicarbonate 22·2, acetanilide 67·4 and caffeine 9·8; it is very probably made by taking 20, 70 and 10 parts, respectively.—*Pharm. Ztg.*, 1891, 255.

Thiol-opodeldoc (5 per cent.). 70·0 dialyzed stearin soap and 20·0 dialyzed olein soap are dissolved with heat in 850·0 alcohol (90 per cent.), 2·0 oil of lavender added, filtered and the filtrate diluted to 900·0 by addition of alcohol. Mix in a warm capsule 50·0 each of liquid thiol and distilled water, pour this slowly into the soap solution, add 25·0 ether and pour into containers.—E. Dieterich, *Pharm. Centralhalle*, 1891, 176.

Extracts for writing inks.—The directions for use are: The contents of the package are placed in an earthen-ware vessel with 1¼ litres rain water and heated to slow boiling for 15 to 20 minutes; allow to cool, transfer to a bottle, allow to stand four weeks and decant into small vials.

60·0 tannin, 27·0 dry ferric sulphate, 10·0 gum arabic and 5·0 sugar, mixed in form of coarse powders, constitute the base: For *blue* ink add to the above 5·0 soluble aniline-blue I B; for *red*, 10·0 Ponceau R R; for *violet*, 4·0 Ponceau R R and 3·0 soluble aniline-blue I B; for *green*, 10·0 aniline-green D; for *blue-green*, 6·0 aniline-green D and 2·0 soluble aniline-blue I B; for *black*, 20·0 deep black

E. These extracts are to be put up in metal-boxes or glass bottles.

Extracts for copying inks.—For these the directions for use are the same as for writing inks; they differ only in being more concen trated when made. The following constitutes the base: 70·0 tannin, 30·0 dry ferric sulphate, 15·0 gum arabic and 10·0 sugar. For *blue* add to the above base 10·0 soluble aniline blue I B; for *red*, 10·0 Ponceau R R; for *violet*, 4·0 Ponceau R R and 6·0 soluble aniline-blue I B; for *green*, 10·0 aniline-green D; for *blue-green*, 7·0 aniline-green D and 3·0 soluble aniline-blue I B; for *black*, 20·0 deep black E; for an *alizarine* ink add 10·0 dry indigo-carmine (Indigotin).—E. Dieterich, *Pharm. Centralhalle*, 1891, 190.

Christia and Fibrine-Christia are English manufactures intended to replace gutta-percha paper, silk protective, etc.; christia is made by treating manila-fibres in such a manner as to make it insoluble, and impervious to water and alcohol; fibrine-christia is made by treating a silk-texture in the same manner. According to an examination of E. Dieterich the treatment to which the manila and silk is subjected is the application of a chromium-gelatin solution and exposing afterwards to sun-light. The following is the tabulated result of the analyses:

	Christia		Fibrine—Christia	
			I	II
	a.	b.	dense texture.	gauze.
Loss at 100° C. (moisture), ...	16·0	16·5	16·0	17·2
Water soluble (glycerin and salts),	29·0	29·0	26·5	30·0
leaving ash, ...	6·81	6·25	6·75	——
Insoluble chromium gelatin (dissolved in hot 30 per cent. acetic acid)	26·0	29·5	48·0	48·5
Remaining fibre	29·0	25·0	9·5	4·3

Dieterich states the following mixture spread upon both sides of imitated parchment paper will give an article handsomer in appearance than the *Christia:* 30·0 gelatin (or glue) are allowed to swell up in 200·0 water and then dissolved by heating to the boiling-point; add 30·0 glycerin 30° B. and lastly 3·0 finely powdered potassium bichromate. Exposure to sun-light reduces the bichromate, the yellow color changing to a dirty-green; this change is accompanied by another rendering the gelatin insoluble.—*Pharm. Centralhalle*, 1891, 193.

Creasote.—A. Reissmann made some experiments upon the best

method of preventing deterioration of creasote pills on exposure; he finds that of the several methods of protecting pills none is equal to putting the mass into capsules.—*Pharm. Centralhalle*, 1891, 203.

THE ALKALOIDS OF VERATRUM ALBUM.[1]

By G. Salzberger.

Prior to the year 1879 very little was known concerning the active constituents of the root of veratrum album. In 1819 Pelletier and Caventou assumed its active constituent to be veratrine, the alkaloid of cevadilla seeds. The researches of Maisch (1870) and Dragendorff (1872) tended to show that this assumption had no foundation in fact, as they both failed to find this principle.

Simon, in 1837, isolated a base, which he named jervine, and forty years later Tobien confirmed his work, at the same time stating that he had obtained an amorphous base, veratroidine.

In 1879, much more light was thrown upon the matter by the paper communicated to the Chemical Society by Wright and Luff. In order to properly appreciate their work, and to compare it with the results of Salzberger, a recapitulation of the chief facts is given. Wright and Luff succeeded in obtaining the jervine of Simon, and established for it a corrected formula ($C_{26}H_{37}NO_3$), besides which they found and analyzed two other crystalline alkaloids, rubijervine ($C_{26}H_{43}NO_2$) and pseudojervine ($C_{29}H_{43}NO_7$), together with an amorphous one, described as veratralbine. A small quantity of another base was detected, which, with veratralbine, acted as a powerful sternutatory. This, they thought, might probably be veratrine.

Salzberger began his investigations in 1855, with the view of discovering the active constituent of the drug. Jervine possessing only slightly toxic properties, and rubijervine and pseudojervine being absolutely inactive, it was reasonable to infer that the poisonous principle still remained to be found. In the course of his researches, in which 300 kilos of the rhizome have been used, he has obtained the three crystalline bases described by Wright and Luff, and two other crystalline alkaloids, which he has named *protoveratrine* and *protoveratridine*.

[1] Abstract from *Archiv der Pharmacie*, Band 228, p. 462; reprinted from *The Medical Chronicle*, April, 1891.

The former of these, protoveratrine, is extremely poisonous, as is shown by the statement that 0·5 mg. injected subcutaneously was sufficient to kill a full grown rabbit. When introduced into the nostrils in the most minute quantity it occasions violent sneezing. It can be removed from the powdered drug with cold water, but the solution will not yield it in the crystalline form. In the pure state it appears to be insoluble in water, and only soluble with difficulty in alcohol and ether. The formula ascribed to it is $C_{32}H_{51}NO_{11}$, and the author points out the similarity between this and the formula for veratrine, $C_{32}H_{49}NO_9$. He says, however, that they cannot be identical bodies, as not only do they differ in composition, but they differ in their behavior with reagents.

Two processes for the extraction of the alkaloids were used. By one of these jervine, rubijervine, pseudojervine and protoveratridine were obtained; while by the other protoveratrine, pseudojervine, a little jervine and rubijervine, but no protoveratridine. From this circumstance Salzberger is inclined to consider protoveratridine, as a decomposition product of protoveratrine, and this appears to be very probable from the fact that this latter body is very unstable.

For protoveratridine the formula $C_{26}H_{45}NO_8$ is proposed.

In addition to the examination of these two bodies an examination of Wright and Luff's alkaloids was undertaken, and it is satisfactory to find that their formulas are confirmed. Full details of the reactions, solubilities, ultimate analyses, etc., are given, and plates exhibiting the crystalline forms of protoveratrine, protoveratridine, jervine and rubijervine are appended to the paper.

NOTE ON COMMERCIAL OIL OF CITRONELLA.[1]

By John C. Umney, Pharmaceutical Chemist.

The more common Indian grass oils, known in trade as verbena, ginger-grass and citronella, the products, respectively, of *Andropogon citratus*, *A. Schœnanthus* and *A. Nardus* differ considerably in appearance. The first two are usually of a yellowish-brown color; the third varies, being sometimes yellow, at others emerald-green, the yellow oil generally becoming green on exposure to light.

[1] Read before the Pharmaceutical Society of Great Britain, at an evening meeting in London, April 8; reprinted from *Phar. Jour. and Trans.*, April 11, p. 922.

In order to determine on what the difference in color of this last and the change from yellow to green which takes place depend, eight samples of citronella oil were obtained from various sources, and a small quantity of each exposed to direct sunlight. Of this number five (A, B, C, F, G) were decidedly green before exposure, two (D and E) were yellow at first, but rapidly became green, whilst one (H) was yellow originally and underwent no change. The fact that the presence of copper has been shown (Guibourt and Histed) to be reason of the green color of commercial cajeput oil, led me to suspect the same contamination in the case of this oil. (Since writing this note my attention has been called to the fact that Kremers[1] mentions incidentally the presence of copper in a sample of this oil which he examined.)

250 cc. of the sample *a* was shaken with a dilute solution of ferrocyanide of potassium, when a rapid separation of a red precipitate took place, which, after washing with spirit to free it from traces of oil and then with water to remove any excess of potassium ferrocyanide, was proved to be ferrocyanide of copper. Examination was then made of all the samples, with the following results:

	Sp. gr. at 15° C.	Color.	Remarks.
A	·896	emerald green.	copper present.
B	·895	greenish.	"
C	·890	"	"
D	·887	yellow, becoming green.	"
E	·896	" " "	"
F	·896	emerald green.	"
G	·897	greenish.	"
H	·870	brownish-yellow.	copper entirely absent.

From the fact that only those samples which were green, or became so on exposure, contained copper, it appeared almost certain that the change in color might be due directly to the presence of that metal, which was readily proved by precipitating all the copper from the most markedly green sample, by treatment two or three times with solution of potassium ferrocyanide, when the oil became pale yellow in color. One portion of this oil was then

[1] "Proceedings American Pharmaceutical Association," 1887, p. 562.

exposed to sunlight for some days and a second to the heat of a water bath in an open porcelain dish for twelve hours without any change whatever in color taking place. A third portion of the oil was treated on a water bath for a few minutes in presence of a very small piece of copper foil, when the oil rapidly assumed its original green color, thus showing conclusively that the green coloration of the oil is due to the presence of a trace of copper, and that its removal causes the oil to assume its natural color, namely, yellow.

The green coloration of the oil was destroyed on heating to 50° C., and at a higher temperature an acid distillate was obtained which was proved after neutralization to consist principally of acetic acid. It seems possible, therefore, that the metal exists in combination with this acid, the change in color on exposure to light either depending on oxidation of an aldehyde present to acetic acid, or on the partial decomposition of an ester of acetic acid contained in the oil. Varying statements exist as to the specific gravity of pure citronella oil, for whilst Messrs. Schimmel state that it should not fall below ·895 at 15° C. (*Pharm. Journ.* [3], xx, 264), Dodge (*Pharm. Journ.* [3], xx, 855) assigns to it a gravity of ·877 at 16° C. It will be noticed that sample H, which contained no copper, was of lower specific gravity than the others, and fell considerably below the limit proposed by Messrs. Schimmel. This sample proved, on examination of its solubility in 80 per cent. spirit, to be adulterated with petroleum, as was readily proved by fractionation, and the absence of copper is probably due to its distillation in the earthen or iron stills, now only used by the poorer native distillers. The quantity of copper present, without doubt, derived from distillation in stills of that metal, is, of course, very minute, but it seems desirable to call attention to it, as pointing out that pale yellow, and not green, is the natural color of citronella oil.

ON THE ACTION OF SALTS OF CANTHARIDINIC ACID.[1]

By O. Liebreich.

This important communication of Professor Liebreich was read before the Berlin Medical Society on the 25th of February, and in the discussion which followed several well-known physicians recorded their experience of the effects produced by the treatment introduced by the Berlin professor.

[1] Abstract from *Therap. Monat.*, March, 1891; reprinted from *The Medical Chronicle*, April.

Although cantharides has been employed medicinally since the time of Hippocrates, and not unfrequently given internally, its powerful influence on the kidney has prevented its general employment. It has, however, been recommended in several ailments, and Liebreich points out that by Cazenave, Rayer, and other French dermatologists, the tincture has been employed in psoriasis and chronic eczema, in doses as high as sixty drops, without evil results.

A consideration of the influence exerted by cantharides on the tissues led Liebreich to the therapeutic employment of the drug which he now advocates.

If a dose of cantharides, only just sufficient to cause acute poisoning and death, be given to a rabbit, the kidney symptoms are not such as will account for death, but the animal dies after some hours from dyspnœa. Post mortem the kidneys are not hyperæmic, and there is only slight hyperæmia of the lungs, which, however, are increased in consistence, owing to a slight exudation, for the most part free from cells and not coagulating spontaneously. Acute lung œdema is not present. The exudation is not preceded by a change in the blood pressure or in the condition of the heart, and seems to resemble that observed after the application of cantharides to the skin, in that there is no preceding hyperæmia. Only if large doses be given does an exudation containing cells take the place of a simple serous exudation.

It may be assumed that cantharides has a special action on the capillaries, owing to the peculiar form of irritation it causes.

If the vessel walls are not in a normal condition they may be more susceptible to the irritant action of cantharides, and it seemed to Liebreich possible that in capillaries of decreased resistant power, such as may be present in diseased conditions, those changes might be produced by very small doses of cantharides, which in healthy tissues are only caused by large doses. Such lessened resistance might occur through the irritation connected with the presence of bacilli. Koch's investigation into the action of tuberculin have shown that extremely minute quantities of a substance may cause changes in irritated tissues without acting on the healthy tissues. Whether cantharides could have such an effect or not seemed worthy of investigation. But for this investigation tincture of cantharides would not suffice, since it is not of a uniform strength, the amount of the chief active principle, cantharidin, contained in can-

tharides varying from ·3 to ·6 per cent.; Liebreich, therefore, determined to employ the active principle itself.

The exact constitution of cantharidin ($C_{10}H_{12}O_4$) has not been determined, but of the oxygen atoms contained there is reason for believing that three of the atoms are contained in the group CO and COOH.

Many derivatives have been obtained from it, as for example:

Cantharidinic acid,	$C_{10}H_{14}O_5$
Cantharidoxim,	$C_{10}H_{13}NO_4$
Cantharidoximic acid,	$C_{10}H_{15}NO_5$
Cantharic acid,	$C_{10}H_{12}O_4$
Cantharoximic acid,	$C_{10}H_{13}NO_4$

To avoid complications arising from the irritant action of cantharidin on the stomach and intestines, it seemed desirable to inject it subcutaneously. But cantharidin is not soluble in water, though dissolved by ether and oils. Cornil has used, in experiments on animals, a solution in acetic ether, and Aufrecht a solution in oil; but the former solvent is irritating, whilst the oily solution is not adapted to subcutaneous injection. Cantharidin can also be dissolved in caustic potash and soda, being at the same time in part converted into cantharidinate of the alkali.

Cornil had stated that the potash solution causes suppuration, but Liebreich found that this was due to the excess of alkali used, and that by employing the smallest amount of alkali which would dissolve the cantharidin, a satisfactory material was obtained for subcutaneous use. He commenced the use of cantharidin dissolved in potash by giving $\frac{1}{50}$ of a milligramme ($\frac{1}{3500}$ grain), which caused neither pain nor redness at the point of injection, and gradually increased the dose, but found it could not be raised higher than $\frac{6}{10}$ of a milligramme ($\frac{1}{120}$ grain) without producing urinary troubles.

On injecting a series of tubercular laryngitis with a solution of cantharidin in caustic potash, such distinct improvement was observed that Liebreich thinks there can be no doubt of the curative influence of the drug, though further clinical observations are required to determine the limits of its value.

On an average a solution of 1 cc., containing $\frac{2}{10}$ of a milligramme ($\frac{1}{350}$ gr.) of cantharidin was injected into the back. No febrile reaction or redness of the affected part was observed.

He advises that should diarrhœa or a burning feeling of the

urinary passages occur the dose should be decreased by half. A few drops of tincture of opium suffice to remove any sensation of discomfort which the drug causes. He thinks that probably one to half decimilligramme ($\frac{1}{700}$ to $\frac{1}{1400}$ gr.) will, in most cases, be found sufficient, and the injection should be given every other day.

So far the experiments have been chiefly made in cases of tubercular disease of the larynx, and catarrhal swelling of the vocal cords.

The extraordinary quickness with which the drug acts on tubercular swelling of the larynx leads him to the opinion that the exudation so increases the nutrition of the tissue elements that it produces healing either by causing normal proliferation, notwithstanding the presence of bacteria, or by removing the injurious effect of the bacteria. Probably the exudation of the blood serum possesses the property of killing bacteria. There seems reason for believing that blood serum is destructive to bacteria, and that the action of cantharidin is capable of producing the same effect as transfusion with blood serum. Liebreich suggests that substances allied to cantharidin, and produced from it, as canthro-oxide and cantharene, should be further examined.

When cantharidin is dissolved in potash or soda, a pure cantharidinate is not produced, a variable amount of cantharidin being mixed with it. Hence cantharidinate of potash and soda could not hitherto be used in exact doses.

To prepare a cantharidin solution for injection, Liebreich mixer ·2 grammes of cantharidin and ·4 grammes of potash, dry, and free from carbonic acid, and most carefully weighed; this should be placed in a 1,000 cc. measure with 20 cc. of water, and warmed in a bath until the solution becomes clear; then, whilst the application of heat is continued, water should be added to 1,000 cc. Instead of potash ·3 grammes of hydrate of soda may be used. Each cc. of the solution (18 minims) contains $\frac{2}{10}$ of a milligramme of cantharidin

CHOLESTEROL.[1]

By K. Obermüller.

Two formulas, $C_{26}H_{44}O$ and $C_{27}H_{46}O$ (Reinitzer, 1888) have been ascribed to cholesterol (cholesterin). The chief object of the present research was, by the analysis of certain cholesterol compounds, to determine which is the correct one. The general result

[1] *Zeit. physiol. Chem.*, **15**, 37—48; reprinted from *Jour. Chem. Soc.*, 1891, p. 298.

of the analysis is that Reinitzer's formula is correct. The following compounds were prepared:

Potassium cholesteroxide, $C_{27}H_{45}OK$, was prepared by placing potassium in an ethereal solution of cholesterol. It agrees in all its properties with Reinitzer's sodium cholesteroxide.

Cholesteryl propionate, $C_{27}H_{45}.C_3H_5O_2$, was prepared by heating a mixture of cholesterol with propionic anhydride on the water-bath for half-an-hour; on cooling, it sets to a fatty mass; this is extracted with ether, and the propionate precipitated from the extract by alcohol in the form of rhombic plates; melting point 98°. It is easily soluble in ether, benzene, and carbon bisulphide, sparingly soluble in alcohol. After fusion, there is, on cooling, a play of colors observed, blue, green, orange, and red, in the order named, by reflected light; the complementary colors are seen by transmitted light. In order to use this reaction as a test for cholesterol, the latter must first be obtained in a pure condition; it may be most readily freed from the fats with which it is usually mixed by the method of saponification.

Cholesteryl benzoate, $C_{27}H_{45}C_7H_5O_2$. This is best prepared by the action of benzoic chloride on cholesterol; and this preparation may be used for the quantitative estimation of cholesterol. The crystals are plates which show two melting points, namely, 145° and 178°. A compound with similar properties was prepared from isocholesterol.

Cholesteryl phthalate, $C_6H_4(COO\text{-}C_{27}H_{45})_2$, was prepared by heating phthalic anhydride and cholesterol at 180°, and crystals obtained by the addition of alcohol to a hot ethereal solution. It is sparingly soluble in cold ether; melting point 18–25°.

Cholesteryl benzyl ether, $C_{27}H_{45}\cdot O\cdot C_7H_7$, prepared by heating sodium cholesteroxide and benzyl chloride at 100°, was crystallized from an acoholic-ethereal solution in thin plates melting at 78°.

Cholesteryl propionate dibromide, $C_{27}H_{45}Br_2\cdot C_3H_5O_2$. This additive product is similar to that prepared previously by Wislicenus and Moldenbauer. $C_{27}H_{46}Br_2O$ (*Annalen*, **146**, 178), by the action of bromine dissolved in carbon bisulphide on pure cholesterol, and to that prepared by Reinitzer (*Wiener Monatsh.*, 1888, Heft 5), by the action of bromine on cholesteryl acetate. This substance is important, as the relation between carbon and bromine gives a key to the formula of cholesterol. *Cholesteryl bromobenzoate*, $C_7H_4BrO_2$., $C_{27}H_{45}$, was also prepared and analyzed.

NOTES ON ESSENTIAL OILS.

By Geo. M. Beringer, Ph.G.

Abstracted from the Semi-annual Report of Schimmel & Co.

Bitter Almond Oil.—In the preceding semi-annual report, Messrs. Schimmel & Co. called attention to the fact that the artificial benzaldehyde of commerce prepared from benzyl chloride is always more or less contaminated with chlorine compounds, and proposed tests for this element as a means of detecting adulteration. (See Amer. Journ. Pharmacy, 1891, p. 43). E. Merck has recently stated that genuine bitter almond oil is not always free from chlorine compounds, and has recently placed on his list an ol. amygdal. amarum verum containing chlorine. The same manufacturer also claims to make and quotes on his price-list a purified benzaldehyde free from chlorine. As a result of their examination of this latter product, Messrs. Schimmel & Co. state that it is not chlorine free, its chlorine being readily detected by the combustion method.[1]

The assertion that pure bitter almond oil may contain chlorine is less easily refuted, as nothing is vouchsafed as to the preparation of such an oil or as to the nature of the chlorine compounds contained therein. Messrs. Schimmel state that in the course of the last 15 years they have worked many thousand hundredweight of almonds, of peach and apricot kernels of the most varied kinds, but never have been able to detect in it any chlorine, although for more than 8 years they have carried out the relative investigations with great regularity (as control estimations in the testing of doubtful oils of commerce). The chlorine compounds in bitter almond oil could be of various nature ; either *organic* compounds, benzyl chloride, mono- and dichlorine *substitution products* of benzaldehyde and of benzyl alcohol, etc., or minute traces of *inorganic chlorides* (chloride of sodium and of calcium) which would originate from the process of rendering the oil anhydrous. Chlorine compounds of the latter kind are not detected by the combustion method, but would be shown by the process of testing recommended by Heppe.

Chlorination substitution products may be detected by the following method. A small quantity of the oil is oxidized with a warm alkaline solution of potassium permanganate, excess of the latter decomposed by the addition of a few drops of alcohol, the whole filtered and the filtrate acidified with diluted pure H_2SO_4. After complete cooling has taken place, the separated benzoic acid—which contains the organic chlorine compounds (with the exception of any benzylchloride), in the form of chlorinated benzoic acid—is thrown on a filter and carefully washed. Large quantities of chlorine in the filtrate indicate the presence of organic chlorides in the oil. The benzoic acid is dissolved in pure potash solution, a little nitre added, the solution evaporated to dryness and finally heated in a platinum dish. The residue of incineration is taken up by water, acidified with nitric acid, filtered and tested for chlorine.

Organic Chlorides (benzylchloride) can be detected as follows,—5 to 10 grms.

[1] Since the publication of this method (see Amer. Journ. Pharmacy, 1891, p. 43), I have had occasion to examine a number of samples of commercial oil of bitter almonds and made careful tests with this method with entire satisfaction. Certain samples of undoubted purity as, for instance, "Allen's," gave no reaction for chlorine, while a known sample of synthetic gave a copious reaction, and mixtures of the two could be easily detected.—G. M. B.

of oil are heated to boiling in a distillation flask and the first 10–12 drops of the distillate caught in a 5 per cent. alcoholic potash solution.[1] The liquid is heated for a time under a return condenser, then the alcohol is volatilized, the residue treated with water and the oily constituents (benzyl alcohol, etc.) shaken out with ether. The aqueous liquid is warmed, acidified with HNO_3, filtered when perfectly cooled from the separated benzoic acid, and the filtrate tested for chlorine.

A sample of the *Ol. amygd: ver., chlorine containing*, obtained from E. Merck, showed on application of the combustion method a strong chlorine reaction. Special testing, in the manner described above, showed that *both organic chlorides and the chlorine substitution products named were present.* Thereby indubitable proof is afforded that artificial benzaldehyde from toluol is contained in it, for no one will seriously assert that the chlorine compounds named will originate in the distillation of almonds or kernels.

Angelica Root Oil.—The pronounced odor of phellandrene in the oil distilled from fresh root indicated the presence of this hydrocarbon. The constituents boiling at 178° C. were fractionated and readily gave, with nitrite of sodium and glacial acetic acid, large quantities of a solid nitrite, the identity of which was established by the melting point of the recrystallized substance. The chloroformic solution of the nitrite turned the ray of polarized light to the left. As now the rotation of phellandrene is known to be the reverse of that of the nitrite prepared from it, the hydrocarbon contained in angelica oil is dextro-phellandrene. Its presence was also detected in oil of the seed.

Anethol.—Anethol is characterized by the following properties: (1) An exquisitely fine pure anise taste. (2) Perfect colorlessness. (3) A sp. gr. of 0·985 at 25° C. (4) A constant boiling point at 234° C. (5) A melting point between 21° and 22° C.

Bergamot Oil.—Pure Bergamot oil may be regarded as a rarity in commerce. The most usual adulterants are lemon, sweet orange and turpentine oils; sophistication with lemon oil is just now the special order of the day. A machine pressed oil is especially prepared for this purpose and is an exceedingly dangerous adulterant. In order to provide means of detecting these adulterants, comparative examinations were made of absolutely pure oils pressed by themselves, commercial oils and various mixtures prepared from known oils. The following three factors are stated to give reliable indications: (1) The specific gravity. (2) The rotary power. (3) The solubility in spirits of wine.

For bergamot oil these factors are stated to be sp. gr. 0·881* to 0·885; rotatory power (100 mm.) + 8° 30′ to + 19° 30′.

For orange oil sp. gr. 0·849 to 0·855; rotary power (100 mm.) + 97° 2′ to 97° 4′.

For lemon oil sp. gr. 0·857 to 0·863; rotary power (100 mm.) + 40° 10′ to + 62°.

Pure bergamot oils form clear solutions at 20° C. with ½ part of 90 per cent.

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[1] Benzyl chloride boils at 176° C. Benzaldehyde at 179°. The monochlor-benzaldehydes boil between 212° and 215° C.

* The United States Pharmacopœia gives the sp. gr. as 0·860 to 0·890. My own observations indicate that this range can be reduced and led me to adopt as a standard 0·880.—G. M. B.

(vol.) alcohol which are not rendered turbid by further addition of alcohol of same strength. Neither sweet orange oil nor lemon oil form clear solutions under the same conditions. Adulteration with oil of turpentine is rare and can be mostly detected by smell alone. Oil so admixed has also a lower sp. gr. and yields abnormally large proportions of low (160° C.) boiling fractions (Pinene). Additions of fatty oils are recognized by the higher specific gravity of the specimens and by the residue which they leave when volatilized at 100° C. Half a drachm evaporated on a watch glass at 100° until the odor has completely disappeared leaves about 6 per cent. of a green homogeneous ointment-like residue. In case of adulteration with fat oils there is an increased residue with a supernatant oily yellow liquid.

Birch Tar Oil.—The rectified oil is much weaker in aroma than the crude and the latter is recommended where the color is not a disadvantage. The phenols contained in this oil, according to Max Pfrenger (Archiv f. Pharm., 1890, p. 713) consisted chiefly of guaiacol and creosol; there was also present a small proportion of cresol, and xylenol and traces of phenol. The phenols are the same as exist in beech wood tar.

Buchu-leaf Oil.—Long buchu leaves (Barosma serratifolia, Willd.) gave 1 per cent. of essential oil sp. gr. 0·944 containing only a small quantity of diosphenol (buchu-camphor.) Round buchu leaves (Barosma betulina, Bartl.) yielded 2 per cent. of oil, which even at the normal temperature was quite filled with crystals of diosphenol.

Citronella Oil.—The shipments from Colombo and Galle in 1890, amounted to 12,820,315 oz. Cintronellon, which is found in this oil and in the essential oil of the leaves of Eucalyptus dealbata and E. maculata has been recently examined by F. W. Semmler (Berichte der Deutschen Chem. Ges., xxiv, 209.) By oxidation with oxide of silver a liquid acid, citronellic acid $C_{10}H_{18}O_2$, was obtained. This decides the aldehyde character of citronellon.

Coriander Oil.—The oil contains about 90 per cent. of coriandrol $C_{10}H_{18}O$ boiling between 194° and 198° C., optically dextrogyrate, sp. gr. 0·8679 at 20° C.

Cubeb Oil.—The export of cubebs from Java has enormously increased. In 1889, the weight exported was 66,840 kilos against 8,880 kilos in 1888. Within the year, prices have fallen 35 to 40 per cent. A note from Ceylon appears in the *Tropical Agriculturist*, according to which the plants in the Peradeniya Gardens have become quite acclimated, and it is hoped that it will soon be possible to place sufficient material at the disposal of the intelligent planters of the island.

Eucalyptus Oil.—The oil from Eucalyptus oleosa, an Australian species, is stated to be so extraordinarily rich in Eucalyptol, that in a freezing mixture it solidifies to a pasty mass. This new oil has a sp. gr. 0·923 at 15·5° C., 72 per cent. boiling between 170° and 180° C., and is comparatively free from the lighter constituents. Cumin-aldehyd is also present.

Kuro-moji Oil.—An oil distilled from the wood of Lindera sericea introduced into perfumery. It is stated to have a sp. gr. at 18° C. of 0·901 and a lævorotatory power of 4°. Two different terpenes were detected *dextrolimonene* and *dipentene*. Of oxygenated bodies, *terpineol* and lævo-carvol were found.

Linaloe Oil.—The consumption of this oil has largely increased, it being used in conjunction with cananga oil in the so-called lily-of-the-valley perfumes. It is exclusively distilled by the Indians in the state of Guerrero, Mexico.[1]

According to Semmler (*Ber. d. Deutsch. Chem. Ges.*, 1891, 207) the chief constituent of linaloe oil is *linalool* $C_{10}H_{18}O$, boiling between 190 and 195° C., and in a tube 100 mm. turns the ray of polarized light to the left 3° 10′; sp. gr. at 20° C. is 0·8821.

Pennyroyal Oil.—According to E. Beckmann and M. Pleissner (*Liebig's Annalen*, 262, p. 1), *pulegon*, a body of the formula $C_{10}H_{16}O$, is most abundantly contained in Spanish, and in smaller quantity in American and Algerian pulegium oil. It boils under a pressure of 60 mm. at 130–131°, turns a ray of polarized light to the right and has a sp. gr. at 20° of 0·9323. It behaves chemically like a ketone forming with hydroxylamine an oxime, viz: pulegonoxime $C_{10}H_{19}NO_2$ crystallizing in beautiful needles, m. p. 157° C. With HBr it forms pulegon hydrobromide, a crystalline compound, m. p. 40·5°, and very suitable for its identification. By reduction with sodium in an ethereal solution it yields menthol.

Rosemary Oil.—Pure rosemary oil answers to the following requirements: sp. gr. 0·900 or never lower than 0·890; dissolves at 20° C. in ½ to 1½ parts of 90 per cent. alcohol, the solution remaining clear on further addition of alcohol; it is dextrogyrate.

Sandalwood Oils.—Some Australian sandalwood oil, recently sold at auction in London, although labelled Ol. Santal. flav. pur., proved to be a distillate from the cheap Swan River sandalwood. This oil is distinguished from the East Indian sandal oil by its sharp odor and specific gravity, the West Australian oil being 0·953, while the Indian is 0·978.

African Sandalwood Oil.—A brown-red wood, uncommonly hard, received from Madagascar, the botanical origin of which is unknown, yielded 3 per cent. of a ruby-red oil, sp. gr. 0·969, and consistence of East Indian oil. Odor is not promising and will probably be of no value.

South Australian Sandalwood Oil.—A distillate from the wood of *Santalum Preissii*, a tree growing in South Australia. The wood is dark brown, light texture, hard and heavy, and distinctly different from the Swan River Santalum cignorum. It yielded 5 per cent. of a viscid cherry-red oil, sp. gr. at 15° C. being 1·022. This oil possesses the peculiar property of solidifying at medium temperatures and separating acicular crystals. This phenomenon occurs

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[1] For the botanical origin and composition of oil of lignaloe, see AMER. JOURNAL OF PHARMACY, 1887, p. 449. From the variableness of the commercial article, I have very little doubt that several of the numerous Mexican species of Bursera are distilled and the oil sent into commerce indiscriminately under this name. From my notes, I abstract the following regarding two samples of oil examined: No. 1 purporting to be distilled in the United States from imported wood; sp. gr. 0·950, pleasant aromatic jasmin-like odor; freely soluble in alcohol of 90 per cent. and 85 per cent., and in an equal volume of 80 per cent., soluble in 2 volumes 60 per cent., 7 volumes 50 per cent. and 40 volumes 40 per cent. With iodine it yields a brown solution without fumes. No. 2, from a German house, odor less aromatic, slightly terebinthinate, sp. gr. 0.8807; very soluble in alcohol of 90 per cent. and 85 per cent. and in equal volume of 80 per cent., but required 100 volumes of 60 per cent. for complete solution; with iodine it gives slight fumes and a bluish residue.—G. M. B.

especially in the middle fractures of the oil, and some of these possess a peculiar balsamic odor with a suggestion of rose.

Citral.—J. W. Semmler (*Ber. d. Deutsch. Chem. Ges.*, 1890, 3556, and 1891, 203) found that the aldehyde $C_{10}H_{16}O$ obtained by the oxidation of geraniol with chromic acid mixture is identical with citral. By further oxidation with argentic oxide he obtained *geranic* acid $C_{10}H_{16}O_2$, a limpid oil. On treating citral with potassium acid sulphate cymol was formed. Up to the present time citral has been found in the following oils: Lemon, limetta (Citrus Limetta), Mandarine (Citrus Madurensis, Linn.), Lemongrass (Andropogon citratus), Eucalyptus (Eucalyptus Staigeriana), Backhausia (Backhausia citriodora), Citronella fruit oil (Tetranthera citrata, N.), Japan pepper oil (Xanthoxylum piperitum).

MINUTES OF THE PHARMACEUTICAL MEETING.

May 19, 1891.

The eighth and last of the present series of meetings was held to-day; Mr. Wm. B. Webb occupied the chair, and in the absence of Mr. T. S. Wiegand (through sickness) F. X. Moerk acted as secretary.

The minutes of the last meeting were read and approved. G. M. Beringer, Ph.G., communicated several formulas: "On Essence of Pepsin" (intended to replace the numerous glycerin solutions now flooding the market); "On Elixir of Pepsin and Bismuth." Inquiry elicited the statement that neither of these preparations had a digestive action corresponding to the amount of pepsin used in their manufacture. Mr. Webb stated that years ago he had made a wine rennet which was largely prescribed under the name of *vinum coagulum*. A third formula was for a "Solution of Malate of Iron;" Mr. Webb said he had been informed that a large manufacturer used for some years past cranberry juice in making this preparation. Prof. Maisch suggested that experiments be made with our *mountain ash berries* as the fruit of the European *Sorbus Aucuparia* contains malic acid with very little of other organic acids; another source for malic acid was sumach berries. A question as to the superiority of this salt over other organic salts of iron was answered that it had been a favorite as a mild ferruginous preparation, but was not much used at present because of its indefinite composition. The evolution of *Bitter Wine of Iron* was mentioned, it having been made first from metallic iron by dissolving it in *hard* cider; then iron, orange juice and wine were used and this superseded by the bitter wine of iron.

F. W. Haussmann, Ph.G., read some notes supplementary to his paper of last month on the Solution of Succinate of Iron. Prof. Maisch stated that a formula for this preparation had been published ten years ago and that he contemplated republishing Prof. Wenzell's paper in the AMERICAN JOURNAL OF PHARMACY. A paper on an *Improved Syrup of Hypophosphites with Iron*, by Mr. Haussmann, confirms the properties of ferric hypophosphite as published in the AM. JOURN. PHARM., 1889, 392. Mr. McIntyre obtained best results by adding to solution of calcium hypophosphite acidified with hypophosphorous acid, the solution of ferrous sulphate; in this way the syrup containing ferrous hypophosphite could be kept for several weeks without precipitation; the composition of the precipitate has not been ascertained.

"*The Assay of Ferric Hypophosphite*," by Frank X. Moerk, supplemented some work previously published.

In reference to the question, "What should be dispensed when *naphthol*, simply, is prescribed? the answer was given *Beta-naphthol*. The statement was made that *Hydro-naphthol* has been published to be only an impure naphthol, the solubility and melting points of the two agreeing; a controversy on this identity had been carried on in several New York journals a few years ago.

The question as to the displacement of natural by *synthetic carbolic acid* was answered by the announcement that as the synthetic acid had no superior medicinal action over the natural acid and as they both reddened upon exposure, and in addition the synthetic was much more expensive, it was very little, if at all, used at present. The preparation of synthetic carbolic acid was referred to Mr. Beringer.

A paper on "*Geranium maculatum*," by Prof. H. Trimble and J. C. Peacock, Ph.G., was read by the former; in answer to a query by Prof. Maisch as to the percentage of tannin in the drug after drying, Prof. Trimble stated that such a determination had not been made in this work, but, judging from the results of H. J. Meyers, Ph.G., who examined the air-dried roots and found only about one per cent. gallic acid, there could be but little difference due to decomposition in drying the roots.

An *Improved Compressed Tablet Machine* was described by F. W. Jordan, Ph.G., of Tacony, Phila., and also shown in working order.

In answer to the inquiry regarding the composition of the *commercial acid sulphate of quinine*, Mr. Frank H. Rosengarten replied by letter that two definite sulphates—the neutral and the acid—are known; whether the commercial acid sulphate is a pure definite chemical compound is a hard question to answer, as the determination of the purity of quinine sulphates is a difficult problem, few chemists agreeing on the results.

All of the papers were referred for publication.

The following report of the Committee having in charge the Pharmaceutical Meetings, was read:

To the members of the Philadelphia College of Pharmacy:

GENTLEMEN:—Your committee, appointed at the Pharmaceutical Meeting in December, in whose charge the remaining meetings of the present series were placed would respectfully submit the following report:

When the meeting, in December last, was held, there was but a slim attendance, and not a single paper was presented, the meeting resulting in but a desultory discussion of a few topics suggested by the members present. This was but a logical result of the "go-as-you-please" method with no one in charge, with which these meetings had been conducted. It was suggested that an attempt should be made to popularize these meetings; to have a programme outlined in advance and to make them a source of valuable information both of practical experiences and of scientific knowledge.

With this object in view this committee was appointed and they have labored to attain the desired end.

A circular describing the objects of and the benefits to be derived from these meetings was prepared and distributed with the announcement for the meeting in January. Pharmacists and students were requested to submit, for the con-

sideration of the meetings, queries, observations resulting from practical experience, such as prescription difficulties, formulas or other topics of interest. These circulars inviting the pharmacists to take part in the meetings were sent to every member of the College and to members of the fraternity in the city, and this has been continued through the remaining meetings of the series.

As a result of this effort 21 queries have been submitted, 15 of which have been accepted and have been answered; several others, although accepted, are yet unanswered. At least 8 papers of more or less value elicited by these queries have already been published in the journal.

Another feature introduced by the committee was the introduction of topics for popular discussion. This feature was apparently well received, and even such a thread-bare subject as the ownership of the prescription elicited a stirring discussion.

The increased attendance at the later meetings has been noticeable, and the committee see no reason why a continuation of the effort to popularize and improve them should not result in a large attendance, and the meetings obtain that recognition which they deserve.

The value of these meetings to pharmacists and to the College, as part of its educational system, cannot be overestimated. Especially have they proven a valuable adjunct to the journal, supplying the editor with a goodly number of the original contributions for which the AMERICAN JOURNAL OF PHARMACY is noted.

In conclusion, the committee desire to offer several suggestions regarding the continuance of the work in the future.

(1) That a committee should be appointed at the expiration of one series of meetings to take charge of the succeeding series.

(2) That the Alumni Association should heartily co-operate with the College, by bringing the necessity for upholding and attending these meetings prominently before its members.

(3) That our students should be impressed with the importance and value of these meetings and that our graduates should go forth with the remembrance that their Alma Mater expects them to contribute their observations and contributions to scientific pharmacy through the medium of its institutions.

(4) That the drug trade should be made to realize that these meetings are largely for the benefit of the fraternity, and that as practical pharmacy is made up of a host of small operations, so no observations, no points in manipulation, improvements in processes or suggestions are too trivial for discussion. By such discussions much of allied interest and value will be brought forth.

GEORGE M. BERINGER,
J. W. ENGLAND,
HENRY TRIMBLE,
WILLIAM MCINTYRE.

Prof. Maisch made a motion to tender the thanks of the meeting to the committee for the faithful performance of their difficult task, and in appreciation of their services to request the same committee to take charge of the meetings for the next series. The motion was seconded and carried.

It was mentioned in this connection that considerable credit is due the College for maintaining these meetings uninterruptedly for thirty years.

Mr. Alexander Turner gave some interesting data concerning *prescriptions* compounded at his store; one thousand were looked over containing 2764 specifications, of these 2388 were for U. S. P. articles, 264 non-officinal drugs neither patented nor proprietary in character, and only 112 patented or proprietary drugs, making only about *four per cent.* of the last class.

Mr. McIntyre recently found about nine per cent. of this class prescribed in one thousand prescriptions. This justifies the expression made after the statement that it speaks well for the Philadelphia physicians.

Mr. Thompson showed the meeting some specimens of *cucumber juice*, which had been preserved by addition of salicylic and boric acids, also by an addition of alcohol.

Before adjourning for the summer the members all agreed to assist the Committee in charge, to their utmost, and make the next series even more successful than the present one.

FRANK X. MOERK.

AMERICAN PHARMACEUTICAL ASSOCIATION.

For the second time since its organization in 1852, the American Pharmaceutical Association has held its meeting far in the South. In addition thereto three meetings have been held in the northern section of the Southern States, namely, two in Virginia, and one in Kentucky. The first meeting in the heart of the Southern States was held in Atlanta, Ga., in 1878, and though called in September, had to be postponed until late in November, on account of the yellow fever having become epidemic in some portions of the South, mainly in the Mississippi Valley; it was the only meeting held that late in the year. On the other hand, the New Orleans meeting has taken place two months earlier than the San Francisco meeting, and thus the two southernmost meetings mark the earliest and latest dates at which the Association has convened at its annual gatherings, the large majority of which were in the month of September.

The large drill hall of the Washington Artillery, of New Orleans, located on St. Charles Street, was festively decorated with flags and bunting for the 39th annual meeting of the American Pharmaceutical Association, which was called to order by President A. B. Taylor, on Monday afternoon, April 27. After prayer had been offered by Rev. Dr. W. A. Snively, Mayor Jos. A. Shakspeare spoke words of welcome to the visitors, to which Vice-President Stevens replied.

President Taylor then delivered the anniversary address, in which he referred to the increase in the Schools of Pharmacy, and to the fact that in forty of the States of the Union State Pharmaceutical Associations had been organized since the year 1867. He briefly reviewed the decennial revisions of the U. S. Pharmacopœia since 1840, when for the first time pharmacists participated, officially, in this labor, until in recent years a much more active interest had been taken in the work of perfecting the national pharmacopœia by pharmacists than by physicians. Referring to the complementary branches of the healing art, note was made of the growing sentiment of harmony between the professions of medicine and pharmacy, as an evidence of which was cited the formation of a Section of Materia Medica and Pharmacy by the American Medical Association, at which

a large delegation of pharmacists had been invited. The importance of collecting the formulas for special preparations in local use had been recognized by the Association at an early date, and more recently has led to the publication of the "National Formulary," which, in its subsequent editions will doubtless continue its aim at greater professional uniformity in prescriptions. Among the numerous valuable papers read before the Association it would seem that two have exerted a special influence on the progress of pharmacy, namely, one by Israel J. Grahame, in 1858, on "The history of Percolation or displacement, and its application to Pharmacy;" and the other by William Procter, in 1859, on "Fluid Extracts and Oleoresins." Reference was also made to the researches on synthetical organic compounds and on proximate principles, and to the influence which these observations exert upon the use of old-fashioned galenical preparations.

President Taylor then turned to the internal affairs of the Association, referred to the invitation extended at the preceding meeting for holding an international pharmaceutical congress, at Chicago, in 1893; to the organization of a "World's Congress Auxiliary," at Chicago; to the so-called "cut-rate problem;" to interchange of certificates of State Boards of Pharmacy; to the use of the Centennial Fund, and to various amendments to the by-laws which seemed to be desirable. In closing his address, President Taylor alluded to the usefulness of the Pharmaceutical Society of Great Britain during the fifty years of its existence, the anniversary of the foundation being celebrated in May, and suggested that efforts be made for prohibiting, by national legislation, the allowance of a patent to any medicinal preparation.

The address was well received and was referred to a committee consisting of Messrs. Hurty, Trimble and Pennel.

Eighty-four candidates were admitted to membership.

The list of delegations showed that nine Colleges of Pharmacy, twenty-two State Pharmaceutical Associations, five county and city associations, and three Alumni Associations had appointed delegates to this meeting; later on, the credentials of four or five other associations were received.

Committee reports being called for, the Committee on Prize Essays was granted further time to make their report, and present it to the Council. The other reports were, for the present, laid upon the table.

The Nominating Committee was appointed by the selection of two members from each of the 27 States represented at this meeting; in addition thereto the Chair appointed Messrs. Alexander, of Missouri; Ebert, of Illinois; Remington, of Pennsylvania; Patch, of Massachusetts, and Chalin, of Louisiana, from the Association at large. A motion made that the Committee be instructed to present the names of two members for each office to be filled, was lost.

A committee, consisting of Messrs. Sheppard, of Massachusetts; Remington, of Pennsylvania; Keppler, of Louisiana; Eckford, of Mississippi, and Hollister, of Wisconsin, was appointed to consider and report upon the time and place of the next annual meeting.

The minutes of the Council, read by Mr. Kennedy, were approved. The invested funds consist of the following: Ebert Fund, $759.82; Centennial Fund, $1,463.72; Life Membership Fund, $10,007.34. The total face value of the bonds was $9,800; their market value, $11,907; the cash balances, $323.88.

Including a cash balance on July 1, 1890, of $4,140.57, the Treasurer reported a total income to March 15 of $9,206.39; total disbursements, $4,464.90; cash on hand, $4,741.49.

For account of the National Formulary, during the same period, there was reported: Cash receipts, $543.04; expenses, $198.75. The total receipts from this source, since 1888, were $6,067.64; total expenses, $4,104.81; total cash profit, $1,952.83.

The Committee on Membership, reported the decease of nine members and one honorary member, H. B. Brady, since the last meeting.

The amendment to the By-laws creating a Standing Committee on Transportation, which had been proposed at the preceding meeting, was called up for action, the number of members was increased from five to nine by one member each from Boston, Atlanta, Denver and San Francisco, and then adopted. The vote was reconsidered at the next session, and the by-law modified by charging the Council with the appointment of the Chairman and Members of the Committee on Transportation.

Professor Oldberg presented a communication from the World's Congress Auxiliary of the World's Columbian Exposition in Chicago, stating that a special committee, consisting of Messrs. Oldberg, Sargent, Ebert, Dyche and Hogan had been appointed for the purpose of promoting the holding of a pharmaceutical congress in 1893, and tendering to the Association, in advance, whatever facilities may be in the Auxiliary's power to extend. Some discussion was occasioned in view of the action previously had by the Association, and it was deemed best to refer the whole subject for consideration and report to a committee consisting of Messrs. Gordon, Whelpley, Hollister, Good and Simon.

The amendment to the Constitution, proposed in 1890, creating the office of Assistant Secretary, was, at the suggestion of its mover, Mr. Ebert, indefinitely postponed.

By vote of the Association in 1890, the Treasurer's bond had been reduced from $10,000 to $5,000. On motion and proper consideration, the By-Laws were amended accordingly.

An adjournment was then had until Tuesday morning.

Second Session.—After the reading and approval of the minutes of the first session, in the absence of the Chairman of the Committee on Nominations, the Council presented the names of 63 candidates for membership, whose applications were approved by the Association.

A report from Professor Diehl, Chairman of the Committee on National Formulary, was read, stating that in view of the approach of the issue of the new United States Pharmacopœia, preliminary steps had been taken towards organized action by the Committee for revising the National Formulary as promptly as possible after the issue of the Pharmacopœia; that a circular-letter had been issued to the forty-four members of the Committee; that up to the time of writing the report only sixteen acknowledgments had been received, including one from California, containing a number of practical formulas and suggestions; and that the hope was justified of sufficient progress being made by the next annual meeting to justify the expectation of an early revision of the Formulary.

The Committee on Adoption of the Metric System presented a report, request-

ing authority to memorialize Congress with the view of securing, if possible, the adoption of the prototypes presented by the International Metric Bureau, as the standards for weights and measures of the United States as provided for by the Constitution. A resolution to this effect was passed unanimously.

The Nominating Committee presented a report, placing in nomination for the ensuing year for President, Alexander K. Finlay, of Louisiana; for Vice-Presidents, George J. Seabury, of New York; W. H. Torbert, of Iowa, and L. T. Dunning, of South Dakota; for Permanent Secretary, John M. Maisch; for Treasurer, S. A. D. Sheppard; for Reporter on the Progress of Pharmacy, Charles Rice; and for Council Members, J. M. Good, Adam Conrath and C. T. P. Fennel. The nominees were duly elected.

Professor Fennel referred to the many valuable services rendered to the Association by Professor Diehl, who had declined a re-election as Reporter on the Progress of Pharmacy, and moved for the appointment of a Committee to draft proper resolutions embodying a vote of thanks to this retiring officer. The chair appointed as such committee, Messrs. Fennel, Ebert and Heinitsh.

In this connection it may be stated that rumors had reached the place of meeting of the serious illness of Professor Diehl; but we are pleased to have learned since then, that while he was at that time suffering from sickness, this had at no time been as alarming as had been currently reported, but on the contrary that he was convalescent and in a fair condition of recovering his usual good health.

After hearing the report of the Committee on Publication the Association passed a resolution requesting that Committee to offer the older volumes of the Proceedings at a low figure and to send the price-list to the various pharmaceutical journals with a request to publish it.

The report of the Committee on the next annual meeting, recommending it to be held at the Crawford House, White Mountains, on the second Monday of September, 1892, created considerable discussion, during which Galveston, Tex., Cresson Springs, Pa., Nashville, Tenn., New York City and Denver, Col., were suggested as suitable places for holding the next meeting. Cresson Springs was selected; but at the last session the vote was reconsidered, and the original report of the Committee was adopted, naming the Crawford House, but changing the date to the first Monday of September, 1892, unless the Council shall find it better to change the date or the hotel at which the meeting is called.

Mr. Ebert moved an amendment to Chapter vi, Article viii of the By-laws, by adding a new Section, requiring the Council to decide upon the place and time of the next meeting and to announce its decision at the second session of the Association. The proposed amendment was laid over for future consideration.

The amendment to the By-laws offered at the preceding meeting in relation to an admission fee payable by new members on joining, was, on motion of Mr. Ebert, indefinitely postponed.

The Committee on the President's address presented a report, which was accepted; the Committee took it again in charge for the purpose of preparing resolutions based upon the recommendations, for action by the Association.

The Section on Commercial Interests held a session on Tuesday afternoon and its second session on Wednesday morning, Chairman Canning presiding.

The subject discussed was the cutting of prices on selling proprietary articles at retail, and the remedies against this practice. A number of communications were received and a resolution was presented by Mr. Hallberg, stating several propositions upon which an effective plan should be based. The resolution and all communications were referred to a committee of nine, including the Chairman of the Section, for consideration and report. The deliberations of the Committee resulted in a plan involving the co-operation of manufacturers, distributing agents and retail druggists, the former to sell medicinal proprietary articles only to druggists having signed agreements (excepting in those localities where no druggists are in business), the retail druggist to sign an agreement not to violate the conditions as to retail prices, or to sell to dealers on the cut-off list, or to substitute another article for one called for; any violation of the agreement to subject the party to being placed on the cut-off list.

The plan was adopted, and the Association was asked to appropriate $200 to defray the expenses of carrying out the plan. The preamble which, as adopted, declared that medicines should be sold only by druggists who have been educated to properly perform their duties, was subsequently erased by the Association.

The election of a Committee to serve for the ensuing year, resulted in the choice of W. H. Torbert, of Iowa, as Chairman, Arthur Bassett, of Michigan, as secretary, and Chas. M. Ford, of Colorado, Chas. Holzhauer, of New Jersey, and G. L. Hechler, of Ohio, as the remaining members of the Committee.

The Section on Scientific Papers held three sessions, two on Wednesday afternoon and evening, and the last one on Thursday afternoon. Prof. Patch presided and Prof. Hallberg acted as secretary. The following papers were read:

The general features of the vegetation of Louisiana and adjoining region, and its products in relation to pharmacy and allied industries was the subject of a paper read by Dr. Chas. Mohr, of Mobile, Ala. The author characterized the climate, equally free from the extremes of heat and frost, and favored with an abundant rainfall during the year, as furnishing conditions most favorable to arboreal growth. The blending of southern and northern plants is noticed among the trees as well as among the crops of the field and garden; palms (Sabal) with short stems grow in the shade of the pine; the magnolia side by side with the beech; the yucca shares the ground with the American holly; the pear ripens its fruit with the orange and Japanese plum (*Eriobotrya japonica*); beside the crops of northern fields, sugar, cotton and rice are produced. In Louisiana the subtropical forest, distinguished by the prevalence of broad-leaved evergreens, is presented in its characteristic features, and many shrubs, most of them adorned by a profusion of flowers, add to the beauty and interest of the woods. Passing to the products, a somewhat extended sketch of the turpentine industry was given, and references were made to the wine obtainable from the Scuppernong grape; to the timber of the bald cypress (*Taxodium distichum*); to the sugar cane cultivated in the alluvial lands; to the fig growing in the lower half of the Gulf States, however, on account of its perishable nature in this damp climate, of no value commercially; and finally, to the ramie plants or China grass, *Bœhmeria* species, and to the jute plants, *Corcharus* species, which are easily grown in these localities.

For *Syrup of lactucarium*, a process of preparation was given by G. H. Klie, in which the waxy constituent is dissolved by ether, and the bitter principles by diluted alcohol. The use of *lead oleate* in the place of lead plaster was discussed by Prof. Stevens.

The assay of nux vomica was discussed by Prof. Patch. The exsiccated powder is left in contact with a measured quantity of Prollius' fluid (concentrated ether, 250 cc.; chloroform, 100 cc.; alcohol, 125 cc.; and strong ammonia water, 10 cc.), for about 24 hours. From an aliquot portion of the liquid the alkaloids are extracted by agitation with dilute sulphuric acid; the aqueous liquid is rendered alkaline with ammonia, and the liberated alkaloid extracted with chloroform and weighed after evaporation of the solvent. From the mixed alkaloids the strychnine may be determined by potassium ferrocyanide. The author gave a number of determinations which illustrate the variation of the total alkaloids between 1·25 and 3·9 per cent.; at the same time the variation in the proportion of strychnine to other alkaloids (brucine, etc.) was still greater, it being in some cases approximately 3 : 1; 2 : 1; 4 : 3; 1 : 1 and 2 : 3.

The cultivation of the orange and lemon in the Southern States was the theme of a communication by R. N. Girling; this paper contained many practical hints.

Caffeine salts, their preparation and composition. The researches of H. W. Snow demonstrate the conditions under which certain definite caffeine salts may be prepared, and give also the results of analyses of the hydrochloride, hydrobromide, nitrate, sulphate, salicylate, benzoate and valerianate of caffeine.

What is the duty of the professional pharmacist regarding patent medicines? This query was discussed by Mr. L. H. Leavitt, from the standpoint of the public and of the physician.

A specimen of Florida camphor had been procured by Mr. Heinitsh, and was exhibited at one of the sessions. It was then learned that the camphor tree had also been grown successfully in portions of Louisiana south of New Orleans.

The drug trade and the United States pharmacopœia was discussed in a paper by J. C. Means.

Thiersch's antiseptic solution consists of salicylic acid, 2 parts; boric acid, 12 parts, and distilled water, 1,000 parts. Adolph Levy recommends the preparation of tablets containing salicylic acid, 14 grains; and boric acid, 84 grains; one of these tablets is to be dissolved in a pint of hot water.

An accident case was described by A. Levy; it contains, packed in a convenient manner, all the necessary medicines, instruments and utensils useful in cases of accidents.

For *the manufacture of antiseptic material*, Dr. J. T. Davison explained some of the underlying principles. While the pharmacist could not, probably, compete with the large manufacturer as to price and style, he could, by conscientious attention to details, produce an article every way superior to those usually supplied.

Determination of the value of Mustard. Prof. L. E. Sayre suggests this valuation to be effected by distilling, in a glass apparatus, the volatile oil from a mixture of water and mustard, absorbing the vapors in an excess of solution

of silver nitrate, and at the close of the operation determining excess of silver by sodium chloride.

Scheme to establish a comparative standard for alkaloidal galenicals. The interest in the reading of this paper was enhanced by its author, Prof. J. U. Lloyd, performing the process experimentally with fluid extracts of guarana and of nux vomica, and demonstrating that its execution requires no special apparatus and merely ordinary skill, and that the process is quickly performed and yields the alkaloids colorless or white. The outlines of the process are as follows: 5 cc. of fluid extract are mixed, in a mortar, with an excess (1 or 2 cc.) of pharmacopœial solution of ferric chloride, and sodium bicarbonate, in powder, is then added with constant agitation until a stiff magma results; this magma is then triturated with successive portions of chloroform (about 20, then 10 cc., etc.) (tannin, coloring matters, gums, proteins, etc., are left undissolved), and the chloroformic solution, which readily separates from the magma, is decanted and evaporated, when the pure alkaloids will be left, and are weighed as such. Preparations containing fats or chlorophyll will yield the alkaloids contaminated with these principles; for purification the residue is dissolved in excess of dilute sulphuric acid; the solution agitated with ether, which will remove fat and chlorophyll; the aqueous liquid then rendered alkaline with ammonia, and the alkaloids taken up by agitation with chloroform.

A somewhat similar process was recommeded by Loesch in 1879 (see AMER. JOUR. PHARM., 1880, p. 15), in which the aqueous solution of the extract is mixed with alum, the mixture rendered alkaline with ammonia, then evaporated to dryness, and the powdered residue treated with solvents for the alkaloids. The differences in the two processes and the greater simplicity in the manipulation in the former are very apparent.

Professor Lloyd regards the following as average yields from good fluid extracts:

	Per Cent.		Per Cent.		Per Cent.
Aconite root,	0·40	Coca,	0·50	Ipecacuanha,	1·50
Belladonna leaves,	0·40	Guarana,	3 to 4	Nux vomica,	1·50
Belladonna root,	0·50	Hyoscyamus,	0·20		

It is obvious that in the above scheme ether may be substituted for the chloroform, if desirable. The statement made, that the process was not adapted for opium preparations, elicited the suggestion that, possibly, all the opium alkaloids, with the exception of morphine, could thus be removed, and that morphine might, possibly, be extracted from the residue by some suitable solvent and thus be obtained free from contamination with other alkaloids or coloring matter.

A vote of thanks was tendered to the author for the interesting paper and the clear manner in which the demonstration of the process had been shown.

Oil of Camphor as an adulterant was presented by Prof. Stevens, the aim of the paper being its detection when mixed with other volatile oils.

The preservation of mucilage of acacia was the subject of a brief paper by H. Tiarks.

Louisiana Perique tobacco was described by Prof. Metz, as to cultivation, curing and preparation for the market, the product being about 19,000 pounds; it is one of the strongest tobaccos, containing about 8 per cent. of nicotine.

The yellow coloring principle of Frasera Walteri, which was regarded as identical with gentisin by Kennedy, in 1873, but by Patch, in 1881, was shown to differ from gentisic acid in various reactions, has been further examined by Professors Trimble and Lloyd, who, by repeated crystallization from strong alcohol, succeeded in separating it into at least two distinct principles, one being dark yellow and fusing at 114° C., while the other was in fibre-like light lemon-yellow crystals, having the melting-point 178° C. Both compounds are nearly insoluble in water, sparingly soluble in petroleum ether and benzol, soluble in alcohol, ether, chloroform and glacial acetic acid; the alcoholic solutions are colored dark green by ferric salts, and are not precipitated by lead acetate; solution in sodium hydrate does not reduce Fehling's test. Two combustions made with each substance gave results indicating the formulas $C_{15}H_{15}O_6$ and $C_{16}H_{15}O_6$.

A test for the purity of lithium salts was described by W. L. Scoville, as follows: 2 gm. of the salt, as lithium citrate for instance, are placed in a porcelain capsule having the capacity of 40 to 50 cc., and slowly ignited until completely charred, when the full flame of a Bunsen burner is allowed to play upon the bottom of the capsule until most of the organic matter has been burned off. When the capsule has cooled, normal nitric (or hydrochloric) acid is drawn in from a burette, slowly at first to avoid loss by effervescence, until an excess has been added. After standing until the salt has completely dissolved, methyl-orange indicator is added, and the excess of acid ascertained with normal soda solution. Treated in this way, 2 gm. of lithium citrate should require not less than 28·55 cc. of normal acid; 2 gm. of lithium benzoate not less than 15·6 cc., and 2 gm. of lithium salicylate not less than 26·12 cc. Care must be taken to start with a perfectly dry salt.

Professor Patch had contributed the following practical papers:

Unchangeable Elixir of three phosphates. After reviewing several published formulas, the following is suggested:

Solution of Chloride of Iron U. S. P. 1880,	28 cc.
Quinine Alkaloid,	7·128 gm.
Strychnine Alkaloid,	·104 gm.
Acid Phosphoric, 50 per cent.,	27 gm.
Alcohol,	30 cc.
Simple Elixir,	300 cc.
Syrup, q. s., to make	473 cc.

Mix the solution of iron and the phosphoric acid, and in this dissolve the alkaloids. To this add the syrup, and then the simple elixir and alcohol, previously mixed.

This is not a very pleasant elixir, nor are the commercial articles of the same strength. It has also the objection of having very little color. This can, of course, be remedied by coloring. As it is the fashion to paint quinine red, this elixir might be colored with tincture of cudbear.

The Strength of commercial acids. The results of assays, including impurities present, are given of a number of samples of sulphuric, nitric and hydrochloric acids of ordinary commercial quality and of others sold as chemically pure.

Dilute hydrocyanic acid was found to keep not much, if any, better in

dilute alcohol than in water; a small percentage of HCl preserves from change.

Assays of nux vomica. Three samples of *nux vomica*, powdered unsteamed, yielded from 12·3 to 14 per cent. of extract, 3·39 to 3·9 per cent. alkaloids, and 1·64 to 2·5 per cent. of strychnine. Five samples of commercial *powdered nux vomica* gave 11 to 15·3 per cent. extract, 1·25 to 3·04 per cent. alkaloids, and ·92 to 1·52 per cent. strychnine. Four samples of *fluid extract of nux vomica* gave 10 to 12·8 per cent. extractive, and 1·63 to 2·37 per cent. alkaloids; the extractive of five commercial samples of the fluid extract varied between 3·47 and 11 per cent. Eight samples of *extract of nux vomica* varied in total alkaloidal strength between 15 and 24 per cent.; two commercial specimens yielded 11·5 and 11·7 per cent. of alkaloids. For the preparation of the *powdered extract* it is suggested that the percolate obtained with the pharmacopœial menstruum be evaporated to syrupy consistence, while still warm washed by agitation with benzin and decantation, then mixed with milk sugar, evaporated to dryness and powdered.

Commercial cinchona barks. The essay is a critical study of the methods for determining the total alkaloids and the quinine.

The assay of digitalis. Considering the properties of the different proximate principles of more or less medicinal activity, which have been obtained from digitalis, it is extremely difficult to devise a reliable process of assay.

Granular ferrous sulphate is recommended in the place of the pharmacopœial precipitated salt. It is prepared by dissolving 200 gm. of crystallized ferrous sulphate in 200 cc. of hot water, acidulated with 100 cc. of diluted sulphuric acid, filtering, evaporating to 350 gm., cooling quickly with continued stirring, draining the product and washing it with 50 cc. of alcohol.

The chairman in his address had suggested the creation of a special fund for aiding in researches to be laid before this Section. In view of the existence of the Centennial Fund, the interest of which is available for this purpose, no action was taken on the suggestion.

The Committee of this Section for the ensuing year consists of C. S. N. Hallberg, Chicago, Chairman; H. W. Snow, Detroit, Secretary, and J. N. Hurty, Indianapolis.

The Section on Legislation and Education held its session on Thursday evening, Professor Wm. Simon in the chair, and L. C. Hogan Secretary. The latter presented a report giving a synopsis of the pharmacy laws passed or modified in different States of the United States since 1889.

The chairman's address dwelt upon the difficulty of obtaining correct and reliable information on subjects of special interest to the Section and made various suggestions looking towards increased usefulness of College instruction.

Recognition of College diplomas by State Pharmacy Laws was the subject of the first paper read by Professor Remington. It is impossible to give, in a brief review, the arguments advanced in favor of the position taken by the author, and the causes which, in his opinion, have thus far operated against such recognition in a number of the States. The paper was discussed at considerable length, but without taking action on the suggestions, the other papers prepared for the Section were ordered to be read.

Practical suggestions and experiences in securing pharmacy laws was the title of a paper read by H. R. Slack, of Georgia.

Would reciprocity in registration be practical through the medium of uniform examinations? This question was discussed by Prof. Chas. M. Ford, of Denver. A certificate should carry unquestioned evidence that its holder, at the time of receiving it, was a thoroughly qualified pharmacist, and that he had been given a fair trial in practical fields; the American Pharmaceutical Association might thus be vested with the power of issuing certificates.

Extent and methods of instruction in Botany in Colleges of Pharmacy, by Prof. D. M. R. Culbreth, of Baltimore.

A method of dose instruction, by Prof. Geo. Spitzer, of Lafayette, Ind.

The drift of pharmaceutical education, by S. W. Williams, of East Orange, N. J.

College courses in Pharmacy, by Prof. C. S. N. Hallberg, of Chicago.

The last-mentioned paper presented a resolution "that colleges of pharmacy be requested to extend the term of their course of instruction at the earliest practicable time, to six months;" this was, on motion of Prof. Stevens, unanimously adopted.

The Section passed a resolution asking the Association to make future arrangements with the view of allotting time for the holding of two sessions by the Section; also requesting the appropriation of $50 for defraying the expenses in compiling statistics on legislative and educational matters.

The Committee elected for the present year consists of Professor A. B. Stevens, of Ann Arbor, Chairman; L. C. Hogan, of Chicago, Secretary; and John Kochan, of Denver.

Final Session of the Association.—This was held Friday morning, when, after the reading of the minutes, 20 candidates for membership were admitted.

The preamble and resolutions passed by the Section on Commercial Interests were revised, and the preamble was, on motion, stricken out.

A petition signed by forty ladies was presented in favor of changing the place of the next annual meeting from Cresson Springs to the White Mountains, which was adopted. Mr. H. M. Whitney, of Lawrence, Mass., was elected Local Secretary.

Appropriations were made as requested for the Section on Commercial Interests, $200, and for the Section on Legislation and Education, $50.

Various amendments to the Constitution and By-Laws were presented and laid over until next year. The amendment requiring the Council to decide, annually, upon the time and place of the next meeting was lost; but the amendment directing the president to appoint a Committee on Nominations at the first session was adopted.

The Committee on the World's Fair Auxiliary recommended the acceptance of the invitation of co-operation for holding an International Pharmaceutical Congress, in 1893, and the appointment of a Committee consisting of Messrs. Oldberg, Sargent, Ebert, Dyche, Hogan, Hallberg and *ex officio* the President and Permanent Secretary of the American Pharmaceutical Association.

Votes of thanks were passed to the Local Secretary, Local Committee, members of the Louisiana Pharmaceutical Association, the citizens, press, retiring officers, etc., and after the installation of the officers for the ensuing year the Association finally adjourned.

The entertainments provided for the members extended over the entire week. Some of the visitors reached New Orleans on Saturday, April 25, but

the majority of them arrived during Sunday. Most of the members from the Eastern and Central States went by way of Cincinnati and Chattanooga; those coming from the Southern Atlantic States by way of Atlanta, Montgomery and Mobile; and those from the Mississippi valley and from Chicago came over the Illinois Central Railroad; with few exceptions, all the visitors were provided with quarters at the St. Charles Hotel.

On Monday evening, a promenade concert and soiree dansante was tendered to the visitors, in the spacious halls on the second floor of the Washington Artillery Building. Tuesday evening was set apart for a vocal and instrumental concert at Grunewald Opera House. Wednesday was devoted by the ladies to visiting public institutions and to drives to different parts of the city and suburbs. The excursion on Thursday forenoon was participated in by all the members and their ladies. The steamer *Jesse K. Belle* left the levee at 9 o'clock, proceeding first to Chalmette Cemetery, the final resting-place of soldiers from the civil war. The boat then steamed up the Mississippi, passing the city, to the Ames crevasse where the rush of the waters through the broken levee, the view of the backwater and the sight of the half submerged negro shanties and the overflowed surrounding country proved interesting sights to the visitors, to whom its features were wholly novel. At the Fairfield plantation a landing was made for the purpose of viewing the sugar house and the orange grove on the grounds. It was 2.30 P.M. when the boat reached her wharf. After the final adjournment on Friday morning coaches were in waiting in front of the hall, and accompanied by the ladies, the members had a delightful drive up St. Charles Avenue to Audubon Park, where Horticultural Hall with its tropical and subtropical plants was the centre of attraction. The Marine Hospital was next visited, and the visitors were shown through the institution and served with refreshments. The drive was then continued, one or two cemeteries were visited, and a halt was made at the West End, with its handsome promenades on the shore of Lake Pontchartrain. After the return to the hotel about 5 or 6 o'clock, preparations were made for attending the banquet at Odd Fellows' Hall, which was decorated with evergreens and floral designs. After justice had been done to the elaborate menu, toasts were offered and responded to by Judge Fenner and Mayor Shakspeare; by Messrs. Alexander, Finlay, Remington, Seabury and Hallberg, members of the Association; and by Messrs. Sol. Marx, J. W. Glenn, C. L. Henry and C. C. Wickliffe, of New Orleans. The concluding speech was made by Rev. Dr. Snively, after which President Finlay presented to the retiring President, A. B. Taylor, a floral representation of the local badge used during the meeting, viz: a crescent and star, and the company separated after singing "Auld Lang Syne." On Saturday and Sunday most of the visitors took the trains for the homeward trip, or to some of the attractive places of resort near the coast of the Mexican Gulf. The visitors will long remember the numerous pleasant incidents of the generous hospitality of their New Orleans friends.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Pharmakognosie des Pflanzenreiches. Von F. A. Flückiger. Dritte Auflage. Mit einem geschichtlichen Anhange. Berlin. 1891. R. Gaertner's Verlagsbuchhandlung. 8vo. Pp. xvi and 1117.

Pharmacognosy of the vegetable kingdom. Third edition. With a historical appendix.

The first edition of this work made its appearance in 1867. Since that time pharmacognosy in its various branches has been cultivated by many scientists and specialists, and very considerable progress has been made in our knowledge of vegetable drugs—aside from their medical properties and therapeutic application. The results of these researches are embodied in the work before us.

Of similar works by the learned author, perhaps the one best known in North America is "Pharmacographia," of which two editions have been published, the first one by the author conjointly with the late Daniel Hanbury. This work will give some idea of the scope and the manner in which the subject is treated in the "Pharmakognosie." This latter work, however, confines itself chiefly to the drugs in common use in Central Europe, considering at the same time the different varieties coming from various localities or from closely related plants, and such impurities or substitutions as are occasionally met with in commerce.

The arrangement of the work is essentially identical with that followed in the preceding editions, with some slight modifications, and is based upon a systematic grouping together of the material according to external characters. The drugs are first divided into such without organic structure and into organized substances. The former class comprises the gums, gum-resins, oleo-resins, resins, etc., in all ten divisions, against only three divisions of the second class, namely, pulverulent drugs (starch, lycopodium, lupulin, kamala), galls, and plant organs or parts of plants. This last—the thirteenth—division is obviously the largest one; it embraces nearly three-fourths of the entire work, and is subdivided into cryptogamous and phanerogamous drugs, the latter requiring over two-thirds of the book, and being divided into two series. Subterraneous or partly subterraneous organs comprise the first of these series, and naturally are separated into rhizomes and roots of monocotyledons and of dicotyledons, the further classification being based upon characters of taste, and the presence or absence of starch, laticiferous ducts, etc. Aërial parts of plants constitute the second series, with five natural groups, viz: stems, barks (including cork), phyllomes (bulb-scales, leaves and herbs, inflorescences, flowers and parts of flowers), fruits and parts of fruits, and finally seeds and parts of seeds.

The heading for each drug contains its Latin and German names, the former according to the nomenclature used in Central Europe. Some idea of the manner in which the subjects are considered, may be formed by briefly quoting the subheadings of one drug with its allied varieties. Thus, under "Gummi arabicum" are considered its formation in the tissue; the plant and its distribution; collection; properties; composition; chemical behavior, and history, the whole occupying over nine pages. Then follow upon six pages the other gums resembling gum arabic, and notably Senegal gum; then gums from other parts of Africa, from India, from Australia, from South America

and from North America (gum mezquite). It will be observed that pharmaceutical and therapeutical considerations do not enter into the scope of the work. It is scarcely necessary to state that in connection with the organized substances the anatomical structure receives due attention; in fact, we generally find an explanation of the development of the plant part, its appearance as met with in commerce, its internal structure, and comparison with other articles liable to be mistaken for it.

Every page of the book bears evidence of the scrupulous care bestowed upon the text, the researches of the author and the collection and consideration of all available researches on each subject, the literature being very fully quoted.

The text is followed by an appendix containing biographical accounts of the more important old writers on materia medica, and historical notes on some interesting documents and publications; this appendix comprises 46 pages. A full index facilitates the use of the work.

Those who are familiar with Professor Flückiger's writings need not be told of their attractive character, the completeness and correctness of literary research, the lucidness of statements and the logical deductions. We know of no other work on pharmacognosy, that is so complete, so reliable, and even so fascinating as the one now before us; it will be a lasting monument to its author, and we feel assured that it will be read and studied with close attention by those interested in the materia medica of the vegetable kingdom.

Commentar zum Arzneibuch für das Deutsche Reich (Pharmacopœa Germanica, editio iii), mit vergleichender Berücksichtigung der früheren deutschen u. a. Pharmakopöen, von Dr. Bruno Hirsch, Apotheker in Berlin, und Dr. Alfred Schneider, Korps-Stabsapotheker in Dresden. Göttingen: Vandenhoeck & Ruprecht. 1890. 8vo, p. 720. Price, 13 Marks.

Commentary to the German Pharmocopœia with reference to, and comparison with, the former German and other Pharmacopœias.

This valuable work is now completed. In the December number of our last volume we have commented somewhat in detail on its scope, arrangement and excellent qualities. The expectations then based on the character of a portion of the work, have been fully realized. The value as a commentary on the new German Pharmacopœia is enhanced by occasional references to and comparisons with other pharmacopœias, for which purpose, aside from the old German and Prussian, those of Austria, Belgium, Denmark, Finland, France, Great Britain, Greece, Hungary, Japan, Netherlands, Norway, Roumania, Russia, Spain, Sweden, Switzerland and the United States have been used. As a practical and trustworthy guide to the apothecary the work will be appreciated by all who may consult it.

Materia Medica and Therapeutics, with Especial Reference to the Clinical Application of Drugs. By John V. Shoemaker, A.M., M.D., Professor of Materia Medica, Pharmacology, Therapeutics and Clinical Medicine, and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia, etc. Philadelphia and London: F. A. Davis, publisher. 1891. 8vo, p. 640. Price, cloth, $3.50; sheep, $4.50.

Published as the second and last volume of a "Treatise on Materia Medica, Pharmacology and Therapeutics," this volume is paged consecutively with the

first one from page 355 to 994; but it is independent of the former and complete in itself.

The drugs are enumerated in alphabetical order; the inorganic chemical compounds and the organic salts of metals are grouped together under the chief or basylous element, while the crude drugs with their preparations are found as a rule under their pharmacopœial names, or in case two or more parts of the same plant are officinal, under the name of the plant, under which likewise the non-pharmacopœial vegetable drugs are to be looked for. An exception is Ustilago which, for no obvious reason, is described under the heading of Maidis Ustilago, and two separate headings have been made for products of the maize plant, viz: maidis stigmata for corn silk, and Mays for the fruit, meal and starch; in this latter case the differences in the medical uses of the articles has evidently decided the division. A large number of the recently recommended vegetable and chemical remedies are considered including Koch's famous remedy tuberculin and the so-called spermine, introduced by Brown-Séquard.

Descriptions of the different articles are not given, but usually a few prominent characteristics or, in the case of crude drugs, the chief medical constituents are briefly mentioned for the information of the physician, for whose special use the book has been prepared; attention is, therefore, mainly given to the subheadings physiological action, therapy, doses, hypodermic administration, poisonous effects, treatment of poisoning, and others. An appendix contains seven pages of formulas for hypodermic use, and a very complete table of doses, which occupies six pages in double columns. The introductory chapter treats of the classification of medicines.

The work is an excellent compendium for the use of the physician, and is easily consulted by virtue of its alphabetical arrangement, and of a copious index of drugs and preparations.

Fever: its Pathology and Treatment by Antipyretics; being an essay which was awarded the Boylston prize of Harvard University, July 1890. By Hobart Amory Hare, M.D., B. Sc., etc. Philadelphia and London: F. A. Davis, publisher. 1891. pp. 166. Price, $1.25.

When presented to the Boylston Prize Committee in 1890, the title of this essay was "The uses and values of antipyretics." Under the headings of experimental evidence and clinical evidence are considered the action and application of antipyrin, anti-febrin, thallin, phenacetin, and salicylic acid and its compounds, and numerous observations are described, and the literature on the subject is copiously quoted. The author regards antipyrin as taking the foremost rank as an antipyretic, with antifebrin next, and these followed by thallin and phenacetin, with perhaps a preference for the latter. Antipyrin also takes the lead as an analgesic, followed by phenacetin and antifebrin, while thallin possesses hardly any such power. In rheumatism the salicylates act better than the rest of these antipyretics.

A dermatological Bibliography, compiled by George Thomas Jackson, M.D., New York. Presented to the American Dermatological Association, in 1889, and issued as part of its Transactions for 1890. New York. 1890. 8vo. pp. 91.

A classified catalogue of books on syphilis and skin diseases, giving in most cases the place and date of publication and the price.

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NOTES ON SOME NORTH AMERICAN MEDICINAL PLANTS.

By John M. Maisch.

Read before the Pennsylvania Pharmaceutical Association, June 24.

In a paper bearing the same title as the present one, which I presented last year (see *Am. Jour. Pharm.* 1890, p. 331), some account of *Colorado cough-root* was given, and it was suggested that it was, probably, derived from a species of Ligusticum. Shortly after the publication of the paper my supposition was confirmed by a letter from Mr. John Kochan, of Denver, who stated that "Mr. Ebert collected and identified the plant in 1888, as well as myself in 1889, mention of which is made in *Botanical Gazette*, vol. 14, p. 278 (1889)." The reference alluded to reads as follows:

Ligusticum filicinum, *Watson*, was collected in great abundance near Lake City, Colorado, by E. J. Ebert, in 1888, and in the mountains back of Denver, by John Kochan, in July, 1889. This is the "Osha" of the Indians, who use its very large aromatic roots. It was referred to L. apiifolium by Rothrock in report of Wheeler's Expedition, who collected it about Twin Lakes, Colorado.

The origin of Colorado cough-root being established, another interesting question is opened as to the identity of this Colorado Osha with the *Osha* from New Mexico, described by Wm. Procter from specimens received from Jacob Krummeck, Santa Fé, N. M. (see American Journal of Pharmacy, 1867, p. 202). From incomplete botanical specimens sent by Krummeck, Elias Durand (*ibid.*, 1868, p. 106) referred the probable origin of this root to *Daucosma*

laciniata, now known as *Discopleura laciniata*, which is very common in Western Texas and New Mexico; immersed in boiling water this root has a very strong smell of carrot. It was chemically examined by Herman Haupt (*ibid.*, 1873, p. 347). To the writer the odor of this root suggests that of lovage, and also in general appearance and in structure it resembles the Colorado root; but the latter, probably, does not grow in New Mexico, at least "Coulter's Rocky Mountain Botany" gives the Wahsatch and Uinta Mountains and Wyoming as the range of distribution of this plant, and does not enumerate the species of Discopleura among the plants growing in the Rocky Mountains. It is not unlikely that the Indian name *Osha* may be used in different localities for different species having similar properties; the New Mexican Osha may, therefore, be derived from one of the Southwestern species of Ligusticum or of Discopleura, and the question cannot be definitely decided until complete botanical specimens of the parent plant can be examined.

While the roots of many species of umbelliferæ are aromatic, carminative and stimulating from volatile oil, it is well known that acrid or narcotic properties pervade in some plants of this order. From time to time cases of poisoning have been reported from eating what has been called *wild parsnip root.* The cultivated parsnip, *Pastinaca sativa*, is widely esteemed as a valuable esculent, and since it has become thoroughly naturalized in many parts of the United States, the question as to its poisonous qualities, when growing wild, is certainly a most important one, but in the writer's opinion has been settled in the negative; see account of "the wild parsnip (*Pastinaca sativa*)" by Prof. F. B. Power in "Contributions from the Department of Pharmacy of the University of Wisconsin," No. 2, p. 43. From the root of this plant Jos. T. Bennett (*ibid.*, p. 39) could not obtain any poisonous principle, nor did the cooked root produce any symptoms of poisoning in a cat.

A case of poisoning by "wild parsnip" occurred in April last in Du Bois, Pa.; three of the children who had eaten it died within three hours, and four recovered. Mr. C. J. C. Boyles sent me some of the fresh roots, which were easily recognized as coming from an umbelliferous plant; but when, after a prolonged absence from home, the specimens reached me, the few leaves were not in condition for determining with certainty the plant, which appeared to be either Sium cicutæfolium, *Gmelin*, or Cicuta maculata, *Linné.* One

of the roots was planted, and is at this date beginning to flower, and from the character of the stem and leaves is easily recognized as the species of Cicuta just mentioned. That this plant, and more particularly the root, is very poisonous is stated by most writers on American plants. Dr. Darlington (*Flora Cestrica*) writes that "the lives of children, and others, are often endangered and sometimes destroyed by eating the root in mistake for that of *Sweet Cicely* (Osmorrhiza longistylis, *D.C.*)," and that "the herbage is also said to be destructive of cattle, when eaten by them." Since the sweet cicely has a distinct anise-like odor, the root of cicuta cannot well be mistaken for it. Dr. W. P. C. Barton (*Compendium Floræ Philadelphicæ*) describes the odor, taste and smell of cicuta as being "remarkably sweetish, aromatic and warm." Dr. R. E. Griffith (*Medical Botany*) says: "The whole plant in a fresh state is poisonous; but by drying, the stem and leaves become innocuous, and are eaten by cattle without danger. The root, however, is the most active portion; it has a strong, aromatic taste and odor, and the cortical portion contains a yellowish viscid juice."

The common names, by which the plant is known in different sections of the country, are *water-hemlock*, *spotted cowbane*, *beaver-poison*, *snake-weed*, *and musquash;* in Mr. Boyles' letter I have for the first time noticed the name of *wild parsnip* applied to it; but it is very likely that many of the cases of poisoning reported by plants of the latter name were really due to the cicuta.

Two years ago (*Botanical Gazette*, 1889, p. 18) a case of death was reported, a farmer in Iowa having mistaken this root for an artichoke. So it seems that the fleshy character and agreeable odor and taste render this root as particularly dangerous by mistaking it for others, which are edible and harmless.

That the fruit of Cicuta maculata contains a volatile alkaloid was shown by Joseph E. Young (see AMER. JOUR. PHAR., 1855, p. 289), and has quite recently again been demonstrated by R. Glenk; but whether it is identical with coniine or with the little-known cicutine of Polex and Wittstein has not been satisfactorily demonstrated. Both investigators did not succeed in isolating from the root a similar alkaloid, to which possibly its virulent properties might be due. It deserves to be mentioned in this connection that in 1868 Van Ankum was likewise unsuccessful in obtaining from the root of the European species, *Cicuta virosa*, either a

volatile alkaloid or a crystalline principle possessing the poisonous properties of this plant; the *cicutoxin* of R. Boehm and Trojanowski (1876, 1877) is soft, amorphous and of acid reaction, and represents, essentially, the alcoholic extract of the ethereal extract of the root.

Dr. C. B. White, U. S. A., has recorded (see AMER. JOUR. PHAR., 1873, p. 371) a case of poisoning by the root of the *water parsnip*, *Sium latifolium*, now known as Sium cicutæfolium, *Gmelin*, which, like the water-hemlock, is indigenous throughout the North American continent. Analyzed by A. R. Porter and by N. Rogers (*ibid.*, 1876, pp. 348 and 483), no poisonous principle could be detected, and the deleterious effects were ascribed as being possibly due to a resin. Whether this root has, to some extent, been eaten in the place of other umbelliferous roots, will be difficult to determine; in a large number of works on descriptive and medical botany, which I have consulted, no allusion could be found to its supposed poisonous properties, except in Carter's Synopsis of the Medical Botany of the United States.

During the last and in the beginning of the present century Cicuta maculata appears to have been employed medicinally, and references to its properties and uses will be found in the writings of Schoepf, Barton, Muhlenberg, Bigelow and others.

Euphorbia marginata, *Pursh*, a well-known garden plant, commonly called "snow on the mountain," is indigenous to the country between the Rocky Mountains and the Mississippi River, and in the Eastern States is beginning to establish itself. Like other species of the same genus, it contains an acrid milk-juice. Applied to the skin, this juice produces a decided burning sensation and ultimately redness and a pimply eruption, somewhat resembling that occasioned by poison-oak, as has been observed by Mr. J. Schneck, of Mount Carmel, Ill. (see *Botanical Gazette*, 1890, p. 276). As far as examined the acrid principle of the euphorbias is an amorphous resin, and exists in the different species in very unequal proportion, the annual plants being usually mildest in their action. It would be of interest to determine the nature of the irritating principle of the plant in question, likewise the amount of fixed oil obtainable from the seeds, and to what extent this may possess purgative and rubefacient properties, which are commonly observed in oils of the euphorbiaceæ.

Eupatorium purpureum, *Linné*, is known in some localities as

gravel-root and *kidney-root* in allusion to the supposed virtues of its subterraneous parts. Some time ago it was sent to me from Harrisburg, Pa, with the statement that it was said by some parties to be a sovereign cure for rheumatism, and that it was used in the form of tincture prepared by steeping the root in whisky for a week. An analysis of this drug was made by Mr. G. Herbert Ray and published by Prof. Trimble (see AMER. JOUR. PHAR., 1890, p. 74), from which it appears that only 13 to 14 per cent. are taken up by simple solvents, and of this amount fully four-fifths consists of carbohydrates and albuminoids, the remainder being resinous, oily and waxy matters, so that it is difficult to imagine to what principle the alleged medical properties could be due. A compound of undoubted interest, though most likely destitute of decided activity, is Prof. Lloyd's *euparin* (*ibid.*, p. 76), which crystallizes in handsome bright yellow needles, and is apt to be deposited from the fluid extract on standing. A bitter principle which is present to a limited amount in this drug, is prevalent to a larger extent in other species; but the aromatic properties, which are frequently encountered among the 560 known species of Eupatorium, are wanting almost entirely.

Hieracium is another extensive genus, of fully 200 species, of the order Compositæ, to which also Eupatorium belongs. The plants of the former genus are generally more or less bitter and astringent, and like others of similar qualities have occasionally been employed as mild astringents and tonics. Of the North American species, H. venosum, *Linné*, enjoyed considerable repute as an alexipharmic, hence the popular name *rattlesnake weed*, by which it is still known. The case related by Dr. Harlan (*Trans. Am. Phil. Soc.*, new ser., vol. iii) of a person who allowed himself to be bitten by a rattlesnake, and was completely revived after taking some decoction of this plant, is still quoted in medical works on indigenous Materia Medica. Another claimant for similar honors has recently been reported by Mr. F. D. Kelsey, of Helena, Montana (*Botan. Gazette*, 1890, p. 237), upon the testimony of a clergyman, Rev. Mr. Clark, who affirms that he has successfully treated several patients and has never yet lost a case. He employs Hieracium Scouleri, *Hooker*, the fresh plant being bruised, then gently steeped in milk, the liquid strained and drank in large quantities until the patient has fully recovered; he also believes that it can be made into a preparation like an extract.

The plant is described by Coulter (Rocky Mountain Botany, p. 217) as follows: Robust, a foot or two high; *hairs long and soft setose, whitish or yellowish;* leaves lanceolate or spatulate-lanceolate, 3 to 6 inches long; *panicle irregular or branching;* involucre somewhat furfuraceous and glandular, also sparsely or copiously beset with long bristly hairs; *akenes columnar* and short; *pappus whitish* —from Montana to Oregon and south to the Wahsatch.

It may not be without interest to refer in this connection to a species introduced from Europe, Hieracium prælatum, *Villars*, which according to Lester F. Ward (*ibid.*, 1889, p. 10–17), has become such a pest in Jefferson county, New York, that it is now known there as *devil-weed* and *king-devil.*

The common name *fever-root*, by which Triosteum perfoliatum, *Linné*, is known in some localities, indicates the use which is said to have been made of it by the Cherokee Indians. It is a mild cathartic and in the fresh state possesses emetic properties. The drug appears to enjoy considerable popular reputation in various complaints, as may be judged from information received by me from different sections of the country. Lately I have learned that near Dallas, Georgia, it is in local repute as a remedy in rheumatic affections, and that it is cultivated there by a farmer and prescribed in rheumatism with seeming success. The plant grows mostly in woodlands, from Canada to Iowa and southward to Alabama. It deserves a thorough chemical investigation. It has been variously known as *Dr. Tinker's weed, wild ipecac, horse-gentian,* and *wild coffee*, the latter name having reference to the use which has formerly been made of the hard nutlets, three of which are contained in the rather dry drupaceous fruit.

Ceanothus americanus, *Linné*, is perhaps best known in the Atlantic States as *New Jersey tea* in reference to the use sometimes made of the leaves as a substitute for tea. Medical works also speak of the use of root by the Cherokees in gonorrhœa, cancer and syphilis. Until recently I had not learned that it was popularly employed for one of these complaints; some time ago I received information from the central part of Texas that it is used there in a crude manner in gonorrhœa with much success and is designated as clap-root. The drug is astringent, and from a recent investigation made by F. C. Gerlach appears also to contain an alkaloid.

Helianthemum canadense, *Michaux*, is the only plant of the

indigenous cistaceæ which was formerly admitted into the Pharmacopœia, and is still employed to some extent, mainly in scrofulous affections. The closely-allied genus Lechea comprises about eight homely North American herbs growing in sandy soil and sterile localities. They are generally known as *pin-weeds*; but under the name of *flux-weed* a plant was received from a southern town, which proved to be Lechea major, *Michaux*, and which was stated to be used for complaints indicated by the common name. It has an astringent and somewhat bitter taste, and according to Dr. Carter (*loc. cit.*, p. 14) is reputed to be tonic, febrifuge and antiperiodic. Its constituents are unknown, except so far as they are indicated by the sensible properties of the plant.

To the indigenous plants reputed to possess alexipharmic properties another may possibly have to be added, which, however, is not likely to prove very efficient for such purposes. The plant came from North Carolina, and was claimed to have been successfully used for some time in cases of snake bites, poisoning from insects, etc. It was Galium pilosum, *Aiton*, an herbaceous perennial, found in rather dry soil from New England westward to Eastern Kansas and southward to near the Gulf. It has a nearly erect rough stem, oval and punctate leaves in whorls of four, small purplish-brown pedicellate flowers, and a subglobular dry fruit beset with hooked bristles. The few species of Galium which have been subjected to chemical examination have shown the presence of a peculiar kind of tannin, some citric and other organic acids, to which is probably due the effect upon milk, this being curdled by some species. They have generally been regarded as being mildly refrigerant, diuretic and aperient, and more striking effects were, most likely, not observed from the plant in question, since the party sending it desired to learn from me all its medicinal properties.

A species of the same genus was recently the cause of a curious, though innocent, mistake. A German physician in a Western State ordered for use in his practice a quantity of leaves of "Hirschzunge" (*hart's-tongue*). Both, the German name and its English equivalent, are applied to a fern which is still officinal in some pharmacopœias of Europe, Scolopendrium vulgare, *Smith*, and which is indigenous throughout a large part of the Northern Hemisphere. While this fern is rare in the United States, and not often found in drug stores, an entirely different indigenous plant is well known by the similar

English name of *deer's-tongue*, Trilisa (Liatris) odoratissima, *Cassini*, now also called *vanilla plant*, on account of its fragrant odor, due to coumarin. This species grows only in the Southern States, and from the experience in the present case, appears to be replaced in some localities, probably for use as a tobacco flavor, by another more common plant, which also contains coumarin; for the article supplied as *Hirschzunge*, was Galium triflorum, *Michaux*, the so-called *sweet-scented bedstraw*, which is indigenous throughout North America. The package having been labelled deer's-tongue leaves, it seems that this name is now, in some localities at least, given to the substitute for that plant for which it was formerly exclusively used. In this connection it may be mentioned that the same species of Galium is collected by German inhabitants as *Waldmeister*, and used in the preparation of "may-wine," in place of, and as a substitute for, the closely allied Asperula odorata, *Linné*, which does not grow in the United States.

Tillandsia usneoides, *Linné*, known in our Southern States as *long*, *black*, or *Spanish moss*, has been found very useful by Dr. L. M. Tiffany, of Baltimore (*Med. News*, Dcbr., 1890), as a soft and elastic dressing for wounds. This so-called moss is botanically related to the pineapple, and is classed with the order of Bromeliaceæ. It is a true epiphyte, and is met with only in humid situations where it hangs in long tufts from the branches of trees. After it has been deprived of the softer portions of the tissue, the nearly black fibres are used for upholstering, and are now recommended as stated. The living plant is of a grayish-green color.

CICUTA MACULATA, *LINNÆ.*

By Robert Glenk, Ph.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

This species is popularly known as water hemlock, musquash root, beaver poison, or spotted cowbane, and grows on the borders of swamps and on the banks of streams, flowering during July and August. After fruiting, the stem dies off to the ground, but a bud survives, and from this the shoots of the following spring appear. The flowers grow in umbels of 2 to 4 inches in diameter, without a general involucre. Calyx consists of 5 minute sepals adhering to the 2-celled and 2-ovuled ovary; the 5 inflected white petals alternate with the 5 stamens and are inserted on the disk which crowns

the ovary and surrounds the base of the 2 diverging styles. The fruit is a sub-globular cremocarp, about $\frac{1}{12}$ in. long, contracted or compressed on the side, each mericarp having 5 strong ribs and 6 single oil tubes, two of which are on the face. The seed is suspended from the top of the cell, and consists of a minute embryo, surrounded by albumen. The stem is smooth, branched at the top, hollow, jointed, usually of a striated purplish green color, except when growing in the shade, when it is green. The leaves are alternate, pinnately compound; the leaflets oblong-lanceolate, coarsely serrate, the veins ending in the notches, and not in the points of the serratures. The petioles are hollow and sheathing at base. The root is composed of from 2 to 7 large, fleshy branches, frequently 3–4 in. long and 1 inch in thickness. In various parts of the root bark are found cavities or cells, containing a yellowish, resinous juice. It has a strong, parsley-like odor and taste.

Microscopical Structure.—The root has a corky layer consisting of about 3 rows of flattened cells. The thick bark consists mostly of parenchyma tissue,with large intercellular spaces and numerous large resin cells. Under the thin cambium zone is the meditullium, with broad medullary rays and without wood fibres, but in the centre with a layer of large ducts. The hollow stem is made up of a cylinder of wood, enclosed by a thin cortical layer. The wood wedges are slender, of the same size as the medullary rays, and surround a few circles of parenchyma of a white color, the remnants of the pith. The hollow petiole has a structure analogous to that of the stem. The epidermis of the upper side of the leaflets consist of one row of cells; the palisade layer is in one or more rows of vertically elongated cells; the parenchyma, between this layer and the lower surface, encloses irregular air spaces. On the lower surface are numerous scattered stomata. The leaves are free from hairs on the surface. The tissue of the albumen of the seed is composed of parenchyma, containing colorless drops of fixed oil, also transparent colorless spherical grains, several of which are enclosed in each cell. Under a high magnifying power they show a series of concentric layers; they are colored brown by iodine. The vittæ are filled with a yellowish-brown essential oil, and extend the whole length of the fruit.

Chemical Investigation of the Fruit.—The fruit was gathered during August, September and October, before the dark green color

had been lost, it giving then a stronger odor with solution of potassa, than in the fully ripened condition.

Following out a plan of analysis, similar to Dragendorff's, the following proximate constituents were noted:

The fruit, owing to its oily nature, was first macerated in the bruised condition with petroleum spirit, of a boiling point 40° C., for 3 days; this first extract was then poured off and reserved. The residue was finely powdered and again extracted with petroleum ether until nothing further was dissolved out. On evaporation a residue was left, equal to 21·2 per cent. of the fruit, of which 5·1 per cent. is volatile oil. The fatty oil is semi-solid at ordinary temperatures, and of a green color, owing to the presence of a little dissolved chlorophyll. It belongs to the class of non-drying oils, and forms, with HNO_2, a soft, brownish solid. On decolorizing its solution in ether by animal charcoal, a light, yellowish oil is produced, having the sp. grav. 0·946; with H_2SO_4 conc. (1 acid, 5 oil), colored dark brown; soluble in all proportions in absolute alcohol, ether, chloroform, bisulphide of carbon, and in 100 parts of acetic ether; insoluble in glacial acetic acid.

The volatile oil obtained by distilling the bruised fruit with water was first of a dark color, but on re-distillation was obtained nearly colorless; yield 4·8 per cent.; sp. grav. ·855; boiling point 177° C. (350° F.); soluble in 1½ parts of commercial alcohol, in all proportions of absolute alcohol and in 50 parts of glacial acetic acid. The following color reactions were observed: a solution of bromine in chloroform (1-20) gives a brownish color; a strong alcoholic solution of HCl colors a reddish violet; H_2SO_4 conc. (6 drops to 1 of oil) immediately dark brown; fuming HNO_3 on a solution of the oil in bisulphide of carbon gives a brownish tint; solid iodine added to the oil dissolves slowly; picric acid on warming dissolves with an orange color.

The *ether extract* weighed 2·12 per cent. of which ·98 per cent. was resin soluble in alcohol. This, on incineration, left ·5 per cent. of ash; it gives with H_2SO_4 a brown color, with conc. HNO_3 a light brown solution; with 5 per cent. KOH a yellow solution and this with potassium permanganate becomes an emerald green, purplish, then reddish brown.

The *absolute alcohol extract* weighed 2 per cent. of which ·68 per cent. was resin and 1·32 per cent. soluble in water. The watery

solution gave with ferric chloride a brownish green color, with lead acetate no precipitate; with KOH a decided coniine-like odor; and after acidulation with HCl, a precipitate with potassio-mercuric iodide. After the preparation of the volatile oil from the drug, the residue in the retort was mixed with milk of lime and distilled. The distillate had a strong coniine-like odor. On agitation with petroleum ether and evaporating the solvent, a syrupy strong smelling liquid was left, which turned darker on standing in a beaker for 24 hours. The alkaloid forms heavy white fumes on bringing a rod moistened with HCl in contact with the vapor. On the addition of conc. H_2SO_4 a reddish color is produced.

The aqueous solution reduces mercuric chloride and silver nitrate. Neutral acetate of lead produces a white precipitate; ammoniacal copper sulphate bluish white; platinic chloride yellowish red; potassio-mercuric iodide grayish white; gold chloride yellowish white; tannin or picric acid give no precipitates with the aqueous solution, and ferric chloride is merely darkened in color. Whether this alkaloid is identical with coniine could not be fully determined, owing to scarcity of material. It does not seem to be present in the root.

The results on treating the fruit with other solvents, are given in the tabular statement below.

On drying at 110° C. the loss of the fruit was 10 per cent.; the ash amounting to 6 per cent. contained:

	Per Cent.
CaO,	14·9
Al_2O_3,	20·0
MgO,	29·3
H_2SO_4,	15·2
Cl,	14·5

Smaller quantities of K,Na, SiO_2, Fe_2O_3 and CO_2; phosphoric acid could not be detected.

RECAPITULATION.

		Per Cent.
Moisture,		10·00
Ash,		6·00
Petroleum Ether Extract:	Volatile oil,	5·10
	Fixed oil and chlorophyll,	16·10
Ether Extract:	Resin sol. in alcohol,	·98
	Resin sol. in ether, chlorophyll,	1·14
Absolute Alcohol Extract:	Resin,	·68
	Extractive, etc., sol. in water, alkaloid,	1·32

RECAPITULATION.—(*Continued.*)

		Per Cent.
Aqueous Extract:	Mucilage etc.,	12·90
	Glucose,	6·00
	Malic acid, etc.,	2·70
	Ash,	4·00
Dilute Soda: Pectin and albuminoids,		3·20
1 per cent. Hydrochloric acid: Inorganic matter,		2·00
Chlorine water: Lignin, etc.,		6·00
$KClO_3$ and HNO_3: Incrusting matter,		4·00
Residue: Cellulose, etc.,		17·00
Loss,		·88
		100·00

CEANOTHUS.

By Frank C. Gerlach, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 89.

The root bark of *Ceanothus americanus*, Linné, Natural Order Rhamnaceæ.

This is a shrubby plant indigenous to the greater part of North America, growing in pine barrens and dry woodlands. It attains a height of about three feet and has alternate, ovate or oblong-ovate, serrate leaves, which are sometimes heart-shaped at the base, downy underneath and three-veined. The small white flowers are in axillary panicles, and produce three-lobed capsules containing three seeds. The root is a foot or more in length, nearly cylindrical and from one-half to one inch in thickness, with a knotty head and a few branches, and covered with a firmly adhering rust-colored bark, which is about one-twelfth inch thick, with some longitudinal ridges. This bark is hard, breaks with a short granular fracture, and when cut with a knife has a brown-red and waxy appearance. The wood is very tough, of a light red-brown color and of a waxy lustre upon the recently cut surface. The root-branches have a light colored bark and a whitish wood. The root is without odor, and has a bitter astringent taste, which is strongest in the bark. The leaves of this plant were used during the Revolutionary War as a substitute for tea, and in the late Civil War it was employed in the same manner and pronounced a good substitute for indifferent tea.

The root is astringent and was applied locally by the Cherokee

Indians in gonorrhœa and cancer, and given internally in syphilis. A decoction of the leaves and seeds has been used in ulceration of the mouth and throat, and internally in dysentery. All of these properties are due, no doubt, to the tannin.

The following are the results of a proximate analysis. The moisture by drying to constant weight at 110° C. was found to be 10·08 per cent., and the ash obtained by careful ignition amounted to 8·44 per cent., no unusual constituents were found in the latter.

Soluble in water,	9·48 per cent.
Soluble in hydrochloric acid,	53·32 "
Insoluble,	37·20 "
	100·00 "

Petroleum ether extracted from the finely-powdered drug, 0·20 per cent. The extract was of a dark green color, of a slightly aromatic odor and consisted of fixed oil, which was semi-solid at ordinary temperatures, vegetable wax and a trace of volatile oil.

The residual drug yielded 1·01 per cent. to stronger ether, consisting entirely of resin.

Absolute alcohol extracted from the remaining drug, 6·02 per cent., consisting of tannin, which was determined in another portion, of gallic acid 0·20 per cent., glucose 1·80 per cent., red coloring matter 1·00 per cent., for which the name *ceanothus red* is suggested. The total alcoholic extract was dissolved in a small quantity of alcohol, poured into acidulated water, filtered and the filtrate agitated successively with petroleum ether, ether and chloroform, none of which extracted anything. The liquid after removal of all chloroform was rendered alkaline and again agitated with the above solvents; of these stronger ether extracted 0·2 to 0·3 per cent. of a substance which gave characteristic tests with several alkaloidal reagents. This substance will be considered later.

Water extracted from the remaining drug 7·52 per cent., consisting of mucilage 5·00 per cent., glucose 1·95 per cent., saccharose 0·35 per cent. and tannin 0·21 per cent.

After treatment with water, 4·00 per cent. were extracted by dilute sodium hydrate solution, which consisted almost entirely of albuminoids.

Dilute hydrochloric acid, extracted 2·40 per cent., consisting of calcium oxalate, 0·52 per cent., and 1·87 per cent. of starch, obtained by a special estimation.

Chlorine water extracted 20·30 per cent. of lignin; potassium chlorate and nitric acid extracted 5·96 per cent. of intercellular matter, and there remained 29·88 per cent. of cellulose.

SPECIAL ESTIMATION OF TANNIN.

Ten grams of the drug were exhausted with hot water, and the resulting infusion precipitated with gelatin and alum. The precipitate was washed, dried, weighed, and 54 per cent. calculated as tannin, which indicated it to be present in the drug to the extent of 6·48 per cent. This tannin belonged to that class which precipitates iron salts green.

SPECIAL EXTRACTION OF ALKALOID.

After trying several processes, seven kilos of the drug were exhausted with water acidulated with acetic acid. One-half of the percolate was evaporated to small bulk, rendered alkaline, and agitated with a mixture composed of six parts of ether and one part of chloroform. This mixture was found to most readily extract the alkaloid. On evaporating the ether-chloroform 0·37 per cent. of residue was obtained in white masses.

In the other portion of the percolate the agitation was made without evaporation, and the yield of alkaloid was 0·52 per cent. For this alkaloid the name *Ceanothine* is suggested. It was readily soluble in chloroform, separating, on evaporation, in granular crystals, fusing at about 190° C. It was less soluble in ether, alcohol and carbon disulphide. The taste was a distinct bitter. Ceanothine resembles caffeine, in not forming salts, as in an acidulated solution, evaporated in a vacuum over sulphuric acid, the acid separated from the alkaloid leaving the latter in transparent scales, and, after long contact, turning red. It also differed from caffeine in being precipitated by Mayer's reagent. This alkaloid, when heated with soda-lime, readily liberated ammonia. When heated on platinum foil it burned without residue. It reduced metallic gold from solution of gold chloride, and gave characteristic white precipitates with Mayer's reagent, platinic chloride, phosphomolybdic acid and tannin, also red precipitates with potassium tri-iodide, cadmium iodide and bismuth iodide. When applied to the dry substance, concentrated sulphuric acid gave a reddish-brown color, nitric acid a yellow, and Fröhde's reagent a blue.

SABBATIA ANGULARIS.

By William T. Hankey, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 90.

The American Centaury is a smooth biennial herb, indigenous to the Middle and Southern United States. Its stem is about two feet high, quadrangular, winged and much branched above; the leaves are about one inch long, oblong-ovate, five-nerved, entire, acute and at the base clasping. The flowers are in terminal corymbose panicles, having a five or six-parted calyx with lance-linear lobes, a wheel-shaped, pale or purplish-red corolla about one and one-half inches in diameter. The stamens number from five to twelve and are finally recurved. The capsule is oblong ovate, mucronate and many seeded. The plant blooms in July and should then be collected. In the dry state the drug is without odor, but has a persistent and purely bitter taste. It is employed mainly in domestic practice as a simple tonic.

An analysis of Sabbatia angularis was made in 1871 by J. F. Huneker, who announced the presence of a neutral principle—Erythrocentaurin—but did not succeed in isolating the bitter principle.

With this in view I first submitted fifty grams of the finely powdered drug to proximate analysis with the following results:

Solvents used.	Substances obtained.	Per Cent.	
Petroleum ether,	Volatile oil,	·01	
	Fat,	·91	
	Wax,	·70	
	Caoutchouc,	·37	
			1·99
Stronger ether,	Greenish Resin,	·72	
	Erythrocentaurin,	·05	
	Undetermined,	·12	
			·89
Absolute alcohol,	Bitter principle,	3·75	
	Greenish resin,	·62	
	Glucose,	·43	
	Extractive,	1·57	6·37
Distilled water,	Mucilage,	2·16	
	Dextrin,	1·13	
	Glucose,	1·25	
	Saccharose,	·88	
	Undetermined,	5·56	
			10·98

Solvents used.	Substances obtained.		Per Cent.
Dilute soda solution,	Pectin and albuminoids,		6·06
Dilute hydrochloric acid,	Pararabin,	1·20	
	Extractive,	2·98	
			4·18
Chlorine water,			7·40
Nitric acid and potassium chlorate,			13·90
	Cellulose,		36·50
	Ash, soluble in water,	1·17	
	Soluble in HCl,	1·30	
	Insoluble,	·38	
			2·85
	Moisture,		8·05
	Loss,		·83
Total,			100·00

With a view of confirming the previous analysis and trying to isolate the bitter principle, two hundred grams of the powdered drug were percolated with five hundred cubic centimeters of petroleum ether, to remove fat, wax, etc. The drug was then dried and percolated with eight hundred cubic centimeters of stronger ether, again dried and percolated with 95 per cent. alcohol until exhausted of bitter principle.

Ethereal Percolate.—After recovering ether the residue was dissolved in a small quantity of absolute alcohol, and poured into water containing one per cent. of hydrochloric acid, the greenish resin so precipitated removed by filtration and the filtrate agitated with chloroform, which apparently exhausted it. The chloroform was separated and allowed to evaporate spontaneously, leaving a quantity of resinous matter; this was washed with stronger ether, which, on spontaneous evaporation, left a minute quantity of a substance, crystalline in character, reddish-yellow in color, of a sharp acid taste, and having a strong and pungent odor, resembling that of nicotine. It was soluble in water, alcohol and ether, and gave negative results towards alkaloidal reagents. A small quantity dissolved in water acidulated with hydrochloric acid and placed in a water-bath at 60° C. for one hour, and then made alkaline with sodium hydrate failed to reduce Fehling's solution, indicating its non-glucosidal character. It undoubtedly was the principle isolated by Huneker in 1871, and called by him erythrocentaurin.

Alcoholic Percolate.—After recovering the solvent from this percolate, a considerable amount of a soft and very bitter extract was

obtained, which resembled in color, odor, taste and behavior with ferric chloride, the extract obtained from Gentiana lutea. This was washed with water, which took out the bitter principle, leaving a soft oily resin. The aqueous portion of the alcoholic extract containing the bitter principle was characterized by its property of foaming, which was probably due to the presence of a small quantity of saponin. The solution behaved similarly to gentian towards ferric chloride. This coloration was not due to tannin, as no precipitate could be obtained with solution of gelatin and alum, and the coloration was also produced by the portion soluble in chloroform. It was agitated successively with chloroform, ether, benzol and amyl alcohol without anything being extracted by them that possessed a bitter taste. The solution was then rendered alkaline and again agitated with the above solvents with similar negative result.

Tannic acid failed to precipitate anything from a small portion. The above treatment left the bitter solution of a transparent ruby-red color. It was divided into two equal portions. One portion treated with animal charcoal, the latter removed and boiled with 95 per cent. alcohol, the alcohol filtered off and allowed to evaporate spontaneously, left a bitter amorphous, transparent extract of a reddish-yellow color, quite hygroscopic and very soluble in water, soluble in 95 per cent. alcohol and partly soluble in absolute alcohol. Several attempts were made to get it in a crystalline condition, but without success. The other portion of the bitter solution was evaporated on a water-bath to a soft extract, then dissolved in alcohol, filtered and the alcohol allowed to evaporate, leaving an extract similar to that obtained by the use of animal charcoal. All attempts to obtain this bitter substance in a crystalline condition failed. When heated with Fehling's solution it exerted a slight reducing action, but after heating with one per cent. hydrochloric acid for an hour, making alkaline and then heating with Fehling's solution, it reduced the latter abundantly. This, along with the peculiar odor produced by heating it with dilute acid, demonstrated it to be a glucoside, which, on account of the ease with which it decomposed, could not be obtained in a crystalline state. As obtained, however, from absolute alcohol, it was, no doubt, nearly pure, contaminated only with the products of its own decomposition. In addition to the properties mentioned in the description of its preparation,

it may be stated that it was changed to a ruby-red color by sulphuric acid and to a dark green by ferric chloride. Its aqueous solution, which was of a citrine yellow color, assumed a much deeper color on the addition of sodium hydrate.

CHEMICAL NOTES.

By Henry C. C. Maisch, Ph.G., Ph.D.

Aconitum and Aconitine.—E. Richards and Ashley Roger (*Chem. and Druggist*, 1891, **38**, p. 205, 242) in examinations of Aconitum, arrived at the following conclusions: (I) The best material for the preparation of aconitine is the tubers of Aconitum Napellus. (II) The alkaloid is found in the cambium, the vascular bundles and sieve ducts. (III) The crystals of aconitine represent hexagonal thin plates with acute ends. (IV) It is probable that two varieties, α and β, of aconitine exist. Melting point of α-aconitine = 182–184° C., β-aconitine 178–180° C.; the latter is also about six times as poisonous as the former. (V) Formula for aconitine is $C_{33}H_{43}N_2O_{12}$. (VI) Percentage of alkaloid in fresh tuber 0·71 per cent., dry 0·14 per cent., Japanese aconite dry 0·57 per cent.

The method for the preparation of aconitine, recommended by the above authors, is as follows: (*a*) The powdered tuber is macerated from three to four days, with washed fusel oil, then percolated and the alkaloid extracted from the percolate with small quantities of dilute sulphuric acid. (*b*) The fusel oil is removed from this solution by treatment with ether and the dissolved ether driven off by heat. (*c*) The alkaloid is precipitated from the acid solution by solution of sodium carbonate, collected on a strainer pressed between limestones and then spread on bibulous paper and allowed to dry at ordinary temperature. (*d*) The dried alkaloid is then boiled with pure dry ether and the filtrate set aside to crystallize; the crystals are then redissolved in a small quantity of ether to remove a gum-like body. (*e*) The toxic properties of aconitine as thus obtained is rather great, but can be improved by conversion into the nitrate, and then from this obtaining the alkaloid.

New Alkaloids from Cevadilla seeds.—E. Merck (*Berichte*, Jan., 1891, through *Chem. Ztg., Rep.*, 1891, p. 48) has isolated two new alkaloids from cevadilla, which he has named sabadine and sabadinine, and for which the following is characteristic. They remain dissolved when isolated by alkalis, carbonates and ammonia, but

are precipitated on boiling the solution. *Sabadine* crystallizes from ether in short needles, and in the crystalline state is difficultly soluble in water and ether. The fusing point is 238–240° C., where decomposition takes place. On complete evaporation of the etheral solution the last portions remain as an amorphous mass, which gradually crystallizes. Concentrated sulphuric acid dissolves the alkaloid with a yellow color and a green fluorescence; this disappears as the liquid assumes a blood-red and then violet color. Sabadine is not sternutatory, and has the formula $C_{29}H_{51}NO_8$. *Sabadinine* crystallizes from ether in filiform needles, somewhat soluble in water and rather soluble in alcohol. At a higher temperature, decomposition takes place. Concentrated sulphuric acid dissolves the alkaloid with an unchangeable blood-red color. Sabadinine is not sternutatory, and possesses the formula $C_{27}H_{43}NO_8$ or $C_{27}H_{45}NO_8$.

A new Alkaloid from Conium maculatum.—E. Merck (l. c., through Chem. Centrbl., 91, I, 414) obtained a small quantity of a new alkaloid from the high boiling portion of crude coniine. The isolation was accomplished by fractional distillation in vacuo and recrystallization. The alkaloid crystallizes in needles, is easily soluble in alcohol, ether and chloroform, fuses at about 98° C., and boils at 230–232° C. According to Ladenburg, the alkaloid is an isomere of conhydrine, having the formula $C_8H_{17}NO$, and for this reason the name *pseudo-conhydrine* was selected.

Muawine.—E. Merck (l. c.) isolated this alkaloid from the bark of the Muawi tree (not determined). The bark possesses toxic properties similar to those of sassy bark (Erythrophlœum guineense), only acting stronger and quicker. The alkaloid is thick, syrupy, easily soluble in alcohol, ether and chloroform, and resembles erythrophlœine. The salts do not crystallize, the bromhydrate forming a white powder easily soluble in water, alcohol and chloroform. According to Kobert the physiological action is similar to, but not identical with, that of erythrophlœine.

Reactions of Cocaine and Ecgonine.—D. Vitali (*L'Orosi*, **14**, 1–19) proposes the following test for cocaine. A trace of cocoaine is placed in a porcelain capsule, ½–1 cc. of sulphuric acid added, and solution of the alkaloid effected. To this is added iodate of potassium, or sodium, or iodic acid in quantity equal to three times that of cocaine. If this mixture is slightly heated on a water-bath,

light green stripes appear; by continuing the heating the liquid becomes grass-green and then dark blue. On increasing the heat the liquid assumes a violet color, and violet vapors are given off. The reaction is said to be very delicate, as still 0·00005 gm. can be recognized. Other alkaloids show similar reactions with this reagent, which differ, however, in some respects from that shown by cocaine. Ecgonine does not show this reaction, which seems to be due to the benzoyl group, as benzoic acid is thus affected with the same intensity as cocaine. The difference between the alkaloids is shown by the following: Cocaine is dissolved in 2 cc. concentrated sulphuric acid, and to this added drop by drop an acid (H_2SO_4) solution of potassium permanganate, when a violet color appears, the solution on stirring becoming colorless Ecgonine treated in like manner gives with the first drop a yellow color, and when more is added a violet color, which is more stable than that obtained with cocaine. Iodopotassium iodide gives with cocaine round black globules, while with ecgonine it causes a yellowish-red precipitate gradually crystallizing. This investigation was carried on with the ultimate intention of finding how cocaine behaves in the body. From the reactions with urine of a person who had taken cocaine inwardly it seems as if cocaine is fully decomposed in the human body, at least the urine did not even give the reactions for ecgonine.

On the principal Constituent of the Oil of Mentha Pulegium, Linné.—M. Pleissner (Annalen **262**, 1–37) obtained by distilling in vacuum an oil of boiling point 130–131° C. at 60 mm. pressure. It is colorless, specific gravity 0·9323 at 20° C.; $[\alpha]_D = + 22·89°$. The compound has the formula $C_{10}H_{16}O$ is isomeric with camphor, but differs in being a ketone, wherefore it was named *pulegone*. Among the bodies derived from this we have the monoxime, differing from camphoroxime in containing H_2O, which remains constant in all derivatives. By reducing the oxime the pulegonamine was obtained. Sodium in ether converts pulegone into left menthol, which was identified by the benzoate.

Volatile oil of Asafœtida.—F. W. Semmler (*Ber. d. D. Chem. Ges.*, 1891, 78) found in the above (1), two terpenes; (2) an oxygenated body $(C_{10}H_{16}O)_n$ yielding a sesquiterpene $C_{15}H_{24}$, on treatment with sodium; (3) the disulphides $C_7H_{14}S_2$, and (4) $C_{11}H_{20}S_2$. With zinc

dust these yield the respective monosulphides. Allyl sulphide is not present in the oil of asafœtida.

Olefinic Constituents of Ethereal Oils.—F. W. Semmler (*Ber. d. D. Chem. Ges.*, 1891, 201), describes the following: (1) *Geranial* (Geramium aldehyde) $C_{10}H_{16}O$ is a light yellow fluid, which is obtained colorless by distillation in vacuo, and possesses an odor of lemon and orange. It boils at 224–228° C. at 760 mm. and 110–112° C. at 12 mm. pressure; its specific gravity is 0·8992, and it has no action on polarized light. (2) *Oil of orange peel* contains geranial, and a lower boiling aldehyde. (3) *Citral*, a body isolated by Schimmel & Co., from oil of lemon, lemon grass and citronella is identical with geranial. (4) Geranial boiled with double the amount of bisulphate of potassium yields cymol. (5) *Oil of Coriander* distilled in vacuo yielded terpenes and coriandrol $C_{10}H_{18}O$, boiling at 194–198° C. at 760 mm. with partial decomposition, and at 85–90° C. at 20 mm. pressure. It is dextrorotary, and takes up four bromine atoms. (6) *Linaloe-oil* (Licaria guianensis, *Aublet*, Lauraceæ) contains linalool $C_{10}H_{18}O$, having the specific gravity 0·8702 at 20° C., and is lævogyre. (7) Oil of melissa (German) contains an aldehyde, probably identical with citronellol of Dodge (A. J. P., 1890, 13, 355). (8) As olefinic camphors the author regards bodies having the formulas $C_{10}H_{20}O$, $C_{10}H_{18}O$ and $C_{10}H_{16}O$, which are not benzol derivatives. These bodies as far as known are liquid, have a lower specific gravity and a higher refractive power than the aromatic camphors. They are either alcohols, aldehydes or ketones.

Ol. Ricini—According to H. Meyer (*Arch. f. exper. Pathol.*, 28, 145), the purging action of castor oil is due to ricinolic acid and its glyceride. Besides these two bodies the ricinelaidic acid was also experimented with. All three produced purging with cats.

PHARMACEUTICAL USES OF EXTRACT OF MALT.

By Jean Gordon, Ph. G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

Although the use of extract of malt as an emulsifying agent and as a vehicle for various remedies is frequently mentioned in journals and pharmaceutical works, and manufacturing chemists have put upon the market a very large number of mixtures or emulsions of malt extract with cod liver oil, some of them so prepared as to be quite agreeable to the taste; yet I am not aware

that the dispensing pharmacist has availed himself to any extent of its advantages in preparing mixtures when insoluble substances are to be suspended. I was first led to experiment with it on being asked by a physician to prepare an emulsion of *naphthalin* and to make it as pleasant as possible. The slight solubility of naphthalin in water renders most of its mixtures very unpleasant, and after trying many experiments it occurred to me that extract of malt might be used, it not seeming to possess sufficient medicinal activity to cause its use to be objectionable in the very small proportion necessary to form a good mixture. After rubbing the naphthalin in a mortar to a very fine powder, a definite quantity of malt extract is then added gradually and triturated until a perfectly smooth mixture is obtained. The substance is now suspended, but the mixture is too thick to pour well from a bottle; it is then diluted by the addition of an equal volume of syrup of wild cherry, which not only renders the mixture fluid enough to pour out easily, but also imparts to it an agreeable flavor. The higher specific gravity of the malt extract causes the particles of the naphthalin to remain suspended, and its viscidity, even when diluted one-half, is sufficient to prevent it from floating on the top until after standing for some time, when slight agitation will restore a uniform mixture. In an emulsion of naphthalin with mucilage of acacia a very large proportion of acacia must be used, and after standing for a few hours the naphthalin will be seen at the bottom of the bottle, and it is only after the most vigorous shaking that a smooth mixture can be restored if at all—it being very difficult to dislodge the sediment. Compressed tablets of naphthalin are prepared, but on account of its bulkiness, and the large dose sometimes used, it is not a substance exactly suited to that form of administration, if by any means a preparation can be obtained that will to some degree mask the strong odor and taste.

In extract of malt it seems to be less soluble than in syrup, or mucilage of acacia; the mixture just described having scarcely any of the odor and even less of the taste of naphthalin unless held on the tongue until it has been partly dissolved by the fluids of the mouth. It was not the purpose of the physician to administer a medicinal dose of malt, hence only a sufficient quantity was used to make a satisfactory preparation—five grains of finely powdered naphthalin being contained in one fluid drachm.

Some of the resinous substances most frequently administered in form of emulsion yield with extract of malt mixtures equal in all cases to the acacia emulsions, and, in most instances, more agreeable to the taste, and of more attractive appearance. The unsightly appearance of both the tincture and resin of guaiac when made into an emulsion with acacia is well known to every pharmacist, and as it is a remedy which is frequently prescribed, it would seem to be worth making an effort to improve upon the old emulsion. With the *Tincture of Guaiac* a good mixture can be made by stirring together, in a graduate, equal measures of extract of malt and afterwards tincture of guaiac, gradually added; care must be taken not to allow the tincture to come in direct contact with the sides of the graduate and it is well to take the precaution to first wet the sides with the extract and the syrup before the addition of the tincture. The mixture obtained in this way, while not as bright in appearance as either the malt extract or the syrup, does not assume the bluish color of the gum emulsion. After standing for a day it separates into two layers, the lower transparent and bright, the upper one having a slightly curdled appearance, but a slight shake of the bottle suffices to cause the layers to mix again. That the guaiac is contained in both layers I have determined by setting aside a portion in a narrow tube until the two layers had formed and examining them both; the lower one becomes opaque by the addition of water, but glass tubes or graduates containing it can be made perfectly clear and bright by simply rinsing with cold water, thus showing that the resin has been taken up or emulsionized by the extract of malt.

With the *Resin of Guaiac* the method must be slightly different, it should be first rubbed thoroughly in a mortar with the extract of malt until a smooth paste is obtained, after which sufficient of the syrup of wild cherry is added to make the mixture fluid enough.

With *Tincture of Asafetida* a mixture is obtained in the same manner as with tincture of guaiac, but to prepare a mixture from the gum resin, it is best to rub it first in a mortar with a small quantity of hot water to form a paste, then add the malt and syrup alternately in small portions; it can easily be made to contain 8 per cent. —double the strength of the U. S. P. Mistura Asafœtidæ. An advantage of this over the official mixture is, that it does not have the exceedingly disagreeable smell of the latter and the taste is less

unpleasant. Like the mixtures mentioned before the addition of water renders it opaque.

For the administration of the tincture and fluid extract of *Cannabis Indica*, malt extract answers very well; with these preparations the best result is obtained with the following proportions:

Tincturæ Cannabis Indicæ,	℥ss
Extracti Malti,	ʒj
Syrupi Pruni Virginianæ,	℥ss

With *Copaiva* it is necessary to proceed much the same as in making an ordinary emulsion, starting with a small portion of the extract of malt in a mortar and adding with trituration alternately portions of copaiva, malt and syrup. The mixture retains about the color of the malt, forms two layers on standing, but is easily restored by agitation.

With other resinous tinctures and fluid extracts the results have been similar to those described, the ones selected for mention being those we are called upon most frequently to dispense—and are also typical resinous substances. Extract of malt as prepared by the official process, or as found in the market prepared by the various manufacturers, is in itself too thick to dispense as a vehicle, hence it is necessary to use a diluent of some kind. I have selected the syrup of wild cherry for the purpose, because of its agreeable taste and slight odor of hydrocyanic acid. With extract of malt made according to the direction of the Pharmacopœia, results were obtained identical with those from the commercial extracts; about the only difference noticed was in the color of the mixtures, some of the commercial extracts being of a darker color.

In summing up the result of my work in this direction it may be said that in extract of malt we have a ready, inexpensive and equally good substitute for Acacia in suspending and masking the taste of disagreeable, resinous and other insoluble substances, wherever its presence in small quantity is not found to interfere with the therapeutic action of the substance prescribed.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Elixir of Liquorice.—300·0 extract of liquorice are dissolved in 900·0 fennel water, and 50·0 water of ammonia added; the mixture in a well-stopped bottle is agitated frequently during several days

and then a solution of 10·0 oil of anise in 240·0 alcohol added. After standing the clear portion is decanted, the turbid residue filtered.—Dietel, *Pharm. Ztg.*, 1891, 322.

Ethylene Bromide, which has so frequently been substituted for ethyl bromide, is being recommended and introduced by Dr. Donath (*Wiener Med. Bl.*, 1891, 279) as a remedy for epilepsy; it is given in doses of 0·1 to 0·3 gram three times a day. The forms in which it should be administered, owing to insolubility in water, are emulsions; or alcoholic solution largely diluted with milk before taking; or in gelatin capsules with oil of sweet almonds. The remedy, in physical properties, odor and taste, resembles chloroform; sp. gr. 2·163 at 21° C.; boiling point 131° C.; it contains 90 per cent. bromine and is insoluble in water, but soluble in alcohol and fixed oils.—*Pharm. Ztg.*, 1891, 322.

Salicyl-bromanilide is a combination introduced by Radlauer which is said to contain bromacetanilide and salicylanilide and to unite the desirable properties of acetanilide, bromine and salicylic acid. It is a white powder with an unpleasant, somewhat acidulous taste, sparingly soluble in cold water, easily soluble in boiling water, alcohol and ether; the dose varies from 0·2–0·6 gm.; it is used as an antinervine and reliable antipyretic. Salbromanilide is a term that has been given to this compound for the sake of *brevity*.—*Pharm. Ztg.*, 1891, 323.

Iodophenine, a new iodine derivative of phenacetine, is obtained by adding solution of iodine in potassium iodide to a hydrochloric acid solution of phenacetine. It is made upon a large scale by dissolving 600 gm. phenacetine in 5 kgm. glacial acetic acid, adding a solution of 900 gm. hydrochloric acid in 3 kgm. water and, lastly, a solution of 680 gm. iodine in 1,360 gm. potassium iodide and 1,360 gm. water; if the phenacetine solution be used warm, upon cooling the new compound separates in crystals closely resembling potassium permanganate. Iodophenine possesses a faint iodine-like odor, has a burning taste and colors the skin yellow; it is soluble in glacial acetic acid and in alcohol; insoluble or nearly so in water, in benzol, chloroform and 50 per cent. acetic acid. The iodine is very easily liberated, heating alone or boiling with water accomplishing this; it contains 51 per cent. iodine and has given encouraging results as an antiseptic and a febrifuge.—Dr. L. Scholvien, *Pharm. Centralhalle*, 1891, 311.

Test papers.—E. Dieterich made a series of test papers by impregnating filtering paper with solutions (1 : 250) of the following salts: *Potassium ferrocyanide*, this will indicate one part ferric chloride in 25,000 parts of water and one part copper sulphate in 2,000 parts of water; *Potassium ferri-cyanide* which will indicate one part of ferrous sulphate in 40,000 parts of water; *Potassium sulphocyanate* will react with ferric chloride 1 : 5,000; *Potassium iodide* will indicate lead acetate 1 : 500, bismuth nitrate 1 : 7,000 and silver nitrate 1 : 1,000; *Potassium chromate* will serve to detect lead acetate 1 : 2,000 and silver nitrate 1 : 3,000; *Zinc sulphide* (made by coating filtering paper with freshly precipitated and thoroughly washed zinc sulphide suspended in water), this will react with solutions containing copper sulphate 1 : 15,000, lead acetate 1 : 15,000, bismuth nitrate 1 : 7,000, silver nitrate 1 : 8,000 and mercuric chloride 1 : 1,200. *Starch paper* can be made to indicate one part iodine in 25,000 parts water; *potassium iodide paper* one part chlorine in 30,000 parts water; *litmus paper* was found to be more delicate and reliable than *lacmoid paper.*—*Pharm. Centralhalle*, 1891, 314.

Purification of chemicals by great cold.—Prof. Pictet who about a year ago moved his laboratory from Geneva to Berlin, has since been engaged in experiments having for their object the elimination of impurities from chemicals by the aid of low temperatures. The first source of cold is a mixture of liquefied carbonic and sulphurous oxides (obtained by heating strong sulphuric acid with carbon); this, if under a pressure of 4–12 atmospheres, will produce sufficient cold on evaporation to liquefy nitrogen monoxide; the latter under a pressure of 200–400 atmospheres will liquefy air, hydrogen, oxygen and nitrogen. The experiments made upon the purification of chloroform are very interesting: The purest chloroform of commerce subjected to a cold of —70° C. deposits a crystalline body, which is removed and the liquid portion subjected to a temperature below —100° C., when the chloroform separates in crystals and is freed from a liquid portion. The chloroform purified by this treatment does not impart any color to sulphuric acid although they may be in contact for a long time; chromic acid mixture (bichromate of potassium solution and concentrated sulphuric acid) is reduced by the best commercial samples, while the chloroform purified by cold is unaffected; exposure to light for a long time without the addition of alcohol does not appear to induce decomposition. It has been suggested

that a pure glycerin might be made in the same manner.—Dr. H. Thoms, *Pharm. Centralhalle*, 1891, 275.

Sterilization of cat-gut.—In a test tube are put 8–10 drops of oil of juniper berries, which are then absorbed by introducing a little absorbent cotton; upon the cotton is placed the cat-gut in spiral-form, and the test tube closed as tightly as possible with a plug of absorbent cotton; by placing the test tube (in a horizontal position) in a sterilizing-oven for half an hour, at 150° C., the cat-gut is effectively sterilized without loss of flexibility or firmness.—Koch, Stuttgart, *Pharm. Ztg.*, 1891, 360.

Tincture of ferric formate.—(1) 150 gm. ferric chloride solution are diluted with 600 gm. distilled water; 100 gm. water of ammonia are diluted with 600 gm. distilled water. These solutions, chilled by surrounding ice, are allowed to run in thin streams into a vessel containing three liters of boiled distilled water; the precipitate is washed by decantation until free from chlorides, then collected upon a filter, allowed to drain, expressed, transferred to a vessel containing 100 gm. formic acid (sp. gr. 1·18) and dissolved by stirring. The solution is diluted with distilled water to 500 gm., and 500 gm. alcohol added; after standing, the clear liquid is decanted; this contains 3 per cent. of ferric formate. If this preparation be made at ordinary temperatures the ferric hydrate does not dissolve completely, and the finished preparation has a tendency to precipitate a basic salt.

(2) 75 gm. formic acid (sp. gr. 1·18) are neutralized with 35 gm. precipitated calcium carbonate, the calcium formate being held in solution by warming to 30° C.; 140 gm. ferric sulphate solution are mixed with 300 gm. distilled water and 25 gm. formic acid; add to this solution that of the calcium formate, stirring constantly; and, lastly, 500 gm. alcohol; allow to stand 5–6 hours, filter and wash the precipitate with dilute alcohol until the filtrate measures one liter. This tincture also contains 3 per cent. ferric formate.—M. Rozsnyai (Gyogysz. Hetilap.) *Pharm. Post*, 1891, 402.

Assay of cinchona for total alkaloids.—20 gm. in *very fine* powder are placed in a flask holding 500 cc., 10 cc. water of ammonia (10 per cent.) and 20 cc. alcohol (94 per cent.) added, the mixture well shaken and 170 cc. ether added; allow to stand for 2–3 hours, occasionally shaking, and decant 100 cc. of the clear liquid into a sepa-

rating funnel containing 50 cc. water and 2 cc. dilute sulphuric acid (sp. gr. 1·117), or sufficient to give the aqueous solution an acid reaction after agitation with the ethereal solution; separate the acid, yellowish solution from the ethereal layer, warm to expel the dissolved ether and return to the cleansed separating funnel; add 30 cc. chloroform, then sufficient sodium hydrate solution to precipitate the alkaloids, and agitate *at once* for several minutes; the chloroform solution is removed to a small tared flask and the agitation repeated with portions of chloroform of 20 cc. each until the alkaline solution after acidifying, fails to give a precipitate with iodine solution; distil off the chloroform or allow to evaporate, and dry the contents of the flask at 100° C. to constant weight. In case the chloroform forms an emulsion when shaken with the alkaline solution, this is poured upon a filter, well wetted with chloroform, stirred with a glass rod and washed with a little chloroform. The success of this method depends largely upon the fineness of the powder used.

This method was deemed the best one for the assay of cinchona, and is recommended by the committee for the new Swiss Pharmacopœia.—W. Haubensak, *Schwz. Wochenschr. f. Pharm.*, 1891, 147.

The manufacture of metallic sodium by electrolysis of the fused chloride has not been successful in practice because of the high temperature at which sodium chloride melts, this bringing about reunion of the two elements; a patent has recently been granted to L. Grabau, in which the melting point of sodium chloride is considerably reduced by addition of potassium and strontium chlorides. The metal obtained by electrolysis of a mixture containing 3 molecules each of sodium and potassium chlorides and 2 molecules of strontium chloride is entirely free from strontium, but contains about 3 per cent. potassium, from which it may be freed, if necessary, by an oxidizing fusion; the yield is about 95 per cent.; during electrolysis the bath may be kept of proper composition by addition of sodium and potassium chlorides.—(*Ztschr. f. angew. Chemie.*) *Pharm. Centralhalle*, 1891, 345.

Anagallis arvensis, used in Mexico instead of saponaria, has been found by Dr. Schneegans to contain two glucosides identical with those obtained from quillaia and senega.

The aqueous decoction is precipitated with neutral lead acetate; the precipitate, thoroughly washed with water containing lead acetate, is suspended in water and decomposed by dilute sulphuric

acid, the excess of the acid neutralized by lead carbonate, the mixture filtered, the filtrate evaporated to dryness, the residue dissolved in boiling absolute alcohol, four volumes of chloroform added, the precipitate removed and the filtrate mixed with ether until precipitation ceases; this precipitate, dried over sulphuric acid, corresponds with quillaic and polygalic acid. It is soluble in water, dilute alcohol and boiling absolute alcohol; the aqueous solution has an acid reaction, foams strongly and reduces Fehling's solution after boiling with dilute acids; it has a sharp, acrid taste.

The filtrate from the lead acetate precipitate is precipitated with basic acetate of lead and the precipitate purified as above, avoiding, however, the use of chloroform; by repeatedly dissolving in hot alcohol and precipitating with ether, and drying over sulphuric acid a yellowish powder was obtained identical with sapotoxin and senegin. It is easily soluble in water, dilute alcohol, also in hot absolute alcohol; the aqueous solution is neutral, foams strongly, reduces Fehling's solution after boiling with acid, and gives a precipitate with basic lead acetate which is soluble in acetic acid.—*Journ. Pharm. von Els.-Lothr.*, 1891, 171.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Preparation of Tinctures.—M. Vauthier, a Paris pharmacist, describes, in the *Répert. de Phar.* of May 10th, a simple apparatus for the above purpose. It consists of a wide-mouthed jar into the opening of which is inserted a smaller jar whose bottom is pierced with small holes, the perforated portion falling far enough below the shoulder of the larger jar as to become fairly well immersed in the alcohol with which the latter is filled, the smaller jar having previously received the iodine or resin to be dissolved; the charged portion of the solution goes to the bottom of the jar, leaving the unsaturated portion of the alcohol always in contact with the drug, thus insuring very rapid dissolution. Excellent results are also obtained in the preparation of many other tinctures. An advantage of the apparatus lies in the fact that it is not necessary to watch or handle it until the solution is completed.[1]

[1] During the past fifty years this process of *circulatory displacement* has been frequently described and recommended.—See Amer. Jour. Phar. viii, 89; xvi, 313; xxii, 380; xxiv, 318; xxvi, 17, etc.—Editor.

Lard and Vaselin in Ointments.—M. Carles lately stated, in the *Jour. de Méd. de Bordeaux*, that benzoated lard was preferable to vaselin in the preparation of ointments, because it permitted an easier absorption of the medicament associated with it. Dr. Dubreuilh replies in the same journal (Apr. 12) that in certain cases the use of vaselin is more advantageous. This is especially true of ointments containing corrosive sublimate, oxide of mercury or any other substance which undergo alteration on contact with fats. Also, the non-absorption of vaselin is advantageous when ointments are to be used as dressings. Lard dries too quickly and does not prevent evaporation from the surface of the skin. A vaselin dressing will last for a day, and its viscosity prevents its being too readily disturbed. Lard is preferable (when a profound effect is required) through its capability of being absorbed; vaselin should be used when we want a protective covering.

Transformation of Cupreine into Quinine.—Referring to the announcement that Grimaux and Arnaud had succeeded in making quinine by synthesis (*Compt. rend. Acad. des Sci.*, Apr. 13), the editor of *Répert. de Phar.*, May 10th, says: "This assertion is not strictly correct; we would not detract from the merits of these able chemists, but it is admitted that we cannot really obtain quinine by synthesis until we shall have succeeded in preparing it from an artificial body. Grimaux and Arnaud obtained their quinine by operating with cupreine, a natural product; hence, they have simply transformed the latter into quinine. Indeed, these chemists gave their labors the unpretentious title of a 'transformation.' Cupreine is a base of *quina cuprea* or *Remigia pedunculata*, soluble in alkalis, colored by perchloride of iron and appearing to have a phenolic character. If we compare its formula ($C^{19}H^{22}N^2O^2$) with that of quinine ($C^{20}H^{24}N^2O^2$) we find the same relation between these bases as exists between phenol (C^6H^6O) and its methylic ether (C^7H^8O). Cupreine being a body of mixed functions, part base and part phenol, quinine would be its methylic ether. This prevision was confirmed by the authors. They added soda to cupreine in a solution of methylic alcohol, and this heated with an excess of iodide of methyl, formed two iodomethylates of quinine. In replacing the iodide by the chloride of methyl and heating to 100° C. in sealed tubes for 12 hours free quinine was obtained. The product of the reaction was evaporated to dryness and that portion of the cupreine not transformed was

removed by a weak solution of soda. Agitation with ether dissolved the quinine, which, being transformed into the sulphate, presented the usual characters of that compound. It is notable that the natural products of certain plants often include the methylic, but never the ethylic group. The transformation of cupreine into quinine demonstrates the existence, in the latter of the group (OCH^3). More than this, it will permit us to obtain new bases analogous to quinine, which, like that substance, will constitute cupreinic ethers. These bases will, perhaps, furnish new resources to therapeutics."

Combinations of Caffeine with Resorcin, and of the Phenols with Eucalyptus and Antipyrine.—At a meeting (Apr. 1) of the Paris Society of Pharmacy, M. Léger read a communication from M. Barbey concerning these new products. Their description is not yet reported. About the combinations of the phenols with antipyrine, M. Patein observed that they had no interest from a therapeutic point of view, from the fact that they decompose rapidly in the organism.

Examination of Castor Oil for Cotton-Seed Oil.—Mix 10 gm. of oil of ricinus with 6 gm. of a reagent, composed as follows: Nitrate of silver, 5 gm.; nitric acid, 1 gm.; alcohol, 100 gm. This mixture should be well stirred, and placed for 5 minutes upon a water-bath heated to 100° C. If cotton-seed oil be present there will be a red coloration, but if the oil of ricinus is pure there will be no change.—*Boll. farm.* No. xxx, Feb., 1891.

Toxicity of Oil of Salvia.—MM. Cadéac and Albin (*Société de Biologie*, Apr. 11) report that oil of sage is more toxic than essence of absinth, and gives rise to attacks of epilepsy, commencing by tonic and followed by clonic convulsions. An intravenous injection of 5 cgm., caused epileptiform attacks in a dog; 10 cgm. determined several successive attacks of the same nature.

Combinations of Alcohol with the Alkaline Sulphides.—At the April meeting of the Paris Society of Pharmacy, M. Prunier communicated the results of M. Demond's researches on this subject. The latter obtained crystallized combinations with these sulphides, chiefly with the sulphide of sodium. One of them contained 1 molecule of alcohol and 1 of alkaline sulphide, and another was formed of 1 molecule of alcohol and 9 molecules of sulphide.

A New Reagent for Oxide of Carbon.—M. Berthelot (*Bull. de la Société chimique*, Apr. 20) writes that oxide of carbon has the

power of reducing ammoniated nitrate of silver. This reagent is prepared by adding diluted ammonia, drop by drop, to a solution of nitrate of silver until the precipitate shall be entirely redissolved, but adding no more than this. If, into the above solution we pass a few bullæ of oxide of carbon, the liquor, without heat, becomes quickly of a brownish color; with ebullition there forms an abundant black precipitate. The reaction likewise takes place with an aqueous solution of oxide of carbon. As the reagent is very sensitive and will operate in the presence of atmospheric air, it may be used to ascertain the presence of traces of oxide of carbon in gaseous atmospheres, provided no other reductive substance be present.

NITRATE OF STRONTIUM.—In the *Répert de Phar.* of May 10th, Dr. Boutron, a professor in the Nantes School of Medicine and Pharmacy, writes as follows in confirmation of Dr. Laborde's statements as to the innocuousness of strontium salts (see AM. JOUR. PHAR., 1891, p. 129): "In 1885, when I was in the service of Dr. Vulpian at the Hôtel-Dieu he gave to a patient suffering from acute articular rheumatism, 25 gm. (*that is to say, twenty-five grammes*) daily, of nitrate of strontium. The treatment was continued for about two months and did not appear to cause the least inconvenience to the patient. It was withdrawn because it ceased to have further action, and was replaced by salicylate of lithium in doses of 5·50 gm. daily.

THE NATURE OF SOLUTION.

An answer has long been sought to the question, "What goes on when a solid substance is dissolved by a liquid?" Those who received their course of didactic instruction a good many years ago were taught that the solid substance was *liquefied.* It was said that the particles of a fusible salt, such as nitre, for instance, could be brought into the liquid condition by one of two methods; the first that of applying heat, heat-energy being used up in the process of liquefaction; the second process being that of submitting the body to the action of water, when the absorption of heat due to liquefaction was shown by the lowering of temperature. This explanation of the process of solution has been long since found unsatisfactory, and in more recent years teachers have preferred to say as little as possible about a process in appearance so simple, but of which the explanation was found to be encompassed with

difficulties. Of late, however, the question has assumed another aspect. We have not attained, it is true, to unanimity of opinion as to what goes on in the process of solution, but there is nevertheless a perfectly definite theory of the process now current, which has the strenuous support of a prominent school of continental chemists. A complete account of the new theory has recently appeared in an accessible form in Oswald's "General Chemistry." In this work the *pros* rather than the *cons* of the question are dealt with. Exceptions yet remain to be explained, and fundamental experiments will have to be repeated and confirmed by independent workers, before the new theory can be looked upon as firmly established. Whatever may be the final judgment of the chemical world, the adequacy of the new theory to explain the phenomena of solution is undoubtedly one of the great scientific questions of the day.

The following is a short *résumé* of the theory and the data on which it is based.

The particles of a body in solution are not in the liquid, but the gaseous condition; that is to say, they obey laws having exactly the same form as the laws of gases. In dilute solutions the conditions are similar to those in a perfect gas; concentrated solutions show deviations from the simple laws which are similar and in the same direction as the deviations from the laws of Boyle and Charles shown by gases near the point of liquefaction. If pure water be poured on the surface of a solution of sugar the particles of sugar rise against the action of gravity and mix with the pure water. There are certain substances with which we can build up a "semi-permeable wall" which will allow the water to pass but not the dissolved substance. A porous earthenware cell in and on which is deposited copper ferrocyanide forms such a wall. Its properties are not the same as those of an animal membrane, such as parchment, which will allow crystalline substances in solution to pass through it. If a cell containing a sugar solution be provided with such a semi-permeable wall and is further connected with a pressure gauge, then on immersing the cell in a vessel of pure water, water passes slowly into the cell, the sugar does not pass out, and the particles of the dissolved substance exercise a pressure on the solvent which is registered by the manometer. The maximum pressure is only obtained slowly, but is of considerable magnitude, a one per cent. solution of sugar showing a maximum pressure of

about 50 cm. of mercury. The arrangement described affords us then a means of measuring the pressure exerted on the solvent by the particles of a substance in solution. It is found that this pressure is directly proportioned to the concentration of the sugar solution. All the other substances which have been investigated follow this law—pressure varies as concentration. It will be noticed that this law is of exactly the same form as that of Boyle, which states that the pressure of a gas varies inversely as the volume, *i. e.*, directly as the concentration.

Again, the pressure of the dissolved substance increases as the temperature rises, and for all substances so far investigated the rate of increase is the same as in the case of gases. With gases, if the volume be maintained constant, the pressure varies directly as the temperature reckoned from the absolute zero of the air thermometer. This is Charles' law, followed, as has been said, by dissolved substances as by gases. We see then that the general relation of volume, *i. e.*,

$$\frac{1}{\text{concentration}},$$

to pressure and temperature is the same for dissolved substances as for gases. For either case we may write:

Volume varies as pressure $\times$ temperature, or
Volume = pressure $\times$ temperature $\times$ a constant quantity.

The most striking evidence in favor of the view that substances in solution are in the gaseous state is afforded by the fact that this *constant* has the same value for dissolved substances as for gases; in other words, a dissolved substance at a certain temperature and which exercises on the solvent a certain pressure, occupies the same volume as it would if under these conditions of temperature and pressure it were in the form of a gas. An example will make this striking relation clear. At 0° C. and 760 mm. of mercury pressure, the molecular weight of any gas expressed in grams occupies 22,380 cc. The pressure of 760 mm. of mercury is 1,033 grams per square cm., which number expresses the pressure in absolute units; 0° C. = 273 on the scale of absolute temperature; therefore the value of the constant for a gas is:

$$\frac{1{,}033 \times 22{,}380}{273} = 84{,}700 \text{ approximately.}$$

Now take the case of sugar in solution. The molecular weight expressed by the formula $C_{12}H_{22}O_{11}$ is 342. In a 1 per cent. sugar solution therefore the molecular weight expressed in grams occupies 34,200 cc. At 0° C. the pressure on the solvent is found to be equal to 493 mm. of mercury, that is to say, 671 grams per square centimeter. The *constant* for sugar is therefore:

$$\frac{671 \times 34{,}200}{273} = 84{,}200$$

which agrees to within 6 parts in 1,000 with that for gases. As this relation is not special to the case of sugar but is a general relation, it follows that Avogadro's law is obeyed by substances in solution, equal volumes of which, at the same temperature, and exercising the same pressure on the solvent, contain equal numbers of molecules.

It is well known that the abnormal vapor densities of certain bodies which we now know to be *dissociated* in the gaseous state long opposed an obstacle to the acceptance of Avogadro's generalization. The exceptions met with in the case of substances in solution are of exactly parallel character. The deviations from the law are always in one direction, giving too great a volume when the calculation is based on the received molecular weights. This is met by the hypothesis that such exceptional substances are to some extent dissociated in solution. As in the case of gases so also in the case of substances in solution, many bodies occupy a volume twice as great as that calculated from their molecular weight. These are regarded as being completely dissociated into two constituents. The most important classes of substances which behave thus are the strong acids and bases and their salts. A large number of phenomena afford evidence in support of this hypothesis of dissociation in solution, the study of which now constitutes an important field of work connected with the development of the new theory of solution.—*Phar. Jour. and Trans.*, May 16, p. 1018.

NATAL ALOES.

By E. M. Holmes, F.L.S.

There has for many years been a difficulty in determining the botanical source of the article known in commerce as "Natal," or sometimes as "Hepatic" Cape aloes.

In appearance the drug bears a strong resemblance in color and

opacity to true Hepatic aloes, but differs from it in four particulars, (1) in odor, which resembles that of Cape aloes; (2) in the color of the powder, which has a greenish-brown, not yellowish-brown, tint; (3) in the chemical reaction with nitric acid, and (4) in the fact that it yields a distinct aloin.

Some months since, hoping that more light might be thrown on the question by examining the juice of leaves of authenticated plants, I suggested to Messrs. Bainbridge and Morrow that they should investigate the subject from this point of view. Their results, published in the *Pharmaceutical Journal* ([3], xx, p. 570), were unexpected, and led to the conclusion that *Aloe succotrina* alone, of all the leaves examined, was the most likely source of the Natal aloes of commerce.

I then wrote to Mr. J. Medley Wood, asking him to make further inquiry concerning the botanical source of the drug, and the Director of Kew Gardens, who had already most courteously furthered my wishes by supplying the aloe leaves necessary for Messrs. Bainbridge and Morrow's investigation, also wrote officially to Mr. Wood, with the result that the latter sent some aloes prepared in Natal (as described in the Kew *Bulletin*, No. 44), to Kew (see *Am. Jour. Pharm.*, 1891, p. 33). A small portion of this was kindly placed at my disposal by the Director. This specimen, however, resembled Cape aloes in its translucent appearance, and not Natal aloes.

This specimen I handed to Mr. Bainbridge to test in the same manner as the aloes previously examined. As will be seen from the table given by Mr. Bainbridge the aloes, although translucent, agrees with the opaque Natal aloes and with the juice of *A. succotrina*, in its chemical reactions.

I then asked him to make comparative experiments with some aloes and aloe juice obtained from plants growing near Port Elizabeth, which were presented February 9, 1885, by Mr. Albert Walsh, of the firm of B. G. Lennon & Co., together with a living plant. The plant I had compared at Kew with the living specimens in the collection there, and it appeared to agree fairly well as regards the leaf with *Aloe platylepis*, Baker. The plant presented by Mr. Walsh was handed to the then Curator of Kew Gardens, Mr. Smith, for cultivation, but it died without flowering.

The results of Mr. Bainbridge's examination shows that this

aloes corresponds with the Cape aloes, and not with that known as Natal.

I may add that I carefully evaporated some of the juice in a water-bath soon after its arrival, but that the resulting aloes was *translucent.*

I think it may, therefore, be concluded, since the translucent Natal aloes sent by Mr. J. M. Wood gave the same reactions as opaque or Hepatic Natal aloes, that the aloes known in English commerce as Natal, or Hepatic Cape aloes, is the product either of *Aloe succotrina*[1] or some species the juice of which gives the same chemical reaction, and that its opacity is probably due to some peculiarity in the mode of manufacture. Further, it appears probable that different species are used in different districts in Natal, and that no botanist has yet seen the opaque aloes manufactured.

It may be hoped that Mr. J. Medley Wood, aided by the light already thrown on the subject by Messrs. Bainbridge and Morrow, may be able ultimately to clear up the history of the opaque Natal aloes.—*Phar. Jour. and Trans.*, April 4, 1891, p. 898.

EXAMINATION OF SPECIMENS OF SOUTH AFRICAN ALOES.

By J. Bainbridge.

Some specimens of aloes and aloes juice were recently handed to me for examination by the Curator of the London Museums of the Pharmaceutical Society. These consisted of, (1) a small sample of the aloes from Natal, sent to Kew by Mr. J. Medley Wood, a note upon which, quoted from the Kew *Bulletin*, has already appeared in the *Pharmaceutical Journal* (p. 495);[2] (2) aloes prepared from a South African species, and believed by Mr. E. M. Holmes to be *Aloe platylepis*, or an undescribed species closely allied to it; (3) some juice of the last-named, which had been in the Museum since 1885.

For the sake of uniformity in the results the same method of testing was adopted for these samples as described in the *Pharmaceutical Journal*, January 18, 1890, p. 570.

[1] Since the reactions given by the juice of *A. ferox*, Mill., in the Kew Gardens and those of the juice of the plant believed by Mr. Wood to be *A. ferox* are different, it is obvious that the evidence is not sufficient to attribute Natal aloes (as distinct from Cape), to *A. ferox*. Further comparison of Mr. Wood's *A. ferox* with allied species may show that it is distinct.

[2] See *American Journal of Pharmacy*, January, 1891, p. 33.

There is an absolute identity in the results between the specimen of *A. ferox*, obtained from Mr. Wood, and the large number of commercial specimens of Natal aloes that had been previously examined. In comparison with the aloes obtained from plants grown at Kew, I find that it resembles most closely in its reactions those obtained from *A. succotrina*. The only reaction in which they do not agree is the bromine test, but this reaction is not considered as a proof that the commercial Natal aloes are not derived from this species, but that it is possible that the property might be lost on keeping or by fermentation. The reactions of the aloes from the plant supposed to be *A. platylepis* are similar to those of commercial Cape aloes.

The results are recorded in the following table:

TABLE OF RESULTS.

Specimens.	HNO_3.	H_2SO_4 and vapor of HNO_3.	Cripps and Dymond.	C. and D., with NH_4HO.	Bromine Test.	Fe_2Cl_6.
Natal aloes, from "*A. ferox*," J. M. Wood, . .	Permanent crimson.	Blue.	Deep crimson.	Intense brown-red.	No effect.	Olive-green.
A. ferox, grown at Kew, .	Evanescent. crimson.	Green.	Pale yellow.	Red.	Violet.	Olive-green.
Commercial Natal aloes, .	Permanent crimson.	Blue.	Deep crimson.	Intense brown-red.	No effect.	Olive-green.
A. succotrina, grown at Kew, ...	Permanent crimson.	Deep blue.	Crimson.	Intense brown-red.	Deep purplish red.	Olive-green.
Aloes prepared from *A. platylepis*, grown near Port Elizabeth.	Green after standing a few minutes.	Nil.	Orange-red.	Pale claret.	Nil.	Olive-green.
Juice of *A. platylepis*, . . .	Beautiful emer.-green.	Nil.	Orange-red.	Pale claret.	Nil.	Olive-green.

—*Phar. Jour. and Trans.*, April 4, 1891, p. 899.

ANALYSIS OF BRANDY AND ALCOHOL.[1]

BY E. MOHLER.

Ethereal salts.—100 cc. of the distilled alcohol is boiled for an hour with 20 cc. of decinormal potash in a reflux apparatus; the excess of potash is determined, and the rest is calculated to ethyl acetate.

Aldehydes are estimated by means of the coloration with rosaniline bisulphite, the intensity of the color of the solution examined being compared, by means of a Duboscq colorimeter, with the coloration given by a solution of aldehyde of known strength; 10 cc. of

[1] *Compt. rend.*, **112**, 53-55; *Jour. Chem. Soc.*, 1891, 503.

a 0·01 per cent. solution of acetaldehyde in alcohol of 50° is a convenient quantity to employ as a first standard.

Higher alcohols.—100 cc. of the distilled liquid is mixed with 1 cc. of aniline and 1 cc. of phosphoric acid of 45° B. to retain the aldehydes, and after cohobating for an hour, is distilled to dryness in a solution of salt. The distillate is treated with sulphuric acid of 66°, and the coloration is compared with that given by an alcohol containing 0·250 gram of isobutyl alcohol per litre.

Nitrogen compounds.—100 cc. of the undistilled liquid is distilled to dryness with 2 cc. of a solution of phosphoric acid of 45° B., the residue is dissolved in about 1,000 cc. of distilled water, mixed with 10 grams of sodium carbonate, and distilled, the distillate being nesslerized. Alkaline potassium permanganate is then added, and distillation and nesslerizing is repeated. The first operation gives the nitrogen present as ammonium compounds and amides, and the second gives the nitrogen existing as pyridine bases and alkaloids.

Several analyses of brandy and alcohol are given.

CHEMICAL ANALYSIS OF THE PANCREATIC JUICE IN MAN.[1]

By J. Zawadzki.

The author states that all our knowledge of the pancreatic juice has been derived hitherto from experiments on the lower animals. In man, as yet, only two analyses have been made, and these in the case of juice obtained post-mortem.

The pancreatic juice analyzed by Zawadzki was obtained from a girl, who had been operated upon for the removal of a pancreatic cyst. For 14 days an abundant secretion appeared, at first purulent, then watery. After four weeks the wound healed completely.

The pancreatic juice for 24 hours was collected and analyzed. It was tenacious, yellowish, turbid, and had an alkaline reaction. The deposit contained large epithelial cells, mucous corpuscles, and fine granular detritus, but no crystals. In the ashes were found compounds of carbonic, sulphuric, phosphoric and hydrochloric acids. The bases were sodium, calcium, potassium and iron. The juice contained coagulable albumen and hemi-albumose, but no peptone.

By the action of the juice on starch for five hours, at a suitable

[1] *Oest.-ungar. Centralblatt für die medicinischen Wissenchaften*, No. 6, 1891; reprinted from *The Medical Chronicle*, April.

temperature, maltose was obtained. The action of the juice for four hours on the white of egg gave peptone only, and neither albumen nor propeptone. Finally, the juice emulsified oil.

The analysis gave the following results:

Water,	86·405 per cent.
Solids,	13·395 "
Organic compounds,	13·251 "
Albuminous bodies,	9·205 "
Extractives,	4·046 "
Other extractives soluble in alcohol,	0·827 "
Salts,	0·344 "

MODERN DERMATOLOGICAL REMEDIES.

The following information respecting some of the newer forms of external remedies used in the clinic of Professor Hebra, Vienna, is published in the *Pharmaceutische Post*, and reprinted from *Pharmac. Journal and Transactions*, May 23:

Spray Treatment.—Very frequently an ether spray is used as a vehicle for mercuric sublimate (1 to 2 p.c.) and chrysarobin (10 p.c.). It is considered that the spray, besides its anodyne properties presents the advantage of attacking affected parts otherwise difficult to reach, such as those covered with hair. Whilst the mercuric chloride spray does good service principally in affections of the mucous membrane the chrysarobin spray is used in mycosis of the skin. The apparatus used is one combined with a ball blower.

Medicated Soaps.—The super-fatted medicated soaps introduced by Unna, are used in a form as improved by Eichoff. The basis consists preferably of beef tallow, together with liquor sodæ two parts, liquor potassæ one part and some olive oil. The super-fatted soaps employed are the resorcin-salicylic, resorcin-salicylic-sulphur, and the resorcin-salicylic-sulphur-tar soaps. In these forms the resorcin is claimed to develop advantageously its action antagonistic to inflammation; the salicylic acid is said to dissolve the horny layer of the epidermis and to act as a bactericide; the sulphur also lowers the inflammation; while the tar diminishes the itching and favorably influences the dilated vessels.

Glycerinum Saponatum.—This is an ointment basis, containing a large proportion of glycerin, in the preparation of which a small quantity of the neutral cocoanut oil soda soap is used. Its composition varies from 80 to 92 per cent. of glycerin and 20 to 8 per

cent. of soap. The *glycerinum saponatum* is soluble in cold and warm water, and is said to possess the advantageous property of dissolving a large number of substances, and of holding other insoluble pulverulent substances in suspension. To this class belong:

(*a*) Ointments with an Acid Basis (80 p. c. glycerin).—(1) *Glycerinum Saponatum* with salicylic acid (5 p. c.), employed especially for the removal of horny epidermal growths; (2) Glyc. sapon. with salicylic acid (5 p. c.) and resorcin (5 p. c.) combines the properties of the preceding with those of resorcin, in diminishing the inflammation, acting as an antiseptic and promoting the regeneration of the epidermis; (3) Glyc. sapon. with salicylic acid (5 p. c.), and creasote (5 p. c.) promotes healing without pain in lupus vulgaris, lepra, etc.; (4) Glyc. sap. with salicylic acid (3 p. c.) and tar (10 p. c.), useful in scaly eczema with itching.

(*b*) Ointments with a Neutral Basis (92 p. c. glycerin).—Glyc. sapon. with zinc oxide (5 p. c.) used for cosmetic purposes and in slight cases of eczema; (2) Glyc. sapon. with sulphur (10 p. c.); (3) Glyc. sapon. with zinc oxide (10 p. c.), used in acne; (4) Glyc. sapon. with iodoform (5, 10, to 50 p. c.), said to be remarkably active, purifying and promoting granular action in wounds, ulcers, buboes and carbuncles. (5) Glyc. sapon. with chrysarobin (10 p. c.), approved especially in psoriasis; (6) Glyc. sapon. with hydroxylamine (1 p. c.), used in psoriasis of the face and hairy scalp; (7) Glyc. sapon. with ichthyol (5 p. c.), renders good service in violent itching of skin affections and arthritic swelling of the joints; (8) Glyc. sapon. with ichthyol (10 p. c.) and zinc oxide (10 p. c.), as in the preceding and in incipient eczema; (9) Glyc. sapon. with carbolic acid (2 to 3 p. c.) is good for disinfecting the hands and also to relieve itching.

In other cases the vehicle represents a kind of dressing. Among the *Pastes*, the zinc-starch-vaselin paste, with corresponding medication, takes a high place. This paste is used with good result in combination with salicylic acid (acid salicyl., 1–2; zinci oxidi et amyli, āā 25; vaselini, 50). The paste adheres to the face without any bandage; it is also dusted with starch. In the *Traumaticin* treatment, traumaticin (a solution of one part of gutta-percha in ten to fifteen parts of chloroform) is used as a medium for applying different remedies, such as chrysarobin, etc. It forms a pliant coating and surpasses collodion by far in this respect.

Glycero-Gelatin is prepared in three forms: Soft (5 p. c. gelatin added), hard (10 p. c. gelatin and water) and hard (10 p. c. gelatin without water). Before using the preparation is liquefied by heat, and in this condition is spread on to the part affected by means of a brush and covered with mull.

In the preparation of Ointment and Plaster Mulls Unna's recommendation is followed to substitute lard by mutton fat, which renders unnecessary additions of paraffin or wax. The dressings are dipped into the melted mass, dried and rolled up. The gutta-percha mull is considered to present many advantages.

A new kind of dermatological plaster has been introduced, the basis of which consists of purified india-rubber and anhydrous lanolin worked up together to a remarkably adhesive mass. The mixture is medicated with various substances and spread upon linen and is then known as *Collemplastrum.* Among the advantages claimed for this kind of plaster are its low cost, that the mass does not separate from the linen, that while possessing the adhesive properties of india-rubber plaster, the lanolin favors the absorption of the added medicament, and that the plaster can be readily removed without leaving portions adherent to the skin. Besides the simple collemplastrum adhæsivum, others are used containing respectively 10 to 20 p. c. salicylic acid, 30 p. c. pyrogallic acid, 60 p. c. mercury, 60 p. c. mercury and 5 p. c. carbolic acid, 50 p. c. thiol, 40 p. c. zinc oxide, 10 p. c. liquid pitch, etc.

GERMS AND DISEASE.

If an infusion of hay or any vegetable substance be kept in a warm place for some days and a drop be then examined under a microscope it will be found to swarm with bodies which, from their power of movement, appear to be endowed with life. An infusion of meat under similar conditions gives the same result. Some of these minute living bodies belong to the animal world, some are classed as plants. All of them owe their origin to "spores" or seeds carried to the infusion by the air, and produced by pre-existing plants or animals of the same species. At one time it was held by some scientists of repute that these organisms were spontaneously generated from the decaying matter in the infusion. The fallacy of the experiments on which this theory was based has, however, been exposed—mainly by the researches of Tyndall and Dallinger.

Chief among the organisms visible in the drop of meat infusion are numbers of rod-shaped bodies vibrating in a most characteristic manner. These are the lowest forms of plant life, being composed of a single cell and reproducing their kind by simple division of their bodies. They are known to naturalists as *bacteria*. Among these microscopic plants we have as much divergence in form and properties as can be found among the higher plants that people our fields and lanes and gardens. The remarkable difference in properties characterizing some of the latter which so closely resemble each other in form as to be placed by botanists in the same order is a fact now generally recognized. Thus, we have such a poisonous plant as *Belladonna*, or "deadly nightshade," belonging to the same order as the potato and scarcely distinguishable from it by the untrained eye; the hemlock, too, claims as close relations to the carrot, the parsley, the caraway and the coriander. The bacteria found in infusions of hay and of meat correspond to the useful plants, for besides being in themselves harmless, they act as nature's scavengers by feeding on and converting into its component elements the putrefying matter among which they live. Corresponding to the poisonous plants, we have the bacteria which are the essential factors in the production of infectious diseases and popularly known as "disease germs."

The "germ theory" of disease is not a product of to-day, but was mooted as long ago as 1675. Since that time it has passed through many phases, and been to all appearances as completely proved as it has afterwards been disproved. The "snow-white cube of truth," of which all the theories have been mere vestments, still survives, however, and its recognition has been rendered certain by the more accurate methods of research and the more perfect instruments brought to bear on its numerous manifestations within recent years. Since the discovery by Pasteur—fully twenty years ago—that a disease which caused great ravages among silk worms in France was caused by a micro-organism, progress has been continuous. In 1877, Koch published the result of his researches on the life history of the *bacillus*—a species of *Bacterium*—of splenic fever. His observations were confirmed by Pasteur, who also showed how the bacillus might be weakened or "attenuated," so that inoculation with the attenuated form prevented or mitigated the more virulent disease. These researches laid the

foundation for the methods now adopted by Pasteur for the cure of hydrophobia and by Koch for the cure of consumption, methods which are now riveting the attention of the whole civilized world.

In consideration of the intense interest now being taken in the work going on in Berlin and the centres supplied from it, some explanation of the methods adopted for proving the presence of a disease-producing organism and for checking its ravages may not, it is hoped, be devoid of interest. The chain of evidence on which bacteriologists rely as proof of the presence of disease-producing bacteria is as follows:

(1) The organism must be found (by the aid of the microscope) in the blood or tissues of the affected animal.

(2) It must be transferred from these to nutrient solutions contained in test tubes (the nutrient materials of these solutions consist of gelatin and other meat products) and cultivated therein. These cultivations must be carried on through successive generations of the organism.

(3) A "pure cultivation" obtained in this way must, when introduced into a healthy animal, produce the disease in question.

(4) In the inoculated animal the same micro-organism must again be found.

In forging a chain of evidence such as this is, the greatest skill is required and the utmost precautions must be taken to prevent the entrance into the pure cultivations of other bacteria, which are present almost everywhere. All the apparatus used must be "sterilized," and the slightest neglect of details like this leads to hopeless confusion. Bacteriology is, in fact, an art requiring of its workers exceptional qualities and special training.

The methods adopted for curing or preventing diseases, which owe their origin to bacteria, vary with the disease under treatment, and the principles underlying them are not yet removed from the domain of theory. Pasteur, in his famous researches on hydrophobia, found that by various methods he could attenuate the virus of rabies so that when injected into a healthy animal it not only did not produce any untoward symptoms, but it actually prevented the most active virus from having any effect. The method he now adopts is that of suspending pieces of the spinal cord of inoculated rabbits in bottles of air, dried by means of potash. After hanging

a certain time under such conditions the virulence is found to have diminished. Injections of the virus so attenuated not only confer immunity against rabies, but actually prevent its development even if practised after the disease has been introduced into the system by the bite of a rabid animal. This is rendered possible by the exceptionally long incubation period of rabies.

In the case of *tuberculosis*, or consumption, the method employed is somewhat different, although it is probable that at some not very remote date, the principle underlying both methods may be shown to be the same. Koch found in the course of his observations that the bacillus of consumption when injected in cases of consumptive affections of the skin produced increased activity in the regions affected, resulting in the casting off of the affected skin and healing of the scars. By a series of masterly experiments and inductions he showed that it was not the bacillus itself which produced this effect, but a poison secreted by it. This poison he succeeded in extracting from pure cultures of the bacillus by means of a mixture of glycerin and water, and this is the fluid which, during the last few months, has been creating such a stir throughout the whole world. Whether the remedy will do all that newspaper correspondents have claimed for it is very questionable; but it is beyond doubt that its properties are most remarkable, and that it will be to the physician a most powerful auxiliary in the detection and treatment of some of the most insidious diseases to which flesh is heir.—*Phar. Jour. and Trans.*, May 16, p. 1019.

ARTIFICIAL SALICYLIC ACID.[1]

By W. R. Dunstan and O. F. C. Bloch.

Artificial salicylic acid has been observed to differ in its therapeutic action from the pure "natural" acid obtained from the oil of winter-green. Although much work has already been done on the subject with the view of ascertaining the cause of this difference, the exact nature of the impurities contained in the artificial acid of commerce has not been experimentally established. The authors have examined two foreign acids, isolated by Williams in 1878 from commercial salicylic acid, but not then identified. These acids are

[1] *Pharm. J. Trans.* [3], **21**, 429—436, abstract; reprinted from *Jour. Chem. Soc.*, 1891, 454.

now shown by their physical and chemical properties, as well as by the analyses of their silver and lead salts, to be orthocresotic or orthohomosalicylic acid [CH_3 : OH : COOH = 1 : 2 : 3], and metacresotic or metahomosalicylic acid [CH_3 : OH : COOH = 1 : 3 : 4] respectively. The ortho-acid melts at 163° (corr.), the meta-acid at 174·5° (corr.). They have been formed from the corresponding cresols contained in the crude phenol from which the salicylic acid had been prepared.

The melting point of pure salicylic acid has been variously stated, the highest recorded temperature being 159° and the lowest 155°. The authors find that "natural" salicylic acid, after recrystallization from alcohol, melts at 156·75° (corr.), and that if the acid melting at this temperature be converted into the sodium salt, and fractionally precipitated with silver nitrate, the acid recovered from each fraction of silver salt also melts at 156·75°, which may therefore be accepted as the melting point of the pure substance. By very slowly cooling a 1 per cent. solution in hot water, the pure acid may readily be obtained in large, distinct, prismatic crystals, but in presence of about 5 per cent. of one of the cresotic acids, the salicylic acid no longer furnishes large crystals, and the impure acid melts at a lower temperature.

A specimen of the artificial salicylic acid of commerce (m. p. 154·5°) was examined by Williams' method. It was converted into a calcium salt by boiling with water and calcium carbonate, and crystallized many times from water. From the residue of soluble salt from which most of the calcium salicylate had crystallized, there was obtained a small quantity of an acid, which after further purification melted constantly at 151° (corr.). Analysis of the silver and lead salts, as well as its physical and chemical properties, proved it to be paracresotic or parahomosalicylic acid

(CH_3 : OH : COOH = 1 : 4 : 3).

For the purposes of preparing pure salicylic acid from the impure acid of commerce, the method depending on the different solubilities of the calcium salts was not found satisfactory, being extremely tedious, owing to the number of recrystallizations that are necessary. A better plan consists in preparing the lead salts by the action of lead carbonate, and crystallizing these from dilute alcohol; lead salicylate being much less soluble than the lead cresotates. By

this means 70—80 per cent. of the original acid may be recovered in the form of pure salicylic acid from the first fraction of crystals deposited from the alcoholic solution.

At the request of the authors, Professor Charteris ascertained whether the three cresotic acids described above were poisonous. When administered in alcoholic solution to animals by injection, the ortho-acid was observed to be markedly toxic, the para-acid less so, whilst the meta-acid proved to be innocuous. (See this JOURNAL, January, p. 38.)

SUBERIN AND CORK CELLS.[1]

BY F. A. FLÜCKIGER.

Kügler (1884) showed that suberin contained an appreciable amount of fat and extracted stearic acid; he also isolated the crystalline *phellonic acid*, which, however, does not belong to the fatty series. Gilson (1890) maintains that *suberin* is that part of cork texture which is insoluble in neutral liquids, and is not taken up either by concentrated sulphuric acid or by ammonio-copper oxide solution, but is dissolved by alcoholic potash, and with nitric acid yields suberic and other fatty acids soluble in ether and alcohol. He finds the coloring matter of cork to be very soluble in sodium carbonate solution, which scarcely attacks suberin even on prolonged boiling. After treating finely divided cork with sodium carbonate, the suberin is extracted by a 3 per cent. alcoholic potash solution. The solution filtered hot gives a precipitate on cooling, which, after washing with water and recrystallization from alcohol, consists mainly of potassium phellonate. The alcoholic filtrate freed from alcohol, diluted with water, and treated with hydrochloric acid, gives a semi-fluid deposit; the decanted liquid yields glycerol. Gilson dissolves the deposit in ether, washes out the hydrochloric acid with water, expels the ether, dissolves in alcohol, and boils with potassium carbonate, when the addition of an alcoholic solution of magnesium chloride precipitates phloionic acid; the solution on further treatment yields suberinic acid. Kügler gives $C_{22}H_{42}O_3$ as the formula for phellonic acid, whilst Gilson prefers $C_{22}H_{43}O_3$. The latter gives the melting point as 102°. When heated at 105° with hydrochloric acid, the anhydride $C_{44}H_{84}O_5$ is obtained. *Phloionic acid*, $C_{22}H_{44}O_8$, is insoluble in cold water, but dissolves in hot water,

[1] *Arch. Pharm.*, **228**, 690—700; reprinted from *Jour. Chem. Soc.*, 1891, 465.

forming crystalline needles on cooling; it is very soluble in alcohol, but only slightly in ether and in chloroform; it melts at 62—63°. *Potassium phloionate* is very soluble in ether, less so in alcohol. *Silver phloionate* is rapidly decomposed in the light, whilst the corresponding phellonate is only slowly colored. *Magnesium phloionate* forms a crystalline precipitate when an alcoholic solution of a magnesium salt is added to a solution of phloionic acid. *Suberinic acid*, $C_{17}H_{30}O_3$, when gently warmed, forms a liquid miscible with alcohol, ether and chloroform, but not with light petroleum. Its alkaline salts are soluble in water, and alcohol; in the alcoholic solution no precipitate is produced either by magnesium or barium acetate. When heated without access of air, suberinic acid gradually forms a transparent, elastic mass, for which no solvent has yet been found. No water appears to be separated; the change appears rather to be due to polymerization. *Potassium suberinate* is soluble in water and alcohol, but not in ether. The *silver* salt is rapidly decomposed. Gilson has observed a characteristic test for phellonic acid, which consists in the beautiful reddish-violet color produced on moistening the acid with a very dilute alcoholic iodine solution, and adding sulphuric acid (sp. gr. 1·8); the reaction succeeds best with potassium phellonate, and may be obtained with iodine in aqueous solution of potassium iodide, or with iodine in zinc iodide. The foregoing relates entirely to cork from *Quercus suber*. Gilson has, however, glanced at that from *Ulmus campestris* var. *suberosa*, and finds that this is much poorer in suberin. It yielded phellonic and suberinic acids, but neither phloionic acid nor glycerol.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Pharmaceutical Examining Board of Pennsylvania held an examination in the Central High School of Philadelphia, January 19, when 109 candidates applied for registration as Pharmacists, of which number 30 passed the examination; and 51 out of the 89 applicants for Qualified Assistants' certificates. At the examination held at the Girls' High School, at Harrisburg, April 25, there were 107 applicants for Registered Pharmacists' certificates, and 49 for Qualified Assistants; of these numbers 71 and 38, respectively, were successful.

The Massachusetts College of Pharmacy held its twenty-third annual commencement, May 27, when President Sheppard conferred the degree of Ph.G. upon 27 candidates. Addresses were delivered by Professor G. R. Tucker and F. W. Day, Ph.G.

The New York College of Pharmacy held its sixty-first commencement

April 27, when 119 candidates received the degree of Ph.G. at the hands of Vice-President Massey. The valedictory address on behalf of the class was delivered by F. E. Nabers, and Mr. Milhau, president of the graduating class, presented to Professor Bedford a valuable watch, as a mark of their esteem. Before the close of the session Prof. Bedford had resigned his position, which he has creditably filled for a long period, intending to devote his entire time to other labors; to the success in his new field of work, he carries with him the best wishes of his numerous friends. The vacancy thus occasioned has been filled by the election of Prof. Virgil Coblentz. Prof. Coblentz graduated with honors at the Philadelphia College of Pharmacy in 1882, held for several years the chair of Materia Medica in the Cincinnati College of Pharmacy, and continued his studies in Germany, receiving the degree of doctor of philosophy at the University of Berlin.

The National College of Pharmacy, Washington, D. C., had its nineteenth commencement on the evening of May 12, when 20 candidates received the diploma through Professor Waggaman, the president of the College. Addresses were delivered by Hon. J. L. Chipman, and on behalf of the class by W. G. Roe.

The Alabama Pharmaceutical Association convened at its tenth annual meeting at Huntsville, May 12, and in the absence of the presiding officers was called to order by secretary Candidus. J. D. Humphrey, of Huntsville, presided. The usual reports claimed most of the attention, and the schemes for preventing cutting of prices were discussed, the resolutions passed at New Orleans being concurred in. Besides the officers mentioned before, the following were elected to serve for the ensuing year; M. F. Tucker, Mobile, vice-president; E. P. Galt, Selma, treasurer, and A. Van Antwerp, Mobile, local secretary. The next meeting will take place at Mobile, May 10, 1892.

The Arkansas Pharmaceutical Association met at its ninth meeting at Hot Springs, May 20, and transacted chiefly routine business. E. E. Shendal, Hot Springs, was elected president; J. W. Beidelman, Little Rock, secretary, and J. A. Jungkind, Little Rock, treasurer. The next meeting will convene at Fort Smith, in May, 1892.

The Connecticut Pharmaceutical Association held its fifteenth meeting at New Haven, February 3, president Gessner in the chair. Routine business, reports of committees, and discussions on cut rates and other topics claimed the attention of the association. E. A. Gessner was re-elected president, L. H. Goodwin treasurer, and F. Wilcox secretary. The next annual meeting will be held at Hartford in February.

The Florida State Pharmaceutical Association assembled in fifth annual meeting, at Jacksonville, May 19, president Rawls in the chair. A gold and a silver medal were awarded for two of the papers read at the meeting. A. E. Phillips, Sanford, was elected president; and secretary Watson and treasurer Delouest were re-elected. The next meeting will be held at St. Augustine, April 12, 1892.

The Georgia Pharmaceutical Association met at its sixteenth annual meeting in Augusta, May 12, president Goodwyn in the chair. The usual annual reports and several interesting essays were read and discussed. H. R Slack,

Jr., Lagrange, was elected president; M. H. Taylor, Macon, treasurer, and H. H. Arrington, Summerville, secretary. Columbus was selected as the place for holding the next meeting, May 10, 1892, and J. P. Turner was appointed local secretary.

The Indiana Pharmaceutical Association convened in Indianapolis, May 6, in tenth annual meeting, president Hurty presiding. The customary reports were read, several papers, chiefly of a practical nature, were read; Prof. Oldberg delivered a lecture on weights and measures and on the metric system; the action taken at New Orleans for regulating price cutting on proprietary articles was endorsed. Prof. Oldberg and L. M. Andrews were elected honorary members; W. C. Buntin, Terre Haute, president; G. G. Allen, Indianapolis, treasurer, and F. W. Meissner, La Porte, secretary.

The Kansas Pharmaceutical Association had its twelfth annual meeting, at Ottawa, May 19. Besides the annual reports, the reading of papers, the discussions on the pharmacy law and of other topics, a very attractive feature was the microscopic exhibition, including the use of the projecting microscope. C. L. Becker, Ottawa, was chosen president; J. T. Moore, Lawrence, secretary, and H. W. Spangler, Perry, treasurer. Kansas City was selected for holding the next meeting, the date of which will be announced hereafter.

The Kentucky Pharmaceutical Association held its fourteenth annual meeting at Frankfort, May 20, president Brooks in the chair. Reports of officers and committees were presented, papers were read on "Triturations," "soluble Pill coating," and other subjects; the plan adopted at New Orleans for preventing price cutting was concurred in; and the following resolution was adopted:

Resolved, That the Legislative Committee be and is hereby authorized to take such steps as may be deemed necessary to obtain an amendment to the existing pharmacy laws that will place druggists on a footing with grocers in the collection of debts, and make their claims against decedents for necessaries furnished during the last illness preferred.

The officers elected for the present year are: W. Chapman, Frankfort, presi, dent; J. W. Gayle, Frankfort, permanent secretary, and H. Jett, Cynthiana-treasurer. The meeting adjourned to meet again at Carrollton, May 18, 1892.

The Louisiana State Pharmaceutical Association had postponed its ninth meeting from the second week in April so as to meet simultaneously with the American Pharmaceutical Association. President Breslin presided. Several papers were read, aside from the usual reports, and discussions were had on drug adulteration and on amendments to the pharmacy law; a motion by Prof. Metz, requesting the pharmacy department of Tulane University to change the degree of master in pharmacy, which is now conferred, to graduate in pharmacy so as to harmonize with other Colleges of Pharmacy, was opposed by former graduates of the university on the plea that the value of their diplomas would be reduced by such a step, and the matter was laid upon the table. The next meeting will again be held in New Orleans, the date being April 13, 1892. President for the current year is John Johnston; the corresponding secretary Mrs. E. Rudolf, the recording secretary L. F. Chalin, and the treasurer E. Lalmant, were re-elected.

The Maryland Pharmaceutical Association held its eighth meeting at the hall of the Maryland College of Pharmacy, April 16, Prof. Culbreth presiding. It was reported that the state pharmacy bill had passed the Senate, but failed in the House owing to the opposition of the country storekeepers; the bill will be again presented to the Legislature. Prof. Simon read a paper on the unit for atomic weights, opposing the selection of oxygen for the purpose. E. M. Foreman, Centreville, was chosen President, J. W. Geiger Secretary, and S. Mansfield Treasurer. The Association will meet again in Baltimore November 13, next.

The Missouri Pharmaceutical Association met at Excelsior Springs, June 9, for three days' work and enjoyment. The address of president Bard, the reports of the secretary, treasurer and of the various committees furnished material for discussions; likewise the papers read, among them one by Prof. Curtman, on testing of chemicals for small amounts of impurities; by G. H. C. Klie, on nitroglycerin, pyroxylin, ground flaxseed and others. The proposed amended pharmacy law, the metric system, cut rates and other subjects received the attention of the meeting, and the resolutions adopted at New Orleans were considered and approved. Dr. Chas Mohr, Mobile, was elected an honorary member. President for the current year is Prof. F. Hemm; secretary Klie, treasurer G. J. Meyer, and local secretary M. Cravens were re-elected. The association adjourned to meet again at the "Elms," Excelsior Springs, June 14, 1892.

The New Jersey Pharmaceutical Association convened at Trenton, May 27, this being the twenty-first annual meeting. In his address, president M. Abernethy suggested the establishment of a State Laboratory under the auspices of the Association, where pharmaceutical preparations should be manufactured and furnished to the members at the lowest cost compatible with the keeping up of the establishment; he expressed the belief that physicians would soon learn that such preparations were made by skilful chemists, uniform in strength and perfect in finish, and that every pharmacist in the State would be desirous of becoming a member of the Association. The suggestion was favorably considered, and a committee of five was appointed, W. Scott Taylor, Trenton, chairman, for elaborating a feasible plan for the establishment of such a laboratory. Papers were read on "Pills, Tablets and Triturates," by J. F. Somerhoff. "Amenities of Business," by Prof. Bedford; "Some Drugs and Foods in the Market," by A. Drescher; "Rock Candy Syrup," by H. J. Lohman; "Aromatic Spirit of Ammonia," by P. E. Hommell, etc. President for the current year is F. R. Danis, Morristown; secretary, C. F. Dare, Bridgeton, and treasurer, W. M. Townley, Newark, were re-elected. Plainfield was chosen as the place for holding the meeting in May, 1892.

The Ohio State Pharmaceutical Association met in Dayton, June 9, at its thirteenth annual meeting, president Heath in the chair. Reports were presented by the different officers and committees, and a number of papers were read on the assaying of drugs and fluid extracts, and on various pharmaceutical preparations. Prof. C. L. Diehl, of Louisville, and A. E. Ebert, of Chicago, were elected honorary members. M. A. Burkhardt, Dayton, is president for the current year; the permanent officers are L. C. Hopp, Cleveland,

secretary, and F. A. Kautz, Cincinnati, treasurer. Next year the association will meet in Canton, June 14.

The Pennsylvania Pharmaceutical Association had for the first time selected a summer resort for its annual reunion, the fourteenth meeting having been called at the Bedford Springs Hotel, located near the northern end of the Cumberland Valley, and about 37 miles south from the main line of the Pennsylvania Railroad at Huntingdon. The springs are about a mile distant from the town of Bedford in the narrow valley of Schober's Run, one of the tributaries of the Juniata; the hills are forest-clad and endowed with an interesting flora. The meeting lasted from Tuesday, June 23, to Thursday, five sessions being held during that time, and was welcomed by Hon. John Cessna and by Chief Burgess McNamara, of Bedford. President J. H. Stein occupied the chair, and delivered a very interesting address, discussing, among other topics, the aims and relation of pharmaceutical education and legislation. The treasurer reported the finances to be in a favorable condition, the cash balance remaining on hand having increased to over $1,000. Among the reports that of the committee on legislation created some discussion as to the causes of the failures of the amendments to the pharmacy law which had been before the legislature during the past year. The subject was referred to a committee, whose report was at a later session adopted; it contained a protest against the clause of the pharmacy law permitting the registration as pharmacists of physicians merely upon proof of three years' medical practice, and without requiring any pharmaceutical experience whatever; and it declared the ultimate object of pharmaceutical legislation to be increased usefulness secured by thorough education. A very pleasing feature of the meeting was the presence of a delegation from the Pennsylvania Medical Association. Dr. Bishop, one of the delegates, advocated concerted action of the two State societies, whereby the desirable and necessary legislation for each profession could be best secured. Only three papers were read at this meeting, one of which is printed in the present number of the Journal. F. H. Gleim contributed a paper on soap liniment, suggesting a reduction of the strength of the alcohol with the view of preventing precipitation. A paper by W. H. Reed discussed the subject of cut rates on proprietary articles. Messrs. Chas. Mohr, Mobile; W. T. Wenzell, San Francisco; Chas. Rice, New York, and C. L. Diehl, Louisville, were elected honorary members. The officers for the current year are: John F. Patton, York, president; W. H. McGarrah, Scranton, and Wm. McIntyre, Philadelphia, vice-presidents. Secretary Miller and treasurer Lemberger, who have served the association in these positions since its organization, were re-elected. The next meeting is to be held at the hotel Shikeliney, Susquehanna Heights, in the immediate neighborhood of Sunbury and Northumberland, June 14, 1892. D. M. Krauser, Milton, was elected assistant secretary.

The Texas Pharmaceutical Association held its twelfth annual meeting at Houston, May 12, President Morrison in the Chair. The transactions consisted of the usual routine business, the president's address, reports of committees and the reading of several papers. George Kalteyer, San Antonio, was elected president; W. F. Shook, Dallas, treasurer, and L. M. Connor, Dallas, secretary. Waco was selected as the place for holding the next meeting May 10, 1892; H. L. Carleton, local secretary.

The Washington Pharmaceutical Association met at Ellensburg, May 11, elected W. P. Bonney, Tacoma, president; H. Dubbs, Seattle, treasurer, and W. St. John, Tacoma, secretary, and adjourned to meet again in Seattle, May 10, 1892.

The Pharmaceutical Society of Great Britain celebrated the fiftieth anniversary of its foundation, Tuesday, May 26, by a reception in the lecture theatre of the Society's building, 17 Bloomsbury Square, London, the President, Michael Carteighe, receiving the visitors. A large number of addresses were presented from pharmaceutic and other scientific societies of Great Britain, France, Germany and Belgium, and by their representatives were read, or the congratulations expressed verbally. A still larger number of congratulatory addresses had come from similar societies, from members and honorary members, and from prominent pharmacists and others residing in different parts of the globe.

The Hanbury Medal was awarded on the same evening (for previous awards, see this Journal, 1889, p. 492) to Dr. Oswald Hesse, of Feuerbach, near Stuttgart, Germany, probably the highest living authority on the chemistry of the cinchona alkaloids, also an investigator of santonin, Calabar bean, coto bark, coca and of many other drugs. The recipient of this mark of distinction, in expressing his thanks, presented in return a valuable monograph, entitled a study of coca leaves and their alkaloids, which has since been published in Pharmaceutical Journal and Transactions.

The Jubilee came to a close by a grand dinner on the following Wednesday evening, at which a number of toasts were proposed and speeches were made by many of the scientists present as visitors.

REVIEWS.

The Pocket Materia Medica and Therapeutics: a Résumé of the Action and Doses of All Officinal and Non-officinal Drugs Now in Common use. By C. Henri Leonard, A.M., M.D., Professor of Medical and Surgical Diseases of Women and Clinical Gynæcology in the Detroit College of Medicine. Cloth, 12mo, 300 pages; price, postpaid, $1.00. The Illustrated Medical Journal Company, publishers, Detroit.

Among the special features of this work may be mentioned the indication of pronunciation of the drug-names, with the genitive case-ending, and the compactness of the information. Non-pharmacopœial names are, as a rule, indicated by an asterisk (*); the common names are given, followed by the dose, and then by the synonyms, English, French and German, in the latter case, however, without paying any attention to the use of the customary capital letters. The descriptions of plants are mostly too brief for botanical recognition; the characterization of the drugs is quite condensed; their action is briefly indicated, and the diseases are mentioned in which their use has been recommended; synergists, antagonists, antidotes and incompatibles are also indicated, and finally the various pharmaceutical preparations of each drug with their doses. The proof-reader has overlooked some errors, like flores arnic*a*, p. 49; berberin*a* sulphas, p. 61; guai(*a*)ci lignum and resina, pp. 138, 139. The book is a

handy and useful remembrancer to the physician, giving information on all pharmacopœial remedial agents, and on a large number of old and of recently introduced drugs.

Veterinary Counter Practice. A treatise on the diseases of animals and the most suitable remedies for them. Written expressly for chemists and druggists by qualified members of the Royal Veterinary Colleges. Published at the offices of the "Chemist and Druggist," London and Melbourne. 12mo, pp. 268. Price, 3*s.* 6*d.*

A popular treatise on diseases of animals and on suitable remedies therefor is here presented, which while mainly intended for the apothecary and druggist, may also be consulted by other intelligent persons interested in domestic animals. Opening with general remarks on the treatment of animals in disease, the veterinary medicines of more general application are next considered and a number of formulas are presented, after which the diseases of the different animals are described and their special treatment indicated. Most of the space is devoted to the diseases of the horse; next to cattle, sheep, pigs, dogs and poultry. An appendix contains a copy of the Veterinary Surgeons Act of 1881, a synopsis of the Contagious Diseases (Animals) Acts, of the British laws relating to the sale of horses, and the veterinary curriculum. A good index renders the consulting of the little work quite easy. The book is intelligently written, suitably illustrated, and appears to well fulfil its aim of presenting suggestions which in many instances will enable the druggist to understand cases detailed to him at his counter and to supply the most suitable remedy.

The Species of Epilobium occurring north of Mexico. By William Trelease. 8vo. pp. 50, and 48 plates.

This monograph is a separate issue from the second annual report of the Missouri Botanical Garden, in which the author critically reviews the North American species of Epilobium, describing thirty-eight, and an additional one, *E. Pringleanum*, Haussknecht, which he had doubtfully described as a variety, *gracillimum*, of *E. Oregonense*, Haussknecht. Several other plants are mentioned which are regarded as hybrids, or some of them possibly as distinct species. The monograph is a very valuable addition to North American botanical literature; the plates are handsomely executed, and plainly illustrate the characteristics of the species.

Proceedings of the Seventh Annual Convention of the Association of official Agricultural Chemists, held at the U. S. National Museum, August 28, 29 and 30, 1890. Edited by Harvey W. Wiley, Secretary of the Association. Published by authority of the Secretary of Agriculture. Washington, 1890. 8vo. pp. 238.

The pamphlet is issued as Bulletin No. 28, Division of Chemistry, U. S. Department of Agriculture. It contains methods of analysis of commercial fertilizers, foods and feeding stuffs, dairy products, fermented liquors and sugars.

Annual Address of the President, Dr. C. A. Crampton, delivered before the Chemical Society of Washington, January 22, 1891, on food preservation and food preservatives. 8vo. pp. 24.

Reprint from Bulletin No. 6 of the Chemical Society of Washington.

Medical Symbolism, in connection with historical studies in the arts of healing and hygiene. Illustrated. By Thos. S. Sozinskey, M.D., Ph.D., etc. Philadelphia and London: F. A. Davis. 1891. pp. 171. Price, $1.00.

A very interesting little work, treating quite fully of medical mythology and the origin and meaning of such symbols like the Æsculapian staff and serpent, the pinecone, tree of life, pentacle, etc. A small chapter is also devoted to pharmacists' symbols, and the author comes to the conclusion that "say 1,000 years before Moses, people were in the habit of having medicines stored in vases of a set kind, and that the Babylonians had considerable pharmaceutical knowledge." The work is posthumous, the author having died two years ago, and is published as No. 9 in the Physicians' and Students' Ready Reference Series.

Aperçu du Premier Rapport du Laboratoire Chimico-Pharmaceutique du Jardin Botanique de l'Etat de Buitenzorg. Par M. Greshoff. 8vo, pp. 14.

Brief account of the first report from the chemico-pharmaceutical Laboratory of the State Botanical Garden at Buitenzorg.

A reprint from vol. ix of the Annales du Jardin Botanique de Buitenzorg. The interesting results of the investigations carried on by the author, are given in a paper published in our last number, pp. 230–236.

Proceedings of the New Hampshire Pharmaceutical Association, at the seventeenth annual meeting held at The Weirs, September 16 and 17, 1890. Derry: 1891, pp. 37.

The executive officers for the current year are E. H. Currier, Manchester, president; S. H. Bell, Derry Depot, secretary; and F. A. James, Manchester, treasurer. The next annual meeting will be held at Exeter on the second Tuesday of September, 1891.

The Total Eclipse of the Sun, January 1, 1889. A report of the Observations made by the Washington University Eclipse Party at Norman, California. Published by the Academy of Science, of St. Louis. Cambridge: John Wilson & Son, 1891, 4°. pp. 39.

The interesting pamphlet contains seven large illustrations from photographs and drawings made, during the eclipse, of the sun and corona.

How should girls be educated? A public health problem, for mothers, educators and physicians. By William Warren Potter, M.D., of Buffalo. 8vo, pp. 17.

The anniversary address of the President, delivered at the 85th annual meeting of the Medical Society of the State of New York, reprinted from the Transactions.

Ueber eine interessante Reaction des p-Phenetidins und Phenacetins. Von Ludwig Reuter. Heidelberg, 1891, pp. 8.

On an interesting reaction of para-phenetidin and phenacetin.

VARIETIES.

Collodion of Iodol, for covering small abrasions, is made by Pick of iodol 1, ether 5, and pyroxylin 0·5 gm. See also AMER. JOUR. PHAR., 1887, p. 562.

Cocaine dissolved in castor oil was found by Dr. S. Mitchell (*Bost. Med. and Surg. Jour.*) to relieve the pain caused by a corneal ulcer and to favor the healing process.

Powder for Migraine.—Caffeine citrate, 0·10; phenacetin, 0·12; milk sugar, 0·25 gm. If necessary the dose may be repeated in two hours.—*La Médecine moderne.*

Poisoning by Male Fern is reported by Hofmann (*Wien. klin. Wochenschr.*) in the case of a girl 5½ years old, who took 7·5 gm. oleoresin of male fern in three doses within 1¾ hours. A portion of the tape worm was expelled in 1½ hours, then vomiting and somnolence set in, which after three hours, was followed by convulsions and death. The fatal result was presumably caused by impaired resistance due to miliary tuberculosis of the lungs and abdominal glands.

Gelatin paste, recommended by Unna, has been used by Prof. Trendelenberg for flexible dressing, permitting free motion of the parts, and not interfering with the excretory functions of the skin. It is prepared in two degrees of consistence: The thick paste contains gelatin, glycerin and water each 30 parts, with oxide of zinc 10 parts. The thin paste has gelatin 20 parts, glycerin 30 parts, water 40, with oxide of zinc 10 parts. Heat is necessary when the pastes are compounded; it is also needed to liquefy them when they are used. The pastes are readily removed with warm water.—*Jour. Am. Med. Assoc.*, Jan. 10.

Monesia bark from Chrysophyllum glyciphlæum, *Casaretti*, has been studied by P. G. Rozanoff (*Inaug. Dissert. Moscow*, 1890), who considers it to be a very good expectorant, due to the presence of saponin and monesin; abounding in tannin, the bark possesses also valuable astringent properties.

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AUGUST, 1891.

HAPLOPAPPUS BAYLAHUEN—C. GAY.*

[*Hysterionica Baylahuen* (Gay) Baillon.]

By Harry Kahn, Phar. M.

This plant, which is indigenous to Chili, has until recently been little known to science. The February 28, 1889, issue of the *Bulletin Général de Thérapeutique*, p. 160, contains a paper by Dr. G. Baillé, and in the *Druggists' Bulletin*, 4, 39, may be found a paper, with an illustration, by Dr. H. Rusby.

Gay's description of the plant under consideration, as translated by Rusby, is as follows: Stem woody, cylindrical, ramose, glutinous and lightly sulcate, the same as the branches, which are elongated, and very glabrous, nearly naked in the upper part, all terminated by a single head. Leaves coriaceous, thick, with a base persistent upon the stem, much crowded below the branches, obovate spatulate, nearly cuneiform, narrowed at the base, half clasping, slightly wavy above the middle; they are bordered by thick teeth, glutinous, very glabrous on both faces, an inch long at the most and 4 to 6 lines wide. Involucre campanulate, formed of some four rows of scales, the exterior of which are foliaceous, ovate dentate, the interior lance-linear, acuminate, entire, scariose, slightly membranous at the margins, nearly as large as the disk flowers, longer than the ligules. Akenes very glabrous; pappus of a tawny reddish color.

* My thanks are due to Parke, Davis & Co., of Detroit, Mich., for the very liberal supply of drug for this analysis.

There are only two works in which any reference to the medicinal properties of this drug can be found (Rusby, *Druggists' Bulletin*, 441). One is *Historia Fisica y Politica de Chili, Flora*, Tomo iv., p. 43, where it is stated: "It grows in the high ranges of Hardato (Province of Coquimbo). The peasants use it to cure ulcers of horses and other animals." The other work is *Elementos de Botanica para el Uso de los Estudiantes de Medicina y Farmacia en Chili*, by Dr. R. A. Philippi, p. 324, in which the following statement may be found: "The peasants use it in the diseases of women and to cure ulcers of horses," etc.

There appeared, as before noted, in the *Bulletin Général de Thérapeutique*, of February 28, 1889, p. 160, a paper by Dr. G. Baillé, in which he stated that Dr. Dujardin-Beaumetz had received from Dr. Cervello, of Valparaiso, Chili, a small supply of the plant, which he stated, possessed an especial action in certain gastro-intestinal diseases, especially chronic hæmorrhages of the lower bowel, flatulent dyspepsia, indigestion, etc.

Dr. Dujardin-Beaumetz referred the drug to Dr. Baillé for investigation. The latter found on examination of the drug a volatile and a fixed oil, the latter in considerable quantity, and having the same odor which characterizes the plant, also large quantity of a brown acid viscous resin, which possessed the odor of the plant and an irritating taste, together with a little tannin and other ordinary vegetable constituents. "To this resin and oil then," Dr. Baillé says, "we must refer the medicinal properties of the plant." As to the properties his observations are given in full. He concludes as follows: "*Hysterionica Baylahuen*, given in infusion, is an excellent anti-diarrhœic and has produced in the hands of Dr. Cervello excellent effects in the treatment of malarial and chronic dysentery. The results obtained by us in the treatment of diarrhœa of phthisis, led us to test its employment in the diarrhœas supervening upon the course of certain cachectic maladies, as cancer, and so on. The infusion of *Hysterionica*, perhaps, permits of continued urgent employment of a medicament like copaiba and mercury by suppressing the diarrhœa which these occasion. *Hysterionica* can perhaps replace the balsamics and other applications in the treatment of the respiratory apparatus. Given in the form of an alcoholic tincture this plant does not produce constipation. Applied to the treatment of the genito-urinary apparatus, it appears to produce

the result of modifying the urine and diminishing the bad odor. In the treatment of ulcers, applying its collodion to the wound gives an antiseptic covering, which excludes the contact of air and of micro-organisms and facilitates cicatrization. The infusion has given us the best results and it is in the infusion that we advise the use of *Hysterionica*."

In the *Therapeutic Gazette*, 15, 67, DR. H. GILBERT states that Haplopappus Baylahuen is of the utmost value in chronic diarrhœa.

The infusion of the drug was examined for a crystalline principle, but all efforts in that direction have as yet failed, tannin being the only important constituent found.

The resin which constitutes a large portion of the drug (21·15 per cent.) was examined. In order to obtain it the drug, in moderately fine powder, was mixed with coarsely powdered glass; placed in a "Gomberg's extraction apparatus," and extracted with alcohol until the menstruum came through nearly colorless, which took from 18 to 24 hours, after which the resin was obtained by the usual method.

After trying many methods for the separation of the resin the following was found the most satisfactory.

The resin was treated with a one-fourth saturated solution of sodium hydroxide, raised to the boiling point, when two layers were formed, one dark green and thick, the other brown and clear. The brown solution was syphoned off and when cold, to it was added a solution of barium chloride, which formed a light greenish yellow precipitate (*a*) and a light yellow supernatant liquid.

The green solution was dissolved in hot water and while hot barium chloride was added. A precipitate (*b*) green in color and somewhat darker than (*a*) was obtained. The supernatant liquid was dark reddish color.

Alpha.—The light greenish yellow precipitate (*a*) on being decomposed by hydrochloric acid gave a dark brown precipitate which was difficultly soluble in alcohol.

Beta.—The yellow supernatant liquid from (*a*) was made acid with hydrochloric acid, giving a yellow amorphous precipitate, which after being dissolved in alcohol and the alcohol evaporated, a soft solid resin remained.

Gamma.—The precipitate (*b*) after treatment with hydrochloric acid gave a granular green precipitate, which settled very rapidly into a cake.

Delta.—The supernatant liquid of the precipitate (*b*) was made acid with hydrochloric acid, which precipitated a reddish brown substance in flocks, which after solution in alcohol and evaporation formed into a soft mass.

The different physical characters, together with the following reactions with reagents, have led me to believe the four above-named substances to be different.

Reagents.	Alpha.	Beta.	Gamma.	Delta.
Sulphuric acid.	Seal brown with green edge.	Reddish brown with green edge.	Crimson.	Red with light green edge.
Fuming nitric acid.	Very light yellowish brown.	Reddish yellow with green edge.	Very light yellow solution.	Reddish yellow like β with greenish edge.
Sulphuric acid and sugar.	Yellowish brown with green edge.		Dark red with purple edge.	Dark red.
Froehde's reagent.	Brown with green edge after standing.	Dark brown with emerald green edge.	Dark brown with blue edge.	Dark brown with green edge.

The original resin is bronze colored, but if left in contact with air becomes dark green.

In the analysis of the drug the scheme of DRAGENDORFF was followed.

I. The drug was ground in an iron mortar until all passed through a No. 80 sieve. After the iron, which had been mechanically obtained from the mortar, was removed by a magnet, one gram was heated in an air bath at 110° C. to constant weight, which was ·9124 Gm., making a loss of ·0876 Gm., of which ·0665 Gm. was volatile oil, the remainder, ·0211 Gm., being *moisture.*

II. One gram was ignited at a low red heat in a platinum crucible. The resulting ash weighed ·1269 Gm., of which ·0171 Gm. was soluble in water, ·0605 Gm. soluble in hydrochloric acid ·0493 Gm. insoluble in these solvents. The ash consisted of the usual constituents.

III. Ten grams of the drug were macerated for eight days in 100 cc. of petroleum spirit, boiling between 40° and 80° C. with occasional shaking.

(*a*) The volatile oil was estimated by the method of Osse (*Archiv d. Pharm.* [3] 7, 104) ·665 Gm. was found.

(*b*) After the estimation of (*a*) the remainder of the petroleum spirit extract was evaporated to dryness, the temperature then raised to 110° C., water was then added and the residue again evaporated to dryness. The residue was treated with a small quantity of petroleum spirit, when the spirit evaporated. No fixed oil could be detected. The resin, which weighed ·479 Gm., was of a green color, and easily soluble in cold solution of potassium hydroxide.

IV. After the drug had been thoroughly washed with petroleum spirit, it was dried at the ordinary temperature in a current of dry air, then macerated for seven days, with occasional shaking, in 100 cc. of ether, which had been allowed to stand over calcium chloride, then distilled.

(*a*) The ether extract was evaporated to dryness in a current of dry air. The residue was treated with water, which took up a substance which had a pleasant acetic odor and was acid to litmus, but which was present in such small quantity that no attempt was made at quantitative estimation.

(*b*) After treatment with water, the residue was placed in a desiccator over sulphuric acid until dry, when it was treated with petroleum spirit, but, as before, no fixed oil could be extracted. The residue 1·329 Gm. was a soft resin.

V. After dissipation of the ether, the drug was macerated in 100 cc. of absolute alcohol, for seven days, with occasional shaking.

(*a*) The alcoholic extract was partly evaporated under diminished pressure, then finished on the water bath. The residue was treated with water, which took up ·028 Gm. This water extract had an acid reaction, was turned slightly green by ferric chloride, and was precipitated by lead acetate.

(*b*) The remainder of the residue, ·307 Gm. was a greenish yellow resin, soluble in potassium hydroxide and in dilute ammonia water.

VI. The drug, after extraction with alcohol, was then macerated for two days, with occasional shaking, with 100 cc. of water.

(*a*) An aliquot part of the water extract was taken, mixed with two volumes of absolute alcohol, allowed to stand in an ice chest for two days. The precipitate was then collected, washed with 66 per cent. alcohol, ·146 Gm. was found, which consisted of mucilage, together with some albuminoid matter.

(*b*) The filtrate and washings from (*a*) were evaporated to a small bulk, then 4 volumes of absolute alcohol were added. A precipitate was formed which weighed ·262 Gm. This precipitate consisted of dextrin and allied substances.

(*c*) The filtrate and washings from (*b*) were heated to drive off the alcohol, then lead acetate was added and the solution set aside for two days. The precipitate was collected and ignited according to the directions given by FRESENIUS (*Quantitative analysis*, 1881, 299, [b]). The organic matter in the precipitate was ·227 Gm., which may be noted as *organic acids*, of which tannic acid constitutes the largest part.

(*d*) The remaining ·347 Gm. of the water extract consisted of coloring matter, albuminoids, etc.

VII. The drug while still moist was macerated with 100 cc. of a ·2 per cent. solution of sodium hydroxide for one day.

(*a*) An aliquot part of the solution was mixed with 3 volumes of 90 per cent. alcohol, and allowed to stand 24 hours in an ice chest. The precipitate weighed ·142 Gm. It consisted of mucilaginous substances (pectin) and albuminoids.

(*b*) The filtrate from (*a*) was evaporated to dryness, weighed, and then ignited; the loss was ·222 Gm., which was mostly decomposition products and albuminoids not precipitated by alcohol.

VIII. The residue from VII was washed with water, then macerated in 100 cc. of a 1 per cent. solution of hydrochloric acid. No starch could be found under the microscope, so only the estimation of parabin and calcium oxalate was found necessary.

(*a*) The solution was raised to boiling, filtered while hot, an aliquot part neutralized with ammonia, then 3 volumes of 90 per cent. alcohol were added. The precipitate was collected, dried and weighed, then ignited; the loss, which was ·340 Gm., was parabin. (*b*) The remaining calcium oxide was calculated to oxalate, which was ·143 Gm.

IX. The residue from VIII was first washed with water, then alcohol, and then with ether, finally dried, weighed, then ignited, the difference being cellulose, lignin, etc., which was 3·752 Gm.

Summary:

	Per Cent.
Moisture, I.,	2·11
Ash, II.,	12·67

	Per Cent.
Volatile oil, III. (*a*),	6·65
Resin III. (*b*), IV, (*b*), V (*b*),	21·15
Organic Acids (Tannin, etc.) V. (*a*), VI. (*c*),	2·55
Mucilage, VI. (*a*),	1·46
Dextrin, VI. (*b*),	2·62
Albuminoids, coloring matter, etc., VI. (*d*),	3·47
NaOH extract not precipitated by Alcohol, VII. (*b*),	2·22
NaOH extract precipitated by Alcohol, VII. (*a*),	1·42
Calcium oxalate, VIII. (*b*),	1·43
Parabin, VIII. (*a*),	3·40
Cellulose, Lignin, etc., IX.,	37·52
Loss,	1·33

University of Michigan,
School of Pharmacy, June, 1891.

ANTHEMIS COTULA.

By William H. Haake, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 91.

Mayweed is naturalized in the United States from Europe, and is found in roadsides and other waste places. The flowers which are employed as a domestic remedy were used for this investigation.

On drying some of the powder to constant weight at 100°, the loss which was regarded as moisture amounted to 5·73 per cent. 7·82 per cent. of ash were obtained by ignition, of which 41·22 per cent. dissolved in water, 45·80 per cent. in dilute hydrochloric acid, and the remainder, 12·97 per cent., was regarded as silica and silicates.

Fifty grams of the finely powdered drug were exhausted with petroleum ether, the solvent recovered by distillation and the residue found to amount to 1·33 per cent., of which ·66 per cent. were dissolved by 95 per cent. alcohol, indicating fat, ·50 per cent. soluble in absolute alcohol, indicating wax and ·16 per cent. of caoutchouc. There was also a distinct quantity of volatile oil, which, however, was not estimated.

Stronger ether extracted 1·11 per cent. of resin together with traces of a bitter principle and a small quantity of organic acid, which darkened with ferric chloride. This acid was obtained by dissolving the resin in alcohol, pouring the solution into water acidified with hydrochloric acid and the clear solution, after separa-

tion of resin, agitated with ether or chloroform, which left a slightly acid residue on evaporation.

Absolute alcohol extracted from the drug 2·18 per cent. of resin, with traces of an organic acid and traces of a bitter principle. The solution of the alcohol extract dissolved in alcohol, poured into water acidified with dilute hydrochloric acid and then made alkaline yielded on agitation with chloroform and evaporation of this solvent a substance which, when dissolved in dilute acid, gave precipitates with alkaloidal reagents, similar indications were gotten from residues of agitations of ether and chloroform with the acidified aqueous solution of the alcohol extract.

Water extracted from the drug 17·78 per cent. of solid matter, 3·20 per cent. of which was ash, leaving 14·58 per cent. of organic matter in the aqueous extract. This contained 3·20 per cent. of mucilage, 4·32 per cent. of glucose and 3·62 per cent. of unreducible sugar, leaving 3·44 per cent. of undetermined extractive. The drug then yielded 7·74 per cent. to dilute soda solution. 2·96 per cent. of this consisted of albuminoids; the remainder of the alkaline extract was undetermined. Dilute hydrochloric acid then extracted from the drug 3·60 per cent., of which 1·28 per cent. was found to be calcium oxalate and 1·13 per cent. pararabin.

The lignin was found to equal 5·43 per cent., and the amount of cellulose was not determined.

A convenient quantity of the drug was distilled with a one per cent. aqueous solution of sulphuric acid. The distillate was neutralized with calcium carbonate and filtered, the filtrate was concentrated to a small bulk and a portion warmed with sulphuric acid, when a strong odor of valerianic acid was evolved; to another portion sulphuric acid and alcohol were added when the odor of valerianic ether became very apparent on warming.

A quantity of the drug was distilled with milk of lime, the distillate, which was alkaline, was acidified with hydrochloric acid and agitated with ether which removed volatile oil. The distillate was then made alkaline and agitated successively with ether and chloroform. A slight excess of hydrochloric acid was added to each and the solvent allowed to evaporate spontaneously. The two residues appeared to be identical, so they were mixed, dissolved in ether and set aside to evaporate spontaneously which left the alkaloid in a pure state. This alkaloid was a reddish brown volatile liquid,

with a characteristic odor and taste, and soluble in chloroform, ether, alcohol and water. When acidified, its aqueous solution produced a yellow precipitate with Mayer's reagent, a dark yellow with potassium tri-iodide, a reddish with tannin and a reduction with auric chloride.

In addition to the usual plant constituents mayweed contains small quantities of a bitter principle, valerianic acid and a volatile alkaloid. The small amount of bitter principle possessed the properties of a glucoside.

POLYGONATUM BIFLORUM.

By Benjamin H. Gorrell, Jr., Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 92.

This plant flourishes abundantly in North America from New Brunswick to Florida and west to Minnesota, Eastern Kansas and Texas, being most abundant on wooded hillsides, and where the soil is not too dry or sandy.

The drug consisting of the underground portion comes in the market in pieces $\frac{1}{5}$ to $\frac{1}{4}$ inch in diameter and 2 to 6 inches in length. The larger pieces are sliced. The color is pale yellow, odor peculiar and reminding one of squill. The fracture is rather short and horny showing internally a white color. The taste is mucilaginous, sweetish and afterward faintly bitter.

Fifty grams were dried at 100° and afterward reduced to a very fine powder. This powder if exposed to the air absorbed moisture rapidly and became solid, in this respect very much resembling squill. The moisture was found to be 5·9 per cent. This was gotten by taking that which had been dried at 100° and heating to constant weight at 110°. The ash of that dried at 100° was found to be 2·30 per cent. 14·70 per cent. of this ash was soluble in water and 73·30 per cent. in dilute hydrochloric acid.

The usual solvents were employed successively on the drug.

Petroleum ether extracted ·22 per cent. which was not further examined.

Stronger ether dissolved ·12 per cent., resinous in character. This treated with warm water and the water tested with ferric chloride indicated the absence of tannin or gallic acid.

This solution also slightly reduced Fehling's solution, and gave an aromatic odor on heating with dilute hydrochloric acid.

The absolute alcohol extract amounted to ·72 per cent., which was found to be resinous in character. When, however, it was treated with water a small quantity of something was dissolved which reddened litmus paper, but was not affected by ferric chloride.

Water proved to be the best solvent of the drug, extracting 74·50 per cent. 15·70 per cent. of this was glucose, 18·40 of non-reducible sugar and ·60 per cent. of mucilage. The remainder of the aqueous extract appeared to consist of sinistrin, and to this constituent is due the resemblance to squill.

The dilute alkali extract of the drug amounted to 5·00 per cent., which was nearly all precipitated by alcohol and acetic acid, indicating it to be largely composed of albuminoid matter.

The dilute hydrochloric acid extract consisted of 3·50 per cent. of calcium oxalate and ·50 per cent. extractive.

Chlorine water extracted 2·34 per cent. of lignin. There remained 4 90 per cent. of cellulose. A special examination was made of the sinistrin by treating about 50 grams of the coarsely powdered drug with 100 cc. of hot water. The mixture was strained and the same operation repeated twice. The resulting aqueous extract was evaporated to a syrupy consistence and treated with four volumes of absolute alcohol which precipitated the carbohydrates, other than sugars. This precipitate was then rapidly filtered off and dissolved in water and precipitated with 95 per cent. alcohol to remove mucilage. The filtrate from the mucilage was evaporated to dryness, a portion dissolved in water reduced Fehling's solution and was not precipitated by basic lead acetate. Another portion dissolved in 40 per cent. alcohol was precipitated by saturated solution of barium hydrate. These properties, together with the physical one of "puffing up" when the solution was evaporated to dryness, exactly as does a solution of sinistrin from squill, confirmed the previous conclusions. Several samples of the drug were obtained from different sources and all gave indications of containing sinistrin.

CANNABIS INDICA.

Does it Contain an Alkaloid?

By Henry F. Smith, Ph.C.

This is a drug from which the alkaloid has long been sought, and numerous investigations have been made. Many have disputed the presence of an alkaloid.

In 1846, T. and H. Smith, of Edinburgh, published in *Pharm. Jour.*, vol. 6, p. 171, a method for the preparation of hemp resin, which they claim is the active principle.

In 1857, Personne published an article in *Jour. de Pharm.*, vol. 39, p. 48, which states that he received a volatile oil by distillation of the plant with water. This volatile oil was composed of two hydrocarbons; one ($C_{18}H_{20}$) a light hydrocarbon, the other ($C_{18}H_{22}$) a solid crystalline substance. To the former he gave the name cannabene, to the latter hydride of cannabene. This oil he claims to be the only active principle.

In 1883, Dr. Mathew Hay made a chemical examination of this drug, and claimed to have found an alkaloid, to which he gave the name tetano-cannabine. (*Pharm. Jour. Trans.*, vol. 13, p. 998.)

In 1884, Warden and Waddell, of Bengal Medical Service, after diligent search, failed to isolate Dr. Hay's alkaloid. (*Pharm. Jour. Trans.*, vol. 15, p. 574.)

In 1884, Merck of Darmstadt applied the term cannabin tannate to a glucoside contained in Indian Hemp, which he combined with tannin. Dr. Dornmüller asserts that this tannate of cannabin has soporific effects, but Dr. H. C. Wood has found it to be inert physiologically. (*Pharm. Jour. Trans.*, vol. 15, p. 574).

In 1876, Preobraschensky operated on hashish obtained from Turkestan. He asserted that the active principle was not a resin, but an alkaloidal body which he recognized as nicotine. (*Pharm. Zeit. f. Russland*, p. 705.)

In 1886, Kennedy made a search for nicotine in Indian hemp without success, but obtained indications of the presence of another alkaloid. (Proceedings Am. Phar. A., 1886, p. 119.)

In 1881, Louis Siebold and T. Bradbury examined Indian hemp for nicotine. They failed to find the same, but separated what they stated to be a volatile alkaloid, and gave it the name cannabinine. An outline of their method is as follows:

Ten pounds of Indian hemp were placed in a still, with a suitable quantity of water, rendered powerfully alkaline with caustic soda, treated with steam until one-half of the water was carried over. This aqueous solution was neutralized, treated with ether, the ethereal liquid rejected, the aqueous solution then made alkaline, and shaken out with ether several times; the united ethereal solutions were allowed to evaporate to dryness at an ordinary temperature,

when there remained a transparent, varnish-like substance, with a strong peculiar odor, somewhat mice-like, which became more striking still on the application of heat, without, however, possessing the characteristic pungency of nicotine. The odor somewhat resembled that of conine, but was decidedly less powerful and nauseous. This substance was soluble in alcohol and ether, but only slightly soluble in water, and still less soluble in solutions of caustic alkalies. It was powerfully alkaline to test paper, capable of neutralizing acids, and its solutions gave precipitates with the general alkaloidal reagents. From ten pounds of the drug they obtained about two grains of the alkaloid.

In my investigation upon Indian hemp, a principle was found which was identical in color, consistence, odor, solubilities and gave the same alkaloidal tests as this so-called cannabinine, although the methods used in obtaining this principle were quite different. The first method by the writer is as follows:

The analysis.—Forty grams of the drug was reduced to a number 80 powder, macerated with 175 cc. of Prollius' liquid for 48 hours, occasionally agitated, the mixture transferred to a filter, allowed to drain well, and the filter washed with 50 cc. of Prollius' liquid. To the clear filtrate in a separatory funnel 75 cc. of dilute H_2SO_4 (20 per cent.) were added, allowed to stand 4 hours, occasionally agitated the water solution drawn off, the operation repeated with 30 cc. of dilute H_2SO_4 (20 per cent.), and the Prollius solution now rejected. To the water solutions in a separatory funnel 75 cc. of ether were added, then made alkaline with NaOH, allowed to stand for one hour, occasionally agitated, the ethereal solution drawn off, the operation repeated with 25 cc. of ether, and the water solution rejected.

The ethereal solutions were united, transferred to a separatory funnel, 75 cc. of dilute H_2SO_4 (10 per cent.) were added, the mixture allowed to stand for one-half hour, occasionally agitated, the water solution drawn off, the operation repeated with 25 cc. of dilute H_2SO_4 (10 per cent.), and the ethereal solution rejected. The water solutions were united, transferred to a separatory funnel, 50 cc. of ether were added, made alkaline with NaOH, allowed to stand for one-half hour, occasionally agitated, the ethereal solution drawn off, the operation repeated with 25 cc. of ether, and the water solution rejected. The ethereal solutions were united, evaporated to dryness on a water bath, and there remained a yellowish green, trans-

parent varnish-like substance. It had a strong, peculiar odor, resembling that of conine, still stronger on the application of heat, was soluble in ether, chloroform, alcohol, and acidulated water, but only slightly so in water, was alkaline to test paper and capable of neutralizing acids. When dissolved in very dilute H_2SO_4 (1 gtt. in 5 cc.) it gave a clear yellow solution and the following reactions:

With Mayer's reagent, abundant white precipitate.

KI + I + H_2O, abundant brown precipitate.

Phosphomolybdate of Soda, abundant white precipitate.

Solution Picric Acid, abundant yellow precipitate.

Solution $K_2C_2O_7$, yellowish brown precipitate.

Solution NH_4OH, yellowish green precipitate.

Solution NaOH, yellowish green precipitate.

Solution KOH, yellowish green precipitate.

Solution KI, yellowish precipitate.

Solution Tannic Acid, yellowish brown precipitate.

The second method was upon a somewhat larger scale and by a different process. In this method one kilo of the drug was rendered to a number 40 powder, mixed with 3,000 cc. of 95 per cent. alcohol, and macerated for 13 days, occasionally agitated; now transferred to a cylindrical percolator, allowed to drain well and the drug exhausted with 1,000 cc. of 95 per cent. alcohol. The alcoholic fluid extract was made slightly acid with H_2SO_4, allowed to stand for 3 hours, the alcohol driven off on a water bath at a temperature not exceeding 89° C. and small quantities of acidulated water added from time to time. The remaining solution with resin was transferred to a filter, which retained the resin, and the filter washed with 50 cc. of acidulated water. The filtrate of a clear and yellowish-brown color, was transferred to a separatory funnel, 150 cc. of ether were added, then rendered alkaline with NaOH (5 per cent.) allowed to stand for one hour, occasionally agitated, ethereal solution drawn off, the operation repeated with 100 cc. of ether, and the water solution rejected. The united ethereal solutions were transferred to a separatory funnel, and 100 cc. of dilute H_2SO_4 added; the mixture was allowed to stand for one-half hour, occasionally agitated, the water solution drawn off, the operation repeated with 50 cc. of acidulated water, and the ethereal solution rejected. The water solutions were united, transferred to a separatory funnel, 75 cc of ether were added, made alkaline with NaOH,

allowed to stand for one-half hour, occasionally agitated, the ethereal solution drawn off, the operation repeated with 50 cc. of ether, and the water solution rejected. The ethereal solutions were united and evaporated to dryness on a water bath. The residue which remained was in larger quantity, of the same color, consistence and odor as that found in the previous method. The quantity obtained from one kilo of the drug was about 75 m. g. A portion of the residue made into a chloride gave the same alkaloidal reactions, but more abundant precipitates were obtained.

A small portion of the residue gave the following test for nitrogen: About one m. g. of the residue was placed in a test tube with 2 or 3 m. g. of metallic sodium, fused together by means of a Bunsen flame for 2 or 3 minutes, cooled, 10 cc. of water added, filtered, heated with 4 or 5 m. g. of $FeSO_4$, acidulated with H_2SO_4, a drop or two of solution of Fe_2Cl_6 added, at first the solution turned pale blue; upon standing a short time a blue precipitate of prussian blue settled at the bottom of the test tube. (Conversion of the nitrogen into cyanogen. Prof. A. B. Prescott's Organic Analysis, p. 199).

In forming salts, a crystalline sulphate was obtained in the following manner: About 50 m. g. of the residue was neutralized with very dilute H_2SO_4, allowed to evaporate to dryness, this residue dissolved in alcohol, the alcoholic solution allowed to evaporate spontaneously, crystals were formed which could be seen with the naked eye. Under the microscope they appeared to be long needle-shaped crystals, and of a white color.

In making a quantitative estimation, a method in which the fluid extract is used, proposed by J. U. Lloyd, was followed out, as follows: 100 cc. were rubbed with 20 cc. of solution of perchloride of iron (U. S. P. strength), the mixture triturated with $NaHCO_3$ until a stiff magma was formed. This magma was abstracted with chloroform, using 50 cc. four different times and decanted after each addition. The chloroformic solutions were united, extracted by rotating in a separatory funnel with 75 cc. of dilute H_2SO_4 (1–50) two different times, and the chloroformic solution now rejected. The water solutions united, were extracted with ether, using 50 cc. two different times (this extracts the chlorophyll), and the ethereal solution rejected. The water solution was made alkaline with NaOH, shaken out two different times with chloroform, using 50

cc. and 25 cc., respectively, the chloroformic solutions united and evaporated to dryness on a water-bath. The same residue remained as found in the two previous methods. The amount obtained from 100 cc. of fluid extract was 10 m. g. or ·01 per cent.

The drug upon which I worked was furnished by Messrs. Gilpin, Langdon & Co., of Baltimore, Md., to whom my thanks are due for the favor.

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School of Pharmacy of the University of Michigan, June, 1891.

THE MANIHOTS.

By Arthur Edward Hanson, Ph.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

The Mandioca or Cassava plant appears to belong to Brazil; according to tradition, it was given to the Indians of the "Tupi" tribe by two strangers, one of whom was a very old man, with a long white beard, named "*Tyomé.*" They taught the use of the mandioca, but as the Indians proved ungrateful and treated them roughly, they disappeared as mysteriously as they had come. Other tribes of Indians say that this plant was of divine origin and given to them by the god "*Tyomé.*"

The first notice of the mandioca to Europeans was given by Piso, in the year 1648. He described the plant and its culture and stated that it was to be found as far as 30° S. L. and in the tropical zone. By this it may be seen that the mandioca grows from one extreme to the other of Brazil. Now it is cultivated from Florida to Tierra del Fuego, in several parts of Asia and to a great extent

in Africa, where it is considered one of the most important of foods.

The name Mandioca has been taken from the Tupi language, meaning "Something baked at home," "*Mandi*," baked, "*Oca*" house.

The genus Manihot is found in America only, and almost exclusively in dry and hot regions; of the 80 known species, 71 belong to Brazil, therefore, I should say that Brazil ought to be called its home. On the Western coast of Africa the bitter mandioca is largely cultivated, and some writers have said that it was brought over by the negroes; but this hardly seems credible, as the Portuguese, when they discovered Brazil, found the mandioca cultivated by the Indians, under many names, thus proving that the culture had been long continued. It is true that the seeds of mandioca preserve their fertility for a considerable length of time, and that they may possibly be carried across the ocean by the currents.

Varieties and Description.—There are two kinds of mandioca, viz: The *bitter*, or *red* or *black*, Manihot utilissima, *Pohl*, and the *sweet* or *white* (Manihot palmata, *M. Arg.*), from which spring the many useful varieties, distinguished chiefly by their color.

Their leaves, when bruised or pressed, have an odor similar to that of peach leaves, and the odor of the peach kernel is observed in the fleshy rhizomes and roots. The latter are called *mandioca*, while the whole plant is named *maniva*.

Mandioca doce (sweet) or Manihot palmata, is in the Southern Provinces (now States) called *aypim*, and in Northern Provinces *macaxera*. It is a bush, about one to two meters in height, monœcious, stems and branches light green; the leaves, with three, five or seven lanceolate lobes, dark green on upper surface; blossoms yellowish. The roots are white, weigh about one kilo, are 30 to 45 centimeters long, 4 to 5 centimeters thick, and covered with a thick bark, which is easily removed, even with the fingers. In the white varieties the quantity of milky fluid is scarcely observable, and indeed if present is always in the bark; a white fibrous wood bundle runs through the center, which is as thick as ordinary twine (about 1-16 in.), and is never found in the bitter mandioca. The white mandioca is seldom used for flour (*farinha*) and should never be dug up for use while flowering, as it

is then watery and has an insipid taste. These fleshy roots, when boiled or baked, become mealy like potatoes, and frequently take their place.

Mandioca branca (white) is similar to the above, but the bark is not as easily removed; it is extensively cultivated and greatly esteemed by the negroes.

There are about 15 more well known varieties resembling the preceding, like *Maniva manterga* (butter); *suissa* (Swiss); *amarella* (yellow) and others.

"*Manihot utilissima*" is commonly called bitter mandioca; all its varieties have more or less red brown, blackish stems and branches; the leaves are five lobed, dark green and sometimes red-brown on lower surface; the seeds are small and resemble those of Ricinus. The plant is 3 to 5 meters high; stem and branches are woody; the fleshy root is about one meter long, 36 cm. thick, and has a brown bark. The whole plant, including the roots, contains a great deal of milk juice, which is of thick consistency, and reddens blue litmus. All bitter mandiocas are poisonous, due to the presence of hydrocyanic acid, or a substance which is easily converted into it; a very small quantity is sufficient to extinguish life. After being exposed to the air for thirty-six hours, the juice loses its deleterious properties, and the same thing happens when it is boiled, or submitted to distillation.

Some botanists regard *Manihot utilissima* as the mother plant, and all other cultivated mandiocas as derivatives of the same.

Mandioca assu (giant) is about 4 meters in height; stems about 7 cm. thick, red-brown; branches dark green; leaves generally 5 or 7 lobed. The root of this variety is about 3 meters long and 15 centimeters in diameter; some enormous specimens have been obtained, one was said to weigh 150 kilos, but the average weight is 29 to 30 kilos (or over 60 pounds); if allowed to grow to this size it becomes tough and woody. This mandioca is generally fed to cattle.

Many other varieties are of more or less importance; among these may be mentioned *Maniva manipeba*, which is tall and differs by being bulbous, scattering its bulbs in different directions, and in this way making itself very firm in the soil; there are 2 varieties, both being extremely poisonous; animals will not even touch one of these, and the second gives a flour which ants also reject.

Cultivation of the Mandioca.—It was formerly planted by cutting the stalk in pieces after the manner of sugar cane, each node being planted about 6 inches deep and covered with earth, but nowadays in some parts the soil is ploughed. The natives say the old manner of planting yielded better results. The plant flourishes best in dry and sandy soil, exposed to the sun, and is not injured by storms or rains; the leaves may be affected, but not the roots.

The mandioca is planted in the months of March and September (these being the months for planting all roots and grains); it takes from 18 months to 2 years before it is ready for use, and 3 years before it is mature. It may remain in the ground for five years, after which length of time it becomes hard and woody. It belongs to the richest of starch producers, and from a given space of ground will yield six (6) times as much flour as any other amylaceous plant.

Manufacture of "Farinha."—The root is scraped, washed and grated and then put into baskets called *tipiti*, which are made from a vine called *sepoy;* the poisonous juice is expressed and collected in troughs where it is allowed to stand for some time with the water used for washing the pulp, the liquid is poured off, and the sediment, which is a white fecula, is dried; it is called *tapioca.*

After taking the pulp from the press out of the basket, it is sifted and graded according to fineness, and afterward roasted or torrefied, whereby it is deprived of the poisonous properties, and assumes a granular appearance.

Farinha is also made by another process; the root is placed in a large basket made of pliable bamboo, immersed in a stream of running water, and allowed to remain there for seven or nine days the root is then soft, is pounded in a wooden mortar, sifted and torrefied as above; this flour is called "*farinha puba.*"

The furnace for making the farinha is built of clay or some dry bricks, and has a large deep circular copper pan, where the flour is put to bake, stirred and tossed with paddles until it is thoroughly dry. Quite a variety of cakes are made out of the farinha while it is yet damp.

The "Beyou," much appreciated by the natives, is made by taking a handful of the farinha and placing it in little portions all over a hot pan, after which, beginning with the first, these portions are flattened, thinned, then rolled up into numerous fancy shapes. They

are, indeed, very delicious. The farinha, mixed with water, and made into poultices, is used very much for inflammations of various kinds and abscesses.

OLIVE OIL.

By A. B. Stewart, M.A., Ph.G.

On the 15 of June, 1871, the writer bottled twelve two ounce bottles of pure olive oil, which were boxed and kept on a garrett in darkness, and where the temperature in winter was not sufficient to cause precipitation of margarin. On the 15th of June, 1891, the oil was examined; three bottles had precipitated 25 per cent. of margarin, four 20 per cent. and five 16 to 18 of margarin. When placed in hot water the oil instantly became deep green in color and transparent; on being placed in a dark closet for 24 hours it became opaque, 24 hours longer deposited about $\frac{1}{16}$ margarin, and after 7 days complete precipitation took place; when exposed to the light of the sun the margarin would rise toward the top, and in a few seconds the solid part would become translucent. It then becomes obvious that age and darkness cause precipitates, to a greater or less extent, of the margarin contained in all oils, from the fact that on repeated closeting of the oil precipitation would occur, while sun-light would render it translucent and transparent. This oil was then subjected to chemical tests for purity. Mercury 18½ grs., and nitric acid 21½ grs., sp. gr. 1·35, were mixed with the oil, which failed after a few hours to be converted into a solid mass. Sulphuric acid, by a tinge of rose-color, in three or four shakings in the test tube, revealed the presence of poppy oil. Nitric acid failed to reveal the green color given to the pure oil. Equal parts of nitric and sulphuric acids mixed with equal weights of the oil neither revealed a bright yellow color of the pure oil nor the beautiful deep green color of the oil of sesamum. After testing pure lard oil, the results were compared and revealed that what was apparently pure olive oil, was in reality lard oil with a variable proportion of cotton seed oil and minute traces of poppy oil.

Duncannon, Pa.

COMPARISON OF SOME COMMERCIAL ACETIC ETHERS.

By Robert Glenk, Ph.G.

Although having no great pharmaceutical or medicinal importance, acetic ether is, however, used, technically to a considerable

extent, and a large bulk of it goes into the manufacture of artificial fruit essences. It has also of late years been used considerably for giving the "vinegar flavor" to artificial vinegar, made by diluting the commercial glacial acetic acid. One fluid ounce of acetic ether to a barrel gives a fragrant fruity odor to the compound, which is very desirable, and in which many of the natural vinegars are lacking. It was in this connection that the samples for comparison were obtained, and as a basis a sample of acetic ether was made as free from alcohol, water and impurities as it was possible to make it.

Absolute Acetic Ether.—Dried acetate of sodium was decomposed with concentrated sulphuric acid and alcohol, and the acetic ether distilled off by the aid of a water bath. This distillate was then thoroughly washed with water containing about 25 per cent. of calcium chloride in solution (the ether being less soluble in this mixture than in water alone), and the washing repeated successively five times to remove the alcohol present; then digested with fused chloride of calcium to free it from water, and finally distilled over anhydrous acetate of sodium on a water bath.

The separation of the last trace of alcohol by the above process is very tedious and wasteful; in acetic ether made by the following method, this disadvantage is obviated: 150 parts of dried sodium sulphethylate were decomposed by 85 parts of dried acetate of sodium and about 20 parts of sulphuric acid, and the acetic ether which was produced by the reaction, was distilled off from the sulphate of sodium, and condensed in a receiver surrounded by ice. This ether had an acid reaction from the presence of free acetic acid, but was entirely free from any contamination with alcohol. To free it from acid, it was shaken with a few crystals of bicarbonate of potassium until all acidity had disappeared. It was then washed with a 3 per cent. solution of permanganate of potassium to free it from any oxidizable compounds which may have been present; then digested with half its weight of fused chloride of calcium, decanted and distilled, by the aid of a waterbath over anhydrous acetate of sodium.

This gave as a result a clear, colorless, refractive, volatile liquid, with a burning taste. The odor on fresh distillation was very weak, but on standing for a day was more decidedly developed. This ether had a specific gravity of ·8893 at 15·5° C., and a boiling point of 72° C. It had a neutral reaction and dissolved in 11 parts of

water at 16° C. It is clearly miscible in any proportion with chloroform, ether, petroleum ether (40° C.), benzol, benzin, fixed and volatile oils, liquid petrolin, and glacial acetic acid; also soluble in 2½ times its volume of bisulphide of carbon, but only very slightly soluble in glycerin. It dissolves iodine and bromine freely, sulphur and phosphorus with difficulty. Quinine, cinchonine, strychnine, tannin, pyroxylin and resins are also freely soluble in absolute acetic ether. Alkalies decomposed it into acetic acid and alcohol.

Table Showing Comparison of Some Commercial Acetic Ethers.

	1	2	3	4	5	6	7	8
Reaction, ...	neutral	neutral	acid	acid	acid	acid	acid	strongly acid
Sp. g. at 15·5° C., . . .	·8893	·886	·878	·877	·875	·857	·877	·886
Boiling point, ...	72° C.	70° C.	71·5° C.	72° C.	72·5° C.	75° C.	74° C.	75° C.
H_2SO_4 1·82, ...	colorless	colorless	colorless	colorless	colorless	colorless	colorless	pinkish
Residue on evaporation, ...	—	—	—	—	—	—	—	—
Test Sol. $AgNO_3$, . .	—	—	—	—	—	—	—	—
Test Sol. $BaCl_2$, . . .	—	—	—	—	—	—	slightly turbid	very turbid
Solubility in Benzol, .	clear	clear	cloudy	cloudy	cloudy	cloudy	very cloudy	very cloudy
Solubility in CS_2., equal volume, . . .	clear	clear	cloudy	cloudy	cloudy	cloudy	very cloudy	very cloudy
Odor on saponifying and super saturating with dil. H_2SO_4,	no odor	no odor	butyric odor	slightly empyreumatic	no odor	no odor	butyric odor	empyreumatic odor
1% Sol. $K_2Mn_2O_8$, . . .	—	—	—	color destroyed	—	—	—	color destroyed

Number 1 is the absolute acetic ether made by the sodium ethylate process, for comparison; No. 2 is of German origin, marked "absolute C. P.;" the remainder are domestic specimens obtained from various sources.

The reaction of the different ethers was determined in the following manner; to about 7 cc. of distilled water in a test tube, 5 drops

of tincture of litmus were added and 10 drops of the acetic ether, then agitated, when in the presence of acid, the liquid would become pink. All the ordinary commercial samples with this test, gave evidence of acid reaction. The boiling point was ascertained by gradually heating by means of a water bath, about 5 cc. of acetic ether contained in a long test tube in which a few fragments of granulated zinc were previously placed, the bulb of the thermometer being immersed in the liquid, the point at which ebullition commenced was noted. The specific gravity was taken by means of a 100 grain specific gravity bottle.

On looking over the table, the great variation in specific gravities and boiling points will be noticed; in no instance do the ordinary specimens fill the requirements of the U. S. P., which are: A sp. g. of ·889–·897, and boiling point of ·76° C.

None of the ordinary specimens examined would form a clear solution with benzol, chloroform or an equal bulk of bisulphide of carbon; this was due to the presence of a larger or smaller proportion of water. The 8 specimens under comparison showed the following behavior: On shaking 15 cc. of acetic ether in a graduated tube with 15 cc. of chloroform (which was previously saturated with water by shaking it with that liquid and filtering) Nos. 1 and 2 gave clear solutions.

Nos. 3, 5 and 6, separated, ...	1 cc. or	6·6 per cent.	water.
No. 4, separated, ...	8 cc. or	5·3 "	"
Nos. 7 and 8, separated, ...	1·5 cc. or	10 "	"

On shaking 10 cc. of acetic ether in a graduated tube with 10 cc. of water at a temperature of 15·5° C., the following separation took place: No. 1, 9·2 cc.; No. 2, 8 cc.; No. 3, 3 cc.; No. 4, 7 cc.; No. 5, 6·5 cc. Nos. 6, 7 and 8 did not separate.

The several samples were also examined for fusel oil by carefully pouring a thin layer of acetic ether on some colorless sulphuric acid (1·82) in a test tube, and allowing them to remain in contact for half an hour, the absence of any red or pink color was taken as proof of the absence of fusel oil.

Acetic ether is sometimes contaminated with butyric ether; this impurity may be detected by the following method: 1 cc. of acetic ether is saponified with 3 cc. of a saturated solution of sodium hydrate, by the aid of a moderate heat; when the odor of acetic ether has disappeared, 5 cc. of water are added, and then super-

saturated with dilute sulphuric acid. If butyric ether has been present, the disagreeable odor of butyric acid will be recognized.

Acetic ether should burn with a lambent blue flame, and leave no residue on evaporation. Distilled water agitated with the ether and filtered, should give no reaction with test solution of nitrate of silver or chloride of barium. Distinct quantities of sulphuric acid could be detected in one of the samples under examination.

Aldehyd and empyreumatic impurities in acetic ether may be detected by adding 2 or 3 drops of a 1 per cent. solution of permanganate of potassium to about 3 cc. of the ether, when, in the presence of aldehyd, the pink color will be destroyed immediately.

FERROUS SYRUP OF THE HYPOPHOSPHITES.

By F. W. Haussmann, Ph.G.

In the June number of the American Journal of Pharmacy, while treating of syrup of the hypophosphites with iron, a short note was appended, relating to a ferrous syrup, which was stated to decompose rapidly, and future investigations were invited to stay the decomposition. The chemical nature of the products formed was not inquired into, partly due to lack of time, but a precipitate formed was believed to be ferric hypophosphite. Later examination proved this view, based upon a published statement, to be erroneous.

The ferrous hypophosphite was employed in solution, prepared by double decomposition between ferrous sulphate and calcium hypophosphite in molecular proportion. The resulting liquid, filtered from the precipitated calcium sulphate and subjected to various methods of exposure, always gradually precipitated. On closer examination the precipitate was found to be calcium sulphate, which is retained in the ferrous solution with great tenacity.

The precipitate, as well as the liquid portion, always gave negative results to ferric reagents, unless directly exposed to air for some time. The same was found to be the case with syrups, prepared by the formula given in the previous paper, which had been standing 8 weeks.

Various methods of separating the calcium sulphate, such as filtration through freshly precipitated barium sulphate or purified talcum, gave but partial results, enough $CaSO_4$ being retained,

always to interfere with the attempt to prepare a stable syrup. It not being possible to separate the $CaSO_4$ by filtration or other means, an excess of calcium hypophosphite was added to the ferrous solution, on which addition the greater portion of it is precipitated.

The following formula is based on this method:

Ferrous sulphate, crystallized, ... 64 grs.
Calcium hypophosphite, ... 40 grs.

Dissolve each separately in 12 drams of distilled water, mix, and allow the $CaSO_4$ to precipitate. Exposure to cold aids the precipitation. Filter, and to the filtrate add calcium hypophosphite 180 grs., aiding the solution of the salt by an addition of 5 grs. citric acid or 2 drams of 10 per cent. hypophosphorous acid.

Allow to stand from 12 to 24 hours, in which time the greatest portion of the calcium sulphate will precipitate, and add 60 grs. each of potassium and sodium hypophosphite. Filter, and in the filtrate dissolve 5 oz. avoir. of sugar, by agitation without heat.

By this method all but a slight amount of $CaSO_4$ is precipitated out, and merely slight traces are found in the finished syrup. An excess of acid is necessary to dissolve a small amount of ferric hydrate formed during the operation, due to impurities in the commercial calcium hypophosphite. If this addition be omitted, the syrup will gradually deposit a brown precipitate of ferric hydrate. When citric acid is employed, the finished syrup will be of a light green color, with gradual, very slight precipitation.

If, on the other hand, diluted hypophosphorous acid be substituted, the syrup will be colorless, very much of the appearance of the officinal syrup of the hypophosphites. As in the case of the ferric salt, ferrous hypophosphite turns bright green in the presence of soluble citrates. If an addition of an equal weight, corresponding to the amount of ferrous hypophosphite present, of potassium or sodium citrate be made to the syrup, a handsome bright green color is communicated to it.

This addition does not, however, increase the stability of the preparation.

Neither of the syrups, prepared in this manner, gives any indication of the presence of ferric iron. It may be fair to assume, that ferrous hypophosphite, in the form of a syrup, unless subjected to

direct exposure to air, is stable. The syrup, containing an excess of hypophosphorous acid, appears to be the most satisfactory, and may, perhaps, make a good substitute for the officinal Syrupus Hypophosphitum cum Ferro.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Salicylate of Bismuth.—M. Causse (*Comptes rend., Ac. des Sci.*, May 25), recommended the following mode of preparation: Dissolve 100 gm. of sub-nitrate of bismuth in concentrated hydrochloric acid. When the liquid becomes clear, it is poured into a litre of concentrated solution of sal ammoniac. To absorb the free acid, sub-nitrate of bismuth is slowly added so long as it will dissolve. A more rapid and complete result is obtained by neutralizing with ammonia dissolved in a saturated solution of sal ammoniac. The first portions of the alkali determine a precipitate which disappears in proportion as the liquor contains free acid. The neutral solution of bismuth is mixed with a solution of 120 gm. of salicylate of soda, made with 500 gm. of a saturated solution of sal ammoniac. A voluminous crystallization of salicylate of bismuth soon follows. The crystals are washed several times and dried at an ordinary temperature. These crystals are colorless and microscopic, resembling those of dehydrated sulphate of quinine. Cold water has no effect on this salt, but it is decomposed by boiling water, by alcohol and by heat. The salt is neutral, and contains 4 molecules of water of crystallization.

Combretum Raimbaultii.—Dr. E. Heckel (*Répert. de Phar.*, June 10) describes the use of this plant in "bilious hematuric fever" as employed by the natives of Western Africa, between Rio-Numez and Sierra-Leone, under the name of *kinkeliba*. They make a decoction of 16 gm. of the powdered leaves to 1 litre of water, boiling the mixture for 15 minutes and then filtering. One tumblerful (250 gm.) is given at once; half this quantity is given ten minutes afterward, and a quarter of it ten minutes later. Vomiting supervenes, but soon ceases and does not recur. The patient continues to take the decoction whenever he is thirsty, for four days; but he should not ingest more than 1½ litre daily. Kinkeliba contains tannin (20·80 gm. per 100 gm.), and a quantity (not stated) of nitrate

of potassium. It acts as a tonic, diuretic and, at first, as an emetic. Cholagogue properties are attributed to it by the natives. Dr. Heckel found that it sometimes gave rise to a bilious diarrhœa.

Quinine for Hypodermic Use.—At the meeting of May 6th, of the Paris Society of Pharmacy, M. Vigier said that five per cent. solutions of lactate of quinine could not be made after this compound has once been dried. They should be made extemporaneously for this purpose. M. Barillé stated that M. Laveran no longer used lactate and hydrochlorate of quinine extemporaneously, but, taking advantage of the power of antipyrine in favoring the solubility of quinine, he used the following formula: Hydrochlorate of quinine, 1 gm.; antipyrine, 50 cgm.; water, 2 gm. The solutions are not painful to patients.

Valerianate of Antipyrine and Quinine.—M. E. Sochaczewski (*Bull. Comm.*, June) gives the following as the best method of preparation: Dissolve 10 gm. of valerianate of quinine in a sufficient quantity of 90 per cent. alcohol to give a thoroughly saturated solution. Dissolve 10 gm. of antipyrine in the smallest possible quantity of distilled water. Mix the solutions in a crystallizing dish and apply heat, being careful that it does not go beyond 122°. The crystals form and no sub-product is obtained. Some of the crystals measure 6 centimetres in length.

Naphthol-Antipyrine.—M. G. Patein (*Répert. de Phar.*, June 10) has made this combination with α and β naphthol, the former being liquid and the latter crystallized. The preparation with β naphthol is made by dissolving 150 gm. of that substance in 90 per cent. alcohol, and pouring slowly into it, while stirring, a solution of 190 gm. of antipyrine in the smallest possible amount of water. A viscous mass forms in a few minutes. This must be vigorously stirred for 4 or 5 minutes, when the liquid will become perfectly clear. Pure, fine crystals of β naphthol-antipyrine are now deposited. By taking these up in warm 60 per cent. alcohol, large, colorless crystals are obtained. These melt at 82–83° C. [179°6–181°-4 F.]; they are soluble in alcohol and ether. By the addition of cold water the naphthol precipitates and the antipyrine remains in solution. Decomposition is prevented by making a solution as follows: β naphthol-antipyrine, 1 gm.; alcohol of 90 per cent., 25 gm.; distilled water, 40 gm.

Coronillin: A Characteristic Reaction.—As described by

Schlagdenhauffen and Reeb (*Jour. de Phar. d'Als.-Lorr.*, June, 1891), this glucoside appears in amber colored plaques, very soluble in water, less soluble in alcohol, and of a very bitter taste. It cannot be obtained in crystals. It contains no nitrogen and appears to belong to the digitalin group. Like the latter, it is very toxic and a "heart poison;" it arrests that organ in systole. It is sensitive to sulphuric acid, with which it gives a brown coloration. But, as other organic substances give the same reaction, this acid can only be considered as sufficient to detect the presence of coronillin in alimentary substances. A characteristic reaction is the red coloration obtained by treatment with nitric acid to which cupric chloride has been added. With this, the quantity of ·00025 gm. may be detected.

THYMOLACETATE OF MERCURY.—Loewenthal's formula for intramuscular injections in syphilis was given (*Deut. Med. Woch.*) as follows: Thymolacetate of mercury, 1 gm.; glycerin, 10 gm.; hydrochlorate of cocaine, 10 cgm. Dr. Tranjen (*Répert. de Phar.*, June 10) is using this substance in the same way for tuberculosis, the formula being: Thymolacetate of mercury, 75 cgm.; liquid vaselin, 10 gm. The injection—which is not painful—is made every 8 or 10 days. After having given two or three injections, the doctor gives iodide of potassium internally. Its action is beneficial in proportion to the promptness with which it is used. It has no effect on the late period of the malady.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, Ph.G.

Starch-formation from formaldehyde.—The formation of starch in plants, first explained by von Baeyer, was that from the carbonic oxide, there was formed formaldehyde CH_2O, which by polymerization formed starch. Th. Bokorny (*Berichte Deutsch. Bot. Ges.*, 1891, iv.) has now succeeded in establishing direct proof of this hypothesis; the use of formaldehyde itself is excluded because of its poisonous nature, but starting with sodium oxymethylsulphonate

$$CH_2{<}\begin{matrix}OH\\SO_3Na\end{matrix}$$

which by heat in aqueous solution is decomposed into formaldehyde and acid sulphite of sodium ($CH_2OHSO_3Na = CH_2O + NaHSO_3$)

the synthesis was effected. The solution of this salt answers as a nourishing medium for certain bacteria; to prevent the injurious action of the acid sulphite some di-potassium phosphate is added, which goes to form neutral sulphite and the mono-potassium phosphate. The nourishing medium employed was a solution containing calcium nitrate 0·1 per cent., potassium chloride 0·05 per cent., magnesium sulphate 0·02 per cent., mono-potassium phosphate 0·02 per cent. and ferric chloride a trace; to this was added sodium oxymethylsulphonate 0·1 per cent. and di-potassium phosphate 0·1 per cent. The plant used in the experiments was Spirogyra majuscula, *Ktz.;* if a number of these plants (containing little starch) were introduced into the nourishing medium, taking care to exclude even traces of carbon dioxide, it was noticed after five days that in all cases where the oxymethylsulphonate of sodium was added an enormous increase of starch resulted, whereas if this salt was not added, there was no starch, no growth, and, in a number of cases, the plants perished.

In these experiments success was only obtained on exposure to light. It was also found that in the absence of potassium salts the plants did not assimilate carbon dioxide. The nourishing medium made up without potassium salts but containing sodium oxymethylsulphonate favored the production of starch in the plants after three days; this last experiment is conclusive evidence that formaldehyde is immediately concerned in the formation of starch since in the absence of potassium salts carbon dioxide could not be assimilated. In the change of inorganic matter (CO_2) into organic matter formaldehyde ranks as the first organic matter.—*Pharm. Post,* 1891, 462.

Iodoform-odor.—To conceal the odor of iodoform, W. Pagenkopf recommends the addition of a little Russian turpentine oil; it is said to impart a peculiar, almost pleasant odor to iodoform preparations.—*Pharm. Ztschr. f. Russl.,* 1891, 391.

Alkaloids of the Amaryllidaceæ.—These plants, although poisonous, have not yet been chemically examined; two (Amaryllis formosissima and Amaryllis Belladonna) are cultivated in gardens, because of their beautiful flowers. The alkaloids were obtained by extracting the powdered bulbs with alcohol, distilling off the solvent, taking up with water, precipitating with sodium carbonate and dissolving the precipitate in ether. The alkaloid obtained on evaporation of the solvent was purified by solution in acidulated water, precipitating

and dissolving in ether or chloroform, finally, by crystallization from alcohol. *Amarylline* is the name proposed for the alkaloid from A. formosissima and *bellamarine* for that from A. Belladonna. Amarylline forms clusters of short needles, is slightly soluble in water, easily so in ether, chloroform and alcohol; melts at 196° C., apparently with slight decomposition; with the exception of platinic chloride, potassium bichromate and tannin, it yields precipitates with the alkaloidal reagents; with sulphuric acid it gives a red-brown color, which becomes green on addition of a few drops of water; mixed with sugar and then H_2SO_4 it gives a green, changing to yellow, color; with Froehde's reagent a brown-green, changing to dark green.

Bellamarine forms colorless needles, soluble in alcohol, ether and chloroform; it melts at 181° C. with darkening; it precipitates with all of the alkaloidal reagents; its most characteristic color reaction is with sulphuric acid, gray; upon warming a pretty red.—Dr. B. Fragner, *Pharm. Post*, 1891, 421.

Linimenta exsiccantia or drying liniments are intended as an improvement on the gelatin treatment in dermal practice. The base is made by either triturating in a mortar or heating in a suitable vessel 5 parts tragacanth, 2 parts glycerin and 100 parts water; made by the aid of heat the preparation keeps without the addition of antiseptics; the advantages of this base are that it can be applied in very thin layers, and can be removed by simply washing with water. To medicate the base, soluble substances are dissolved in the water used to make the base; insoluble substances, oils, iodoform, zinc oxide, etc., are triturated in a mortar with the previously-made base.—Prof. Ph. J. Pick (*Prag. Med. Wochenschr.*) *Pharm. Post*, 1891, 425.

Coffee adulteration.—A coffee was recently offered for sale in Amsterdam which, by its dark color, excited the suspicions of the purchaser. A microscopic examination revealed the structure of the true bean, but also the absence of fat globules; the ethereal extract left only about 1 per cent. residue, whereas, good coffee generally yields from 13–14 per cent.; it is, therefore, evident that this sample had been exhausted for the purpose of making coffee extract, and then roasted a second time after addition of a little sugar, this explaining the dark color and polish of the sample.—(*Int. Rev. f. Verfälsch.*) *Ztschr. f. Nahrungsm. Unters. u. Hyg.*, 1891, 82.

Artificial indigo.—The yield of indigo in the various syntheses has been so small that artificial indigo could not compete with the natural article. The best yield so far has been obtained by Heumann (Am. Jour. Pharm., 1890, 614), about 15 per cent. Further investigations succeeded in considerably increasing the yield, so that it may now be possible for the artificial indigo to compete with the natural. The improvement of the process consists in treating phenylglycocoll with fuming sulphuric acid at low temperatures; at —5° C. the glycocoll dissolves very readily in fuming sulphuric acid, with a yellow color, which, on dilution with ordinary sulphuric acid, changes to the intense blue, characteristic of indigo; addition of sodium chloride to this solution precipitates the indigo-carmine.—Dr. A. Haas, *Südd. Apoth. Ztg.*, 1891, 172.

Gelatinizing of infusion of digitalis.—In the *Am. Jour. Pharm.*, 1890, 615, the results of some investigations are given, having for their object the conditions under which this infusion will gelatinize. Dr. W. Braeutigam has now succeeded by a bacteriological investigation in determining that a *bacillus* is the cause of the change; if a little of the culture be introduced into a sterilized infusion of digitalis, containing 5 per cent. of simple syrup, gelatinization will take place in about two days, depending somewhat upon the temperature; in the absence of the syrup, the infusion became *slimy* but never *gelatinous*. The cultures were made by using an infusion of digitalis containing 5 per cent. simple syrup and 6–8 per cent. gelatin as the nourishing medium; the cultures have a grayish appearance with pearly lustre; the bacillus develops in an alkaline or acid medium.—*Phar. Ztg.*, 1891, 349.

Eugenol-ethers.—*Benzoyl-eugenol* or *benzeugenol* $C_{10}H_{11}O.OC_7H_5O$ crystallizes in colorless, odorless, slightly bitter needles, neutral in reaction and melting at 70·5°C; almost insoluble in water, soluble in hot alcohol, chloroform, ether and acetone; with strong sulphuric acid a purplish-red coloration results.

Cinnamyl-eugenol $C_{10}H_{11}O.OC_9H_7O$ forms colorless, odorless, tasteless, lustrous needles, melting at 90–91°C., neutral in reaction; solubility and color reaction like the preceding. Both are easily saponified and then on addition of acid give the characteristic eugenol odor and separate the acid. J. D. Riedel of Berlin has applied for patents covering the manufacture of these compounds directly from the oil of cloves; they are to be used in pulmonary

affections acting in the same manner as benzosol and styracol (*Am. Jour. Pharm.*, 1890, 444 and 1891, 188).—Dr. H. Thoms, *Pharm. Centralhalle*, 1891, 365.

Metallic sodium.—To remove the black crust from the metal, Max Rosenfeld places the metal in a mixture of 1 part amyl alcohol and 3 parts petroleum, rubbing with a cloth thoroughly saturated with this liquid until the metal becomes silvery white in color, then it is placed for a short time in petroleum containing 5 per cent. amyl-alcohol, washed with petroleum and, lastly, kept in a vessel containing petroleum with 0·5 to 1 per cent. amyl alcohol. Sodium by this treatment takes a beautiful metallic lustre and shows crystalline figures on the surface; after prolonged keeping in the last-named liquid a yellow film may coat the metal, but this can be removed simply by rubbing with filter-paper. Potassium and lithium may be purified in the same way.—(*Ber. d. D. Chem. Ges.*) *Pharm. Centralhalle*, 1891, 395.

Oil of lemon by fractional distillation yields three well-defined fractions:

(1) 170–170·5° C., forming a colorless, mobile liquid, sp. gr. 0·8867 and having a very fine lemon odor; it consists of limonene $C_{10}H_{16}$, forming the tetrabromide melting at 31° C.; also the dichlorhydrate $C_{10}H_{18}Cl_2$ crystallizing in colorless hexagonal plates and melting at 50° C.; (2) 176–178° C., this is present to the extent of 90 per cent. in the oil, has the sp. gr. 0·899, has the same formula and molecular weight as limonene, but forms a tetrabromide melting at 102–103° C.; (3) 240–242° C. This is composed principally of sesqui-terpene $C_{15}H_{24}$, has the sp. gr. 0·9847 and is optically inactive differing from the other two fractions. Oil of lemon is dextrogyre according to age it may vary from 117 to 123° using a 200 mm. tube; on an average 120° will be found. Adulterations with turpentine oil may be detected by the polariscope; French turpentine oil shows a rotation of — 55°; American and Russian oils + 12° to + 14°, thus the presence of these adulterants will decrease the rotatory power of the oil.—V. Oliveri, *Apoth. Ztg.*, 1891, 341.

Test for acetone.—The test depends upon the formation of iodoform from acetone and iodine in the presence of ammonia; it is of especial value since alcohol in the presence of ammonia does not form iodoform. It is carried out by adding to a little of the solution to be tested a few drops of strong ammonia water and then 1–2

drops of $\frac{n}{10}$ iodine solution; there may be produced at this stage a dark turbidity due to nitrogen iodide which will disappear upon agitation or warming (if not too little acetone is present) and show the yellowish turbidity due to iodoform; more iodine solution can then be added until the nitrogen iodide ceases to disappear; and this accomplished by the cautious addition of a dilute solution of sodium thiosulphate, all of the acetone is made to react with the production of iodoform. The odor of the latter is not affected by the presence of the ammonia. The reaction is quite delicate, 1 part acetone in 5,000 parts water giving the precipitate in a few minutes; the test is considered a good one for the detection of acetone in urine. It is thought that all bodies containing the group $CH_3.CO$ — will give the reaction.—Prof. A. Schwicker, *Chemiker Ztg.*, 1891, 914.

Test for guaiacol.—The addition of concentrated sulphuric acid and a minute quantity of acetone to guaiacol or its compounds (benzosol, etc.) produces a beautiful cherry-red or purplish-red coloration; the addition of two volumes of chloroform to the test and agitation makes the color more pronounced.—Dr. J. Bongartz, *Pharm. Ztg.*, 1891, 370.

Salicyl-bromanilide, also called *antinervine*, claimed to be a combination of salicylanilide and bromacetanilide (*Am. Journ. Pharm.* 1891, 345) has been examined at various times by Dr. Ritsert and always found to be composed as follows: 25 parts ammonium bromide, 25 parts salicylic acid and 50 parts acetanilide. An interesting point was brought out during the examination: The mixture melted between 80 and 90° C.; after removing the salicylic acid and acetanilide with chloroform and evaporating, the residue was found to melt at 82–84° C.; mixtures made of salicylic acid and acetanilide in varying proportions always melted between 80 and 90°. Another interesting observation was that acetanilide crystallized from petroleum-ether in needles.—*Pharm. Ztg.*, 1891, 393.

Dermatol.—B. Fischer publishes the following method of preparation, as it is stated that the process by which it is made by Meister, Lucius and Brüning is to be patented: 15 parts bismuth subnitrate are dissolved in 30 parts glacial acetic acid, 200–250 parts water added and filtered, to this solution is added, with constant stirring a warm solution of 5 parts gallic acid in 200–250 parts water. The precipitate is first washed by decantation, then on a filter until the

washings are free from nitric acid; lastly, it is dried at 100° C. The saffron yellow powder should not yield anything to alcohol (absence of gallic acid) and should yield not less than 55 per cent. bismuth oxide (theory demands 56·66 per cent.).—*Pharm. Ztg.*, 1891, 400.

Gymnemic acid.—To isolate this acid the finely powdered plant (Gymnema silvestris) is moistened with a small quantity of 20 per cent. soda solution, allowed to stand 48 hours and extracted for 24 hours with benzin; the benzin is distilled off, the residue repeatedly washed with ether and dried. The impure acid so obtained forms a brownish crystalline powder, very soluble in alcohol, in 100 parts water, insoluble in ether, chloroform and carbon bisulphide; acids decompose it; it forms salts which are not soluble in water. In larger doses, 0·3–0·4, it is emetic; in very small quantities it is very effective in disguising bitter tasting medicines. For this purpose it is recommended to use an one-half per cent. aqueous solution, to which is added a small quantity of alcohol for rinsing the mouth before taking the medicine.—A. Quirini (*Gyogysz. Hetilap.*) *Pharm. Ztg.*, 1891, 401.

METALLIC DERIVATIVES OF CUPREINE.[1]

By A. C. Oudemans, Jr.

The sodium and potassium compounds of cupreine separate as crystalline scales when a solution of the alkaloid in slight excess of the corresponding hydroxide is subjected to cold. The separated scales are dried by a filter pump, washed rapidly with strong alcohol, and placed in a desiccator over potassium hydroxide for some time. *Potassium cupreine*, $C_{19}H_{21}KN_2O_2 + 8H_2O$, forms acicular crystals or hexagonal scales. *Sodium cupreine*, $C_{19}H_{21}NaN_2O_2 + 5H_2O$ and $+ 8H_2O$, forms large scales which are greasy to the touch. The potassium compound appears to be more soluble in mixtures of aqueous and alcoholic alkalies than the sodium derivative.

In contradistinction to Hesse, who denied the existence of an ammonium derivative of cupreine, the author states that the alkaloid dissolves easily in concentrated ammonia solution, to a smaller extent in weaker solutions, and inasmuch as the specific rotatory power of such solutions is similar to that of like solutions of the sodium derivative, he concludes that an ammonium compound does

[1] *Rec. Trav. Chim.*, **9**, 171–183; reprinted from *Jour. Chem. Soc.*, 1891, 471.

exist. Solutions of lithium hydroxide and of barium hydroxides also dissolve cupreine. All the metallic derivatives of cupreine assume an orange or brick-red color after prolonged drying or on heating above 120°.

Hesse having proved that cupreine behaved as a phenol in which hydrogen may be displaced by a metal, the author has investigated the influence such replacement has on the specific rotatory power of the alkaloid, in order to determine if the alkaloid and the base combined molecule for molecule, in which case an excess of base ought not to affect the specific rotatory power to any great extent, and he publishes very complete tables of the specific rotatory power of the alkaloid in both aqueous and alcoholic solutions of potassium and sodium hydroxides, in aqueous solutions of lithium and barium hydroxides, and in ammonia solution.

The results of the observations are as follows: (1) Approximately the same values obtain for the sp. rot. power of cupreine for similar concentrations of alkaloid and either potassium, sodium, lithium, and barium hydroxides in aqueous solution, but in the case of the ammoniacal solution the rotatory power has a higher value, and differs in the values obtained from its solution in fixed alkalies in the fact that an increased strength of ammonia solution augments the sp. rot. power. (2) The sp. rot. power of the alkaloid diminishes inversely with the amount present in the alkaline solution, and also with the amount of alkaline hydroxide present. (3) The highest values for the sp. rot. power are obtained when the amounts of alkaloid and of hydroxide associated are approximately those represented by their molecular weights; in this respect cupreine is analogous to quinamine and conquinamine in acid solution. It is to be noted that the values obtained in alkaline alcoholic solution are much higher than those in aqueous solution, and that in this case additional alkali increases the rotatory values.

The mean rotatory power for 1 mol. (in milligrams) of cupreine in 20 cc. of water with 1–2 mols. (in milligrams) of alkaline hydroxide is about —205°.

Camphoric acid has been used by Dr. Combemale (*Jour. de Méd.*, March 1, 1891; see also Amer. Jour. Phar., 1890, p. 462) as an antidiaphoretic, which will diminish, almost with certainty, the exaggerated functional action of the sweat-glands, and has not the great disadvantage of atropine of causing phenomena of delirium, nor, like agaric, does it produce free purgation.

THE CULTIVATION OF GINSENG.[1]

Ginseng is indigenous to the greater part of the cooler regions of the United States. In Georgia and Alabama it is found in the mountains and thence northward along the elevated plateaus, gradually descending to near the sea level in some of our Northern States. It appears to thrive best in loamy soils, such as are usually found in sugar maple and oak forests at the North. Shade seems also to be essential, for when the plants are exposed to the direct rays of the sun they soon die out, and for this reason open field or garden cultivation of the plants has rarely or never been attended with success. The proper way to start a plantation is to select a piece of land at the edge of some forest where the plants are found growing wild; then clear out all the underbrush and small trees, leaving just enough of the larger ones to afford the shade required. This should be done in spring or during the summer. Then break up the surface of the soil with a harrow, steel rakes, hoes or other implements to the depth of two or three inches, removing all weeds, grasses, and their roots. The bed thus prepared will be ready for the reception of seeds and small unsalable roots as collected in the autumn, the season of ripening depending somewhat upon latitude.

Ginseng berries are of a crimson color when ripe, each containing two seeds, produced in small clusters at the top of a central peduncle elevated above the principal leaves. When gathering the seed, the roots may also be dug up, and all small and unsalable ones preserved and replanted in the prepared bed. The seed should be rubbed from the pulp very carefully with the hand, and then sown, or better, pressed into the ground with the finger about half an inch deep, and one every six inches along the row. The rows should be from one to two feet apart for convenience in removing weeds, should any appear. Both seeds and plants should be in the ground before hard frosts occur in autumn, for when these come, the leaves of the large trees will fall on the bed and give the natural protection required.

The following season no cultivation will be needed—if the bed is thinly covered with leaves—except to cut out sprouts and remove

[1] Having had several inquiries concerning the culture of ginseng on a somewhat extensive scale, we copy from a paper in the *American Agriculturist* that portion relating to this subject.—Editor.

any large, coarse weeds which may spring up from seeds or roots left in the ground. If winds blow away the leaves needed as a mulch, a few old dead branches of trees may be scattered about to hold the mulch in place. At the end of the third season the roots will have reached a remarkable size, and may then be dug, and the same bed worked over and restocked with seeds or small plants.

Some who have tried it say that raising ginseng can be made profitable where a man has suitable land in the forest or a grove near at hand. The cost of preparing a bed cannot be very much, and the seed can be obtained from the wild plants in our forests.

ACTION OF LEECH EXTRACT ON BLOOD.[1]

By W. L. Dickinson.

The general properties of the extract of the anterior part of the dicinal leech which, as Haycraft showed (see *Am. Jour. Pharm.*, 1886, p. 272), possesses a strong anti-clotting action on blood, are the following: It is neutral to litmus paper; its specific gravity is not appreciably higher than that of the medium used for extraction. Boiling causes no precipitate, and no loss of activity. Alkalies cause no precipitate. A trace of acetic acid causes cloudiness readily soluble in excess. Strong acetic acid causes no precipitate in salt free, but a copious cloud in salt-saturated extracts. Nitric acid in the cold causes a precipitate soluble on boiling, and reappearing on cooling. Saturation with ammonium sulphate causes a precipitate, after which no proteid remains in solution; saturation with magnesium sulphate or sodium chloride, on the other hand, causes no precipitate. If all salts are removed from the extract by dialysis, there is no precipitate produced, and no loss of power. Copper sulphate, lead acetate, and mercuric chloride give precipitates insoluble in excess of the reagents. Copper sulphate and potash give a pink (biuret) reaction. Alcohol causes no loss of the activity of the extract.

The leech extract, therefore, contains a proteid having some features in common with Kühne's proto-, and others with deutero-albumose. The albumose precipitated by ammonium sulphate has all the anti-clotting power of the original extract; the extract *minus* the albumose has no such powers. Hence, probably the albumose is itself the active principle.

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[1] *J. Physiol.*, **11**, 566–572, *Jour. Chem. Soc.*, 1891, 482.

Clotting in plasma obtained from blood, prevented from coagulating by admixture with leech extract (either intravenously or after it is shed), cannot be induced by carbonic anhydride or by dilute acetic acid; it can, however, always be induced by a sufficient quantity of fibrin ferment. Such plasma gives no precipitate on cooling.

Fibrin soaked in leech extract fails to yield ferment when subsequently treated with 8 per cent. sodium chloride solution. The extract, however, still contains cell-globulin. Cell-globulin prepared from lymphatic glands by Halliburton's method (1888) retains all its properties, except its fibrinoplastic power, when treated with leech extract. This is regarded as an argument in favor of the non-identity of the cell-globulin and fibrin ferment.

FANCIFUL ANIMAL REMEDIES IN PHARMACY.

By P. L. Simmonds, F.L.S.

In the present day Hygeia entrusts her reputation, and the safety of invalids, chiefly to vegetable and mineral substances. But it has been well observed if science is reserved in the employment of animal substances in the Pharmacopœia, ignorance and credulity have given full flight to their fancy in many countries. "Fools have rushed in where angels feared to tread." Especially is this the case in the Chinese Empire, where animal substances enter extensively into the remedies of the doctor. The following are reliable statements, published in connection with the pharmaceutical collections shown by the Chinese Imperial Maritime Customs at different International Exhibitions.

The gall bladder of the *bear* is prescribed for affections of the liver and ophthalmia. They fetch about $2.50 each. The *cow bezoar* is considered a sedative and tonic, and *cow's gall* expectorant. *Glue* made from asses' hides is a tonic for the liver and kidneys, and stimulant. Glue from tigers' bones is also tonic, that made from buffalo hides is considered sedative.

Musk is used as a stimulating and antispasmodic medicine, and pills made of musk and Barus camphor, etc., covered with wax, are considered sedative and mildly expectorant. Portions of a *tiger's skull* are administered in typhoid fever, ague and rheumatic headache, and are also given to a person who has been bitten by a mad dog to prevent hydrophobia.

The horns of a small species of *antelope* are given as a cooling medicine, and supposed to cure inflammation of the lungs and liver. They range from 80 cents each to $180 a picul or 1¼ cwt. A *gelatin* made by boiling down young deer horns is given as a tonic, but this costs $500 the picul. In some years 600 pairs of these horns are secured. The horns broken and boiled to the consistency of jelly are also given as a stimulant in nervous ailments, for spermatorrhœa and leucorrhœa. The horns sell at $5 a pair.

A decoction of the shavings of *rhinoceros horns* is taken in fever, small-pox, ophthalmia, hæmoptysis, etc. These horns of the Sumatran and Siamese

rhinoceros, imported from Signapore, cost $24 per horn. But it is not only the quadrupeds which are utilized in Chinese pharmacy, the bimana also contribute their quota in the genus homo.

Dried human *placenta* is considered tonic in consumption, and can be bought at $2.50 each.

Dried human *urine* is given in pulmonary complaints, and is believed to possess demulcent properties. Taken internally it is supposed to cure debility and as a lotion is good for weak or sore eyes. Eggs boiled in boys' urine are also considered very strengthening. Dried urine seems to be cheap, since it only fetches $7 a picul. Another prescription is boys' urine, gypsum and dew mixed, and stirred with a piece of mulberry wood. This process is gone through several times. The resulting deposit is put on paper, with lime underneath, and dried in the sun. It is then powdered, put into a small pot with water and evaporated to dryness. It is given in phthisis, gonorrhœa and spermatorrhœa, and also used as salt with rice! The price is 20 cents a catty or pound.

What is known as a "medicine stone," is a stone roasted and afterwards put into the urine of a child. After having gone through the process seven times, the stone is dried and powdered, and the powder is applied to ulcers and opacities of the cornea. This medicine stone costs $3.20 per catty or pound.

The skin of the common hedgehog is sold for 50 cents and decocted for pulmonary complaints and made into pills for cutaneous diseases.

The sea-horse (*Hippocampus*), used as a stimulant, fetches $200 to $500 the picul.

The lining membrane of the *gizzard* of the common fowl, peeled off and dried, is sold at $38 to $47 the picul. It is prescribed in dyspepsia, diarrhœa, spermatorrhœa and urinary disorders. That of the male bird is used for preparing the drug for female patients and vice versa.

Snakes and reptiles play a prominent part in medicine in China. Dried lizards are sold at 10 cents the pair.

Snake skin is administered for small-pox and used as a carminative. The skins cost $1.20 each. They are also believed to relieve itching in skin diseases and applied to piles and fistula. Salted *scorpions* are given in small-pox. The price of these is $45 per picul.

A tincture of scorpions, much vaunted for its miraculous effects, is given as a diaphoretic for rheumatism, paralysis and ague. The price is a dollar a pound for the salted scorpions. Dried *toads* are tonic and sudorific, but they can be had as cheap as 2 cents each.

The under shell of the *land turtle* being considered strengthening and stimulant, is administered in decoction to the old and weak. Made into glue, it is given as a tonic, and sells at $400 the picul of 1¼ cwt.

The scales of the *amadillo* are administered for cutaneous diseases, and are worth $75 to $90 the picul. The scales of the *ant-eater* are used in rheumatism and to hasten eruption in small-pox. They sell at a dollar and a half a pound.

Leeches are not used alive, but a decoction, either in water or spirit, of dried leeches is taken as a purgative, and is applied outwardly to bruises, etc. Reduced to powder in spirit it is given in abdominal tumors, etc. They fetch $10 a picul.

Edible birds' nests are, of course, in high repute as aphrodisiacs, but they are more food articles than medicines.

The shells of the mollusca are used medicinally, thus *clam shells* are cathartic; *oyster shells* administered for deafness. *Fossilized shells* are used as a powder in ophthalmia and in scabies; internally in fever and in syphilis. *Coral* is also applied in powder to opacities of the cornea, and as an astringent for epitaxis.

Seed Pearls are prescribed in affections of the heart and liver; in the form of a powder to ulcers, and opacities in the cornea; in deafness it is put into the interior of the ear, and is applied to pustules of small-pox. This remedy is, however, dear, being quoted at $160 the catty or pound.

Petrified crabs are applied to boils and sores, etc. Fragments of these fossil crabs crushed, powdered and finely levigated are used in opacities and other affections of the eyes, and sell at from $30 to $300 a picul in different localities.

If we pass to the lower order of insects, we find the skins of the *dung beetle* fetch £3 the cwt., for medicine. The flesh flies (*Musca carnivora*) collected on putrid carcases are torrefied and employed as drugs. *Maggots* are prescribed in the delirium of fever and dysentery. *Silk-worms* in cystitis; after being burnt the ash is mixed with wine and drunk, in order to cause the bursting of abscesses.

The larva of the *grasshopper*, torrefied and pulverized, made into pills, are considered anthelmintic and given to children in fevers.

Wood bugs (*Cimex*) are also torrefied and given as medicine. The bodies of *Cicada sanguinolinta*, with the wings and feet taken off, are considered a cure in hydrophobia.

Caterpillars are considered good for bronchial complaints; are given as a purgative and antispasmodic, and are apparently cheap, selling at $6 the picul. The cocoons of a caterpillar are applied in inflammation of the eyes.

A decoction of *centipedes* is used in gonorrhœa; powdered they are applied externally to venereal sores, but it costs $150 a picul.

Cantharides are used in hydrophobia.

Cuttle-fish bone, mixed with native wine, is given for cancer.

A species of green *mantis* and its nests are used in cases of incontinence of urine and spermatorrhœa. The *cricket* forms the basis of a medicine to throw out splinters which have entered into the skin. It is considered anti-hydropic. Three or four such crickets are administered in a wineglassful of Chinese rice wine. The drone or *wasp* is used in cases of bites by spiders, ulcers and leucorrhœa. It is said also to cure toothache.

But while we may smile at most of these Chinese remedies, it should be borne in mind that as great ignorance prevailed, and as much prejudice existed among ourselves in times not long passed, before chemical knowledge and scientific discoveries had made such rapid strides.

Take for instance the following asserted facts:

Had one of our ancestors a distressing toothache, there were ready at hand the *weevil* and the *lady-bird*, either of which would be crushed and applied to the afflicted part. Nay, did he wish to get rid of the offending organ altogether, he had but to touch it with the ashes of burnt "emmets or pismires," and straightway the tooth would drop from the gum. Had he the misfortune to sprain his leg or bruise his foot? Two at least of the beetles which dwell in

the excrementitious matter, *Geotrupes* and *Aphodius*, were specifics held in high estimation. The yellow matter which exudes from the joints of the oil beetle was held to be as efficacious in dropsy or rheumatism as in hydrophobia, and no doubt was so. Another infallible remedy against the bite of a mad dog consisted of the fat white *maggots* generated in the putrid carcase of the dog itself. Truly a case of homœopathy run mad! That foul disease, leprosy, could not stand before the bruised body of a *meal-worm*. The great jaws of the *stag-beetle* when powdered, we are told, proved a certain cure in most of the maladies incidental to childhood. The different *tree bugs* were good against ague; the male cricket taken internally could drive away a cold. Was the cold accompanied by headache? There were plenty of remedies at hand, such as *earwigs* and *cockroaches*. This last insect was especially valuable, for according to Dioscorides (whose receipt was unhesitatingly reproduced by Mouffié in the 17th century), the fat of the cockroach, pounded with oil of roses, was singularly efficacious in earache, and the same insect boiled in oil removed warts. Snake poison, too, was rendered perfectly harmless, if the patient could be induced to swallow one or two *bed-bugs!*

There was a time when three *gnats* were taken as a dose, just as three grains of calomel might be taken now; while three drops of *lady-bird's milk* were formerly prescribed as seriously as a small dose of some fashionable medicine at the present day.

It is even still alleged that the little insect known as the *golden cetonia*, found in considerable numbers on rose trees, when pounded to a powder and administered internally, produces in the person a sound sleep, which lasts sometimes thirty-six hours, and which has the effect, in many cases, of nullifying hydropic symptoms.

A kind of paste made from the cockroach, administered internally, was found one of the most powerful antispasmodics known, and particularly useful, when diluted with water, in the case of lock-jaw.

Considering the number of species (at least 150,000) and the varied properties they possess, it is astonishing how few insects have been pressed into man's service, either for curative or culinary purposes.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Brooklyn College of Pharmacy was organized June 9th last, and will commence its lecture course next October. The faculty is constituted as follows: R. G. Eccles, M. D., professor of materia medica, W. P. De Forest, Ph.G., professor of general pharmacy, L. F. Stevens, Ph.G., professor of special pharmacy, and G. C. Diekman, Ph.G., M. D., professor of chemistry.

The School of Pharmacy of the University of Michigan held its 23d annual commencement on June 25th, when thirty candidates received the degree of Pharmaceutical Chemist, one became Master in Pharmacy, and seven Bachelors of Science in Chemistry. In addition to these the honorary degree of Master of Pharmacy was conferred upon Giles Lewis, who, in 1867, received from this University a certificate of proficiency for chemical and pharmaceutical work.

The Massachusetts State Pharmaceutical Association met at its tenth annual convention at Nantasket Beach, June 23; president Marshall in the chair.

Aside from the customary routine business, the cut-rate problem was discussed with the result that the plan adopted at New Orleans was approved. Three papers were read, on syrup of tolu by J. G. Kilbourne, on assay of nux vomica, by W. L. Scoville, and on trade problems, by Prof. Bedford. The officers elected for the ensuing year are H. M. Whitney, Lawrence, president; M. L. H. Leavitt, Boston, secretary; and T. B. Nichols, Salem, treasurer. The time and place for holding the next meeting will be announced by the executive committee.

The Nebraska State Pharmaceutical Association had its tenth annual meeting at Beatrice, May 26, president Daubach in the chair. G. J. Evans, Hastings, was elected president; Julia M. Crissey, Omaha, secretary; J. Forsyth, Omaha, treasurer, and F. S. Hazard, Grand Island, local secretary. The next meeting will convene in the last-named place, June 7, 1892.

The Oregon Pharmaceutical Association, which was organized a year ago, (see Am. Jour. Phar., 1890, p. 429), held its first annual meeting June 10, in the city of Portland, when papers were read on oil of wintergreen by A. Wilson, on petroleum ointments by E. D. Oesch, and on disinfecting fluids by O. Bierbach. G. C. Blakely, The Dalles, was elected president; C. E. Bailey, Forest Grove, secretary, and O. P. S. Plummer, Portland, treasurer. The next meeting will again be held in Portland in June, 1892.

The Tennessee State Druggists' Association convened at its sixth annual meeting, May 20, at Knoxville, president Yeager occupying the chair. Trade interests and the causes of the failure of the passage of the pharmacy bill furnished the chief topics for discussion. Prof. Ruddiman read a paper on galenical preparations of deficient strength. The executive officers were re-elected for the current year and the date of the next meeting was fixed for May 18, 1892.

The Western Interstate Associated Pharmacists is the title of a new organization formed at Excelsior Springs, Mo., June 11. It is to consist of delegates appointed by the State Associations of Arkansas, Colorado, Illinois, Iowa, Kansas, Missouri, Nebraska and Texas; the object is the improvement of the professional and trade interests of these State associations; each state is entitled to ten delegates, but only to one vote; a quorum is to consist of three members. Provision has been made for standing committees on Registration, Legislation, Formulary, Improvement, and Retail Interests, and this seems to be the sphere in which this interstate association expects to exert its influence. President for the year is Rob. J. Brown, Leavenworth, Kan., and G. H. Willett, Kansas City, Mo., is secretary. The association will meet again at Excelsior Springs, Mo., in June, 1892.

Proceedings of the Connecticut Pharmaceutical Association, at the 15th annual meeting. 8vo, pp. 124. For a brief account of the transactions see July number, p. 369. D. G. Stoughton, Hartford, is local secretary for the next meeting, to convene February 2, 1892.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Falsifications et autres Défectuosités des principaux Médicaments Simples; par Nt. Gille, Pharmacien, Professeur émérite, etc. Deuxième édition, revue et augmentée avec la collaboration de Eug. Gille, Pharmacien, etc. Bruxelles: Imprimerie Charles Vande Weghe. 1891. 12mo, pp. xxxii and 409.

Falsifications and other imperfections of the principal simple medicaments.

Although this little work is primarily intended for the use of students with the view of familiarizing them with the methods for recognizing and establishing the purity of drugs and chemicals and the nature of impurities that may be present, the book affords also valuable information and many practical hints to those who are already accustomed to such investigations. In an introductory chapter the author discusses in a general way the causes of impurities, the nature of falsifications, and the manner of detecting them and guarding against them. The work proper is divided into three parts, the first of which treats of inorganic drugs, divided into simple and compound bodies, and further arranged into convenient groups according to chemical or physical qualities. The second part treats of organico-inorganic drugs, comprising salts of an organic acid with an inorganic fixed base; salts of an organic base with a mineral acid, and non-saline fossil and allied compounds, like petroleum, paraffin, amber, etc. The third part, relating to organic drugs, occupies more than one-half of the work, and is divided into three sections, chemical compounds, organic products of a complex composition (gums, resins, fats, etc.), and plants and plant organs. The individual drugs are not described, but strictly in accordance with the aim of the work only the possible impurities and the occasional adulterations and substitutions are enumerated and the manner of their detection indicated. This detection is effected, wherever possible, by chemical means, but for drugs consisting of plants or plant organs, the botanical and physical characters are mainly dwelled upon, however, to the exclusion of the structural characteristics, the determination of which belongs to a different course of study. In an appendix the author gives several chemical tables useful for investigations like those treated of in the work, and the Belgian laws against falsifications. The work is thoroughly practical and gives evidence that it has been written by a close observer and an experienced teacher.

Monograph on flavoring Extracts, with Essences, Syrups and Colorings; also formulas for their preparation. With appendix. For the use of druggists. By Joseph Harrop, Ph.G. Columbus, O. Harrop & Co. 1891. 12mo. Pp. 162. Price, cloth, interleaved, $2.

The title of this little work sufficiently explains its scope, and since its author has been engaged for some years in the manufacture of such preparations, he was enabled to offer a work of practical usefulness, containing original formulas and others compiled from various sources, presumably after having verified their worth. In six chapters are discussed the articles used; the manufacture of flavoring extracts; artificial flavoring essences; syrups; colorings, and finally in the appendix, various preparations mostly connected with the soda water trade. The practical utility of the work will secure for it many interested readers. As it is interleaved, observations can be noted in suitable places for future reference.

Arzneimittel welche in dem Arzneibuch für das Deutsche Reich, Dritte Ausgabe (Pharmacopœa Germanica, editio III), *nicht enthalten sind.* Bearbeitet und herausgegeben von dem Deutschen Apotheker-Verein. Berlin. 1891. Selbstverlag des Deutschen Apotheker-Vereins. 8vo. Pp. 320.

Medicaments which are not contained in the German Pharmacopœia, third edition.

A pharmacopœia naturally does not contain all the drugs and preparations which are employed as medicines, but only such which, on account of their general use or their efficiency, have attained a certain prominence over others. Medicaments not thus officially recognized are, however, more or less prescribed by physicians, and in order to obtain the desirable uniformity also in non-pharmacopœial medicines, the Pharmaceutical Associations of several countries have found it necessary to issue what may be considered *Supplements* to their pharmacopœias. In such a manner originated the "National Formulary" as a supplement to the pharmacopœia of the United States; and the work now before us is an analogous supplement to the recently issued German pharmacopœia. It is printed in the German language, and has been prepared in a style similar to that of the pharmacopœia, by a special commission of the German Apothecaries' Association charged with pharmacopœial labors. The number of medicaments in this work is 811; but of these a large number are either chemical compounds, or crude drugs of vegetable or animal origin. Among the former may be mentioned crude hydrochloric acid, oxalic acid, stearic acid, some ammonium salts (benzoate, iodide, nitrate, oxalate and phosphate), salts of quinine, morphine, barium, lithium, etc., alkaloids (aconitine, atropine, hydrastine, eseridine, etc.), other proximate principles (amygdalin, cumarin, cantharidin, kosin, papayotin, etc.), synthetic chemicals (iodol, methacetin, orexin, thiol, saccharin, etc.). Among the crude drugs alluded to are found cochineal, castoreum, cuttle-fish, various roots, rhizomes, leaves, flowers, fruits, seeds, resins, six wines of different origin, etc. It will be observed that the work is far more comprehensive, than those issued in this country and in Great Britain, both of which confine themselves to formulas for medicinal preparations of various kinds, a course which appears to us to be preferable to the one adopted in the work just described. The articles are alphabetically arranged by their Latin titles, which are followed by the German synonyms; a table is appended giving the usual maximal doses of the more active medicaments; and two other tables contain the names of poisonous articles which are recommended to be kept under lock and key, and others which are less dangerous, but are recommended to be kept separate from the non-poisonous medicaments. Among the numerous formulas we find many which are apparently little used in this country. The work is handsomely gotten up; the types are clear, and the text is well displayed.

A Course of Home Study for Pharmacists; first lessons in the study of Pharmacy. By Oscar Oldberg, P.D., Professor of Pharmacy, etc. With 150 illustrations. Chicago: Published by the Apothecaries' Company. 8vo. Pp. XIV and 523.

The author presents here, in a compact form, the outlines of the sciences related to applied pharmacy (botany is excepted) in such a manner as to be adapted for home study. In Part I the elements of pharmaceutical physics

are taken up; Part II treats of chemistry, and the following two parts of materia medica and of pharmacy. It is obvious that, in the limited space at hand, it is absolutely impossible to enter into details, and the statements had, therefore, to be made in as concise a form as the nature of each subject would admit. As a rule, the author has well succeeded in compressing definitions into a few words without sacrificing clearness, and the deductions are generally drawn in such a clear and convincing manner as to be easily grasped by the student. In the materia medica descriptions, we think that the most important characteristics deserve to be more prominently pointed out. The work will, doubtless, be of much utility and help to those who are endeavoring to acquaint themselves with the rudiments of science before entering a college in pursuance of their studies, or who may not be able to seek instruction outside of that obtainable in active business. The latter will find in the book a useful guide for intelligently comprehending the material and the processes in daily use. In the preface the author gives some timely advice in regard to the object of study, and, while the baneful influence of the habit which considers memorizing as equivalent to study, should be denounced on all suitable occasions, we quote with pleasure the following, as bearing on this question: "To the student I wish to say that the mere memorization of facts and theories, however valuable these may be when properly used, should, by no means, be your main object. It should be your constant aim to clearly understand what you read, to develop your faculties of observation and reasoning, and to be able to rightly use what you learn. Only by using it and adding to it can you make it your own."

Pharmacographia Indica.—A History of the principal Drugs of Vegetable Origin met with in India. By Wm. Dymock, Brigade-Surgeon, retired, etc.; C. J. H. Warden, Surgeon-Major, Bengal Army, etc.; and D. Hooper, Quinologist, etc. London: Kegan Paul, Trench, Trübner & Co. 1891.

Part IV of this work, now before us, completes its second volume, and besides several orders of minor importance treats of the drugs procured from the orders of Sapotaceæ, Styraceæ, Apocynaceæ, Asclepiadeæ, Loganiaceæ, Gentianaceæ, Convolvulaceæ and Solanaceæ. This part is characterized by all the excellencies upon which we have commented in connection with the preceding parts on their publication. Among the plants a number are noticed which are either indigenous or spontaneous in North America, like chicory, taraxacum, Sonchus oleraceus, Anagallis arvensis, dulcamara, stramonium, etc.; while others are cultivated either for ornament or other purposes, like Tagetes erecta, calendula, jessamine, oleander, Ipomæa Bona-nox, capsicum, tobacco and others. Far more numerous are those plants which are either indigenous to India or have become naturalized there from other tropical countries.

Contributions from the U. S. National Herbarium. Published by authority of the Secretary of Agriculture.

The fourth number of vol. 1 of these "Contributions" contains a list of plants collected by Dr. E. Palmer in 1890 in Western Mexico and Arizona, embracing a number of new species of which eleven are represented upon well-executed plates.

Volume II will bring a manual of the phanerogams and pteridophites of Western Texas, from the pen of Professor John M. Coulter. The first part, which has just been issued, describes the polypetalous dicotyledons upon 152 pages, and makes known several new species. We are pleased to note in this issue the practical application of the metric system, all the measurements being given in m., dm., cm. and mm. This work will supply a want which has been felt for a long time; that this want is being filled by Professor Coulter will be hailed with pleasure by all interested.

The Pathology of Actinomycosis in Man and Animals. With record of cases and experiments. By Geo. A. Bodamer, M.D., B.S., etc. 8vo. Pp. 40.

A reprint from the Transactions of the Pathological Society of Philadelphia, 1891.

Modern Antipyretics; their Action in Health and Disease. By Isaac Ott, M.D., etc. Easton, Pa. E. D. Vogel. 1891. 8vo. Pp. 52.

This little volume treats of the physiological and pathological action and of the therapeutic uses of the class of compounds mentioned in the title; a brief account is also given of the chemistry of pyridine, hydroquinone, antipyrine, thalline and others. The work reviews the literature on the subject and gives an account of the author's own experiments and observations, with illustrations of the effects produced under various conditions.

The Pocket Anatomist. Founded upon Gray. By C. Henri Leonard, A.M., M.D., Professor of the Medical and Surgical Diseases of Women and Clinical Gynæcology, in the Detroit College of Medicine. Fourteenth revised edition, containing Dissection Hints and Visceral Anatomy. Detroit, Mich. 1891. The Illustrated Medical Journal Co., Publishers. Cloth; 297 pages, 193 illustrations; price, postpaid, $1.

This little work is intended as a companion for the dissecting-room, and is, mainly, a condensation from Gray's and of several other standard works. Having reached the fourteenth edition is evidence sufficient to show that it has been found useful. Its value as a remembrancer seems to be quite evident, considering the numerous illustrations and the terseness of the descriptions; the absence of stupid stereotype questions is also in its favor for such a purpose.

Tuberculosis.—Three editorials regarding the priority in demonstrating the toxic effect of matter accompanying the tubercle bacillus and its nidus.

The Bacteriological Laboratory of the Academy of Natural Sciences of Philadelphia has republished these editorials to place on record the claims of Dr. Saml. G. Dixon for having published in the Medical News, of October 19, 1889, experiments and results with the tubercle bacilli, analogous to those which were announced by Professor Koch in August, 1890, and in January, 1891. Since it is likely that the lines of research pursued by the two investigators may ultimately lead to important practical results, it is but proper that the early steps pointing towards this end should not be forgotten.

Vacation Time, with Hints on Summer Living. By H. S. Drayton, M.D New York: Fowler & Wells Co., Publishers. 1891. 12mo. Pp. 84. Price, 25 cts.

A seasonable little volume with practical suggestions concerning summer hygiene, applicable alike for the city and country, for the seaside and the

mountains, and for the tourist as well as for those who prefer a summer vacation without prolonged travelling.

Proceedings of the eighth annual Convention of the National Confectioner's Association of the United States. Philadelphia: Confectioners' Journal Print. Pp. 194.

The convention was held in St. Louis, May 5, 1891. The book contains the minutes with the discussions; also the official reports, circulars and communications of the year.

Pharmakopœfragen.

Pharmacopœial questions.

A reprint from the transactions of the tenth international medical Congress, held at Berlin in 1890, containing reports by A. Langgaard and Bruno Hirsch on questions connected with the elaboration of a pharmacopœia, and with the desirable uniformity in strength of preparations recognized by several or all pharmacopœias.

A Study of Coca Leaves and their alkaloids. By O. Hesse.

Reprint from the Pharmaceutical Journal, London, June 6, 13, 1891.

Sur l'Aristol. Par L. Reuter.

Ueber die Beziehungen des Filixsäuregehaltes zur Wirkung des Extr. Filicis æthereum. Von L. Reuter.

On aristol, reprint from Répertoire de Pharmacie.—On the relation of the amount of filicic acid to the activity of the oleoresin of male fern; reprint from Pharmaceutische Zeitung, April 31, 1891.

Resection of the Optic Nerve; by L. Webster Fox, M. D.

Reprint from The Medical and Surgical Reporter, May 30, 1891.

Pepsin. A review of the pepsin question, by Dr. C. F. Witte.

Reprint from Notes on New Remedies, Febr. and March, 1891.

OBITUARY.

Carl Wilhelm von Nægeli, professor of botany at the University of Munich, died May 10, aged 74 years. He was born near Zurich, and studied medicine and natural history at the universities of Zurich, Geneva and Berlin. In 1849 he became professor in Zurich, then in Freiburg, and from 1859 to 1888 he was attached to the university of Munich. His extensive labors in vegetable anatomy, physiology and morphology made his name known to scientific botanists everywhere. In systematic botany he was especially interested in the study of the algæ and of the genus Hieracium and the hybrids of its species.

Carl Johann Maximowicz died at St. Petersburg, February 16, aged 64 years. During his extensive travels in Japan, Siberia and adjoining countries he thoroughly studied their floras, and he described also the plants collected by several Russian travellers in Central Asia. Among the systematic botanists he stood in the front ranks.

Moritz Richard Schomburgk, Ph.D., director of the botanical gardens at

Adelaide, South Australia, died March 24, aged 80 years. He was a younger brother of Sir Robert Hermann Schomburgk, who died 26 years before him, and for some years had accompanied the latter in his travels and explorations.

James W. White, M.D., D.D.S., died in Philadelphia, May 27, in the sixty-fifth year of his age. He was born at Hulmeville, Bucks Co., Pa., and after the death of his father was raised in Burlington, N. J. He studied medicine at the University of Pennsylvania. At the time of his death he was the senior member of the firm of Hance Brothers & White, and the president of the S. S. White Dental Manufacturing Company. He was connected with the Dental Cosmos, as contributor and editor, since its establishment in 1859. He was interested in a number of philanthropic undertakings, and in 1887 was appointed president of the Board of Charities and Correction, an unsalaried position of honor, which he held for two years, when he was removed for refusing to acquiesce in what he conceived to be a violation of the letter and spirit of the civil service laws of the city.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

Edwin R. Burdick, class 1880, died in Philadelphia, where he was in business, June 18, aged 34 years.

J. Crawford Dawes, class 1841, died here June 26. For a number of years he had left the drug business and was engaged in other enterprises.

Edward Gaillard, class 1854, died here March 30, aged 53 years. For about 25 years he was in business at Eleventh Street and Montgomery Avenue. He contributed several papers to former volumes of this Journal.

Edward Warrington, class 1880, died June 6; he was in business on Richmond Street, in this city.

George F. Wiggan, class 1848, died June 4, aged 63 years. He was formerly chemist for Chas. Ellis & Sons, but more recently had been an extensive coal operator.

VARIETIES.

Pepsin.—The Pharmaceutische Centralhalle, June 4th, 1891, describes the production of pepsin by the patented method of J. L. Webber, which consists in macerating animal stomachs with acidulated water, clarifying the solution obtained by the addition of sulphurous acid, removing the clear liquid from the precipitate and then separating the pepsin from the peptone, by saturating at a higher temperature with sodium sulphate, whereupon pepsin is deposited whilst the peptone remains dissolved. The precipitate is dissolved in weak hydrochloric acid; the sodium sulphate is removed from the solution by dialysis, the residual liquid concentrated and dried. From the liquid, out of which the pepsin is deposited, the sodium sulphate is separated from the peptone by recrystallization on cooling. The product is readily soluble and, being free from peptone, is non-hygroscopic and permanent. It is claimed that one grain of it is capable of dissolving ten thousand grains of egg-albumen according to the test of the National Formulary.

Sulphonal is regarded as one of the most reliable and safest hypnotics; but that there is a certain amount of danger, was shown by Dr. Bresslauer, of Vienna (*Lancet*, April 4, 1891). The patients were lunatics, and had been taking the drug for a considerable time in good doses, and borne it well until symptoms of disturbance set in, these being great constipation, dark-brown urine, slow, or in some cases rapid but feeble pulse, discolored patches resembling purpura on the limbs, and great prostration. In several cases which ended fatally, the cause of death was heart-failure, with œdema of the lungs.

Retinol, a product of distillation from resin, seems likely to prove of service in the treatment of skin diseases. It dissolves many antiseptics: Salol, 1·10; iodol, 1·50; naphthol, 1·50; aristol, 1·50; camphor, 1·20; chrysophanic acid, 1·40; cocaine, 1·30; codeine, 1·40. It mixes with fats, oils, petrolatum, lard, lanolin or glycerin. Combinations of convenient density are: Retinol, ten parts; white wax, four parts; cacao butter, six parts. Retinol, eight parts; resin, eight parts; lanolin, five parts; or of each five parts.—F. J. Vigner, *British Journal of Dermatology*, May, 1891.

Cactine, the active principle of *Cereus grandiflorus*, has been isolated by F. W. Sultan, and its physiological action examined by O. M. Myers (*N. Y. Med. Jour.*, June 13, 1891), who states that, locally, it is absolutely non-irritant and that in therapeutic doses it is a powerful cardiac tonic stimulant, useful in functional cardiac and circulatory disturbances and in organic heart disease, except mitral stenosis, for which digitalis is preferable.

Nutrient enemata.—HUBER (*Corres. Bl. für Schweizer Aerzte*), recommends that 1 gm. of chloride of sodium should be added to each egg which is given as a nutrient enema. In this way, he thinks, about 12 per cent. is absorbed. An enema should contain two to three eggs and should be given two or three times daily. An hour before it is given the bowels should be washed out with warm water.

Phenylurethane (euphorin) is strongly recommended by Adler (*Wien. Med. Wochenschr.*, No. 17) for its analgesic and antirheumatic action; hardly any unpleasant after-effects were noticed, increased diaphoresis and a feeling of warmth being observed in one case. (See also Amer. Jour. Phar., 1890, pp. 389, 584).

Iodoform in Tuberculosis.—Flick regards its curative powers as being limited to those cases in which the circulation has not yet been cut off from the deposit. It is dissolved in cod liver or olive oil, and is given by injunction; the preparation should last for several weeks.—*University Med. Mag.*, August 1891, p. 727.

Aristol, used by freely dusting the powder on the affected parts, has produced almost magical relief in a case of rhus poisoning which had reached the vesicular stage and was attended with much swelling and burning.—Dr. J. J. Levick.—*Med.* News, July 25, 1891.

The cholagogue property of salicylate of sodium was made known by Rutherford, but has not received much attention. Professor Germain Sée now reports (*London Lancet*) that he has found it to be the most efficient of all cholagogues in promoting the expulsion of gall-stones.

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SEPTEMBER, 1891.

DIALYSIS BY MEANS OF SULPHATE OF CALCIUM.

By Guadalupe Morales, Ph.G., of Nicaragua, C.A.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 94.

In a monograph (See *Am. Jour. Pharmacy*, 1889, p. 159) published by Mr. A. L. Herrera, from Mexico, wherein he treats of Chemical Dialysis, a new process he has invented, caused me to try his experiments, following his instructions, to determine if that process could have any practical application for the extraction of alkaloids.

He says that it has not been studied with elaborate care; what he has done has been to establish the general principles, corroborating them with a certain number of experiments, done with several substances under different conditions, and to point out the application they may have, leaving to the study of others, who may want to try them, to determine if the applications which he indicates can have any practical value; he declares that he does not know many of the imperfections and objections attached to his process.

In order to understand better the process of Mr. Herrera, I will extract and condense from his paper the more important points.

"When water or an aqueous solution is separated from calcined sulphate of calcium by a membrane of parchment paper, the water passes through the membrane and is employed in the hydration of the sulphates; besides, if the substances in solution are crystalloid, they totally pass from the interior to the exterior of the dialyzator; it does not happen thus if they are colloid.

"For example: if a parchment paper filter be filled with water containing albumen and sodium chloride, and its external surface is put in contact with calcined sulphate of calcium in powder, the water and the salt pass to the absorbent, and the albumen remains in the dialyzator.

"If the sulphate be substituted by fused chloride of calcium, by quick-lime and in general by any hygroscopic substance, the same result is obtained as with the first of these absorbents.

"Taking as a foundation the results gotten above, it can be said that the chemical affinity of the absorbent for the liquid is the determinate cause of the phenomenon."

Practice of the Chemical Dialysis.—Mr. Herrera indicates first the different kinds of septum that can be used, viz: parchment paper, animal septum, the epidermis of American Agave, clay vessels, slate, etc., and he presents the advantages and disadvantages of each one, but at last recommends parchment paper as more convenient and general in its application. The calcium sulphate should be freshly calcined, should absorb at least two parts by weight of water and should produce heat in the act of being hydrated. The empty dialyzator, folded like a filter and attached to a rectangular wooden frame, is introduced into a vessel containing the calcined sulphate of calcium in powder, taking care that the contact with the outer surface of the membrane may be as complete as possible, the liquid is poured in and the whole set aside for some time. In order to increase the rapidity of the operation the solid crust of hydrated sulphate of calcium formed around the filter is removed, powdered and put again in the vessel. If organic matter in a state of decomposition be dialyzed the membrane must be changed frequently. In order to recover the crystalloid substance, the calcium sulphate is powdered, packed in a percolator and extracted with alcohol.

Applications.—The process may be applied to the separation of organic acids from solution, or to the extraction of alkaloids. The latter is founded on the general facts: 1st, that the salts of organic bases belong to the class of crystalloid substances; 2d, they are soluble in acidulated water, and 3d the same salts are soluble in alcohol. He gives the following method that may be adopted. After macerating the powdered drug for 24 hours in water slightly acidulated with tartaric acid the mixture is filtered, and the filtrate subjected to dialysis with the precautions given above. When the

liquid contained in the dialyzator is not precipitated by the general reagents for alkaloids, the process is discontinued.

" The hydrated absorbent is powdered and by means of lixiviation or maceration with concentrated alcohol the organic salts are separated.

" Proceeding in this way an almost pure alcoholic solution of the alkaloidal salt is obtained, not containing extractive, coloring or resinous matter. For extracting the organic base it is sufficient to separate the alcohol by distillation or evaporation, to dissolve the residue in water and precipitate by means of an alkali or alkaline carbonate."

He considers the process may be applicable to the separation of glucosides, to the concentration of extractive liquids, to the concentration of extracts which owe their activity to colloid substances and to toxicological investigations.

My own experiments on the above methods.—The following are some of the results of my own experiments which I made three times.

Ten grams of powdered opium were macerated for 24 hours in water acidulated with ·5 per cent. of tartaric acid, after this time the liquid was filtered and the residue washed with water until 200 cc. of the liquid were obtained. I started the dialyzation, using two dialyzators made of parchment paper, folded like filters and fastened to wooden frames. I divided the liquid between the two and surrounded them with recently calcined sulphate of calcium. After 24 hours the level of the liquid in the dialyzators had lowered, and with the object of putting the septum in contact with a fresh portion of the absorbent, I removed, carefully, the filter and scraped the hydrated part off and removed it as completely as possible from the non-hydrated portion, using the latter as an absorbent for a continuation of the process. The operation was then continued for four days, at the end of which time one of the parchments commenced to decompose and the liquid was transferred to the other, at the end of two more days the 2d parchment commenced to decompose and the operation was stopped.

After powdering the hydrated sulphate it was packed in a percolator and treated with 1,200 cc. of 95 per cent. alcohol, employing about 5 days in the percolation, which was stopped when the percolate ceased to give any reaction for alkaloids.

The alcohol was recovered from the percolate by distillation, and the residue treated according to Dr. Squibb's method for the estimation of morphine. Narcotine was found in the ethereal washings, and the amount of morphine found was 7·77 per cent. The non-dialyzed liquid showed a considerable quantity of morphine and narcotine by qualitative tests.

It can be seen from the above experiments that the results were not very satisfactory for Mr. Herrera's process, at least for assaying purposes, when it is taken into account that I found in the same opium 14·41 per cent. of morphine, following Dr. Squibb's method for determination of the alkaloid.

Since it is a new process, and consequently subject to improvements by a thorough and conscientious study, I do not want to condemn it. It has, no doubt, some value for separating alkaloids *qualitatively*, for example in toxicological investigations, since it transfers them without exposure to heat, to an absorbent, sulphate of calcium, from which they may be readily removed without fear of decomposition.

My experiments show that *quantitatively* the method is without value, as there are other processes more accurate, less expensive and more rapidly executed.

THE LEAVES OF CEANOTHUS AMERICANUS.

By John A. Buckner, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 93.

The plant from which the leaves were obtained was fully described by F. C. Gerlach, Am. Jour. Pharmacy, 1891, p. 332, in his paper on the analysis of the root. As stated there, the leaves have been used as a substitute for tea, and the following analysis was undertaken with a view of seeing how nearly they resembled the tea leaves in chemical composition.

Five grams heated in an air-bath at 100° to 110° lost ·305 grams = 6·10 per cent. of moisture. Five grams after ignition weighed ·265 grams = 5·30 per cent. of ash. Fifty grams in fine powder were exhausted by petroleum ether, and the extract, after recovering the solvent by distillation, weighed ·889 grams = 1·77 per cent. This consisted of ·038 per cent. of volatile oil, ·022 per cent. fat, ·51 per cent. wax, and 1·20 per cent. caoutchouc. Stronger ether then

extracted from the drug 2·19 per cent., which was found to consist of gallic acid and resin. This extract gave negative tests for alkaloids. Absolute alcohol next extracted 5·99 grams = 11·98 per cent. This extract was first treated with distilled water and the aqueous solution tested for alkaloids with negative results, and the water yielded nothing when agitated with such solvents as petroleum ether, ether and chloroform, except that the stronger ether removed some gallic acid. Further agitation removed a yellowish-red crystalline substance, which gave tests with ferric chloride and lead acetate corresponding to quercitrin.

Distilled water extracted from the remaining drug 3·71 per cent. of organic matter, consisting of mucilage 3·04 per cent., and sugar ·67 per cent.

Dilute alkali solution extracted 1·76 per cent. of albuminoids, and dilute acid extracted 1·76 per cent., consisting almost entirely of calcium oxalate.

Lignin extracted by chlorine water = 7·37 per cent., and the remainder 58·37 per cent. = incrusting matter and cellulose.

The tannin was estimated as follows: Ten grams of the drug were treated with distilled water in separate portions for two hours. The filtered liquids were mixed and made up to 500 cc. 25 cc. of this were diluted with two volumes of water, and this, while warm, was completely precipitated with a solution of gelatin and alum (·5 gram gelatin, 2·5 grams alum and 250 cc. water) added carefully, with constant stirring. The precipitate was collected, well washed, dried at 110° and weighed. An average of two determinations gave 9·45 per cent. of tannin.

As these leaves have been used as a beverage to replace coffee and tea, I thought other than the astringent principle might be present, and tried the following assay process for theine. Five grams of the drug were treated with boiling distilled water. The filtered liquid was evaporated, with the addition of two grams of calcined magnesia and five grams of fine sand, to complete dryness. The residue was placed in a flask with 60 cc. of ether and 10 cc. of chloroform and allowed to stand 24 hours. This was repeated twice and the solvents, after separation, were mixed and recovered by distillation. The residue, dissolved in acidulated water, gave negative reactions for alkaloids.

I then tried the following method with similar negative results:

Fifty grams of the drug were macerated for two days in water containing one per cent. of sulphuric acid. The liquid filtered off, evaporated somewhat, and agitated with ether. The ethereal solution was allowed to evaporate spontaneously, and yielded a mass of needle-shaped crystals, which proved to be gallic acid. The liquid was then rendered alkaline with sodium hydrate and again agitated with ether, which was allowed to evaporate spontaneously, and the residue tested for alkaloids, with negative results. The formation of the gallic acid indicates that the tannin of ceanothus leaves readily yields gallic acid.

PROXIMATE ANALYSIS OF THE ROOT OF CEANOTHUS AMERICANUS.

By John E. Hitchcock, Ph.C.

The root is astringent and imparts a red color to water and to alcohol.

The scheme followed is Dragendorff's as outlined in "Prescott's Organic Analysis," 1889, p. 423. The root to be examined was reduced to a No. 60 powder and all particles of iron removed with a magnet.

I. Two grams were dried rapidly until they ceased to lose weight, at 110° C.—the difference in weight indicating a loss by moisture of 8·285 per cent.

II. Two grams were now taken and ignited in a platinum crucible; the weight of the residue indicated 2·76 per cent. as total ash.

In the water solution of this ash was found potassium sulphate, potassium chloride, and traces of sodium and magnesium; the dilute hydrochloric acid solution showed calcium and magnesium phosphates and carbonates, the residue, insoluble in water and acid being silica.

III. Ten grams of the powder were placed in a flask, macerated with 100 cc. of petroleum benzin for eight days, and the solution rapidly evaporated in a dry current of air, the residue making a total benzin extract of ·92 per cent. Water was now added to the dry extract, and this again dried in an air bath at 110° C. in order to drive off all traces of volatile oil or other vaporizable matter, the difference in weight indicating ·14 per cent. as volatile oil in the benzin extract. This oil has a strong peculiar aromatic odor, a

greenish color and a slightly bitter taste. The remainder of the benzin extract consists of a hard resin and chlorophyll.

IV. After having thoroughly washed with petroleum benzin, and dried at 110° C., the drug was macerated with 100 cc. of dry ether for eight days in a cool, dark place, and the liquid evaporated as before; the weight of the residue indicated a total ether extract of 1·91 per cent. This extract was insoluble in water, but readily soluble in 98 per cent. alcohol, from which solution a grayish-white hard resin was separated on pouring it into cold acidulated water. This resin is turned yellowish-brown by cold concentrated sulphuric acid, and on heating a faint purple is produced. Froehde's reagent in the cold gives a brown reaction, and in the hot solution an apple-green.

V. The powder was now well washed with ether, dried, then macerated with 100 cc. of 98 per cent. alcohol for eight days, and the liquid evaporated, leaving 3·205 per cent. alcoholic extract. 36·7 per cent. of this extract was soluble in cold water. This portion gave reactions for tannic acid, with the following reagents:—a greenish-black with a ferrous and ferric solution, precipitates with tartar emetic, copper acetate and gelatin. The amount of tannin present in this solution, as estimated with lead acetate, is ·218 per cent.

The remainder of the alcoholic extract was dissolved with very dilute ammonia water, and from this solution there was precipitated by acetic acid 1·21 per cent. of phlobaphene. The extract also contained a red coloring matter and a resin.

VI. The drug was again washed, dried and then macerated for 48 hours with 100 cc. of water, total water extract being 5·88 per cent. Ten cc., treated with 98 per cent. alcohol, gave 0 22 gm. as the weight of water extract insoluble in diluted alcohol. A filtrate from this precipitate was concentrated and again treated with three times its volume of 98 per cent. alcohol, giving 0·055 gm. as the weight of water extract insoluble in stronger alcohol. The portion insoluble in dilute alcohol was principally gummy matter. That insoluble in the stronger alcohol was albumen and mucilage. Traces of sugar were also found in the water solution.

VII. The powder was next macerated with a ·2 per cent. solution of sodium hydrate for 24 hours; the liquid acidulated with acetic acid and treated with 90 per cent. alcohol, which precipitated 4·74 per cent. of albuminous and pectous substances. The remainder of

the alkali extract was undetermined, and represented 14·03 per cent.

VIII. After washing free from the alkali, the residue was treated with acidulated water for 24 hours; 12·8 per cent. were extracted from this solution, which consisted of inorganic salts and starch.

IX. The remainder of the drug, after thoroughly washing and drying, was weighed and estimated as cellulose and lignin, equalling 43·2 per cent.

An aqueous infusion was made with one gram of the powder, and tannin estimated with copper acetate, which gave 6·81 per cent. the total amount of tannin in the root. The total albumen as estimated by Kjeldahl's method was 2·375 per cent.

SUMMARY.

Moisture,		8·285
Ash,		2·61
Petroleum benzin Extract,		·926
Ether	"	1·91
Alcohol	"	3·25
Aqueous	"	5·88
Alkali	"	{ 4·74 14·03
Acid	"	12·80
Cellulose and Lignin,		43·20
Loss,		2·37
		100·00

See also analysis of the root bark of ceanothus, Am. Jour. Phar., 1891, July, p. 332, and of the leaves, ibid., Septbr., p. 428.

FABIANA IMBRICATA.

A Plant Analysis.

By Harry C. Loudenbeck, Ph.C.

Under the name of "Pichi," *Fabiana imbricata* is known in Chili and Argentine Republic for its prompt action in diseases of the kidney and liver.

This shrub which might be taken for a conifer, belongs to the natural order Solanaceæ, sub-order Curvembryeæ and tribe Nicotianeæ. It grows on high and dry hill tops, and is remarkable for its light bluish-green branches, which are covered with a resinous matter, that hardens, forming a gray powder. In trade Pichi consists of the stems and leafy branches which are covered with a thin gray bark to which a considerable resinous matter adheres.

It was first brought to notice by Dr. Henry H. Rusby,[1] who wrote a botanical description and made a crude, but, under the circumstances, a good chemical analysis of the drug. He observed that by extracting with ether, alcohol, or water, the extractive produced with ammonia a deep blue fluorescence, which he supposed to be due to a resin. He also obtained with the same fluids a heavy brown precipitate upon adding a solution of iodine in potassium iodide.

Dr. A. B. Lyons[1] found: A minute quantity of some alkaloid that formed crystallizable salts, a neutral crystalline principle, a fluorescent body much like æsculin which he did not succeed in crystallizing, a volatile oil, and a resin.

George A. Deitz[1] took up the work and made quite a full plant analysis of the drug, and succeeded in crystallizing the fluorescent principle, but could not find an alkaloid as reported by Dr. Lyons. He also reported "no tannin," and Prof. Henry Trimble[1] and J. M. Schroeter made a further investigation of the neutral principle, making combustions of the same and calculating therefrom the formula $(C_{18}H_{31}O_2)_x$.

I have given a summary of the work that has been done, so that a better understanding may be had of my work and the questions involved.

The Analysis.—The leaves and branches were ground together and passed through a number 60 sieve.

I. *Treatment with petroleum ether.*—Ten grams of the powder was taken and macerated with 100 cc. of petroleum ether for 10 days. This solvent extracted 5·64 per cent., fat and wax 3·24 per cent., volatile oil 2·22 per cent., and a small amount of fluorescent principle and a caoutchouc-like body, that burns with a crackling sound and a bright flame and is soluble in chloroform but insoluble in alcohol, and distils with white fumes of a suffocating odor.

II. *Treatment with stronger ether.*—The drug freed from the previous solvent was treated with 100 cc. of stronger ether that was entirely free from water, and macerated for 10 days. Total amount dissolved 3·94 per cent. The ethereal extract was evaporated and this residue treated by means of a Gooch crucible with hot water. The residue after washing thoroughly seemed to be full of minute

[1] See references at the close.

crystals, which I concluded was the neutral principle. The mass was entirely soluble in absolute alcohol, from which the neutral principle crystallized out in small shining crystals of a pure white color. They dissolved readily in absolute alcohol, ether and chloroform, but were insoluble in water. Besides this principle, the residue consisted of a light colored resin soluble in alkalies, producing an intense yellow solution, and a minute quantity of chlorophyll. The hot water extracted 1·09 per cent. The aqueous solution was agitated with chloroform and setting aside it deposited upon evaporation a considerable quantity of the fluorescent principle in the form of minute needles, which I purified by dissolving in water and recrystallizing and finally obtained them quite pure and of a light nearly white color. They have a bitter taste and give an intense blue fluorescence with ammonia, which is changed by acids to a much paler but distinct rose fluorescence.

With iodine in a potassium iodide solution it gives a reddish brown precipitate; with bromine water it gives a blue precipitate which is soluble in chloroform, forming a pink solution. The bromine water must be added in a minute quantity so as not to be in excess, otherwise it would destroy the peculiar color of the chloroform layer and change the blue precipitate to a dirty brown. Strong hydrochloric acid, added to the crystals and a minute portion of potassium chlorate added, gives a bright red color, which when heated on a water-bath gives a reddish violet. It gives no precipitate with ordinary alkaloidal reagents, such as Mayer's reagent, picric acid, ammonium molybdate, etc. It gives no precipitate with the salts of the heavy metals, such as copper sulphate, silver nitrate, mercuric chloride, lead acetate, ferric chloride and gold chloride. It melts at 190° C., forming a dark yellow liquid, and at a few degrees higher it decomposes, forming very irritating fumes. That it is a glucoside is proved by its readily reducing alkaline solution of copper. The impure aqueous solution of the ether residue gives precipitates with alkaloidal reagents, and thinking that perhaps there was an alkaloid mixed with the fluorescent principle, I made the solution acid and shook out with chloroform until the fluorescent principle was entirely extracted, then the solution was made alkaline and treated again with chloroform, which was siphoned off and allowed to evaporate; a soft neutral resin was left, of an intense bitter and tingling taste; it is insoluble in water, not easily soluble in alkalies, but was soluble

in 80 per cent. alcohol. It may be a decomposition product formed by the action of the acid upon the glucoside. It will be seen that no alkaloid was found, and it is probable that the glucoside mixed with impurities has been mistaken for an alkaloid.

III. *Treatment with 95 per cent. alcohol.*—Total amount dissolved 11·12 per cent., nearly all of which was soluble in water. The water solution was treated with chloroform; upon separating the chloroform layer and allowing it to evaporate spontaneously, an additional quantity of the fluorescent principle was obtained, but no results by treating the acid and alkaline solutions in like manner.

The water solution gave the following reactions:

Solution of ferric chloride, inky green precipitate.

Solution of lead acetate, golden yellow precipitate.

Solution of copper acetate, dirty yellow precipitate.

Solution of gelatin, white precipitate (slight).

Solution of molybdate of ammonium, a red color.

Solution of ferrocyanide of potassium, with ammonium hydrate, a deep red color.

Solution of cinchonine sulphate, a white precipitate.

The water solution was precipitated with lead acetate and the amount of the peculiar tannin found to be ·78 per cent. The amount of the alcoholic residue not soluble in water was soluble in dilute ammonia, and consisted of phlobaphene.

IV. *Treatment with water.*—Total amount dissolved, 8·8 per cent. A small amount of mucilage was found and 1·8 per cent. of dextrin, organic acids and allied substances 7 per cent.; probably a large amount of this is tannin and gallic acid.

V. *Treatment with ·2 per cent. solution of potassium hydrate.*—Total amount dissolved, 10·5 per cent., mucilage 1·55 per cent., albumen 3·88 per cent., undetermined substances 5·07 per cent.

VI. *Dilute acid* dissolves a very small amount. Cellulose and lignin 45·4 per cent., ash 4 per cent., moisture 8 per cent.

SUMMARY.

	Per Cent.	Per Cent.
Ash,		4·00
Moisture,		8·00
Petroleum ether Extract,		
(*a*) Volatile Oil,	2·22	
(*b*) Wax and Fat,	3·24	
(*c*) Fluorescent Principle and caoutchouc-like body, small amount,		5·65

	Per Cent.	Per Cent.
Ethereal Solution,		
(*a*) Fluorescent Principle (impure),	·6	
(*b*) Light Colored Resin,	2·5	
(*c*) Neutral Principle and Chlorophyll,	·14	
(*d*) Undetermined Substances,	·7	3·94
Alcoholic Solution,		
(*a*) Organic Acids (tannin),	·78	
(*b*) Phlobaphene,	3·12	
(*c*) Undetermined Substances (resin, fluorescent principle),	7·22	11·12
Aqueous Solution,		
(*a*) Dextrin,	1·8	
(*b*) Organic Acids and Allied Substances,	7	8·8
Dilute Potash Solution,		
(*a*) Mucilage,	1·55	
(*b*) Albumen,	3·88	
(*c*) Undetermined Substances,	5·07	10·50
Intercellular Tissue, as Cellulose and Lignin,		45·04
Loss,		3·96
Total,		100·00

Methods for extracting fluorescent principle.—Several methods were used for extracting the glucoside from the plant. A strong decoction was made, and to the wine colored liquid was added acetate of lead; this threw down a heavy precipitate of coloring matter and organic acids, which was filtered off and the clear filtrate treated with hydrogen sulphide which precipitated the excess of lead. The precipitate was filtered off and the filtrate concentrated, which caused the fluorescent principle to crystallize out; it was purified by dissolving in hot water and re-crystallizing. If charcoal is used in purifying, it seems to absorb the glucoside and prevent it from crystallizing.

Another method was to extract the drug with dilute alcohol, recovering the alcohol by distillation, drying the residue and powdering with sand; treat this with successive portions of hot water and filter, shake the filtrate with chloroform which dissolves the glucoside, remove the chloroform layer, evaporate off the chloroform, which may be recovered by distillation, and a white mass is left, consisting chiefly of the fluorescent principle which may be purified by dissolving in hot water and crystallizing. The fluorescent glucoside seems to be the bitter principle of the drug and deserves further study.

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My thanks are due to Messrs. Parke, Davis & Co., of Detroit, who sent me a liberal supply of material.

SCHOOL OF PHARMACY OF THE UNIVERSITY OF MICHIGAN, June, 1891.

CARPAINE IN NORTH AMERICAN PAPAYA LEAVES.

BY J. B. NAGELVOORT.

It is well known that plants grown under different conditions may differ very essentially in some of their constituents; thus Cinchona Calisaya grown in hothouses is said not to produce alkaloids, and I think it was Leunis who made the statement that Conium maculatum, grown in Scotland, is free from coniïne. It seemed to me worthy of a trial to submit Carica Papaya, grown in Detroit, United States, to an analysis, since Dr. Greshoff discovered that the young leaves grown in Java, contained an alkaloid, which he called carpaïne. I refer to the original contributions from the chemical laboratory of the Botanical Garden at Java.[1] Mr. Geo. S. Davis, very liberally allowed me to cut down, for this purpose, the young leaves of ten nice healthy papaya trees, raised in his greenhouse, but at the time of this investigation, transplanted out-doors; these leaves were found to contain about 0·25 per cent. carpaine, calculated on the dry material.

DETROIT, July, 1891.

MAGNOLIA GRANDIFLORA.

BY B. ALFRED RANDOLPH, PH.G.

From a Thesis presented to the Philadelphia College of Pharmacy.

In going down Buffalo Bayou from Houston, Texas, to Galveston Bay, a distance of about fifty miles, a person cannot realize a more beautiful scenery than is presented here by nature, with the banks of this rivulet filled with magnolia trees, their height ranging from the magnificent altitude of forty to seventy-five feet; their leaves of

[1] See AM. JOUR. PHARM., May, 1891, p. 230.

a lovely polished green, and their flowers beautiful and gorgeous and of a fragrance rendering the atmosphere rich with their delicate odor. In autumn the large green fruit, from which are suspended a number of delicate scarlet seeds hanging by a slender silken thread, again renders the tree beautiful in appearance, and the contrast with the flowers, as sometimes seen on the same tree, is quite striking.

This species has its spreading branches appear on the trunk at about twenty feet from the ground. Its habitat is Florida, Louisiana and Texas, although it is found as far north as Tennessee and as far west as California. It thrives best in sandy soil along the banks of rivers and is seldom found elsewhere. It does not bear fruit until it is about five years old.

The leaves are always alternate oval-obovate dark green above, mid rib prominent, margin entire, under surface of a light brown color and velvety appearance; when bruised, they have a very disagreeable odor and a bitter and acrid and pungent taste, which properties are lost when the leaf becomes dry. By placing a linen cloth on the under surface of the leaf and marking with a blunt instrument an indelible ferruginous mark is obtained.

The flowers terminate the young branches and appear in the spring, the buds being covered with two deciduous tough hairy scales. The petals are large oval or obovate, abruptly narrowed at the base, coriaceous and of a brilliant white color, but becoming instantly ferruginous when bruised. Letters can easily be written on them with a sharp instrument. The stamens are very numerous and much shorter than corolla.

The fruit is about three to four inches long, two to three inches wide, conical, composed of numerous dehiscent carpels arranged in a sort of imbricated spike; each carpel contains one or two seeds which after dehiscence remain suspended by slender threads, and which are the size of a pea and covered with scarlet pulp, the centre being a hard kernel, white externally and dark colored internally. The taste of the fleshy portion is exceedingly pungent, acrid and bitter, and when a ripe seed is bruised in the mouth the irritation often extends far back into the throat causing a lasting disagreeable taste, followed by incessant and painful coughing.

The seeds after falling from the fruit, if covered over with loam, begin to grow the following spring. In raising them for ornamental purpose, out of several hundred seeds planted only a small number

ever matured. On exposure to air the seeds become rancid and to preserve their germinating powers they should be kept in rotten wood or moist sand.

The bark is about half an inch thick and breaks with a short fibrous fracture; externally it is of a gray color and smooth, often covered with moss; inner surface whitish or after drying yellowish or pale brownish, smooth and very finely closely striate. The dry bark has scarcely any odor and a slight bitterish taste, but the fresh bark is of a strong aromatic odor and bitter acrid and astringent taste.

It is used, domestically, in infusion or decoction for the treatment of rheumatism and malaria, and the tincture made by macerating the bark in brandy or whiskey is said to have produced cures in chronic cases of chills and fever when quinine had failed.

The bark which had been collected in November, 1890, yielded an infusion of an acid reaction, and giving no precipitate on the addition of alcohol. The tincture became milky when mixed with water. By distillation with water a little volatile oil was obtained. The presence of tannin, starch, saccharine and coloring matter was shown, and on incineration 6½ per cent. of ash was left.

OPIUM ASSAYING ONCE MORE.

By Alfred Dohme, Ph.D.

In a previous article in this Journal * I have reported upon some comparative work done upon the methods of Flückiger, Squibb and the U. S. Pharmacopœia for the assaying of opium. Inasmuch as the method of Dieterich has come into some prominence due principally to its adoption by the German Pharmacopœia I decided to make some comparative experiments with it, comparing it principally with our present officinal process. The method of Dieterich was then also critically examined as to its complete or incomplete exhaustion of the opium under varying conditions.

A large supply of Smyrna opium (opium A) was dried at 100° C.

* American Journal of Pharmacy, vol. 63, p. 161.

In my previous article on opium assaying, I stated that the residues remaining after treatment of the morphine with lime water were narcotine. Not being in the scope of my work, I did not especially examine these residues save to test them for narcotine, in which case I obtained an affirmative test. I have since, however, examined the matter more thoroughly, and find that the residue contains some narcotine at times, but is mainly and usually made up of calcium meconate.

for eight hours and after powdering very finely, again dried for five hours at 100° C. In a second series of experiments, the opium, also a Smyrna opium (opium B), was dried at 60° C. The method of Dieterich was used in both modifications so that in the first series of experiments, the method as laid down in the German Pharmacopœia was used while in the second series the modified and shortened method as last published by Dieterich[1] was adopted. The first three results by the U. S. P. process agreeing so well, it was thought unnecessary to obtain any more by that method.

The morphine obtained by either method is quite pure, but it appears to be more nearly colorless in case of the U. S. P. than in case of the Dieterich process.

The following are the results obtained:

SERIES I (Opium A.)

	U. S. P. Per Cent.	*Dieterich.* Per Cent.
1,	12·51	10·79
2,	12·60	15·32
3,	12·55	13·17
4,	—	12·75
5,	—	10·96
6,	—	11·46
7,	—	10·55
8,	—	10·20
9,	—	11·37
10,	—	10·86
11,	—	12·25
12,	—	13·60
13,	—	13·06
14,	—	12·28
15,	—	12·05
16,	—	12·38

SERIES II (Opium B.)

	U. S. P. Per Cent.	*Dieterich.* Per Cent.
1,	12·87	13·17
2,	13·30	13·78
3,	13·16	12·49
4,	13·48	15·25

In experiments 8, 9 and 10 by Dieterich's method, the entire fluid was taken instead of an aliquot part and proportionately more ether and ammonia was added. In experiments 11 and 15 the usual method was used, but the opium was allowed to stand in contact with the water for twenty-four hours, instead of one, as required by the method.

In experiments 12, 13 and 14, the entire fluid was taken instead of an aliquot part and it was also allowed to stand twenty-four hours in contact with the opium before filtering.

[1] Helfenberger Annalen, 1890. pp. 66–68.

From these facts and figures, the following conclusions may be drawn: That the method of the U. S. Pharmacopœia, 1880, gives results that do at any rate agree with one another, if not with the truth as has been claimed, so that reliance can be placed upon them; while Dieterich's method gives results that vary so greatly from one another that hardly any reliance can be put in them.

That using the entire extracting fluid in Dieterich's method instead of an aliquot part does not improve the yield of morphine (see experiments 8, 9 and 10)—but:

That—a longer and hence more intimate and complete contact of the water with the opium does improve the yield of morphine (see experiments 12, 13 and 14); and that the results by Dieterich's method vary so very greatly among one another that it is hardly justifiable to draw any conclusions from them.

ON DIETERICH'S MORPHIOMETRIC METHOD.

By J. B. Nagelvoort.

The preface of the "Helfenberger Annalen" for 1890 is not dated, as was the case in the two preceding editions; but since the present issue contains several papers which were read in Berlin, Germany, April 2, 1891, it is evident, that the volume could not have reached me here in Detroit, before the publication of my paper in *Pharm. Weekblad* (Holland), May, 1891. In this paper the most important objections to the Helfenberg method of morphine determination have been considered. As early as the beginning of summer, 1890, I communicated, privately, to Prof. Maisch the results of a number of assays made by that method, which had led me to the conclusion that the method could not be implicitly relied upon in all cases.

On p. 76 of the "Helfenberger Annalen" for 1890 is given a modification of the assay process, which is translated as follows: "Based upon later observations, we find it necessary to add the following: *Not every opium powder* used for assaying yields after maceration sufficient filtrate for using, therefrom, 42 gm., and it may happen that only 38 to 39 gm. are obtained by spontaneous dropping. In such a case, the residue upon the filter is to be moderately pressed with a thick glass rod, whereby the deficient amount of liquid will be caused to drop off."

As the Helfenberg method has been adopted by the German

Pharmacopœia for the assaying of opium, its shortcomings—whatever they may be—should be known.

In a reference to my paper on the assaying of opium preparations in the AMER. JOUR. PHAR., August, 1890, the foot-note, on page 409, is quoted by the "Helfenberger Annalen" for 1890, page 69, in a very incorrect manner, which is best shown by placing the English version of the quotation along-side of the foot-note, viz:

From *Am. Jour. Ph., 1890, p. 409.* Dieterich's unfavorable results are *unfairly* obtained. He exhibits, in the Helfenberger Annalen for 1889, a brilliant array of 54 comparative assays, of which not a single one *is made according to Flückiger.*

From Helfenb. Ann., 1890, p. 69 (translation). Dieterich's unfavorable results are *dishonestly* obtained. He exhibits, in the Helfenberger Annalen for 1889, a brilliant array of 54 comparative assays, of which not a single one *agrees with Flückiger.*

Dieterich choose to translate "unfairly" by "unredlich;" but this German word signifies in English *dishonest*—and this word is *not* synonymous with unfair.

DETROIT, August 3, 1891.

GERMAN PHARMACISTS AND PHARMACIES.

BY ALFRED DOHME, PH.D.

Much has recently been said and written in disparagement of our schools of pharmacy and especially of our pharmacies, so that the latter have even been termed grog-shops, groceries and confectioneries. The greater part of this pessimistic philosophy and eloquence comes, if one will take the trouble to investigate matters slightly below the surface, from an element among our people which is foreign in birth as well as sentiment to this our native land. A man naturally clings to his native home all during life, no matter how long a time has elapsed since he last saw and gathered around it, especially so, however, if he had left it during youth or early manhood. When, hence, he once again returns to said home and country, everything looks splendid; he sees things through flawless glasses and he has no fault to find with anything therewith connected. Pharmacists are no exception to this rule and they who came over from some part of Europe to try their fortune on these shores, on returning thither find everything more advanced, better and more complete than over here in this fast country. It is from these men that we learn, and they often take pleasure in airing their opinions while abroad as well as at home, sometimes even publicly,

that we should model our drug stores after those of the country from which they come, and that our pharmacies are cigar stores and saloons while our pharmaceutical colleges are druggist mills. What value is to be placed on their statements let each man decide for himself. Suffice it to say that pessimistic philosophy has never yet done the world much positive good or advanced it, while it has in many instances harmed it considerably.

While in Germany, the writer made many observations on the mode of teaching and practising pharmacy, especially during the last year when during the course of one semester he had occasion to work in the same laboratory with the candidates of pharmacy, question them as to their information and attend their examinations.

The general standing of the students of pharmacy is certainly no better, in fact rather below that of the disciples of Æsculapius in our country. The men spring from the lower middle and lower classes as a rule and stand lowest as a class in popular estimation among the university students. They should not properly be placed in this latter category for they are not compelled to pass the same examinations as the other university students do, their so-called "Einjähriges Examen"* enabling them to pursue their studies at the university in pharmacy. They must spend at least three semesters (one and a half years) at the university and do spend them, usually as follows: First semester, lectures on inorganic chemistry and botany, with laboratory work in qualitative analysis; second semester, lectures on pharmaceutical chemistry, organic chemistry and materia medica, with laboratory work in quantitative analysis; and third semester, lectures on pharmacognosy and physics, with laboratory work in pharmaceutical chemistry. A course in the physical and botanical laboratories is open to them, but few of them take advantage of it. The final examinations are oral, the candidate putting in an appearance in a black suit with white necktie and white gloves and looking about twice as miserable as candidates for examination usually do. Before a man can come up for his examination he must have served an apprenticeship extending over a period of six years. The facilities offered the student, both in the way of lectures and laboratory work, are perhaps better than those

* An examination which enables them to serve one year in the army instead of three as the law requires.

of our colleges because they are those of the universities and usually rather good. The amount of time spent at their work in the laboratory is greater than with us, for they spend their entire day during five days in the week either at lectures or in the laboratory, thus enabling them to devote their entire attention and thought to their studies. It must hence be admitted that the facilities offered a German student of pharmacy are better and more complete than ours here; but it is just as true that the men do not take advantage of the same, for although they spend considerable time in the laboratory and lecture room they spend remarkably little at their books, so that nearly every evening finds them with their university chums in some restaurant or other delectable spot about town. The result is that they indulge in but little studying and reading until within a month or so of their examination, when they strive to make up for lost time. This is, however, impossible for an average student and the display of ignorance many of them make is at times lamentable in the extreme. The German student of pharmacy is hence by no means a paragon for his American confrère to pattern after.

Now a few words regarding the German pharmacies. These are, as a rule, not to be compared with ours in point of completeness, accommodation or general appearance. They do not, to be sure, sell soda water, cigars or confectionery, but they do look all the more sombre and uninviting for the absence of an ornamental soda fountain or a tasty cigar case and perfumery counter. There is certainly nothing inviting looking about an European pharmacy; in fact, one frequently rather feels more like as if he were entering an undertaker's establishment. This cannot be said of any of our drug stores. Quite on the contrary, a mingled feeling of comfort, pleasure and refreshing ease comes over one whenever he enters a first-class pharmacy in this country. Competition is the life of trade as it is the keystone of advancement in every phase of life to-day. There is no competition among German pharmacists, and the result is they are, as a rule, not as accommodating by far as ours are. Although there may be room for improvement in many of our colleges of pharmacy, this is rapidly being appreciated and acted upon, and our pharmacists have no reason to consider themselves at all behind the times or below the standard of other countries.

BALTIMORE, August 8, 1891.

THE CHEMISTRY AND CLINICAL VALUE OF STERILIZED MILK.

Of late years a great deal has been written upon the dangers of transmission of infection by means of milk derived from diseased animals or improperly handled or exposed, and, as a consequence, sterilization has been regarded as a necessity; but the milk, after sterilization has been found to be so changed in that process that of late a reaction has set in, and the question has arisen whether or not the desired immunity could not be better attained by some other means. In the *American Journal of the Medical Sciences* for June, 1891, Professor A. R. Leeds and Dr. E. P. Davis contribute a valuable paper as to the nature of the changes effected in milk by sterilization and the clinical value of sterilized milk.

Professor Leeds is well known as an authority on the subject of milk analysis, and his conclusions are extremely interesting and valuable. Dr. Leeds finds that raising the temperature to the boiling point, and still more the retaining of it at that point for a lengthened period, as in sterilization, converts a considerable portion of the soluble into insoluble proteids. The effect of heat is greatest on the galactozymase—the ferment found in raw milk, which has the power of liquefying starch; even raising milk for a moment to the boiling point destroys this ferment action. Experiments made to contrast the behavior of sterilized milk with raw milk, when subjected to the action of rennet, acid, artificial gastric juice, and pancreatic juice, show that the casein, while not coagulated by the heat, is, nevertheless, less readily coagulated by rennet, and yields slowly to the action of pepsin and pancreatin. Moreover, a part of the lactalbumen of the milk is coagulated, although only partially so. Its effect, however, is to thicken the milk and intensify its colloidal (ropy or mucilaginous) character. The fat globules are likewise somewhat affected by the heat, and the coagulated proteid matters attach themselves to the fat globules, and probably have an influence in bringing about the difficulty with which the fat is assimilated.

Finally, milk-sugar, Dr. Leeds finds, is completely destroyed by long-continued heating, and is probably affected to a certain extent during the interval ordinarily allowed for sterilization. Dr. Leeds thus shows that sterilized milk is less readily and less perfectly digestible than raw milk, and if sterile milk is sought for, the present desideratum is to obtain it either directly from

the animal or by a process not accompanied by such serious drawbacks.

Dr. Davis confirms the opinion which has gradually gained ground that while sterilized milk may be useful as a remedy in various bowel complaints, it is not sufficient to sustain life. If sterilized milk is desired, Dr. Leeds recommends that, after being rendered feebly alkaline with lime water, the milk should be heated to 155° F. for six minutes; or, still better, the treatment in alkaline solution, with pancreatin at 155°, followed, if not immediately used, by momentary heating to the boiling-point. Either of these procedures Dr. Leeds maintains, will render milk sterile without detracting from its digestibility.—*Therapeutic Gazette*, July, 1891.

A NEW TEST FOR ALBUMIN AND OTHER PROTEIDS.[1]

By John A. MacWilliam.

The reagent is a saturated watery solution of salicyl-sulphonic acid, a white crystalline substance readily soluble in water and alcohol. It precipitates all classes of proteids: 1, native albumins (egg-albumin and serum-albumin); 2, derived albumins (acid-albumin and alkali-albumin); 3, globulins (*e. g.*, serum globulin and myosin); 4, fibrin (whether held in solution by dilute alkalies or by neutral salts; 5, proteoses (albumoses, etc.); 6, peptones.

With all these the reagent at once forms a dense, bulky, white precipitate. This precipitate is not redissolved on boiling, except in the case of an albumose or peptone. The precipitate is readily soluble in a dilute alkali, provided a sufficiency of the alkaline solution be added. It is not soluble in weak acids, nor in strong acids unless a large quantity of strong acid (such as nitric) is added.

The method of testing is as follows: Take a small amount of urine (for example, 20 minims), preferably in a very small test-tube, and add a drop or two of a *saturated* watery solution of the reagent. If the urine is strongly alkaline an extra drop or two of the acid should be added, and if no opalescence or precipitate occurs it is well to test the reaction with litmus, and make sure that the urine has been made strongly acid. On adding the reagent, shake the tube quickly so as to mix its contents; then examine at once. The occurrence of an opalescence or cloudiness immediately or within a

[1] *Brit. Med. Journ.*, No. 1581; *Amer. Journ. Med. Scien.* Aug., 1891.

very few seconds (say two or three) is a test for proteids, intermediate in delicacy between the cold nitric acid test, on the one hand, and the acetic acid and heat test (under favorable circumstances), on the other. The development of an opalescence some time after (for example, one-half to two minutes) is a more delicate test than even acetic acid and heat, and shows the presence of minute traces of proteid, which are probably insignificant from a clinical point of view, as a rule.

Next heat the tube to boiling-point. If the opalescence or precipitate is caused by the ordinary "albumin" commonly present in albuminous urine, it does not disappear on heating; but, on the other hand, becomes markedly flocculent. But if the precipitate or opalescence is due to the presence of albumoses or peptones, it clears up on heating (before the boiling-point is reached) and reappears when the tube cools.

The author is satisfied from careful experiments, that—1, the precipitate is really a proteid one; 2, that it is always obtained when proteid is present in the various abnormal conditions of urine which may have to be examined; 3, that the precipitate cannot be caused by any other non-proteid constituent of the urine. Cloudy phosphatic urine clears adding the reagent.

Urine containing excess of urates gives no precipitate, nor does proteid-free bilious urine. As regards the presence of a large quantity of mucin this is not likely to prove a scource of error. Moreover, it is probably only in the case of alkaline urine, when there is at the same time a marked irritation of some part of the urinary passages, yielding a greatly increased mucous secretion, that the amount of mucin in the urine can be sufficient to come into question at all. But in such conditions of the urinary tract the detection of a trace of albumin is probably of no significance. Normal urine gives no reaction with salicyl-sulphonic acid.

GUM ARABIC AND GUM SENEGAL.[1]

By L. Lieberman.

The employment of gum senegal as an adulterant of, or even as a substitute for, gum arabic led the author to investigate the properties of these two gums.

Gum arabic forms rounded or angular, colorless, yellowish, or

[1] *Chem. Zeit.*, 14, 665; Jour. Chem Soc., 1891, p. 866.

brownish, and strongly-refractive little lumps; whilst gum senegal is usually in long, straight or curled cylindrical pieces, but occasionally in mulberry-shaped nodules, and is either colorless or faintly-yellow or white, like etched glass, superficially, and lustrous and transparent internally. The two gums are therefore readily detected in the uncrushed condition, but under other circumstances they require further investigation for their identification.

Water dissolves both gums, leaving a residue of wood fibres, these being usually red if from gum arabic and black from gum senegal. Potassium hydroxide and copper sulphate produce a blue precipitate in both solutions; the gum arabic precipitate is more considerable than the senegal precipitate. Moreover, the former is coherent, and rises to the surface, whereas the latter is more flocculent, and remains disseminated in the liquid. The precipitates are only very slightly soluble on warming, and are not reduced even on boiling. Under similar treatment, dextrin also gives a bluish precipitate insoluble in the cold, but soluble to a clear, dark-blue solution on warming, which solution is completely reduced by prolonged boiling. By heating with dilute potassium hydroxide for some time, solutions of gum arabic or dextrin become amber-yellow; solutions of gum senegal, on the other hand, scarcely alter, or are but very faintly yellow.

Mixtures of the gums arabic and senegal behave, with potassium hydroxide alone, like gum arabic; with potassium hydroxide and copper sulphate like gum senegal. The blue precipitates from mixtures of dextrin with gum arabic or gum senegal are reduced on boiling, provided the quantity of dextrin is not too small; but when the latter is the case, after thorough warming, the precipitate must first be filtered off, then, on boiling the filtrate, reduction takes place if dextrin is present. When both gums as well as dextrin are present, the precipitate is washed, dissolved in dilute hydrochloric acid, and the gums precipitated by means of a large excess of alcohol; when settled, they are washed and examined by the above methods.

The examination of a sample of gum arabic may be conducted in the following manner: Dissolve the powdered substance in lukewarm water, examine residue—any gelatinous matter indicating foreign gums; treat the solution with excess of potassium hydroxide and copper sulphate, warm, filter, and examine for dextrin and senegal as described above.

Gum senegal has been stated to be more hygroscopic than gum arabic; but on drying at 105°, the former lost 13·39 per cent., the latter 14·56 per cent., and, on exposure to the moist atmosphere, the former reabsorbed 6·15, the latter 6·34 per cent. of water.

NOTE ON SANDAL WOOD.*

By M. Adrian.

Sandal wood has been known in India from the highest antiquity; it is mentioned under the name "chandanna" in the "Nirukta," or writings of Yaska, the most ancient Vedic text known, dating the fifth century B.C. At that time, and for long after, it was specially utilized as a perfume, as well as in burial rites, either to embalm the dead or to feed the funereal pile. Even now this wood is used for the same purpose in India, and the honor rendered to the dead is proportional to the number of logs of sandal wood upon the pile.

The Greeks and Romans seem not to have been acquainted with sandal wood. In any case it is not mentioned in their writings, and the first European writer who speaks of it is Constantinus Africanus, of Salerno, in the eleventh century. In the fifteenth, Ebn Serapi, surnamed Serapion the younger, mentions three kinds, red, yellow and white.

Already at this time the three kinds of sandal wood were indicated as being kept by the apothecaries, but it was not until later that the true medicinal properties of the wood were known. In 1750, Dutch travellers visiting the Moluccas brought back and communicated to Rumphius, of Rotterdam, a remedy used by the natives against blennorrhagia, which consisted of a maceration of disintegrated sandal wood. Rumphius studied this product, and it was he who first gave, in his work entitled "Herbarium Amboinense," a detailed description of *Santalum album*.

However, the favor accorded at first to sandal wood was of short duration, and as a medicine it had fallen completely into oblivion, when in 1865, in the United States, Dr. Henderson, in order to avoid the disagreeable repetitions and intestinal disturbances that accompany the administration of copaiba and cubebs, thought of substituting it by oil of sandal wood. The experiments made by him in this direction having been crowned with success, he com-

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municated the results obtained to the *Medical Times and Gazette* of June 3, 1865.

In the month of July following mention was made in the Société de Chirurgie of the employment of oil of sandal wood in blennorrhagia. At that time Dr. Panas made some experiments with capsules containing 40 centigrams each in the Lariboisière hospital, and on the 20th of September of the same year he communicated to the Société de Chirurgie the results obtained, stating that oil of sandal wood is very well tolerated by the most delicate stomachs and does not occasion any disturbance either of the digestive canal or of the kidneys. Some months later Dr. Simonet confirmed the statements made by Dr. Panas.

Formerly three kinds of sandal wood were recognized:

(1) *Red sandal wood*, from *Pterocarpus santalinus* (Leguminosæ). This wood possesses no medicinal properties and is used exclusively in dyeing on account of the red coloring matter it contains.

(2) *White* and (3) *yellow sandal wood.* The last two kinds are the produce of several trees of the genus *Santalum* (Santalaceæ). Certain authors have stated that they represent one the sap wood and the other the heart wood; but it has long been recognized that the depth of color of these woods depends solely upon the species that yields them, and the two sorts are in fact confounded under the same name.

This wood is very hard, of a more or less dark yellow color, and has a very pronounced aromatic odor. The hard trunk wood is alone sent to Europe, the branches and white wood having no value; the roots are utilized in the country where they are grown in the preparation of essential oil.

Sandal wood came originally from India. The *Santalum album* is still cultivated there in the mountains of Mysore and at Arcot in Madras. The cultivation is protected by the government, which decides every year the number of trees to be cut down. The seeds of the tree are sown together with capsicum. The latter spring up very quickly, and the young capsicum plants protect the young sandal plants from the fierceness of the sun. They also serve the purpose of providing nourishment, as the young sandal plants, being parasitic, fix themselves upon the roots of the capsicum plants and draw from thence the necessary juices until they have attained a development, when they can nourish themselves directly by the aid

of their own roots. When the trees have attained an age of twenty to thirty years they are cut down, and the trunks are freed from white wood and cut into small billets, which are sent to China or Europe. The roots are cut into chips and distilled on the spot by a very primitive process. The two ports of exports from India of sandal wood and oil are Bombay and Mangalore.

The actual quantity of sandal wood oil exported from India tends to diminish. It is a strongly colored oil and always adulterated, probably with castor-oil.

Sandal wood is also met with in the Sandwich Islands, where it is yielded by *Santalum Freycinetianum*, and in the Fiji Islands, where the *Santalum Yasi* is found.

In Australia an essential oil is obtained by the distillation of *Fusanus spicatus* and *F. acuminatus*, which is beginning to arrive in the European markets, but which is less odorous, like the wood from which it is obtained.

Lastly, there is received from Venezuela, but in small quantities, an "oil of sandal wood," known as West Indian, and which is indicated in the price currents as "W. I."

The best oil is, without doubt, that which is prepared in Europe, principally in France and England. The billets are reduced to shavings and distilled with water in large apparatus. The oil, being mixed in the wood with a resinous substance, separates with difficulty and distils over only after a time, when it is collected in a series of Florentine receivers, where it separates slowly from accompanying water. It is afterwards clarified by paper filtration. In this way is obtained an oleaginous liquid, having a density of about 0·975 (the B.P. indicates 0·960 and the U.S.P. 0·945), lævogyre, neutral to litmus, soluble in alcohol, ether, and chloroform, and nearly insoluble in water. Exposed to the air oil of sandal wood oxidizes and resinifies; on the other hand, it gives reactions similar to oil of turpentine and other hydrocarbon essential oils.

The consumption of sandal wood oil is an increasing one, and its high price presents naturally a temptation for fraud. It is not rare to find this essential oil in commerce mixed with fixed vegetable or mineral oils of far inferior commercial value. This addition is easily detected, for these fixed oils are usually lighter than essential oil of sandal wood, and diminish consequently the density when mixed. Further, if a drop of suspected oil be placed on a piece of unsized

paper, any fixed oil present will not volatilize, but leave a permanent stain.

A sophistication more difficult to recognize consists in the admixture of essential oil of cedar or copaiba, either made after distillation, or, as is sometimes practised, by distilling the cedar and sandal woods together. In this case it is not easy to detect the fraud, especially upon a brief examination. It can, however, be discovered with the aid of the polarimeter, as the addition of either cedar or copaiba oil to oil of sandal wood diminishes its rotatory power.

OLEFINIC CONSTITUENTS OF ETHEREAL OILS.[1]

By F. W. Semmler.

Geranaldehyde, $C_{10}H_{16}O$, boils at 224–228°, under a pressure of 760 mm., and at 110–120° under a pressure of 12 mm.; the sp. gr. is 0·1972 at 15°/15°. The compound is optically inactive; the refractive index indicates the presence of two ethylene bonds, and this view is supported by the formation of a *tetrabromo*-additive compound which has not yet been obtained in crystals. Hydroxyl may be substituted for the bromine atoms, and the products thus obtained are being further investigated.

Orange oil appears to contain from 0·5 to 0·75 per cent. of oxygen; its sp. gr. is 0.8435 at 20°/20°; on treatment with hydrogen sodium sulphite, a crystalline compound is formed; on decomposing this and distilling the oily product, geranaldehyde is obtained together with a very small quantity of a lower boiling aldehyde. "Citral" is the technical term applied to an ethereal oil which is contained to the extent of 6–8 per cent. in lemon oil; this substance proves to be identical with geranaldehyde, which is also found in a number of other ethereal oils.

On heating geranaldehyde with hydrogen potassium sulphate for 20 minutes at 170°, and distilling the product in a current of steam, cymene, $C_{10}H_{14}$, is obtained, and is regarded as being formed by elimination of water from the aldehyde.

Coriander oil consists of terpenes and about 90 per cent. of another substance which is termed coriandrol, and may be readily separated by distillation under reduced pressure. *Coriandrol*, $C_{10}H_{18}O$, boils at 194–198° under a pressure of 760 mm., and at 85–90° under a pressure of 20 mm., the sp. gr. is 0·8679 at 20°/20°,

[1] *Berichte*, **24**, 201–211; reprinted from Jour. Chem. Soc., 1891, p. 539.

and the molecular refraction 49·07; this points to the existence of two ethylene unions in the compound. It combines with 2 molecules of bromine, and on treatment with silver oxide, a hydroxyl derivative is formed.

Linaloe oil appears to be a mixture of several compounds, but no terpenes could be detected. The principal constituent, which is termed *linaloöl*, boils at about 195–190° (? 185–190°), and has a sp. gr. 0·8702 at 20°/20°; the molecular refraction is 49·33; the compound combines with 4 atoms of bromine and resembles geraniol.

A sample of "German melisse oil" gave a compound with sodium hydrogen sulphite; this was decomposed in a current of steam; the resulting product has the formula $C_{10}H_{18}O$, and boils at 204–209°; the sp. gr. is 0·8681 at 15°, and the molecular refraction 48·59. It combines directly with 2 atoms of bromine. On treating the compound $C_{10}H_{18}O$ with silver oxide, the corresponding *acid*, $C_{10}H_{18}O_2$ is obtained, which is liquid; the *silver salt* is white. On oxidation, the aldehyde yields isovaleric acid.

The above compound $C_{10}H_{18}O$ is identical with a technical product termed "citronellone" and with a compound with the same name prepared by Gladstone and Wright; it is also probably the same as the citronellic aldehyde of Dodge (compare Am. Jour. Ph., 1890, 356).

The author applies the term "olefinic camphenes," to compounds of the formulæ $C_{10}H_{20}O$, $C_{10}H_{18}O$, $C_{10}H_{16}O$. These, which are always open chain alcohols, aldehydes, or ketones, have a sp. gr. of 0·86 to 0·90 at 20°/20°, and a higher refractive power than the isomeric compounds with closed chains.

DIGITONIN AND DIGITOGENIN.[1]

By H. Kiliani.

The author has shown in a former communication (1890), that pure commercial digitalin, when heated with dilute hydrochloric acid, gives, besides dextrose and galactose, a large quantity of digitogenin, $C_{15}H_{24}O_3$.

Digitonin is best obtained from commercial digitalin by extraction with 85 per cent. alcohol. Digitalin (1 part) is dissolved in 85

[1] *Berichte*, **24**, 339–347; reprinted from *Jour. Chem. Soc.*, 1891, p. 576.

per cent. alcohol (4 parts) at 50–60° and the solution allowed to crystallize slowly. The crude product thus obtained is dissolved in 12 times its weight of boiling alcohol (85 per cent.), heated for two minutes with animal charcoal, and filtered; by rubbing the sides of the beaker as the solution cools, the product is obtained in nodular aggregates of slender needles. The crystals are, however, more compact and the product purer if the solution is allowed to cool very slowly without rubbing the sides of the beaker. Digitonin crystallizes easily from 85 per cent. alcohol, whilst from stronger alcohol it is only obtained in the amorphous state, begins to soften at 225°, is completely melted at 235°, and is lævo-rotatory; for a 2·8 per cent. solution in 75 per cent. acetic acid, $[a]_D = -50°$. The amorphous digitonin of Schmiedeberg dissolved in cold water in all proportions; the crystalline substance is sparingly soluble in water; on heating, it dissolves more easily, but does not crystallize on cooling, and the solution always shows an opalescence. With concentrated sulphuric acid, it gives a red solution; the addition of a drop of bromine-water greatly intensifies the reaction. Concentrated hydrochloric acid gives a colorless solution which, after a time or on heating, turns yellow and then red. Heated with dilute hydrochloric acid under the same conditions as were before given for digitalin, it yields nearly the calculated quantities of digitogenin, dextrose and galactose. The digitogenin obtained in this way was identical in every respect with that formerly obtained from digitalin.

Derivatives of Digitogenin.—When digitogenin is heated in a sealed tube with concentrated hydriodic acid and red phosphorus, a large quantity of a resin containing iodine is formed; but neither methyl nor ethyl iodide.

Acetyldigitogenin, $C_{15}H_{23}O_3Ac$, is obtained by heating digitogenin (1 part) with anhydrous sodium acetate (1 part) and acetic anhydride (6 parts) in a reflux apparatus for one hour, and pouring the bright red solution in a fine stream into a large quantity of water. It crystallizes from a small quantity of absolute alcohol in beautiful needles, melts at 178°, and is extremely soluble in warm alcohol, ether and acetic acid. Instead of sodium acetate, sulphuric acid can be employed as a condensing agent; when zinc chloride is employed, amorphous compounds which were not examined are obtained. The author points out that the formation of a monacetyl derivative from

digitogenin does not agree with the production of two sugars from digitonin, which latter fact points to the existence of two hydroxyl groups in digitogenin.

Digitogenin on oxidation yields, according to the conditions, three acids, which the author names respectively digitogenic, oxydigitogenic and digitic acids.

Digitogenic Acid, $C_{14}H_{22}O_4$, is prepared by slowly adding chromic acid (0·7 part dissolved in 1·4 parts of water and 7 parts of acetic acid) to a solution of digitogenin (1 part) in acetic acid (30 parts). As soon as all the chromic acid is reduced, an equal volume of water is added, and the mixture repeatedly extracted with ether. The ethereal solution is allowed to remain for 24 hours, poured off from the deposit which is formed, the ether distilled off, and the acid residue evaporated on the water-bath until a crystalline crust forms on the liquid; the product crystallizes after 12 hours. The yield amounts to 60 per cent. of the digitogenin employed. It crystallizes from absolute alcohol in colorless needles or thin prisms, begins to melt at 146°, and is completely melted at 150°, becomes strongly electric when rubbed, tastes extremely bitter, and is easily soluble in chloroform and hot glacial acetic acid, less easily in 50 per cent. acetic acid, more sparingly in cold alcohol and ether, and insoluble in water; when heated with water, it melts. When moistened with dilute alcohol, it has a distinctly acid reaction. It dissolves easily in alkali hydroxides and carbonates. The *magnesium salt* $(C_{14}H_{21}O_4)_2Mg$, prepared by adding an excess of dilute magnesium nitrate (1 : 10) to a very dilute neutral solution of the acid, separates as a crust consisting of aggregates of minute needles on allowing the mixture to remain for 24 hours. The *calcium* salt is similar to the magnesium salt. The bye-products of the oxidation with chromic acid probably contain formaldehyde or formic acid, as no evolution of carbonic anhydride was observed. The mother liquors contained a small quantity of an aldehydic or ketonic compound and a large quantity of an acid of high molecular weight which yields no crystalline derivatives.

Oxydigitogenic acid, $2C_{14}H_{20}O_4 + H_2O$, is prepared by dissolving digitogenic acid (1 part) in potash (1 : 10) (10 parts), diluting the solution to 100 parts, and adding a solution of potassium permanganate (1 : 50). When the oxidation is finished, the solution is decolorized with a few drops of alcohol, filtered, one-third the weight

of 93 per cent. alcohol added, and the acid precipitated with 50 per cent. acetic acid. In this way it is obtained crystallized in nodular aggregates of needles, which begin to melt at 250°; it is very sparingly soluble in alcohol and acetic acid, and becomes strongly electric when rubbed. The yield amounts to 70 per cent. of the digitogenic acid employed. The *magnesium* salt, $(C_{14}H_{19}O_4)_2Mg$, is very sparingly soluble and crystallizes in aggregates of small needles.

Digitic acid, $C_{10}H_{16}O_4$, is formed, together with oxydigitogenic acid, by the oxidation with permanganate of digitogenic acid dissolved in 3 parts of potash. When the oxidation is ended, the solution is decolorized with a few drops of alcohol, filtered, ¼ the weight of 93 per cent. alcohol added, and the acids precipitated with hydrochloric acid; the precipitate, which consists of oxydigitogenic acid mixed with some digitic acid, is filtered off rapidly; the filtrate after a time deposits most of the digitic acid in aggregates of beautiful needles. If, however, a separation of the two acids is not obtained in this way, they are dissolved in potash, the solution diluted until it contains 1 per cent. of acid, and fractionally precipitated with hydrochloric acid, when oxydigitogenic acid is precipitated first. A separation by fractional crystallization from alcohol and acetic acid is not possible, although the solubility of the two acids is very different. Digitic acid melts at 192°, dissolves easily in alcohol, chloroform and acetic acid, and crystallizes readily from boiling 50 per cent. alcohol, but not from strong alcohol. The *barium* salt, $(C_{10}H_{15}O_4)_2Ba + 6H_2O$, prepared by adding barium chloride to a solution of the potassium salt, crystallizes in nodular aggregates, and is somewhat sparingly soluble in water. The *potassium* salt also crystallizes well and is extremely soluble in water.

If the acid is dissolved in decinormal potash in the proportion, $C_{10}H_{16}O_4$: 1KOH, and phenolphthaleïn and a few drops of alkali are added, the red color remains both when the solution is allowed to stand and when heated; hence the acid is not a lactone.

Oil of Sandalwood was discovered, accidentally, by Curtin, to be a successful alleviant for some obstinate coughs. It should be given on loaf sugar, or floated on hot or cold water. It acts both locally and generally.—*University Med. Mag.*, August 1891, p. 726.

ALKALOIDS OF THE ROOTS OF SANGUINARIA CANADENSIS AND CHELIDONIUM MAJUS.[1]

By G. König.

The roots of *Sanguinaria canadensis*, a native of North America, and the sanguinarine of commerce contain several alkaloids, including *chelerythrine*, which is present in greatest quantity, *sanguinarine*, *γ-homochelidonine*, and *protopine*.

Chelerythrine crystallizes with a molecule of alcohol, which is not separated at a temperature of 150°; the formula is $C_{21}H_{17}NO_4 + C_2H_6O$; melting point 203°. It is identical with the alkaloid which the author separated from the celandine, *Chelidonium majus*. The *aurochloride*, $C_{21}H_{17}NO_4,HAuCl_4$, melts at 233°; the *platinochloride* is $(C_{21}H_{17}NO_4)_2,H_2PtCl_6$; the *hydrochloride* crystallizes out of aqueous solution with 5 mols. H_2O, and from alcohol with 4 mols. H_2O. The salts are lemon-yellow.

Sanguinarine, $C_{20}H_{15}NO_4$, is very similar to chelerythrine in its properties; it crystallizes with ½ mol. H_2O, and melts at 211°; its salts are red. The *hydrochloride*, $C_{20}H_{15}NO_4,HCl + 5H_2O$, the *nitrate*, $C_{20}H_{15}NO_4,HNO_3 + H_2O$, the *aurochloride*, $C_{20}H_{15}NO_4,HAuCl_4$, and the *platinochloride*, $(C_{20}H_{15}NO_4)_2,H_2PtCl_6$, were prepared.

The base which the author has named *γ-homochelidonine* is probably identical with that separated by Selle from *Chelidonium majus*, and its formula is probably $C_{22}H_{21}NO_4$. Its behavior with alkaloid reagents resembles that of Selle's γ-homochelidonine. The fourth alkaloid, *protopine*, was prepared from *Chelidonium majus*, *Sanguinaria canadensis*, and from opium, all the three specimens being identical. Its formula is $C_{20}H_{17}NO_5$, and it melts at 204°; the *platinochloride*, $(C_{20}H_{10}NO_5)_2,H_2PtCl_6 + 3H_2O$; and the *aurochloride*,

$$C_{20}H_{17}NO_5,HAuCl_4,$$

melting at 182°, were prepared; the *hydrochloride*, $C_{20}H_{17}NO_5,HCl$, crystallizes in two different forms, and appears to be free from combined water.

Cocaine nitrate is employed by Lavaux in connection with silver nitrate, in diseases of the genito-urinary organs, 1 gm. of each salt being dissolved in 50 gm. water. Cocaine nitrate is prepared by precipitating a solution of silver nitrate with one of cocaine hydrochloride.—*Petit Monit. de la Phar.*, June, 1891.

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[1] *Chem. Centr.*, 1891, i, 321–322; *Zeit. Naturwiss. Halle*, **63**, 369–426; reprinted from Jour. Chem. Soc., 1891, p. 843.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

For detannating medicinal wines, M. Rozsnyai uses the following method: The wine is first fortified by the addition of about 5 per cent. alcohol so as to increase the alcohol strength to 18 per cent.; the albuminoids are next precipitated by the addition of 10 to 15 grams tannic acid to the hectoliter of wine, allowing to stand 5 or 6 days and decanting; the natural as well as the excess of added tannin is then removed by the addition of gelatin in thin sheets (33 grams to the hectoliter), which is allowed to remain in the wine for 8 to 14 days. If the gelatin in solution be added to the wine a certain amount of it would remain dissolved, but added in sheets the latter merely swell and do not dissolve, at the same time effectually removing the tannin. The finished wine can be used in dispensing alkaloidal and iron salts without causing precipitates or discolorations. *Pharm. Post*, 1891, 429.

Gelatinizing of infusion of digitalis.—Continuing his research on this subject (Am. Jour. Pharm., 1891, 406), W. Braeutigam establishes the following: (1) The gelatinizing is due to a change of cane sugar; it is accompanied by the formation of small quantities of lactic acid and traces of acetic acid; the products of alteration reduce Fehling's solution. (2) The different degrees of gelatinization depend upon the quantity of the sugar and the quality and quantity of the extractive matter acting as nutriment; the extractive matter from roots and stems owing to their proportion of sugar and salts being more favorable to the change than the extractive from leaves. (3) The cultures of the Micrococcus gelatinogenus (in the previous article it was stated to be a *bacillus*, but this has been corrected and the micro-organism given the above name) as well as the gelatinized nourishing medium have been found to exert no deleterious action upon the human or animal system. (4) The gelatinized infusion still preserves its efficacy.—*Pharm. Centralhalle*, 1891, 427.

Dermatol, the new substitute for iodoform (for method of preparation see Am. Journ. Pharm., 1891, 408), owing to its non-poisonous nature and its capability of being sterilized is claimed to be superior to iodoform; forming an impalpable powder it can be applied with an atomizer. The following formulas for its application have been published: *Dermatol-ointment:* Dermatol, 10·0; lanolin, 20·0; vaselin, 70·0. *Dermatol-zinc-vaselin:* Dermatol, 2·0;

zinc oxide, 2·0; vaselin, 20·0. *Dermatol-zinc-paste:* Dermatol, 2·0 to 5·0; zinc oxide, 24·0; wheat starch, 24·0; vaselin, 50·0. *Dermatol-zinc-gelatin:* Dermatol, 5·0; zinc oxide, 5·0; gelatin, 30·0; glycerin, 30·0; distilled water, 30·0. As a *dusting powder* for fetid feet the following has been recommended: Dermatol, 20·0; talcum, 70·0 and starch, 10·0. Other forms of application for special purposes are Dermatol-collodium-emulsion, 10 per cent.; Dermatol-glycerin-emulsion, 10–20 per cent.; Dermatol-gauze, 10–20 per cent. and dermatol-suppositories.—*Pharm. Centralhalle*, 1891, 436, and *Pharm. Ztg.*, 1891, 480.

Europhen is the latest of the iodoform substitutes; chemically speaking it is isobutyl-orthocresol iodide. The method of preparation patented by the "Farbenfabriken" is as follows: Orthocresol is made to react with isobutylalcohol at higher temperatures in the presence of zinc chloride forming isobutylorthocresol; this in alkaline solution is mixed with an aqueous solution of iodine and potassium iodide, the new compound separating as a yellow, amorphous precipitate which after washing is dried in the dark. It then contains 27·6 per cent. iodine, a proportion indicating one atom iodine in combination with two molecules isobutylcresol, and has the composition $C_{22}H_{31}O_2I$. The powder adheres firmly to the skin; has an aromatic odor; it is insoluble in water and glycerin, but soluble in alcohol, ether and chloroform, hence, in collodium and traumaticin; it is also soluble in fixed oils (a 25 per cent. solution can be obtained in the cold by trituration); in these various solutions iodine is slowly liberated, especially in the presence of a little water; this possibly explains its efficacy due to the nascent iodine. Owing to this decomposition it should not be prescribed with starch, metallic oxides (zinc, mercury) or mercurial salts; made into ointments with fat, vaselin or lanolin it can be kept for considerable periods; the last named is the one to which preference is given.—Dr. F. Goldmann, *Pharm. Ztg.*, 1891, 440.

Iodine absorption of Peppermint oils.—Hugo Andres, to decide which of the several commercial varieties of peppermint oil is the best for medicinal purposes, made use of the iodine-absorptions. The iodine-absorption figures become smaller as the percentage of menthol increases, hence the oil with the smallest iodine-absorption figure would be the most valuable since it is admitted that the active constituent of peppermint oil is menthol. From 0·4–0·8 of the

samples were dissolved in 15 cc. absolute alcohol and an excess of Hübl's iodine solution added (to permanent red color) and allowed to stand for various periods of time (this to determine when the absorption was complete, it will be seen that there was no variation after 12 hours) and the excess of iodine titrated with standardized sodium thiosulphate; the absorbed iodine is calculated to 100 parts oil:

	After Standing				
Variety.	*2 Hours.*	*4 Hours.*	*8 Hours.*	*12 Hours.*	*24 Hours.*
English, ...	42·1	48·4	52·8	52·9	No change.
German, ...	63·5	66·2	67·3	69·7	69·9
American, . . .	64·4	66·6	69·8	72·3	No change.
Russian, ...	84·5	92·4	96·5	96·8	" "

To determine the effect of smaller quantities of turpentine oil as an adulteration on this test, some of the English and Russian oils used above were mixed with varying amounts of French oil of turpentine. The following figures were obtained after allowing to stand for 8 hours with the Hübl's reagent:

Percentage of Oil of Turpentine.	*English Oil.*	*Russian Oil.*
5	132·0	246·8
10	158·3	258·3
15	212·8	318·4

See AM. JOURN. PHARM., 1890, 570.—*Pharm. Ztschr. f. Russl.*, 1891, 417.

Preparation of ammonium sulphide.—Instead of the usual method of saturating solution of ammonia with hydrogen sulphide, E. Donath recommends, when only small quantities of this reagent are required, to place one part powdered ammonium chloride in a retort connected with a good condenser, to add a solution of two parts crystallized sodium sulphide in five parts boiling water and distil off about one-half of the liquid in the retort; the distillate represents a very concentrated and trustworthy reagent.—*Chemiker Ztg.*, 1891, 1021.

Detection of arsenic in metallic iron.—The German Pharmacopœia contains the following test: 1 gm. powdered or reduced iron with 15 cc. hydrochloric acid and 15 cc. water in a Marsh's apparatus should evolve a gas which ignited must not deposit stains upon a porcelain capsule used in depressing the flame. In comparing this test with Bettendorf's (which is employed in the examination of most

of the other chemicals) it was noticed that the former indicated the absence and the latter the presence of arsenic in the iron; the addition first of traces of arsenious oxide to iron, subjected to the above test, and later, quantities as high as 0·1 gram arsenious oxide failed to produce the reaction. Examination of the residue insoluble in the acid showed the presence of the arsenic in the metallic state; the arsenic present in the iron as well as the added arsenious oxide had been reduced to the metallic condition by the iron or ferrous chloride and the nascent hydrogen, hence formed no volatile hydrogen compound. These same results, it was afterwards found on looking up the literature, were published by Wöhler in 1839, and must have been unknown to the revision committee.

It was found that antimony acted in the same way as arsenic in this test; the metal was always found in the insoluble residue.

If metallic zinc be added in the test (5 gm. zinc, 2 gm. iron, 30 cc. hydrochloric acid and 5 cc. water) the evolved gas will readily stain porcelain if arsenic be present.—Otto Sautermeister, *Chemiker Ztg.*, 1891, 1021.

Olive oil.—At the meeting of the Saxony Trade-Chemists, Dr. Bach gave a discourse on olive oil, stating that the iodine-absorption of the oil as published by Hübl (82·8–83 per cent.) was correct for culinary oils, but the technically important, strongly acid last-pressings varied from 81·6–84·5 per cent; there also occur in commerce oils, which by all other tests are characterized as pure, having iodine-absorptions as low as 79 per cent. (due to the presence of cholesterin in larger quantity) and as high as 89 per cent. (caused by the addition of "denaturirungsmittel," i. e., substances preventing the use of the article for internal purposes, but not interfering with its use in the arts, as oils of rosemary and turpentine). The following preliminary treatment is recommended for this last class of oils before taking the iodine-absorption: The oil to be examined is placed in a water bath and stirred with about half its weight of powdered crystallized sodium carbonate; the free fatty acids react with the sodium carbonate with evolution of CO_2 and the volatile oils are dissipated; after the completion of the reaction the oil is poured off from the soap, washed with hot water and, in case it becomes turbid, dried in a drying closet until it becomes clear; it is now ready for a reliable iodine-absorption. In this treatment it was noticed that pure Malaga oils retained their green

color, whereas in artificially colored oils the green color changed to yellow.—*Chemiker Ztg.*, 1891, 1023.

Tonquinol.—(See Am. Journ. Pharm., 1891, 289.) For its manufacture equivalent weights of oil of turpentine and isobutylalcohol are mixed and slowly added to 5 or 6 times its volume of concentrated sulphuric acid, preventing any rise in temperature; after one or two hours this mixture is poured into 5–10 times its volume of fuming nitric acid; when the nitrating is complete, the mixture is poured into a large excess of water which causes precipitation of the nitro-derivative; it is collected on a filter and washed to neutral reaction. It forms a pale yellow powder, of strong musk odor, melting at 70° C.—*Pharm. Centralhalle*, 1891, 459.

Tannin extraction.—A patent has been granted the firm J. D. Riedel, of Berlin, for the following method: The properly comminuted and, if necessary, dried material is placed in a suitable continuous extraction apparatus and exhausted with a solvent for resins, waxes, fats and chlorophyll like ether, carbon disulphide, amyl alcohol, benzol, benzin, etc.; by heating the solvent is completely removed from the material and the tannin then extracted by percolation with water; by dialysis the crystallizable salts and gallic acid are removed as rapidly as possible from the percolate to prevent change in the tannin and then the dialyzed solution is evaporated.—*Pharm. Centralhalle*, 1891, 419.

Oil of rose.—An examination of the German as well as the Turkish oil showed that both contained the same constituents although in different proportions: (1) Ethyl alcohol found in the fraction boiling between 70 and 100° C.; (2) Rhodinol, this constitutes the bulk of the oil and is the odorous constituent; *rose oil freed from stearopten* contains only rhodinol and is made by dissolving the oil in five volumes of 75 per cent. alcohol at a temperature of 75–80° C., cooling, with constant agitation, to 0° C., filtering, washing the separated stearopten with dilute alcohol, and allowing the alcohol to evaporate in vacuo at the ordinary temperature when the purified oil is left. If rhodinol be distilled in quantities greater than 25–30 gm. as much as 25 per cent. will resinify. Rhodinol has the specific gravity 0·8804–0·8813 at 15° C.; is slightly lævogyre; is soluble in alcohol, ether, chloroform, benzin, benzol, carbon disulphide and glacial acetic acid; obtained from German oil it is of a green color, from the Turkish oil of a yellow color; both have a pleasant odor

suggesting a little that of mint; it has the formula $C_{10}H_{18}O$ and differs from geraniol only by different positions being occupied by the methyl- and propyl-groups; it is a methane derivative, but by the action of dehydrating agents yields limonene and dipentene. (3) The stearopten is present in amounts varying from 20–68 per cent., oils from colder climates containing more stearopten; it is probable that the stearopten comprises a homologous series of hydrocarbons, at least two hydrocarbons having been discovered (Am. Journ. Pharm., 1891, 48). In this examination 160 grams German and 460 grams Turkish oil were used, chiefly in the study of rhodinol and in the manufacture of its derivatives.—Ulrich Eckart, *Arch. der Pharm.*, 1891, 355–389.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

Active Principle of Anemone sylvestris. M. Dupuy (*Congrès des Sociétés Savantes*) finds this to be a well-defined solid which crystallizes in needles. He says: "From a therapeutic point of view anemonin is an agent of great value, acting efficaciously in acute and chronic bronchial catarrh, and as a calmative of the spasmodic and irritative cough of pertussis. It is also of value in eye troubles dependent upon the rheumatic diathesis and possesses powerful emmenagogue properties. In elevated doses it has a considerable toxicity, causing hiccough, stupidity, trembling of the limbs, bloody dejecta, perversions of sense, convulsions and death by paralysis."—*Nouv. Rem.*, July 8.

Intoxication Following the External Use of Tobacco.—M. Auché, *Jour. de Méd. de Bordeaux*, cites the case of a man suffering from pediculi pubis who boiled 200 gm. of tobacco in 2 litres of water and rubbed it over his whole body, leaving it to dry on the skin. He was suddenly seized with vertigo, nausea, heaviness of the head, obnubilation of sight, cold sweats, extreme pallor, trembling and weakness of the limbs, etc. The extremities became very cold and purplish in color and the moisture on the skin was viscous. The man's brain "felt compressed" and the air "looked foggy" to him. His pupils were slightly dilated and retained the power of accommodation; they reacted to light; nausea and vertigo were constant symptoms. Patient complained of difficult respiration and spoke with difficulty. The heart movements were slow and weak.

A syncopal condition was constantly threatened. Reflexes and sensibility normal. These symptoms continued for three hours, when they gradually subsided. On the next day the man had a violent cephalalgia.—*Nouv. Rem.*, July 8.

Variability of Medicinal Strength in Extracts.—In a paper upon this subject read before the *Société de Thérapeutique* and reported in *Nouveaux Remèdes*, July 24, 1891, M. Patein formulates the following conclusions: In order to remedy the irregularity of action of the present officinal preparations we must take care: (1) To employ for pharmaceutical uses only those plants which contain a proportion of active principles which has been officially determined. (2) To conserve only those officinal preparations in which the active principles of the plants employed have undergone but slight alterations and which correspond to an official standard. (3) To employ only those active principles of plants, or those chemical products by synthesis, which have a determined elementary composition, and which respond to certain processes of chemical and physiological identification which have been officially formulated.

Massive Injections of Creasotized Oil.—In a communication to *La Société de Dermatologie* (reported in *La Rev. d' hyg.* and *L' Union phar.*, July, 1891), Dr. Burlureaux has constructed an apparatus by which, with the aid of compressed air, he makes hypodermic injections of "50 to 100, and even 200 gm. of creasotized oil (1 in 14 parts), equal to 3 to 14 gm. of creasote." "It is very evident," says the latter journal, "that a massive dose of creasote thrown into the blood must singularly inconvenience the bacilli." During the administration of these doses, the author nourishes the patients by injections of a pure oil. At a single sitting he has thus injected 320 gm. of the latter.

"Poudre de Pistoia."—This preparation, made in a convent of Pistoia is one of the most renowned of the remedies for gout. It is sold in boxes containing 365 powders (for 30 francs), of which one is to be taken daily in hot infusion, or even a glass of cold water, the ingestion of the medicament to be followed by bodily exercise. M. Chastaing has lately analyzed the powder and the result, as follows, was given to the Paris Society of Pharmacy: Colchicum (bulbs), 20 per cent.; bryonia root, 10 per cent.; betonica, 50 per cent.; gentian, 10 per cent.; chamomile flowers, 10 per cent.; the whole to be finely pulverized; daily dose 2 to

3 gm., to be taken in the morning, fasting, suspended in water.—*Méd mod.; L'Union phar.*, July.

Micrococci in Orange-Flower Water.—M. H. Barnouvin (*L'Union phar.*, July), referring to his previous researches on this preparation, says that he then obtained orange yellow deposits, which he now finds to consist of masses of very small yellow cells of a more or less globular form, motionless, and responding by their characters to the chromogenic bacteria described by Cohn as the micrococcus luteus, and by Schrœder as the bacteridium luteum. M. Barnouvin reminds us that at this time, when the public demand that such preparations shall be carefully watched by the pharmacist, a knowledge of these points is important.

Dangers of Tincture of Iodine Prepared with Denaturalized Alcohol.—In the *Union phar.* of July, M. Sochaczewski says that iodine prepared as above is twenty times more irritating than tinctures made with good, ordinary alcohol. From a tincture made with the impure alcohol he has extracted seven principal bodies, which all possess a more or less strongly marked irritative action. These are hydriodic acid, iodic acid, iodal, iodide of methyl, sulfocyanate of allyle (or "essence of mustard"), iodo-acetone and free acetone. He is unable to say how the sulphocyanate of allyle is produced, but thinks there is no doubt of its presence, which was indicated during analysis "by its odor *sui generis*." He says that it is not surprising that the tincture made with denaturalized alcohol is too energetic to be safely employed in certain cases.

Volemite, a Sugar from Lactarius Volemus.—M. Bourquelot (*Soc. de Phar. de Paris*, June 3), showed a sample of the above, extracted by treating the plant with 90 per cent. alcohol, and then taking up the residuum several times with 95 per cent. alcohol, in order to get a pure and crystallized product. Volemite appears as colorless needles grouped in spheroidal forms about the size of a millet-seed. It fuses at 284° F. It is more soluble than mannite in both water and alcohol, has no reducing properties, does not ferment, is not modified by diluted sulphuric acid, and does not give off osazone. Its rotary power, $a_D = + 2°4$, is not augmented by the presence of boric acid, but is increased under the influence of borate of sodium. Analysis has not thus far decided whether volemite is a glucoside or a mannite, but M. Bourquelot thinks it ranges with the latter. With benzoic aldehyde and paraldehyde it gives crys-

tallized acetyls (lævogyre), which are analogous to those prepared from mannite by M. Meunier. The author stated that volemite is not *identical* with any of the known mannites, and that he has not yet been able to transform it into glucose.—*Répert. de Phar.*, July 10.

NEW METHOD OF TESTING THE PURITY OF BUTTER.[1]

By G. Firtsch.

The method depends on the solubility of the barium salts of the volatile fatty acids of butter fat. From 0·99–1·01 gram of the clarified fat is heated in a strong flask of 150 cc. capacity with 50 cc. of $\frac{1}{10}$ N. barium hydroxide for 6–8 hours at 140° by means of a paraffin-bath. It is frequently advisable to allow the flask to cool at the end of 3 hours in order to bring the little fat, which adheres to the sides of the flask, into the reaction, which is assisted by the frothing up which takes place when the heating is resumed. When the saponification is complete, the contents are passed as rapidly as may be through a filter into a half-litre flask, and washed with boiling water until the flask is full. The separation of the soluble from the insoluble barium salts is perfect excepting in the case of cocoa-nut oil, which contains lauric acid. The insoluble barium salts are

	Per cent. of total combined barium.			
	Ba in insol. salts.		Ba in sol. salts.	
Butters, I	68·47		31·53	
" II	66·48		33·52	
" III	65·84		34·16	
" IV	68·99	mean	31·01	mean
" V	67·11	67·26	32·89	32·74
" VI	67·21		32·79	
" VII	66·75		33·25	
" VIII	69·80		30·20	
Pig-suet, I	81·04		18·96	
" II	80·60		19·40	
Tallow,	87·07		12·93	
Margarin, I	76·62		23·38	
" II	75·16		24·84	
Butter, 70 per cent.; suet, 30 per cent.	70·86		29·14	
" 50 " " 50 "	74·02		25·98	
" 30 " " 70 "	78·37		21·16	
Cocoa-nut oil,	66·98		33·02	
Palm oil,	73·24		26·76	

[1] *Ding. Polyt. J.*, **278**, 422–429, *Jour. Chem. Society*, July, p. 868.

decomposed with 25 cc. ½ N. hydrochloric acid and warmed on the water bath, filtered, washed and weighed.

In the solution of the soluble barium salts, the excess of barium is determined by means of $\frac{1}{10}$ N. hydrochloric acid, as also the total amount of barium as sulphate. From the three determinations, the amounts of the insoluble fatty acids, the soluble fatty acids calculated as butyric acid, and the respective amounts of barium combined with them are obtained. The author's results are given in the table on the preceding page.

By distilling the solution containing the acids from the soluble barium salts, figures were obtained which did not agree with those obtained by the Reichert-Meissl method. The weight of the acids of the insoluble barium salts agreed with those obtained by Hehner's method.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Iowa State Pharmaceutical Association assembled at its twelfth annual meeting at Spirit Lake, July 21. President Torbert's address contained many suggestions which furnished material for discussion and action, more particularly in relation to the cut-rate problem. A. A. Broadie, Waverly, was elected president for the current year, and treasurer J. B. Webb, DeWitt, and secretary Rosa Upson, Marshalltown, were re-elected to these positions.

The Maine Pharmaceutical Association is the oldest State Pharmaceutical Association in the country, having been organized in July, 1867, and in the month of September following was represented at the meeting of the American Pharmaceutical Association by Dr. H. T. Cummings and Chas. K. Partridge. Both gentlemen were present, and the last-named presided, at the meeting in Portland, July 23, last, at which the activity of the association was revived, after a dormancy extending over a number of years. The meeting attracted very general attention outside the realm of pharmacy, owing to the vigorous denunciation, in the president's address, of the Maine prohibitory laws which, after nearly half a century's trial, he characterized as a moral, political, demi-religious fraud; in illustration he stated that if alcoholic stimulants are prescribed for a patient, the apothecary, on filling such a prescription, has his legal place of residence in the county jail, and in addition thereto, his pocket-book should be legally mulcted of a handsome sum.

The officers for the present year are: C. K. Partridge, Augusta, president; H. B. Pennell, treasurer; H. E. Bowditch, Augusta, secretary; and H. T. Cummings, Portland, corresponding secretary. The next meeting will be held in Bangor, at a time to be announced hereafter.

The New York State Pharmaceutical Association held its thirteenth annual meeting at Bluff Point, near Plattsburg, June 23, President W. G. Gregory, presiding. The treasurer reported a balance of $679 on hand; the membership was increased to over 800. The customary reports were read; also a

number of papers, and the resolutions concerning cut-rates, adopted in New Orleans, were considered and slightly modified. C. S. Ingraham, Elmira, was elected president; secretary C. W. Holmes, Elmira, and treasurer C. H. Butler, Oswego, were re-elected. Syracuse was selected as the place for holding the next meeting in the month of May, 1892.

The North Carolina Pharmaceutical Association held its twelfth annual meeting at Morehead City, July 8, at which also a delegation from the Medical Society of the same state was present, participating in discussions on counter-prescribing by apothecaries, on the prescribing of secret and proprietary preparations by physicians; on the National Formulary and similar topics. The association is endeavoring to obtain an appropriation of $1,000 for the purpose of establishing at the State University a chair of pharmacy. Besides the president's address and the usual reports several papers were read and discussed. W. H. Wearn, Charlotte, was elected president; F. W. Hancock, New Berne, secretary, and A. J. Cook, Fayetteville, treasurer. The association will meet again at Raleigh, August 10, 1892. W. H. King is the local secretary.

The following printed proceedings of State Pharmaceutical Associations have been received:

Kentucky; 14th annual meeting. Pp. 112. See July number, p. 370; the local secretary is O. W. Geier.

Missouri; 13th annual meeting. Pp. 155. See July number, p. 371.

EDITORIAL.

Membership in the American Medical Association.—This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues. Attendance as a delegate at an annual meeting of the Association is not necessary in order to obtain membership. On receipt of the above amount the weekly Journal of the Association will be forwarded regularly.

Membership in the American Pharmaceutical Association.—The preceding paragraph suggests comparison with the steps required for securing membership in this Association, in which at the time of its organization in 1852 there was a strong sentiment of restricting its membership to delegates from pharmaceutical societies and colleges; to representatives elected by ten druggists in localities where such organizations were not in existence, and to isolated pharmacists residing in places with too small a constituency for sending such a representative. It was, however, decided to admit to membership besides regular delegates, reputable pharmacists recommended by three delegates from their locality or by three members of the Association. Beginning with 1855 application had to be made to the Executive Committee, and though the constitution did not *require* any endorsement, it was customary for the applicant, if unknown to the committee, to furnish some recommendations from two or more apothecaries, wholesale druggists, physicians or other persons; the elec-

tion was decided by two-thirds of the members present at a meeting, or in the interim by the unanimous action of the committee. In 1865, the membership of the Association having extended over most of the States, an endorsement of the applicant by two members was required, and election in the recess between the annual meetings was abolished. Since 1880 the applications had to be examined by the Council before being reported to the Association; and since 1887 suitable candidates for membership need not formally make application, but may be proposed by two members in good standing.

No change has been made in the admission of *delegates* if present at the meeting; they may become members by signing the constitution and by-laws, and, therefore, are virtually elected members of the national association by the local associations appointing them; the only restriction being with regard to such who may have been expelled or dropped from the roll for non-payment of dues. At the organization of the Association in 1852 only six pharmaceutical colleges and associations were known and had appointed delegates, namely, Boston, New York, Philadelphia, Baltimore, Richmond, Va., and Cincinnati; at the present time there are but very few States without a pharmaceutical association, and in view of the fact that the delegates from each may become members of the national body without formal election by the latter, it would seem but logical that any member in good standing in one of the former should be entitled to join the national association under similar conditions, without being appointed a delegate. Others might still be elected upon application or by proposition and invitation.

The State Pharmaceutical Examining Board of Pennsylvania held an examination in the High School at Williamsport on Tuesday, July 14, 1891. Fifty-one candidates appeared for examination, thirty-three applying for Registered Pharmacist's certificates, and eighteen for Qualified Assistant's certificates. Eleven of the former and ten of the latter class were successful.

Two new members of the board were present at this examination, Charles T. George, of Harrisburg, in place of H. B. Cochran, resigned, and Louis Emanuel, of Pittsburg, in place of F. H. Eggers, whose term had expired.

A Convention of Retail Druggists' Associations has been called by the St. Louis Apothecaries' Association, to convene at the Southern Hotel, St. Louis, September 3, at 10 o'clock, A. M.. The call was issued under date of August 17th and 25th, for the purpose of considering trade subjects, and to confer on ways and means to cut the cutter on patent and proprietary articles, likewise to adopt measures which will take the traffic in these goods out of the trade bazaars and department stores.

The meetings of the Congress of American Physicians and Surgeons will be held in Washington from 3 to 6 P. M., September 22d, 23d, 24th and 25th, 1891. William Pepper is chairman of the Executive Committee.

The American Public Health Association will hold its nineteenth annual meeting in Kansas City, Mo. and Kan., October 20 to 23 next. Among the topics for consideration are: (1) Sanitary construction in house architecture; (2) railroad sanitation; (3) meat supplies; (4) milk supplies of cities; (5) arsenical papers and fabrics, and (6) isolation hospitals for infectious diseases in cities. Dr. Irving A. Watson, Concord, N. H., is Secretary of this Association.

The solution of an arithmetical problem, as contained in a letter recently received, will be appreciated by our readers, we think; it is as follows: "I asked whether the time was four years, counting 365 days to the year, or do you mean that your year's time is a certain portion of a year of 365 days. I understand it this way: the two winter terms for Junior and Senior is counted two years. Six months during vacation or between junior and senior terms, and six months' experience is required before entering College. These 2 six months is equivalent to 2 years; hence, the Junior and Senior term, and these 2 six months are equivalent to 4 years."

International Pharmaceutical Congress.—The following is a translation of a circular letter received some time ago, and explains itself:

SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS IN MILAN.

COMMITTEE ON ORGANIZATION,
VIA FIORI OSCURI, 13.

MAY 15, 1891.

Honorable Colleagues:

The directors and proprietors of Italian pharmacies, especially those of the northern provinces of the kingdom, perturbed by the changes in the conditions of practice and property, brought about by the new law of December 22, 1888, for the protection of public hygiene and sanitation, and, by legal contests with the Government over the new exactments, in defence of their rights, have not been able to coöperate towards the success of the Pharmaceutical Congress in Milan, to the extent they promised before the new law, affecting their interests so strongly, went into effect.

Notwithstanding these difficulties the Committee on Organization would have persevered in the undertaking, had it not been for the fact of the very discouragingly small number of adherences received, thus cutting off every hope of success. Despite the announcements and invitations made in the principal foreign and Italian journals and the 25,000 circulars forwarded, the Committee received scarcely thirty assents (adesioni).

After that the Committee was compelled to yield to the opinion expressed by the Chemico-Pharmaceutical Association of Lombardy, charged by the Congress of Brussels with promoting the reunion at Milan, that the present was inopportune for the convocation in Milan, of the Seventh Pharmaceutical Congress, owing to the grave crisis through which the Italian pharmacists are now passing, as the result of carrying into effect the new law previously mentioned.

The Committee, therefore, resolved to postpone the convocation of the Congress to a more opportune time, and meanwhile expresses the warmest thanks to all colleagues and scientists who have rendered assistance.

For the Committee on Organization,

The President: SEN. COMM. PROF. STANISLAO CANNIZZARO.

The Vice-Presidents:
COMM. PROF. DIOSCORIDE VITALI,
DR. GIUSEPPE PESSINA.

The Secretaries:
DR. ARTURO CASTOLDI,
CHIM. FAR. VITTORIO VENTURINI.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Massage, a primer for nurses, by Sarah E. Post, M. D. Lectures before the Training Schools for Nurses connected with Bellevue Hospital, Mt. Sinai Hospital, St. Luke's Hospital and Charity Hospital, New York. Second edition, with seven original photo-plates. New York : The Nightingale Publishing Co., 1891. 12 mo. pp. 53. Price $1.

Intended for the instruction of professional nurses on the correct application of massage, it is equally well adapted for the use of any intelligent person, since the explanations and instructions are brief, but clear and comprehensive. Besides the photo-plates which illustrate different motions of massage, several cuts are introduced in illustration of the massage of the neck.

Report of Willis G. Tucker, M.D., Ph.D., analyst of drugs. Extract from the 11th annual report to the State Board of Health (New York). pp. 65.

The report shows about the same conditions as the preceding one (see Amer. Jour. Phar., 1890, p. 477); perhaps an improvement may be noticed in the condition of the following articles which make the least favorable showing. Of 46 samples of compound spirit of ether 12 were of good or fair quality ; 17 out of 30 specimens of stronger ether passed inspection ; of 20 samples bought as saffron six passed muster, the remaining consisting of safflower ; of 37 samples of precipitated sulphur, ten were correct, five were sublimed or washed sulphur, and the remainder consisted of milk of sulphur contaminated with calcium sulphate.

Thirty-fourth annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria ; with list of Members and Hon. Members. Melbourne : 1891. pp. 22.

Twenty-first annual Report of the Council of the Pharmaceutical Association of the Province of Quebec, for the year ending April 30, 1891 ; with proceedings of the annual meeting held June 10th, 1891. Montreal : pp. 19.

Report of the Board of Managers of the Pennsylvania Hospital. Philadelphia : 1891. pp. 91.

The report was presented at the meeting of the contributors in May, and covers the departments of the sick and wounded and of the insane, also the accounts of the treasurer and stewards.

Minutes of the thirty-ninth Annual Meeting of the American Pharmaceutical Association, held at New Orleans, La., including the reports and papers read. 1891. pp. 256.

Owing to the early date of this year's meeting, the Council deemed it proper to place the official transactions into the hands of the members of the association several months before the report on the progress of pharmacy can be completed and printed ; and this pamphlet has now been sent out during the latter part of August, in compliance with the resolution of the Council referred to. Our June number, page 307, contains a full synopsis of these transactions. These will also be contained in the bound volume, which will be furnished to the members at a later date, when the printing of the annual report on the progress of pharmacy and of the general index to the "Proceedings," for 1883 to 1890 shall have been completed. "Notice to Members," has been printed on the cover calling attention to the reduced prices, at which

the preceding volumes are offered, and the inducements held out in the shape of discounts, for completing sets of these publications, beginning with the first issue in 1851, to any one year up to the present time. Thus the first ten volumes, now on hand, will cost $4.02; the first twenty volumes, $11.55; the first thirty volumes, $23.50, and the complete set of 39 volumes, $35.50.

A Text-Book of Practical Therapeutics, with especial reference to the application of remedial measures to disease and their employment upon a rational basis. By Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, etc. Second edition, enlarged and thoroughly revised. Philadelphia: Lea Brothers & Co. 1891. 8vo. pp. 658. Price, cloth, $3.75; leather, $4.75.

Only a few months ago (see December number, 1890, p. 634) we noticed the appearance of this work, the value and usefulness of which is shown by the fact that it has become a text-book in several medical schools, and that a second edition has already become necessary. Various additions have been made to the contents; thus a number of new drugs are discussed, and such remedial measures as leeching, rest-cure and suspension; tables on metric and apothecaries' weights and measures have been added, and a large number of new prescriptions have been inserted. As might have been expected the text has been carefully scrutinized and rendered more correct and clearer where it was deemed necessary, so that in all respects the work is true to its aim of being a reliable guide in the study of therapeutics. Some erroneous or vague statements have been carried over into the present edition, among which the following may be mentioned. Agaricin (p. 42) is obtained from white agaric, Polyporus officinalis, while punk is derived from P. fomentarius. Under arsenic (p. 70) the distinction between arseniates and arsenites should be mentioned. Physostigma venenosum is a woody climber, not a tree (p. 260). Oil of sandalwood is, or should be, derived from Santalum album, not from Pterocarpus santalinus (p.277).

Notes on New Remedies, including the Additions to the British Pharmacopœia of 1890. Compiled by E. B. Shuttleworth, Dean and Professor of Chemistry, Ontario College of Pharmacy, etc. Toronto: Monetary Times Printing Company. 1891. 12mo. Pp. 87.

The large majority of the remedies noticed in this little book are synthetical compounds or proximate principles introduced into medicine during late years; but also pichi, manaca, and some other plants have found a place, as well as all the new additions to the British Pharmacopœia; a synopsis of the galenical preparations admitted into the latter has been given in our January number, page 14. The little work before us is intended as a compendium of, what are at present, new remedies, giving a brief history of the introduction or derivation of the article, its physical and medical properties, the uses, doses and modes of administration. It is intended for the practical use of the physician and pharmacist, and will serve a very useful purpose, since the compilation has been very carefully made, and the facts are given in a concise form.

THE AMERICAN
JOURNAL OF PHARMACY.

OCTOBER, 1891.

DEPOSIT FROM TINCTURA SANGUINARIÆ.

By Frederick Krauss.

It is a well-known fact that tincture of sanguinaria, U. S. P., when kept for a few weeks, deposits on the sides of the containers, a reddish film of what seems to be a resin. No variation of the menstruum seems to prevent this. It does not interfere with the clearness of the tincture, but merely gives the shop bottle a bad appearance, after a quantity of the tincture has been taken out in the routine of business.

It can readily be removed with a solution of NaOH or of KOH. Ammonia has but little effect upon it. The fixed alkali liquids dissolve only a small proportion of the deposits, the remainder being removed in the state of insoluble powder.

I removed a quantity of this resin from several bottles with the aid of solution of NaOH. Throwing the mixture upon a plain, white filter, I washed it first with water (in which the powder is entirely insoluble), then with water containing a small quantity of HCl. Finally, it was again washed with pure water until washings gave no reaction to test-solution of $AgNO_3$. The residue was then allowed to dry.

It forms a reddish-black, somewhat glistening, resinous powder, very slightly soluble in ether and alcohol. It is more soluble in chloroform and spirit of chloroform, the former making a deep red solution, whereas the latter made a light red solution. The chloroform is of course the solvent in both cases. The resin is insoluble in benzin, burns without melting with a bright white light, and

leaves a black residue. It is also insoluble in HCl, completely soluble, however, in concentrated H_2SO_4, forming a very dark red solution from which the resin is entirely precipitated as a flocculent, red powder, on the further addition of a quantity of water. On allowing the liquid to stand, the resin rises to the top, leaving the colorless solution at the bottom. When shaken up, the mixture has much the appearance that is produced when Tr. Cinchon. Comp., U. S. P., '80, is mixed with water.

The resin is also soluble in HNO_3, from which it is only partially precipitated on the addition of water. After allowing it to stand, the underlying liquid was still highly colored, in which it differed from that of former test.

For an examination of the precipitate in tincture of sanguinaria, see also paper by F. L. Slocum in Amer. Jour. Phar., 1881, p. 277.

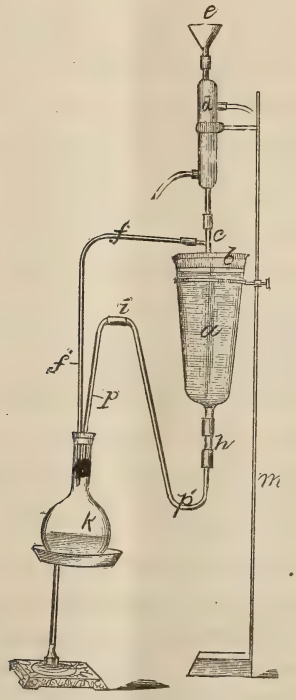
GOMBERG'S EXTRACTION APPARATUS.

By Harry Kahn, Ph. M.

This apparatus which is for the continuous extraction of comparatively large quantities of drug, was constructed by Moses Gomberg, B. Sc., Assistant in Organic Chemistry in the University of Michigan, in the chemical laboratory of which institution it has been in almost constant use for the last three years.

It consists of an ordinary conical glass percolator *a*, of about two litres capacity; the upper opening is fitted with a circular piece of board *b*, which is about 2·54 cm. thick, and after it has been covered with chamois-skin or other suitable material, should fit tightly into the percolator. In the centre of the board *b* is a hole to admit a rubber stopper through which one arm of the T-tube *c* is inserted, the upper arm being connected by means of rubber tubing to an upright Liebig's condenser *d*, to the upper end of which is attached, by means of rubber tubing, a small funnel *e* to facilitate the addition of menstruum. The other arm of the T-tube *c* is connected by means of rubber tubing to the hard glass tube *f and f'*, which is about 1 cm. inside diameter, and is so bent that *f* is 25 cm. long and *f'* 45 cm. To the lower opening of the percolator is attached, by means of rubber tubing, a short piece of combustion tubing *h*, which is drawn out to allow a piece of hardglass tubing *p* and *p'*, 1 cm. internal diameter, to be attached. The tube *p* and *p'* is bent so as to form a syphon

the upper bend being a little below the level of the powder in the percolator. p' from the connection with the combustion tubing h to the second turn i, is 35 cm.; the remainder p, 25 cm., should run parallel with f', and both p and f' are fitted into a two-holed stopper, which in turn is fitted into a florentine flask k of one liter capacity. The whole apparatus is supported by a high retort stand m, the percolator by a large ring, and the condenser by a condenser clamp. The flask k is supported by a small retort stand fitted with



a suitable ring. The syphon p and p' may consist of two sections, joined by a piece of rubber tubing at i. The use of the apparatus is readily understood from the above.

DETROIT, MICH., August, 1891.

Suppositories of Glycerin.—Soak for two or three hours gelatin 20 gm. in distilled water 45 gm.; then melt the mixture in a water bath, add glycerin 165 gm., and pour into suitable moulds; roll the suppositories in prepared chalk. —*Pet. Mon. de la Phar.*, June.

SOME PLANT CONSTITUENTS.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 94.

ASMINA TRILOBA (*Papaw*).—Thomas M. Fletcher examined the bark of this tree which in the extreme Southern States reaches a height of 30 to 40 feet. Further north it is a shrub and does not often exceed 10 to 12 feet in height.

The fruit is in bunches of two to six in each. When in an unripe state the fruit has a green color, breaking with a short fracture. The ripe fruit is of a light yellow color, nearly cylindrical, about five inches in length and one and a half to two inches in diameter, slightly curved, containing a pulpy mass with thirteen to fifteen carpels, each containing a seed with a dark brown hard and brittle testa. The fruit ripens in September, after having been exposed to the frost. It has a sweetish taste resembling the banana, and is highly esteemed by the negroes. The woody portion of the tree is white, very light in weight and enclosed by a dark brown bark, which in older trees becomes an ashen color. The inner bark is of a tough fibrous texture, white in color when first collected, but becoming gradually darker by exposure.

Lloyd[1] found an alkaloid in the seeds and a bitter extractive in the bark. No evidence of the alkaloid was found in the bark by Mr. Fletcher, although various tests were applied to detect one. Petroleum ether dissolved 3·53 per cent. from the finely powdered bark which consisted of a fixed oil.

The most important constituents found by other solvents were 3·43 per cent. of resin, 9·50 per cent. of resin insoluble in ether, but soluble in absolute alcohol, and 8·00 per cent. of glucose and extractive soluble in distilled water. There were also determined 52·16 per cent. of woody fibre, 7·38 per cent. of moisture and 4·20 per cent. of ash.

POLYGONUM BISTORTA.—Paul Krebs determined the following constituents in bistort root: Tannin 15·00 per cent., fat and wax 0·10 per cent., resin 0·30 per cent., mucilage 1·32 per cent., dextrin 1·92 per cent., glucose 4·88 per cent., albuminoids 1·78 per cent., and insoluble matter consisting of incrusting substances, lignin and cellulose 47·06 per cent. There were also found moisture 9·20 and ash 4·80

[1] Drugs and Medicines of North America, **2**, 54.

per cent. Caoutchouc, gallic acid, coloring matter and starch were detected but not estimated. Bowman in 1869 found 20 per cent. of tannin, and other investigators have reported the presence of tannin, gallic acid, starch and mucilage.

CALENDULA OFFICINALIS.—Maxwell J. Tielke states that this drug is used considerably in parts of our western country as a vulnerary.

The following percentages were found:

Volatile oil,	·02
Fixed oil,	5·30
Caoutchouc,	4.90
Resin and coloring matter,	8·71
Mucilage,	6·30
Sugar,	11·82
Albuminoids,	1·32
Pararabin,	·88
Insoluble lignin, etc.,	39·22
Ash,	10·50
Moisture,	6·75
Undetermined and loss,	4·28
	100·00

The activity of the drug is probably due to the yellow resin dissolved by ether and alcohol. Tannin was not found, although the coloring matter was somewhat darkened by solution of ferric chloride.

PENNYROYAL AND ITS VOLATILE OIL.

BY WILLIAM A. HAGUE, PH.G.

From an inaugural essay presented to the Philadelphia College of Pharmacy.

The following notes are compiled from the author's observations and from information obtained during the summer of 1890 from those who gather large quantities of pennyroyal for the purpose of distilling the oil. The herb grows very abundantly near my home in Belmont County, O., and also in the adjoining counties; in fact, so much of it grows in that section that each summer reunions are held known as the "pennyroyal reunion." The herb grows spontaneously, principally in old fields and dry waste places. It is one of the few herbs not subject to cultivation; it will not grow from the seed nor can it be reproduced by transplanting. A field may one season be completely covered with the herb and without disturbing the ground there may not be a single plant in the same field the

next year.[1] And a field that produced not a plant one year may be covered with pennyroyal the next.

The plant grows to the height of from 10 to 15 inches and has a strong odor of the oil. It is found on almost all kinds of soil, from the richest to the most barren fields, and during extremely dry seasons when most other vegetation is dried up, it apparently thrives as well as if there had been plenty of rain. It is claimed that, if there is too much rain, the plant does not yield as large a percentage of oil as in moderately dry seasons, nor oil of as good quality. Pennyroyal does not grow in shaded, nor very damp places, but always in open fields and in newly-cleared grounds.

The herb is gathered principally for the oil it contains, although a large quantity is collected each summer by people living in the neighborhood where it grows, for the purpose of using it during the following winter, the hot infusion being employed as a stimulant for flatulent colic and for colds by promoting perspiration, and for other complaints. It blossoms in August and is gathered then, as it yields the largest amount and best quality of oil when in bloom. Where it grows thickly it is mown and if scattered it is pulled by hand.

The apparatus used for distilling the oil is generally of the simplest construction, mostly "home made," and made portable so that when the crop of one locality is exhausted, the apparatus can easily be moved to another place. A steam-tight tub or tank is made of wood 2 inches thick and large enough to hold about 500 pounds of the herb. After it has been spread upon the ground to partly dry, the herb is packed in the tub by tramping, until this is filled, when it is covered by a closely-fitting lid. Into the bottom of the tub steam is admitted from a boiler, through a 2-inch pipe, and the mixed vapors of oil and water are allowed to escape through another pipe leading to the condenser. This usually consists of a pipe of tin or copper, which passes through a cistern of

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[1] The last two sentences are almost identical with statements made in a paper by Mr. J. F. Patton, published in "Proceedings Penna. Phar. Assoc.," 1890, p. 88. The information was, probably, in both cases obtained from Guernsey County, which adjoins Belmont County. The plant being an annual must obviously be reproduced from the seeds; but it is possible that the hard seed-like akenes may sometimes remain in the ground for several years before germinating.—EDITOR.

water, or if a cistern cannot be had, a barrel is used through which a stream of water continually flows. The condensed water and oil are collected in a peculiarly-constructed receiver known as a "divider." This divider consists of two vessels, made of tin or copper, of convenient size, one fitting inside the other and projecting about an inch above the top of the outer one. The smaller vessel, provided with a hole in the bottom, receives the mixed water and oil; the former being the heavier, sinks to the bottom and passes through the hole into the outer vessel. As the distillation proceeds, the water rises in the outer vessel until it flows over the top while the oil remains in the smaller one. From this it can be easily removed by dipping it out. After filtering, the oil is ready for the market.

The yield of oil varies from 0·5 to 1·5 per cent., depending on the season and condition of the herb when gathered. The freshly-distilled oil is colorless, but becomes yellow and viscid upon exposure to the atmosphere and light.

THE CULTURE OF FLOWERS AND THE PRODUCTION OF PERFUMES IN THE RIVIERA.

The perfumes produced in Nice are of a very high standard. One of the most important processes is the distillation for the production of essences.

So far as the process of distillation itself is concerned: A copper vessel is filled two-thirds with water; then the desired flowers are thrown in, the vessel is tightly closed and placed on the fire. In this manner, steam is engendered in the vessel, and is conducted by a tube through a cylinder, which is constantly filled with cold water and is supplied with an overflow cock. In this cylinder the tube is bent spirally, and ends in a faucet at the bottom, from which the volatile essence drops, after the condensation of the steam. The essence is collected in a small glass vessel, while at the same time, the water takes up a small portion of the perfume, and is then disposed of as rose-water or orangeflower-water. It is not feasible to submit all flowers to this process: such as yield no essence, like jasmin, cassie-flowers, tuberoses, etc., must be treated in a different manner.

Among the flowers which contain essences, those of the orange

tree yield but one gm. of essence for every kg. of blossoms. This essence is the "Neroli" of commerce, and is the principal product in the district between the department of Var and the Italian boundary line. The following table shows the yield of essence of the various kinds of flowers, roots and wood:

Neroli flowers,	1,000 kg.	yield	1·0 kg.	essence.
Roses,	25,000 kg.	"	1·0 kg.	"
Geranium,	1,000 kg.	"	1·0 kg.	"
Mint,	1,000 kg.	"	0·75 kg.	"
Orange leaves,	1,000 kg.	"	1·0 kg.	"
Lavender,	100 kg.	"	0·5 kg.	"
Eucalyptus,	100 kg.	"	0·5 kg.	"
Cherry laurel,	1,500 kg.	"	1·0 kg.	"
Rosemary,	200 kg.	"	1·0 kg.	"
Spike,	120 kg.	"	1·0 kg.	"
Cedar,	40 kg.	"	1.0 kg.	"
Dried Patchouli leaves,	40 kg.	"	1·0 kg.	"

The volatile essences produced by the above process are mixed with alcohol and thus utilized as cologne, toilet vinegar, lavender water, etc.

Mignonette, tuberose, jasmin, cassie-flowers, violet and jonquil contain no ethereal oil, as has already been mentioned; these flowers are used for the manufacture of pomades, from which afterwards alcoholic preparations, extracts or infusions, such as the toilet perfumes of the retail trade, are produced. There are two processes to which these flowers may be submitted, the "cold" and the "hot" process. The cold process is generally used for cassie (*Acacia Farnesiana*), jasmin, tuberoses, violets, jonquil and several other varieties. The freshly-gathered flowers are spread on a ¼-inch layer of pure lard, which has been placed on a glass plate with wooden frame. Forty to fifty of these frames are placed one above the other, and the flowers, according to the variety under manipulation, changed every 12–48 hours, until the lard is sufficiently perfumed, when it is packed in air-tight containers and ready for commerce.

In the hot process, 20 kg. of fat and about 5 kg. of flowers are placed in a copper container and heated slowly with constant stirring. After heating for about ten minutes, the vessel is allowed to cool, and then 5 kg. of flowers are again added; this is repeated until the fat is sufficiently impregnated with the perfume. The hot fluid is then strained and the remaining fatty mass submitted to hydraulic pressure.

The pomades resulting from both these processes, are used for the production of the so-called "extracts," which are obtained by means of spirit of wine; and from the various mixtures and compounds of these extracts result the different sorts of perfumes. Certain perfumes are only extractable from various fruits, flowers and roots by fermentation by means of alcohol; for instance, benzoin, tonka, iris, etc.

The largest perfume manufactories are found in Grasse, Nice and Monaco. The total production of flowers and blossoms for the District of the Sea-Alps is calculated to be for:

Orange-blossoms,	1,860,000 kg.	Tuberoses,	74,000 kg.
Roses,	1,000,000 kg.	Jonquil,	50,000 kg.
Violets,	157,000 kg.	Cassie,	30,000 kg.
Jasmin,	147,000 kg.	Mignonette,	20,000 kg.

At Grasse, poor olive crops and the subsequent improvement of the irrigation facilities have led to the extension of flower culture and essence manufacture. Plantations of jasmin, tuberoses and roses have in many cases taken the place of the olive groves, so that, with the exception of orange-blossoms and cassie, Grasse and the surrounding districts produce as high as four-fifths of the above-named quantities of flowers, and of jonquil and mignonette almost the entire quantity. The mountain sides north of Grasse yield rosemary, lavender, thyme and spike in large quantities.

The prices of the different flowers, etc., varied during the years 1884–88, as follows:

Orange blossoms (neroli),	from	0·30	Francs to	0·50	Francs for	1 kg.
" " bitter,	"	0·70	"	1·60	"	1 kg.
Roses,	"	0·50	"	0·80	"	1 kg.
Jasmin,	"	2·50	"	2·75	"	1 kg.
Tuberoses,	"	2	"	4	"	1 kg.
Violets,	"	2	"	5·25	"	1 kg.
Cassie (*Acacia Farnesiana*),	"	7	"	17	"	1 kg.
Geranium,	"	5	"	10	"	100 kg.
Orange leaves, sweet,	"	3	"	6·	"	100 kg.
Lemon leaves, bitter,	"	12	"	15	"	100 kg.
Cherry laurel,	"	8	"	12	"	100 kg.
Thyme,	"	8	"	11	"	100 kg.
Lavender,	"	7	"	12	"	100 kg.
Mint,	"	10	"	14	"	100 kg.
Rosemary,	"	4	"	5·50	"	100 kg.
Spike,	"	4	"	5·50	"	100 kg.

What importance, beside the use for perfume purposes, the trade of *fresh* flowers has obtained, may be seen from the fact that during the time extending from November 1, 1887, to the end of May, 1888, there were shipped, from the station at Cannes alone, 369·096 kg. of fresh flowers, with a value of 1,858,325 Frcs., while for the season 1888–89 it reached a value of 2,855,475 Francs, or an increase of 997,150 Frcs. over the previous year.

Translated from *Gartenflora*, Sept. 1, 1891. M. A. M.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Linamarin, a glucoside yielding hydrocyanic acid present in the embryo of flaxseed, has been isolated by A. Jorissen and E. Hairs; it resembles amygdalin by yielding sugar and hydrocyanic acid in its decomposition by mineral acids and flaxseed-meal emulsions. Linamarin forms colorless needles crystallizing in groups, having a cooling and very bitter taste; ultimate analysis gives the following composition: C 47·88 per cent., H 6·68 per cent., N 5·55 per cent., O 39·89 per cent. The following points of difference are noted between linamarin and amygdalin: *Amygdalin* is soluble in twelve parts of water; by heating to 120° C. it loses water and melts with decomposition at 200° C.; concentrated sulphuric acid imparts a beautiful violet coloration; it contains 52·51 per cent. carbon and 3·06 per cent. nitrogen; amygdalin is decomposed by an emulsion of *sweet almonds*, also by an emulsion of *flaxseed-meal*; benzaldehyde is one of its decomposition products. *Linamarin* is soluble in an equal weight of water; by heating to 120° C. no water is eliminated, it melts at 134° C. and can be heated to 150° without decomposition; it is not colored by concentrated sulphuric acid; it contains less carbon and more nitrogen; linamarin is decomposed by an emulsion of *flaxseed-meal* but *not* by an emulsion of *sweet almonds;* benzaldehyde cannot be found among the decomposition products. —(Jour. de Pharm. d'Anvers.) Pharm. Post, 1891, 659.

Cod-liver oil emulsion.—Instead of the usual method of preparation with acacia, P. van Aspern recommends the use of a 20 per cent. solution of potash soap by which means it is possible to prepare an emulsion containing 80 per cent. of oil; the emulsion is stated to be

tasteless if taken in milk or warm coffee; if necessary, syrups, creasote or flavoring substances may be added.

Castor oil emulsion. Potash soap 2·0 dissolved in distilled water 10·0 and mixed with castor oil 40·0; flavor by addition of six drops of oil of peppermint.

Volatile oil emulsions may be easily prepared by the use of soap.

Oil of turpentine emulsion.—Potash soap solution (10 per cent.) 40·0, oil of turpentine 50·0; this emulsion separates no oil upon dilution with water.—Apotheker Ztg., 1891, 471.

Detection of quinine in presence of phenacetine.—The latter substance prevents the fluorescence of quinine sulphate, especially in dilute solutions; with chlorine water and ammonia phenacetine produces a yellowish-violet coloration, a mixture of quinine and phenacetine with these reagents producing a fine blue color. To obtain the thalleioquin test, best results are obtained with bromine-vapor: Bromine-vapor is allowed to act upon the solution until a faint turbidity results, then ammonia is added, drop by drop; proceeding in this manner the green coloration appears, although darker and inclined towards a violet; if the test be now agitated with ether and allowed to stand a while, the ethereal layer will be colored yellowish-violet and the aqueous layer green.—Sestini and Campani, Pharm. Ztg., 1891, 494.

Antiseptin.—After the exposure of *Somnal* (claimed to be "ethylated chloral-urethane," but found to be a mixture of alcohol, chloralhydrate and urethane) and *Antinervine* (called "Salicyl-bromanilide," indicating a definite chemical compound of bromacetanilide and salicylanilide, but by analysis found to be a mixture of salicylic acid, acetanilide and ammonium bromide. See Am. Jour. Pharm., 1891, 408). Dr. F. Goldmann publishes an analysis of the third of Radlauer's productions, *Antiseptin* or as it is also designated "zincum boro-thymolicum jodatum." It was found to vary slightly in composition, but the average analysis indicated *zinc sulphate*, 85·0, *zinc iodide*, 2·5, *thymol*, 2·5, and *boric acid*, 10·0.—Pharm. Ztg., 1891, 494.

Alkaloids of the areca-nut.—Of the three alkaloids present two, arecoline and arecaine, have been described at length in the Am. Journ. of Pharm., 1889, 133 and 193; the third, *aracaidine*, $C_7 H_{11} NO_2 H_2O$, isomeric with arecaine, is present to the extent of 0·1 per cent.; it forms colorless, permanent, tabular crystals, and is easily

soluble in water and dilute alcohol, but almost insoluble in absolute alcohol, ether, chloroform and benzol; it loses its water of crystallization at 100° C., and melts, attended with frothing, at 222–223° C; it forms crystallizable salts and is precipitated by platinic and auric chlorides (arecaidine platinochloride melts at 208–209°, arecaine platinochloride at 213–214°; arecaidine aurochloride at 197–198°; arecaine aurochloride at 186–187°). Arecoline is methyl-arecaidine, and it has been possible to convert one into the other; ethyl-arecaidine, called *homarecoline* $C_9H_{15}NO_2$ has also been made and, like arecoline, is poisonous, whereas, arecaidine is not poisonous.—E. Jahns (Ber. d. D. Chem. Ges.), Pharm. Ztg., 1891, 516.

To prevent bumping in boiling liquids a piece of glass tubing 5–8 cm. (2–3 inches) long and 5–10 mm. ($\frac{3}{16}$–$\frac{3}{8}$ inch) diameter is closed at one end, and in this end a piece of platinum wire is fused; the wire should be long enough to extend above the liquid; the open end of the tube is to be placed down in the liquid. During ebullition the air in the tube is displaced and on cooling the tube fills with the liquid; before each operation the tube must be freed from liquid so that it is full of air when introduced into the liquid to be boiled or distilled. This device answers admirably in the distillation of volatile liquids, also in boiling liquids holding fine powders in suspension, like barium sulphate, etc.; likewise in the estimation of volatile fatty acids in butter analysis.—Dr. E. Pieszczek, Chemiker Ztg., 1891, 1126.

Iodine-absorption of fixed oils.—To determine the most reliable method of conducting this analytical operation, Dr. Holde carefully investigated the several conditions necessary, and as the result publishes the following procedure: Of non-drying oils 0·3 gram and of drying oils 0·2 gram are taken and dissolved in 18–20 cc. chloroform in a flask of about 300 cc. capacity; to the non-drying oil 50 cc. iodine solution (which must not be more than 2 weeks old) are added, to the drying oil 60 cc. of an iodine solution (which must be less than 8 days old) are added. Two determinations of each oil should be made and the absorption allowed to proceed for two hours. Two blank tests must be made, the mean of the two giving the value of the iodine solution; the first one is made by titrating at once 50 cc. of the iodine solution with the sodium thiosulphate solution after adding 40 cc. 10 per cent. potassium iodide solution, using starch solution as the indicator; in the second one the iodine

solution is allowed to stand for two hours before titrating. After allowing the tests to stand two hours, 40 or 50 cc. (10 per cent.) potassium iodide solution (the latter quantity for drying oils) and 120 cc. water added and the excess of iodine titrated with the sodium thiosulphate solution. Should the chloroform solution of the oil become cloudy during the two hours, more chloroform must be added. Working after this method the following iodine-absorptions were obtained: Linseed oil, 172–180; hempseed oil, 175–176; poppyseed oil, 139–143; sesame oil, 106–109; cotton-seed oil, 110–115; crude rape oil, 100–108; refined rape oil, 100–107; arachis oil, 91·2–101·5; olive oil, 79–84 (88); bone oil, 59·1–81·7. It is worthy of attention that the drying oils by this procedure give much higher figures than those published by Hübl; in the case of linseed oil Hübl gave 156–160; the difference is caused by using a very considerable excess of iodine from the beginning, thus insuring a more complete absorption.—Chemisches Repert., 1891, 228.

CONSTITUENTS OF RHIZOMA PODOPHYLLI.[1]

By R. Kürsten.

The results of the present investigation supplement the work done by Podwyssotzki (1882). The podophyllotoxin prepared by Podwyssotzki's method was not constant in composition, and its melting point varied from 100° to 125°; further, the podophyllic acid of that author is composed mainly of a crystallizable, active, but very impure substance.

Podophyllotoxin, $C_{23}H_{24}O_9 + 2H_2O$, is obtained by extracting the coarsely powdered rhizome with cold light petroleum, until freed from fat; after drying in the air, the extraction is continued with chloroform, until the liquid comes away almost free from yellow color. As it is not possible to work with alcohol-free chloroform, too prolonged extraction with chloroform would yield a more impure extract. The chloroform extract is distilled, and the residue is dried over a not too warm water-bath, partially dissolved in benzene, filtered, and the filtrate allowed to remain from 3 to 8 days, when a brownish-yellow mass of well-formed, thick, strongly refractive prisms is produced, which is purified by washing with 50 per cent. alcohol, then with ether, recrystallizing first from boiling ben-

[1] *Arch. Pharm.* (1891), **229**, 220–248.; *Jour. Chem. Soc.*, Sept., p. 1133.

zene, and finally from solution in hot 45 per cent. alcohol. The compound is thus obtained in long, well-formed prisms. It melts at 93–95°, and at a higher temperature chars without subliming. 100 cc. of water at 15° dissolves 0·014 gram; hot water dissolves somewhat more. It is very slightly soluble in ether and cold benzene, easily soluble in acetone and strong alcohol, and with difficulty in concentrated acetic acid. When moistened with concentrated sulphuric acid the crystals give an immediate cherry-red coloration, which slowly passes through greenish-blue to violet. Concentrated hydrochloric and nitric acids produce a red coloration; ferric chloride and bromine produce no change; the compound dissolved in glacial acetic acid gives a red coloration with Millon's reagent. The alcoholic solution is strongly lævorotatory. Zeisel's method indicates the presence of three methoxyl groups. Hydroxyl does not appear to be present.

Podophyllotoxin, when oxidized in an alkaline solution in the cold, by means of potassium permanganate, yielded, besides a little carbonic anhydride and a brown, amorphous substance, principally two compounds, the more considerable of which was *podophyllic acid*, $C_{20}H_{24}O_9$ obtained as well-formed, colorless crystals, from solution in a mixture of benzene and alcohol. The compound is without action on animals. It melts at 158–160°. Its aqueous solution, neutralized with aqueous potash, gives no precipitate with gold, calcium or barium chlorides; silver nitrate gives a white precipitate, soluble in much water; copper acetate gives a blue precipitate. The *copper* salt $(C_{20}H_{23}O_9)Cu$, was prepared as beautiful, light-green prisms, and analyzed.

Picropodophyllin results from the action of alkalis on podophyllotoxin; thus, on heating the latter with aqueous ammonia, a well crystallized product is obtained, which at first was recrystallized from strong alcohol; but this was found to be unnecessary, as the melting point, 227°, was not affected by it. Picropodophyllin has the same composition as podophyllotoxin, but they differ in melting point: 227° and 95°; in their action on polarized light: inactive, lævorotatory; as to solubility, the former is less soluble in all liquids than the latter; the latter gives Millon's reaction, the former does not. By oxidation and reduction the two compounds yield the same products. The residue of the chloroform extract, freed from crystalline podophyllotoxin, yielded a little *picropodophyllic acid* in crystals melting

at 156–158°; no other definite substance could be obtained from the extract.

Podophylloquercetin, $C_{23}H_{16}O_{10}$, is best obtained from the rhizome, after extraction by light petroleum and chloroform, by further extracting with ether, distilling off the ether, and treating with cold glacial acetic acid. The crude crystals are purified by repeated recrystallization, best in an atmosphere of carbonic anhydride. It melts at 275–277°, is almost insoluble in water, sparingly soluble in cold glacial acetic acid, more soluble in the hot acid and in ether, easily soluble in strong alcohol. Alkaline copper solution is easily reduced when warm, also ammoniacal silver solution. Probably this compound is not identical with quercetin.

ON THE POISONOUS AND VERMIFUGE CONSTITUENT OF OLEORESIN OF MALE FERN.[1]

By E. Poulsson.

During the past ten years several cases in which poisonous symptoms, in a few instances ending in death, have been caused by oil of male fern. Poulsson has collected twelve, in four of which death took place. A drachm is the smallest dose which has given rise to symptoms of poisoning; on the other hand five to seven drachms have often been taken without evil results. The symptoms observed were vomiting, diarrhœa, cramps and drowsiness, which terminated in coma; in two cases there were somnolence and muscular contractions, assuming in one the form of trismus. In many of the cases which Poulsson has brought together the symptoms have been imperfectly recorded, but it appears that the drug is capable of giving rise (1) to irritation of the stomach and intestines; (2) to paresis and irritation of the central nervous system, and that death may be caused by the influence of the drug on the nervous system.

The active constituents of the male fern root on which its therapeutic value depends, and which are capable of giving rise to poisonous symptoms, have not been hitherto absolutely determined; the extract has been found to deposit crystals of filicic acid; the

[1] Ueber den giftigen und bandwurmtreibenden Bestandtheil des ätherischen Filixextracts.—*Archiv f. Exp. Patholog. u. Pharmak.*, 29, p. 7; from The Medical Chronicle, September, 1891.

composition of this substance has been variously given (Luck, $C_{26}H_{30}O_9$, and Grabowski, $C_{14}H_{18}O_5$); the latter points out that by decomposition with a caustic alkali butyric acid and phloroglucin are produced, and regards it as a dibutyrylphloroglucin; the former was subsequently inclined to regard it as an anhydride, since in several of its compounds, as, for instance, its lead salt, an additional atom of water is included. In addition to filicic acid, the ethereal extract of male fern contains a volatile oil, resin, and other principles, and some doubt has arisen whether the activity of the root does not in part depend on these; for it has been noticed that the crystalline filicic acid does not always seem to possess very active properties.

Carlblom found it sometimes acted as an anthelmintic, sometimes it was without effect, and another observer, Rulle, noted that when he gave an impure filicic acid, made by simply treating the extract with ammonia and then precipitating the filicin by hydrochloric acid, he obtained an active anthelmintic, but when he purified and crystallized the filicic acid in the precipitate it seemed to have no effect.

Poulsson's investigations explain this apparent anomaly. He, too, finds that the impure precipitated filicic acid is an active poison to rabbits, but the crystalline filicic acid does not produce toxic symptoms in a rabbit even in doses of twenty-two grains. He finds, however, that if the pure filicic acid is dissolved in an alkali and precipitated by an acid the amorphous precipitate obtained is a poison acting like the liquid extract. His investigations have led him to the conclusion that the amorphous substance is the true filicic acid, and that it has the composition $C_{35}H_{42}O_{13}$. The crystalline substance hitherto known as filicic acid is the anhydride of filicic acid ($C_{35}H_{40}O_{12}$) and he proposes to call it *filicin*.

Filicin crystallizes in small yellow rhombic plates, is insoluble in water and quite insoluble in cold alcohol, but dissolves in boiling alcohol. It is more or less soluble in ether, amyl-alcohol, benzol, chloroform, and fat oils. In alkalies in the cold it is only soluble in considerable excess of the solvent. It melts at 184·5°.

Filicic acid is an amorphous white powder without taste or smell. It is soluble in the same solvents as the anhydride, but more readily, and it is especially soluble in cold alcohol; it is very easily soluble in alkalies and olive oil. At 100° it becomes of a straw yellow

color, but is not decomposed; it melts at 125°. Filicic acid is easily transformed into the anhydride. If a concentrated ethereal solution be boiled crystals of the anhydride are precipitated, and in a few days a further quantity falls down.

Poulsson has investigated the pharmacological action of filicic acid on the skeletal muscles, on the heart, and on the nervous system. In the frog (Rana temporaria) a weak alkaline solution injected subcutaneously caused ejection of the contents of the stomach and intestines, motor paresis, twitching of the muscles, and irregular action of the heart, which tends to distension in diastole and eventual cessation of the beat. Twitching did not occur after curare or section of the sciatic nerve. Six to seven mg. cause death in one-half to three-quarters of an hour; two mg. in about twelve hours. R. esculenta are not so easily affected. The paralysis produced by filicic acid is central in origin, for the muscles react to the induced current as well after as before the poisoning, and even after death from filicic acid they contract well to the faradic current. The muscle curve is not much altered, nevertheless Poulsson's experiments show that the elasticity and capacity of work of the muscle is decreased, and, therefore, the filicic acid is a muscle poison. Poulsson is of opinion that filicic acid depresses the heart's action in the frog partly owing to its action on the muscle, and partly owing to its influence on the automatic ganglia. It decreases the strength of the beat, and causes arrest in diastole. The local application of atropine will, under some conditions, excite contractions again.

The intravenous injection of one decigramme in a rabbit causes marked muscular relaxation owing to spinal paresis, but soon increased reflex excitability is noticed, later on twitching, and sometimes tetanus. The heart beats after the respiratory muscles cease to act, yet artificial respiration will not prolong life.

Given by the stomach 7½ grains is a fatal dose. It is, however, so slowly absorbed from the intestine that from 12 to 20 hours the animal may remain well. Then weakness of the hinder extremities comes on, and symptoms follow similar to those described as the effect of injection. Death occurs in 24 to 48 hours. The action is more rapid if filicic acid is given in oil. Fern extract produces the same effects as filicic acid.

After death the mucous membrane of the stomach and intestines is found turgid and hyperæmic—even after subcutaneous injection

there is slight fulness of the vessels, and swelling of the mucous membrane. In the urine a trace of albumen is sometimes found, and at times there is a constituent present which is capable of reducing copper.

Poulsson says that filicin does not give rise to symptoms of poisoning even in doses of 1 grm. to 1½ grm. Occasionally a little diarrhœa occurs, perhaps owing to a little filicic acid being formed. Its inertness is, perhaps, due to its insolubility. If given with alkalies it is converted into the active filicic acid.

Filicic acid is soluble in the intestinal contents, but with difficulty absorbed, hence it kills and drives out parasites without injuring the organism. Poulsson's experiments seem to show that it is the essential active principle, and it seems probable that we may be able to employ filicic acid instead of the extract, a manifest advantage, because it is not disagreeable whilst the extract is very nauseous.

ESTIMATION OF TANNIN IN HOPS.[1]

By E. Kokosinsk.

The method depends on the property of tannin of absorbing iodine in presence of alkaline carbonates.

The solution is prepared by boiling 10 grams of hops, the solution being diluted to 500 cc. If the hops have been sulphured, a few drops of hydrogen peroxide are added to the water before commencing to boil. The extract is filtered from the hops. The solutions required are: (1) normal solution of sodium carbonate; (2) normal sulphuric acid; (3) $\frac{1}{50}$ N. iodine; (4) $\frac{4}{50}$ N. solution of sodium thiosulphate 9·920 gram in 1 litre; (5) a solution of pure tannin prepared from galls which contains 0·05 gram tannin in 100 cc.; (6) a freshly prepared solution of starch.

Three flasks of about 100 cc. capacity are employed; into the first is put 10 cc. of water, into the second 10 cc. of the tannin solution, into the third 10 cc. of the hop extract. To each flask 4 cc. of the normal sodium carbonate solution is added, and immediately afterwards 20 cc. of the standard iodine solution. Flasks 2 and 3 are then tested for free iodine by placing a drop of the solution on a piece of starch paper, and if free iodine is not present, more of

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[1] *Chem. Centr.*, 1891, **1**, 377; *Jour. Chem. Society*, July, p. 870.

the standard iodine must be added to each flask. The iodine is allowed to react for five minutes, then to each flask 4 cc. of the normal sulphuric acid is added to neutralize the sodium carbonate, and 10 cc. of the sodium thiosulphate solution is added to reduce the excess of iodine present. A few drops of starch paste are now added to each flask, and the excess of thiosulphate determined with the iodine solution. The number of cc. of iodine required to titrate the thiosulphate in flask 1 represents the amount of iodine which has entered into combination with the sodium carbonate, the starch, and other errors which may be inherent to the titration; the amount of iodine used by flask 2 represents that absorbed by the solution of tannin = 0·005 gram plus the amount absorbed in the blank experiment; the iodine used by flask 3 represents that which was absorbed by the tannin of the hops *plus* the amount absorbed in the blank experiment. From these figures, the amount of tannin in the hops may be readily calculated.

COPPER IN PRESERVED VEGETABLES.

At the meeting of the Bavarian Society of Applied Chemistry, held last month in Augsburg, the subject of the presence of copper in preserved vegetables was the subject of a long discussion, which is epitomized in the *Chemiker Zeitung*, as follows:

The discussion was preceded by a paper from Herr Mayrhofer, of Mayence, in which the author stated as the result of his experience that in nearly all preserved vegetables copper is present, sometimes derived from the vessels used in their preparation, sometimes added directly in the form of sulphate. In the case of fruits boiled with sugar the juice contains on an average 4 to 9 milligrams of copper to the kilogram of juice, derived entirely from the copper vessels, which are found in practice to be better suited for boiling products of this kind than vessels of any other material. The green preserves met with in commerce vary in the amount of copper they contain between 26 and 36 milligrams per kilogram; in once case 76 milligrams per kilogram was found. In these green preserves the copper is partly derived from copper vessels and partly added as sulphate. Preserves of this kind show after heating and sterilizing a green color, comparable to that of the fresh vegetable, whilst without the copper they take a brownish or yellowish color that

makes them unmarketable. The author expressed the opinion that preserves of this kind containing copper can be eaten without injury to health. He stated that he had found by experiment 20 to 24 milligrams of copper sufficient to give the desired green color to a kilogram of preserves. He therefore recommended that this quantity of copper should be considered allowable and unobjectionable for the coloring of preserves.

Med. R. Karsch (Speyer) stated that what was done in Germany was based upon the practical experience of France, and he thought the same limits might be set up there as in that country.

Herr Barth (Rufach) mentioned a case in Brunswick in which a preserve manufacturer had been acquitted on the basis of a medical opinion. The question involved in the use of copper salts was not one of dressing up decayed food material, but of imparting a color. In the case of some preserves, peas for instance, a vegetable pigment can be used in the place of a copper salt, but in others, such as beans, it could not.

Herr Barth communicated some experiments made with wine, containing copper which had been derived from the compounds used as dressing against *Peronospora*. Cows were given up to 8 grams of sulphate of copper daily without any injurious effects being observed.

Med. R. Merkel (Nuremberg) uttered a warning against the results of such experiments on animals being applied to men. It was, however, a fact that the cases of chronic copper poisoning recorded in forensic literature could not support strong criticism; but, on the other hand, it could not be said that there was no danger. Chronic copper poisoning occurring among workers in copper and bronze had not yet come to his knowledge. In his opinion the meeting was not yet in a position to come to a decision upon the question.

Herr Kayser (Nuremberg) also argued against going to the extreme on the one hand of holding that the presence of a copper compound such as verdigris in an alimentary substance was injurious to health in the highest degree, or on the other that the presence of a certain amount of copper in a food was of no consequence.

Med. R. Egger (Landshut) called attention to the fact that up to that time no one had said where the danger of copper in preserved vegetables begins.

The author replied that the copper compounds formed in the pre-

serves made with or without sugar are insoluble, and therefore not of importance.

Herr Kayser pointed out that in the consumption of preserves containing copper it was not water or a concentrated sugar solution that came into question, but the digestive juice, in which the author's experiments had not proved the copper compounds to be insoluble.

The author said that no copper passed from preserved vegetables into dilute acids.

Herr Hilger (Erlangen) recalled that all albuminoid substances form insoluble compounds with copper, and that said copper must be considered a normal constituent of the human body, a remark in which he was supported by Professor Medicus, of Wurzburg.

Director Kochler (Berlin) advised that in the fixing of a maximum limit of that kind regard should be had to the maximum dose in the Pharmacopœia. It was one thing for a poisonous substance to be present in an alimentary substance, and another for it to be introduced by a physician into a human body as a remedy against a disease already there. In the latter case the remedy was often itself injurious, but to a less extent than the disease upon which it acted, and it was always the care of the scientific physician to weigh these conditions.

Director Kochler said that during a visit to the Strassburg exhibition his attention had been attracted to the remarkably beautiful green color of some preserved beans, and upon inquiring as to how this color had been imparted he was told that it was a trade secret. Subsequently he had learned that during the boiling of these vegetables in a copper vessel an electric current was passed through the whole, the copper of the vessel acting as an anode. It was evident that in this way a large quantity of copper would be carried into solution.

At the close of the discussion, a resolution was passed to the effect that the meeting was not then in a position to come to a definite conclusion, but that it would await the results of further experiments with a view of forming a judgment at the next annual meeting.—Phar. Jour. and Tran., Aug. 8, p. 107.

Menthol wash for pruritus is made by Dr. J. J. Berry (*Med. Mirror*) by dissolving menthol ʒi in alcohol ℥i, and adding water 2 oz. and diluted acetic acid 5 oz. Apply with a sponge.

THE ANALYSIS OF BEESWAX.[1]

By C. Mangold.

On account of the natural fluctuations of the so-called constants of yellow beeswax, such as the acid and saponification numbers, as well as the iodine number determined by the Hübl process, adulteration with less than 6 per cent. of paraffin or ceresin is difficult to detect.

A. and P. Buisine, applying (*Bull. Soc. Chem.*, 1890, 3, 567) the principle previously enunciated by Hell, Stürcke and Schwalb, have devised a method of sufficient apparent value to warrant its investigation at the hands of the author.

The wax is saponified with potash and heated with potash lime, by which treatment the higher alcohols are converted into fatty acids with elimination of hydrogen, which serves as a measure of their amount. The hydrocarbons present are unattacked and can be extracted from the residue.

The author's investigations confirm those of A. and P. Buisine, and have led him to recommend the following method: 2–10 grammes of the wax are melted and saponified by potash-lime, the reaction being aided by stirring. The saponified product is powdered when cold, intimately mixed with three times its weight of potash-lime, and the mixture transferred to a thick-walled, pear-shaped bulb-tube, which is heated to 250° C. (for two hours, according to Buisine, *c.f.*, the time adopted by the author below) in a mercury bath contained in an iron vessel. This vessel is provided with a lid which screws on air-tight, pierced with four apertures through which pass air-tight, respectively, the pear-shaped bulb, a thermometer, a thermostat, and a long tube open at both ends to condense any mercury which may volatilize. A tube connects the pear-shaped bulb with a Hofmann's burette, in which the hydrogen is measured.

Although the author has made some determinations of its amount (obtaining results somewhat lower than those of Buisine), his attention has been chiefly directed to the estimation of the hydrocarbons present. Having observed, however, that the volume of hydrogen only becomes constant when the heating has been continued for three hours, he adopts this time as the

[1] *Chem. Zeit.*, 1891, **15**, 799; *The Analyst*, August, 1891.

minimum necessary for the determination of the hydrocarbons. After the completion of the reaction, the residue in the bulb-tube and the bulb-tube itself are powdered and extracted for some hours with petroleum ether in a Soxhlet's tube, the ether distilled off, and the residual hydrocarbon dried at 110° C. and weighed.

Schwalb has already noted (*Annalen*, 1886, 235, 149) that pure beeswax itself contains about 6 per cent. of hydrocarbons; while A. and P. Buisine have found as much as 12·5–14 per cent., a result confirmed by the author. In endorsing this statement, he arrived at the conclusion that as little as 2 per cent. of foreign hydrocarbons may be detected. The best approximation to the true proportion of paraffin is said to be obtained by assuming the quantity of hydrocarbons normally present in beeswax to be 13·5 per cent.

The following table gives some figures for unbleached beeswax of diverse origins:

Source of sample.	Hydrocarbons.	Acid number.	True saponification number (after deduction of acid number).
Aussee,	13·51	19·79	72·51
Native,	13·75	20·44	70·65
"	14·72	20·42	67·84
Dalmatia,	14·51	18·81	71·99
Hungary,	14·60	23·04	66·55
Bosnia (Banjaluka),	14·27	19·31	—
Slavonia,	13·76	20·95	70·23
Carniola,	13·64	20·08	69·62
Bosnia (Dolna-Tulza),	13·32	20·02	70·37
Lower Styria,	14·34	18·26	72·50
Lower Austria,	13·72	20·58	67·83
Mozambique,	13·37	19·42	71·78
Chili,	13·35	19·99	70·01
Monte Cristo,	13·50	20·24	67·45
Morocco,	11·02	21·66	77·02
Bombay,	14·04	—	—
Madagascar,	11·77	20·03	72·85
Saffi,	12·20	19·92	73·48
Oran,	11·55	19·91	79·99
Massanah,	12·80	21·11	69·49
Mogador,	11·40	20·85	75·55

A sample of yellow beeswax from Transylvania had an acid number of 16·66, and a total acid number of 72·68; that is to say, a true saponification number of 56·02, plainly indicating that it was adulterated with paraffin or some similar hydrocarbon. The total

percentage of hydrocarbons was 28·12, corresponding to an addition of 17 per cent. of paraffin calculated on the original wax. The percentage of hydrocarbons and the total acid number of the mixture being known, the total acid number of the original wax could be calculated, and was found in this case to be 87·6. A mixture made by adding 8 per cent. of paraffin to a genuine sample of beeswax gave figures on analysis corresponding to an addition of 7·4 per cent.

A few figures for bleached beeswax are also given:

Source of sample.	Hydrocarbons.	Acid number.	True saponification number (after deduction of acid number).
Smyrna, ...	10·93	20·87	68·33
Egypt, ...	11·35	20·04	69·94
Transylvania, ...	13·61	24·68	—
Hungary, ...	15·48	23·05	*79·49

* 74·49 in original.

According to A. and P. Buisine, bleached wax gives a lower result for hydrocarbons than yellow wax; the last two samples are apparently impure, and have been bleached by chemical means.

INFLUENCE OF MENTHOL ON THE GASTRIC FUNCTIONS.[1]

By Nikolai A. Vladimirsky.

Following Professor I. T. Tchüdnovsky's suggestion, Dr. Vladimirsky has carried out a set of experiments on seven healthy subjects (six men, including himself, and one woman), aged from 24 to 32, the drug being administered with food, in the dose of 0·3, 1·0 and 2·0 grammes. The author has arrived at the following conclusions:

(1) The drug (in any of the doses stated) very markedly diminishes the proportion of free hydrochloric acid in the gastric juice, the decrease attaining its maximum in about 1 or 1½ hours after the ingestion.

[1] *St. Petersburg Inaugural Dissertation*, 1891, No. 77, pp. 44; Medical Chronicle, August, p. 367.

(2) In persons presenting a more or less weakened motor power of the stomach, the decrease lasts longer than in those with a normal one.

(3) The digestive power of the gastric juice is diminished.

(4) The transformation of proteids into peptones is retarded (hence an increased proportion of propeptones, *i. e.*, intermediary products of peptonisation).

(5) The proportion of lactic acid in the gastric juice is augmented, the rise proceeding parallelly with diminution in the proportion of free hydrochloric acid.

(6) The motor power of the stomach grows weaker (in about one hour after the ingestion); in initial stages of the digestion, however, it may occasionally undergo some increase.

(7) The absorptive power of the organ improves, which seems to be dependent upon a favorable (stimulating) influence of menthol on the circulation.

(8) Contrary to the statements of Ossendowski (*vide* the *Journal of Laryngology and Rhynology*, May, 1890, p. 202), L. Braddon, M. Reichert, S. Rosenberg, Hugo Koster, and many other observers, menthol does not appear to possess any special "appetite-making" power.

(9) In 1 and 2 gramme doses, the remedy gives rise to a kind of intoxication, followed, in 4 or 5 hours, by sensations of languor and drowsiness.

(10) Menthol may prove useful as a substitute for camphor.

OPIUM SMOKING BY THE CHINESE IN PHILADELPHIA.[1]

By Stewart Culin.

One of the effects of the McKinley bill has been an advance in the price of opium at most of the Chinese shops in Philadelphia and other cities where it is sold to opium smokers. The purchasers now receive only 11 *fan* (about 54 grains) of the best kind for 25 cents, instead of 12 *fan* (about 70 grains) as formerly. The Chinese are responsible for the introduction of this habit, one of the few customs or innovations they have introduced, and it now has a strong hold among a class of our people who are best defined by the word "fast," and who often take considerable pride in the

[1] From the *Public Ledger*, August 19, 1891.

practice of this form of dissipation. Many of them are learned in the art of smoking, the selection of pipes and all the details which are so carefully dwelt upon by the Chinese, and practically all of them are able to smoke the drug without assistance, as the enforcement of the law against the semi-public resorts have driven opium smokers to smoke in their own apartments.

The opium used for smoking is especially prepared for the purpose, the crude opium being macerated with water, which is evaporated, and the operation repeated until at the completion of the process a treacle-like mass is obtained. This is put up in white porcelain pots holding five *léung*, $6\frac{5}{9}\frac{8}{1}$ ounces avoirdupois, for use in China, and in brass cans containing the same amount for export. Most of the opium used for smoking in Philadelphia, and, indeed, throughout the United States, is imported from China in these cans. Such opium is distinguished from opium not manufactured or prepared in China, by the name of *kung in*, "superior opium," and is all said to be made by two firms in Hong Kong. These companies, syndicates of Chinese and English, have a monopoly of the manufacture, for which they pay an enormous sum annually to the British Government. Their product is sold to Chinese in this country through American agents in San Francisco. Two brands, known by the respective names of the companies, Lai Un and Fuk Lung, are sold here at, one at about $9 and the other at about $8.85 per can. The duty under the new law is $12, instead of $10, per pound, and the price has been advanced $1 per box by the change.

Opium is also prepared at Victoria, B. C. It is regarded as weaker and inferior to the opium manufactured in China, a difference which the Chinese explain as due to the water used in its preparation. More or less of it is imported here, where it is known to the Chinese as *Wik-to-li in* or "Victoria opium." It is sold here at about $6.80 per can, holding five *léung*. The lowest price of smoking opium in Victoria is $85 per 100 taels, equivalent to 20 cans, and as the duty is $5 per can, its lowest possible cost, duty paid, is $9.25 per can. It is fair to assume that the "Victoria" opium, as quoted in Philadelphia shops, is either a mixture made in California or has been smuggled. It is said that the highest price that can be obtained at wholesale for smuggled Victoria opium is $6 per can.

Smoking opium is not prepared from the crude drug to any

extent in the United States. A tax of $10 per pound is levied under our internal revenue laws upon opium for smoking manufactured in this country. No one who is not a citizen of the United States is permitted to engage in its manufacture, and bonds must be given in the usual manner.

Opium Refuse Mass.—The scrapings from the opium pipes, which are always carefully preserved, are reboiled here by the Chinese, however, with an admixture of fresh opium, and sold under the name of *i in*, or number two opium.

This is also known as *in shi ko*, or "opium refuse mass," and is put up in regular cans, which are sold at from $2 to $5 per can. That made in California, which is called "California opium," commands the highest price. It is much weaker than No. 1 opium, and more of it has to be smoked to produce the same effect. According to Dr. H. H. Kane, it produces serious physical ills that do not obtain after the use of No. 1 opium.

The Pipes.—The Chinese shops sell everything required by smokers. The bamboo pipe-stems cost from $1 to $1.25 and upwards, according to their thickness; the pewter socket to which the bowl and stem are united, 25 cents, and the bowls, about 50 cents apiece. Bowls that have been used and well saturated with opium are highly prized by their owners, and, with the bamboo stems that have been long in use, command very high prices. Old pipes are frequently seen offered for sale in the shops at $10 and upwards. The bowls usually display great beauty of workmanship. They are uniformly of graceful proportions, and are often decorated with incised Chinese characters. One of their most ingenious forms is that of a crab of iron gray material resembling slag, that has movable projecting eyes. Plain bowls are ordinarily used. Stands for pipe bowls, of which it is customary for smokers to have several, are made of dark colored wood, with panels of artificially colored marble inserted. They cost about 75 cents. Opium lamps of glass, said to be made in Birmingham, are imported from China and cost 75 cents to $1. Brass lamps for travellers cost $1.50. Small cylindrical boxes of buffalo horn, for carrying opium in the pocket, cost from 25 cents to $1, and are often beautifully decorated with inscriptions in gold and silver. Needles, on which the opium is cooked in the lamp flame, scissors for the lamp wick, and cleaners and scrapers for the pipe constitute, with the above, the usual outfit.

A very complete collection of these appliances may be seen in the Chinese collection in the Museum of Archæology of the University of Pennsylvania. It is customary in China for wealthy people to have much more expensive apparatus than is ordinarily used here.

Opium Boxes.—Opium is not sold directly from the can by the retail merchants, but always from a large pottery vessel. Many of the purchasers are provided with a small horn box. For the convenience of others the shop-keeper usually has a supply of the lichee nut, or of our ordinary playing cards, ingeniously cut and folded into a small shallow box, which he balances upon the pan of his hand balance. Opium is invariably weighed in this manner upon what are familiarly known as money scales, and the customer watches the operation, solicitous of obtaining good weight. It is always sold in sums of 25 cents' worth and its multiple. The profit upon it is considerable, amounting to $2.25 per can on No. 1 opium and much more when a mixture of several kinds is sold. The latter is customary. The shop-keepers say they have to suit the tastes of their customers, and that it is necessary to reduce the strength of the best opium. It is the custom for keepers of opium joints to purchase two boxes of No. 1 opium, two boxes of "Victoria" and two boxes of opium refuse. Mixtures of these various proportions are furnished by the shops, some of which sell as much as 14 *fan* (81 grains) for 25 cents.

The use of opium for smoking in Philadelphia gives employment to a man who mends pipes. His kit includes among several ordinary tools a bow drill like those used in China, of his own manufacture. The use of opium among the Chinese is also one of the reasons for the practice enjoyed by the Chinese physicians, and for the sale of expensive medicines in the Chinese shops. The Chinese claim that they experience little harm from opium, much less indeed than their American customers. Be this as it may, their stomachs and intestines as a rule are in a constant catarrhal state from the effects of smoking. Their tongues are always coated, and their usual condition is well illustrated by the way in which many of them commence their morning ablution. They pour a little water in a hand basin and lave their tongue with their hand. Then they apply a tongue-scraper, and afterwards they rub their tongue with a wet rag.

Smokers.—Smokers are divided by the Chinese into two classes, those who have "the habit" and those who have not. Those of the first class may occasionally be seen here in a condition in which they babble in their talk and appear prematurely old. The writer has not been able to trace the moral deterioration that invariably results from the excessive use of opium in other forms among the Chinese opium smokers, although it probably exists.

From an economic view the habit is a most extravagant one. Much time is taken up in preparing and consuming the drug, and days are sometimes lost in recovering from its effects. The occasional Chinese smoker will consume on an average 25 cents worth per day, while a victim of "the habit" will require from $1 to $1.50 worth during the same period.

In its behalf the Chinese urge the value of the drug as a prophylactic against the effects of cold andexposure, and contend that it is far less injurious than alcohol. They say, too, that while the habit is general few smoke to excess.

It is the opinion of at least some of our own physicians, who have treated patients for the habit, that the constitutional effects of smoking opium are much less serious than those arising from taking the drug in other ways, and, as compared with the use of morphia internally, are in the ratio of the effects of ether when inhaled and when taken into the stomach. However this may be, there can be no question as to the undesirability of the extension of the vice in this country. If the importations of prepared opium through the Custom House are an indication, it would appear that there is a considerable decline in the use of the drug. In 1880 the total importations, which had been gradually increasing, amounted to 77,196 pounds. For May 31, 1890, according to information kindly furnished by Mr. S. G. Brock, Chief of Bureau of Statistics of the Treasury Department, the importations were 29,955 pounds, and for the corresponding months of the present year, 66,549 pounds. The illegal importations, concerning the amounts of which it is impossible to obtain information, render conclusions based upon these returns very uncertain.

The writer has said that the Chinese are responsible for the introduction of the custom into the United States, but they are not the only ones that are blameworthy. As already stated, the preparation of this drug is a monopoly with the English in Hong Kong, as the

production is with the same people in India. It all comes to us from British territory, after having paid double tribute to English purses. Forced upon the Chinese in China, the extension of its use to this country forms a natural, although, possibly, unforeseen part of the mercantile propaganda of the ruling power in the East.

AMMONIUM SELENITE AS A REAGENT FOR THE DETECTION OF THE ALKALOIDS.

Lafon called attention to (see Amer. Jour. Phar., 1886, p. 250) ammonium sulphoselenite as a reagent for morphine and codeine. He prepared it by dissolving 1 gm. ammonium selenite in 20 cc. concentrated sulphuric acid. The author has studied the reagent further in its reactions with other alkaloids, placing small portions of the alkaloids in his experiments upon watch glasses set upon white paper. The following is the table he has prepared :

Atropine. No coloration.

Aconitine. No immediate coloration ; after 20 minutes, a very slight rose-color.

Berberine. Greenish yellow, becoming successively very brown rose at the margins and violet in the middle ; half an hour afterwards entirely vinous red, which lasts for three hours.

Brucine. Reddish or rose color, becoming pale orange ; half an hour after, an amber color, and no deposit.

Caffeine. No distinct coloration. At end of three hours, the liquid was reddish, and there appeared a slight deposit.

Cinchonine. Nothing.

Cinchonidine. Nothing.

Cocaine. After half an hour, no decided coloration or precipitate. After three hours the same reaction as caffeine.

Curarine. Slight violet coloration : after some time reddish. No red deposit at the end of three hours.

Delphine. Slightly reddish coloration, passing into a violet red. No ppt. at the end of three hours.

Digitalin. No immediate color. Yellowish after half an hour. After three hours a reddish deposit.

Eserine. Lemon yellow color, turning to orange. Three hours afterwards the color was paler.

Morphine. Bright greenish blue ; half an hour after maroon yellow and no deposit. After three hours, the liquid maroon brown, no red deposit.

Narcotine. Bluish color, becoming violet and then reddish. After half an hour a fine reddish color and no ppt. After three hours a small red deposit.

Narceine. Yellow-green color, becoming brownish, and after half an hour reddish. Afterwards a red deposit, which is very distinct in two or three hours.

Papaverine. Bluish color; the liquid becoming bottle-green, dirty yellowish green, violet blue, then red. A small bluish deposit.

Pilocarpine. Nothing.

Solanine. Canary yellow, and then brownish. After half an hour, a rose colored ring, and after three hours the liquid becomes violet red.

Saponin. Yellowish, becoming slightly reddish. (Reaction not distinct.)

Senegin. Light, dirty yellow. After three hours, liquid reddish.

Veratrine. Indistinct yellowish color, sometimes with a green tone. After half an hour yellow. After three hours, deposit red and liquid yellowish. (Reaction indistinct.)

—A. J. Ferreira de Silva, Comptes Rendus, 112, 1266; Jour. Anal. and Applied Chem., Aug. 1891, p. 478.

THE CAUSE OF THE SLIGHT SOLUBILITY OF CHEMICALLY PURE ZINC IN ACIDS.[1]

By J. M. Weeren.

The slight solubility of pure zinc in dilute acids is usually explained by supposing that the solution of impure zinc is in reality due to the electric currents set up by the contact of the zinc with the impurities, and that as in pure zinc no such currents can occur, it remains undissolved. This theory does not, however, account for the solubility of the pure metal in nitric acid, or even in dilute sulphuric or hydrochloric acid at their boiling points, and the author has, therefore, again investigated the subject. As the result of his experiments he finds that the insolubility of the pure zinc is due simply to the formation of a condensed layer of hydrogen on the surface, which then prevents the further action of the acid. In the case of nitric acid, this layer is oxidized by the acid as it forms, and cannot protect the surface of the metal, whilst in the case of impure zinc, the hydrogen is evolved from the surface of the more electronegative impurities according to the usual law, thus leaving the surface of the zinc exposed to the action of the acid.

The experiments were made with chemically pure zinc and sulphuric acid, the latter being diluted with 20 parts of pure water. It was proved that even such simple means as brushing the surface of the zinc caused a considerable increase in the quantity dissolved. This became much more striking when the reaction was allowed to take place in a vacuum, the relation of the mean quantity dissolved

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[1] *Berichte*, **24**, 1785–1798; *Jour. Chem. Soc.*, Sept., p. 983.

under atmospheric pressure and in a vacuum being 1 : 6·6. The quantity of impure zinc dissolved under similar conditions was found to undergo very little change.

In the next series of experiments, the quantity of pure zinc dissolved by the acid at different temperatures was determined. The quantity dissolved in 30 minutes increased regularly from 2·1 milligrams at 0° to 9·3 milligrams at 98°, but as soon as 100° was reached and ebullition commenced the quantity rose to 122·1 milligrams. This is in full agreement with the author's theory, as the evolution of bubbles, which start for the most part from the zinc plate, would naturally affect the hydrogen film and expose fresh surfaces of the zinc to the action of the acid. If the temperature be raised above 100° by increasing the pressure, the quantity of zinc dissolved is not appreciably more than at 98° so long as ebullition does not take place. The quantity of impure zinc dissolved is not appreciably affected by the ebullition of the liquid.

The addition of chromic acid and of hydrogen peroxide to the acid also causes a great increase in the solubility of the pure zinc, the former causing an increase in the ratio 175 : 1, and the latter in the ratio 306 : 1, a result which is again strongly in favor of the author's theory. These oxidizing agents do indeed also increase the solubility of impure zinc, but to a much smaller extent, the ratio for chromic acid being 6·5 : 1, for hydrogen peroxide 3·5 : 1.

Similar results have been obtained with cadmium, cobalt, iron and aluminium. The latter, which is as a rule almost insoluble in dilute acids, dissolves readily in a vacuum, and also dissolves under similar conditions in neutral ferric chloride solution, the latter being reduced to ferrous chloride by the hydrogen evolved.

TWO NEW ALLOTROPIC STATES OF SULPHUR.

Two new allotropic conditions of sulphur have been prepared by Engel in the following way: two volumes of a solution of hydrochloric acid containing from 25 to 30 per cent. of acid, and at a temperature of 10°, are mixed with constant stirring with one volume of the same strength of a solution of hyposulphite of soda. Chloride of sodium is precipitated and hyposulphurous acid set free. The acid in this condition possesses a sufficient stability to permit of its being filtered without coloration. Little by little the filtered liquid becomes yellow and the intensity of the coloration increases, and at

the same time sulphurous acid is disengaged. When the yellow tint has become very pronounced and before the liquid has become cloudy from the precipitation of sulphur, the filtered solution is shaken with an equal volume of chloroform. The chloroform is separated in a separatory funnel and left for spontaneous crystallization. There are thus rapidly obtained some crystals of sulphur, which are absolutely different from octahedral sulphur. The sp. gr. of these crystals is 2·135. Their crystallographic nature has been studied by Friedel.[1]

These crystals belong to the rhombohedric type as manifested by the deportment with polarized light and crystalline measurements and are absolutely different from any other form of sulphur known.

At the moment of their preparation they are transparent and remain so for 3 or 4 hours. Then they commence to increase in volume and pass little by little into a state of insoluble amorphous sulphur. They melt below 100°. The coloration of these crystals is orange yellow and not lemon yellow as are those of octahedral sulphur and their analysis shows that they are composed entirely of sulphur.

A solution of hyposulphurous acid in HCl, prepared as directed above, when left gives a precipitate of sulphur which, on cooling, unites into yellow flakes. In this state, the sulphur is entirely soluble in water. Not only does it dissolve when water is added to the liquid which holds it in suspension, but when spread rapidly upon a filter, it preserves in *toto* its solubility in water. The solution in water is rapidly decomposed, giving the ordinary amorphous sulphur.

The explanation of the formation of these two allotropic forms of sulphur appears to be the following: hyposulphurous acid in the conditions before mentioned undergoes a progressive decomposition into sulphurous acid and sulphur. This sulphur is now in the atomic state or at least in the state but little removed therefrom. Little by little the sulphur, after separation, is condensed to the molecular form. This condensation takes place in two different manners according as the sulphur has been dissolved or not, from the liquor in which it is generated, by chloroform. In the first case the sulphur passes at

[1] *Comptes Rendus*, Vol. 112, No. 16, p. 834.

once into the crystalline form. In the second case it is transformed into amorphous sulphur soluble in water before it attains its maximum condensation.—*Comptes Rendus, Vol. 112, No. 16, p. 860. Jour. Anal. and Applied Chem., Aug., 1891, p. 475.*

TWENTY-EIGHTH ANNUAL MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE.

The proceedings commenced in Cardiff, Wales, on Monday evening, August 17, with a reception by the President, Mr. WILLIAM MARTINDALE, and other officers of the Conference, held in the Assembly Rooms in the Town Hall, and was followed by a Conversazione, varied by an exhibition of objects of scientific interest and an excellent chamber concert.

On Tuesday morning, at ten o'clock, the members of the Conference met in the Lecture Theatre of the University College of South Wales and Monmouthshire, when the Marquess of BUTE, as Mayor of Cardiff and President of the College, gave them a hearty welcome. After a suitable acknowledgment by the PRESIDENT, the Senior Honorary General Secretary read a list of Delegates accredited from various associations, and several letters of apology from absent members of the Conference.

The regular business commenced with the reading of the Financial Statement by the Treasurer, Mr. R. H. DAVIES. It contained the usual items, and resembled some of its more recent predecessors in showing that the expenditure had again exceeded the receipts by a few pounds. The principal sources of income had been the members' subscriptions, amounting to £476 12*s.* 3*d.* (representing 1,271 annual payments), or about £50 less than in the previous year, and £135 7*s.* 6*d.* on account of "Year Book" advertisements and sales. On the other side the principal outlay had been in connection with the production of the "Year Book," amounting to £515 0*s.* 4*d.*

The Report of the Executive Committee, which was then read by the Senior Honorary General Secretary, was not very startling or even cheerful in its character. It commenced with a statement as to the work of the Unofficial Formulary Committee which was also subsequently made the subject of a special report, and then briefly referred to the resignation of the late Assistant Secretary and the appointment of a successor, the presentation of an Address to the Pharmaceutical Society on the occasion of its Jubilee celebration, and the revision of the "blue list." Mention was then made in suitable terms of the irreparable loss sustained by the Conference in the death of its former President, Mr. H. B. BRADY. The only other important paragraph was one containing an expression of regret that the special efforts made since the last meeting to increase the membership of the Conference have failed to realize the anticipated success. On the motion of Mr. MUNDAY, seconded by Emeritus Professor REDWOOD, the report was unanimously adopted.

The PRESIDENT then rose to deliver his address. Commencing with a brief reference to the fact that the present was the second visit of the Conference to Wales, and some complimentary remarks as to his predecessors in the chair, the speaker proceeded to discuss first the relations of the pharmacist to the

public. Tracing an analogy in the recognized position of the press in politics as the fourth estate of the realm to that of pharmacy as the fourth estate of medicine, he expressed a fear that this latter position was not always accorded, and that there was now almost a risk of the pharmacist having to give precedence to the nurse. This was partly accounted for by the fact that the pharmacist does not come into such close contact with the patient during the time of suffering, his meed of gratitude being often the thankless one of having supplied nasty physic. In his relations, however, with the medical profession the pharmacist met with more appreciation, as evidenced by the "acknowledged position" accorded to him by the Medical Council in the compilation of the recently published Additions to the Pharmacopœia. The speaker then proceeded to refer to some of the advances that have been made in recent years in the treatment of disease by medicines, and referred to some of the services that had been and might be performed by the pharmacist. The tendency of pharmacy of late, it was pointed out, had been to prepare medicines in as definite and stable a form as possible, and to provide chemical substances of which the purity could be tested. Modern chemistry had in many cases isolated from valued drugs definite active principles, which, having to some extent the same properties as the crude drugs, had been so far accepted medically as possessing the same therapeutic action; but still in this direction much was left undone. In many investigations the therapeutist and the pharmacist came between the physiologist on the one hand and the chemist and botanist on the other. The advances in chemical science and the experimental investigation of recent physiologists and therapeutists had tended to prove that the physiological action on the system of the simpler chemical compounds is, in many cases, a chemical and physical action of the elements of which they are composed, "modified to some extent by what is called life." In the more complex organic substances also there was a marked connection between physiological action and chemical constitution. The physiological action of a certain compound having been ascertained, chemists had endeavored by introducing several certain elements or groups of elements of known properties to modify the action of the original compound in the direction desired by the physiologist or therapeutist. Generally the chemist had been in advance of the physiologist, but the physiologist had at times, by a process of induction, indicated the direction in which he desired the chemist to work. But progress was still hampered by the want of clearer knowledge as to the constitution of many of these complex bodies and their derivatives. These points were illustrated by references to the researches on the relative constitution of morphine and codeine, and of caffeine, theobromine and xanthine; the work of STAHLSCHMIDT, BROWN and FRASER, and TAFEL on the methyl and ethyl derivatives of strychnine; and the gradual building up of kairine, kairoline, thallin, antipyrin and other compounds. But it was pointed out that the prognostications as to the effect of the new compounds on disease are not always fulfilled, as in the case of tetronal. The PRESIDENT then passed on to other forms of the treatment of disease which have recently attracted attention, speaking especially of the medical use of various lymphs, the preparation of which might one day, he thought, form part of the occupation of the pharmacist. But all these novelties notwithstanding it was thought probable that physicians would long continue to order the pure active principles, or extracts or solutions of natural drugs, and in the preparation of these the pharmacist

would be in his element. From this point of view, the work that had been done in respect to standardization was important, and the communications of Messrs. FARR and WRIGHT showed the necessity for further uniformity. Still this might be overdone, for how could the medicinal action of rhubarb, cascara, or senna, or the appetizing effect of compound infusion of gentian be standardized? Reference was then made to the present imperfect provision for teaching pharmacy to the medical student, and the opinion was expressed that a course of six months' practice under the eye of a pharmacist would be of great service to the embryo medical practitioner before commencing his hospital career. It was pointed out that if the coming race of medical practitioners receive no practical training in pharmacy, they will have no confidence in prescribing, because they will never have known their medicines, and that they will consequently become a prey to the advertising manufacturers of ready-made mixtures and specialties, instead of making use of official preparations. It was recognized, however, that the making of preparations in a wholesale manner might in some cases be for the public weal, though to the detriment of the pharmacist's interests. Some remarks upon the position of the chemist and druggist in respect to the sale of nostrums, and the onus that lies upon him to supply the identical article asked for if he supplies any, led up to a discussion of the question of the introduction of synonyms into the Pharmacopœia. Upon this the opinion was expressed that, notwithstanding Dr. ATTFIELD'S reasoning in his recent report, if the British Pharmacopœia is to be made the commercial as well as the medical standard for the articles it contains, and the proposed synonyms are tacked on to the official preparations, pharmacists will often be placed in greater doubt and difficulty, or even danger, than they are at present. If the official list of synonyms were to be extended it would require to be carefully watched, else pharmacists would be placed at great disadvantage as compared with the drysalter in supplying many substances used in the arts and manufactures in a more or less crude condition. After allusions to the work done in the Research Laboratory and the celebration of the Jubilee of the Pharmaceutical Society, a word or two was said as to the desirability of extending the scope of the preliminary examination, and the address concluded with a record of the loss the Conference had suffered since the previous meeting by the death of its former Treasurer and President, HENRY BOWMAN BRADY. At the conclusion of the Address a vote of thanks to the PRESIDENT, moved by Mr. G. F. SCHACHT and seconded by Emeritus Professor REDWOOD in an interesting autobiographical speech, was carried by acclamation.

Before proceeding to the reading of the papers the President, as Chairman of the Unofficial Formulary Committee, presented a report. This was very short, being practically limited to a statement that a new edition of the Formulary had been issued, in which the nine formulæ authorized in 1889 had been incorporated, together with six others; while seven formulæ had been deleted on account of their having been now accorded a place in the official additions to the British Pharmacopœia.

The reading of papers was then commenced. The first was a report upon *Ipecacuanha*, by Messrs. CRIPPS and WHITBY, which was the communication referred to in the report of the Executive Committee as the first instalment of an investigation in aid of which a grant was made from the Conference funds some time ago. The investigation had its origin in the need felt to exist for a

thorough chemical examination of ipecacuanha root, on account of the conflicting statements that have been made as to the quantity of emetine it contains and the comparative ignorance as to the other constituents of the drug. The paper contained the details of a general proximate analysis, for which purpose ipecacuanha root in No. 80 powder was exhausted successively with petroleum ether, absolute ether, 65 per cent. alcohol, cold distilled water, and 0·2 per cent. solution of sodic hydrate. From the general results it appeared that the total alkaloid obtained amounted to 2·42 per cent., which probably was not all emetine, though no confirmation was afforded to the alleged presence of a volatile base in the root. Saccharose was found to the extent of 2·12 per cent., dextrose 4·06 per cent., dextrin 2·08 per cent., and starch 44·44 per cent. Among the other constituents observed were a trace of volatile oil, tannin, free fatty acid, neutral fat, various resins, and a glucoside which gave a frothy solution in water, but was not saponin.

This was followed by a short note in which Mr. W. H. SYMONS described the preparation of an *ammoniated tincture of ipecacuanha*, which had remained clear although made five years ago. The formula was to moisten one ounce of ipecacuanha with one dram of 10 per cent. solution of ammonia and then slowly percolate to twenty ounces with 10 per cent. spirit.

Extractum Euonymi siccum was the subject of the next note by Mr. M. CONROY. In it the author criticised the statement made in the Additions to the B. P. that when this extract is prepared according to the official formula "the mass may be powdered and kept in a well-corked bottle." Mr. CONROY says that the preparation, when made on a large scale, is really so hygroscopic that the operation of powdering has to be performed in a warm dry room, whilst even then it is very difficult to obtain a satisfactory result, and the resulting powder soon coheres and forms a mass. By drying the extract without the sugar of milk and adding the sugar during the powdering, more satisfactory results were obtained. But another plan, which the author says proved in every way a success, was to add light calcined magnesia instead of sugar of milk to the soft extract. The operation of powdering was then performed under ordinary atmospheric conditions without any precaution, and the pulverized extract remained a perfectly mobile powder. The paper led to considerable discussion, some objection being raised to the introduction of so much of an insoluble substance like carbonate of magnesia, while Mr. NAYLOR said the hygroscopicity of the preparation is due to extractive which is not present in the preparation upon which euonymin gained its reputation.

The next paper read was a practical communication upon *Indian Gums for Pharmacy Work*, by Dr. RIDEAL and Mr. W. E. YOULE. The gums from India which find their way into the English market were divided for the purposes of this paper into two classes, those which are entirely soluble in water and exude from species of acacia, of which "amrad" is the most important, and those not entirely soluble in water and not derived from species of acacia, which are known under the generic name "ghatti gum." It is the latter class of gums that form the principal subject of the paper, the "amrad" gums being simply referred to as not of much importance from a pharmaceutical point of view, and as resembling in physical properties second-rate gum arabics. The authors, whilst differing from other observers as to the amount of ash yielded by ghatti gum, which they find to be about 26 per cent., or somewhat less than

the ash from genuine gum arabic, confirm previous statements that the mucilage formed from it is decidedly more viscid than that from ordinary gum arabic. The "absolute viscosity," as determined by a specially constructed apparatus, ranged from 10 per cent. solutions of gum arabic from ·0639 to ·1850; whilst 10 per cent. mucilages of "ghatti" ranged from ·2880 to ·3621 and 5 per cent. from ·1350 to ·1760. The authors are of opinion therefore that to produce from average ghatti gum a mucilage corresponding in viscosity to the B.P. mucilage of acacia it would be necessary to use not less than 8 parts of water to 1 part of gum. The reagents best suited for the detection of ghatti gum were stated to be ammonium oxalate, which produces in the mucilage only a slight turbidity as compared with the copious white precipitate thrown down from gum arabic; ferric chloride, which causes a slight darkening and a gelatinous precipitate; alcohol, which throws down only a slight precipitate; and mercuric chloride, which produces a white, stringy precipitate, whilst with gum arabic it gives no perceptible reaction. Ghatti mucilage is described by the authors as yellowish or light brown in color when properly made, and as being much more permanent and retaining its viscosity unimpaired for a longer time than mucilages of inferior gum arabics from Senegal and Barbary. As is known, commercial samples of ghatti gum are generally dirty and mixed with fragments of bark, the tannin from which, if it goes into solution, spoils the color of the mucilage and causes a further darkening in contact with iron salts. In order to avoid this objection it is recommended that the gum be powdered in porcelain or stone ware, the powder treated with half the quantity of cold water required for the finished mucilage, the whole well stirred until the swollen metarabin has separated from the soluble gum, then strained through muslin, and the swollen pieces of insoluble gum picked out and submitted to similar treatment with the remainder of the water. In this way a strong mucilage can be obtained before the cold water has had time to dissolve out the tannin from the *débris* to any appreciable extent. In the authors' opinion mucilage made in accordance with these directions is quite capable of replacing gum acacia for pharmaceutical work. In the discussion of the paper, however, this position was disputed by several speakers; at the same time it was admitted that for many technical purposes gum ghatti forms a useful substitute for gum acacia.

The Conference then adjourned for luncheon, and on resuming a paper was read on the *Estimation of Volatile Oil in Copaiba*, in which Mr. CRIPPS described an apparatus he had devised for the purpose. In this the copaiba is submitted to the action of a current of steam, which rapidly removes the volatile oil and leaves the resin in an unaltered condition. Incidentally it was mentioned that in eleven commercial samples of copaiba quantities of volatile oil varying from 40·95 to 59·6 per cent. had been found, and that turpentine appears to be now seldom employed to adulterate copaiba.

The occurrence in commerce in recent years of a *Liquid Persian Galbanum*, in the form of a reddish-brown liquid of the consistence of Venice turpentine, has led Mr. E. M. HOLMES to attempt to clear up the local and botanical origin of the different varieties of galbanum, and his conclusions were given in the paper next read. Galbanum is usually spoken of either as "Levant" or "Persian," the sorts termed "Persian" differing from the "Levant" in the possession of a turpentiny odor in addition to that of galbanum. Mr. HOLMES is of

the opinion that all the varieties of galbanum of commerce under either name come through Persia. As to the botanical origin, so far as evidence is at present obtainable, it appears probable that "Levant" galbanum is yielded by *Ferula galbaniflua* and its variety *β-Aucheri*, and the solid "Persian" galbanum possibly by *Ferula Schair*, Borszcz, but the liquid Persian galbanum by a species nearly allied to *F. galbaniflua*, judging from the fruits found in it. It would appear also that the "*Ferula galbaniflua*" found by Dr. AITCHINSON in Afghanistan is not identical with the *Ferula galbaniflua* of BOISSIER, and that neither it nor *Ferula rubicaulis* yield galbanum.

A Short Description of the Present and Future Water Supply of Cardiff was then read by Mr. THOMAS HUGHES, the borough analyst. The present sources of water supply to Cardiff are the Ely pumping station and the gathering grounds of Lisvane and Llanishen. The water from the Ely pumping station is obtained from headings or culverts driven into the magnesian limestone, and has a total hardness of from 28 to 30 parts. The water from the gathering grounds of Lisvane and Llanishen is also somewhat hard and not too free from organic pollution, which is likely to increase. The two sources yield about twenty gallons per head of the population of the district served, and in order to augment this quantity and provide for increasing numbers the Cardiff Corporation has commenced the necessary works for obtaining a large and pure supply from the Upper Taff Valley. The quality of the water from this gathering ground, which consists of mountain pasture land, is said to be excellent, being very soft and "favorably free from organic contamination," while the bleak and uncultivated character of the district, and its distance from any centres of population, are considered sufficient to guarantee safety from future pollution.

Next, Mr. A. W. GERRARD followed up his paper of last year on the *Alkaloidal Values of Henbane* grown in this country, by a report on the results of analyses of commercial samples from Germany and France. The German sample, which is described as having had "a rough look, somewhat musty and narcotic odor and dull green color," was composed largely of the entire annual plant, with about one-fourth of its weight of first year's biennial leaves, in some cases with the roots attached. The French variety had a fair appearance, was pale green, and had a mildly narcotic odor, and consisted entirely of the first year's biennial plant, mainly leaves, with here and there a root attached. Both samples appeared to have been collected at least two years, and they were therefore compared with English specimens of corresponding age. The yields of alkaloid were, from the German, 0·0295 per cent. ; from the French, 0·0398 per cent.; from the English first year's biennial leaves, 0.0390 per cent., and from second year's biennial tops, 0.0451 per cent. As the average yield from the fresh English leaves, as reported last year, was 0·0665 per cent., it would appear evident that changes detrimental to the quality of the drug must take place with the ageing of a sample.

The last paper read on Tuesday was on the *Constituents of Henbane Seed*, by Mr. F. RANSOM, in which the author contributed more definite information as to the amount of alkaloid these seeds contain, previous statements as to which vary from 0·05 to 0·16 per cent. Working by a process that he describes, on seeds from biennial plants of *Hyoscyamus niger* grown at Hitchin, he obtained a quantity of crystalline alkaloid corresponding to 0·058 per cent. in

the dried seed. This is rather less than the quantity of alkaloid obtained by Mr. GERRARD from biennial leaves, as reported by him to the Conference last year, and fails to sustain current impressions as to the relative richness of the seeds in alkaloid. For this reason, and on account of the large quantity of the fixed oil the seeds contain (18·8 per cent.), Mr. RANSOM does not think they can be advantageously used for galenical preparations.

At the conclusion of this sitting most of the members and a good number of ladies made their way to the Pier Head, where they embarked for a channel trip past Penarth Head to Barry Island. The weather was not propitious, rain falling heavily during the entire passage, but it cleared up on landing, and after a somewhat long and unpleasant walk, made longer than it need have been by some uncertainty as to the right destination, the company arrived at the Barry Dock Hotel, where tea had been provided. By the time this had been disposed of the boat had been brought into the dock, closer to the hotel, and the company having again embarked, the return passage was made to Cardiff, which was reached about nine o'clock.

On Wednesday morning the Conference reassembled soon after ten o'clock. In the first paper read, on *Glacial Phosphoric Acid*, Mr. JOHN HODGKIN recorded the results of the analysis of a series of English and foreign samples, which he was induced to undertake by the discovery that a sample of glacial phosphoric acid, represented as being of the quality usually imported into the American market, contained a large proportion of sodium. A sample prepared especially from syrupy phosphoric acid and ammonia, which was obtained in bright colorless lumps, deliquescent to a certain extent, showed upon analysis that it is impossible to drive off all the ammonia by heat, the amount left being equal to 8·05 per cent. of ammonium; it also contained a little silica. The total acid, taken as HPO_3, amounted to 91·52 per cent., of which 48 per cent. was free. A sample of English make, in bright, colorless, somewhat deliquescent lumps, contained both ammonia and soda, as well as arsenic, the total acid as HPO_3 amounting to 92·8 per cent., of which 52·8 was free. Four other samples, one in sticks, contained diminishing amounts of free acid, showing respectively 85·44 per cent. of HPO_3, with 46·08 free; 84·48 per cent., with 31·68 per cent. free; 83·84 per cent., with 36·48 free, and 80·10 per cent., with 42·21 per cent. free, the base in each case being practically sodium. A sample made by adding sodium phosphate to ammonium phosphate liquor and calcining retained nearly 5 per cent. of ammonium, whilst one made by calcining microcosmic salt proved to be pure sodium metaphosphate. Speaking of the four samples referred to above together, Mr. HODGKIN expressed the opinion that there is absolutely no reason for such large additions of sodium phosphate, except that it enables the manufacturer, in the absence of any official standard of purity, to undersell the honestly made article.

Mr. M. CONROY then read a note on a *Proposed Method of Standardizing the Extracts of Nux Vomica and Opium*, in which he attempted to deal with the inconveniences resulting from the consistence of these extracts when standardized according to the official formulæ. The modification proposed is to exhaust the drug as at present, then to evaporate to a pilular consistence, test the alkaloidal strength and make up to the correct standard by the addition of glucose. It was also pointed out that genuine Asia Minor opium, dried and powdered as directed, yields 13 to 15 per cent. of morphine by the official

test, and that as such opium yields about 50 per cent. of extractive, an extract of opium of 20 per cent. morphine strength is always too soft if fine opium has been used in its preparation. Mr. CONROY is of opinion the standard of the dry powdered drug should be at least 12½ per cent., the official preparation being correspondingly increased in strength. In the discussion that followed Mr. J. C. UMNEY said a nux vomica extract that was too thin could be stiffened by adding to it extractive obtained by treating the marc from the first operation with a more dilute spirit. Mr. J. BARCLAY said extract of opium could be similarly stiffened with an extractive obtained by treating opium with hot water, but it was pointed out that such an extractive might contain narcotine and other objectionable substances. The PRESIDENT was inclined to favor the use of sugar of milk rather than glucose if an extraneous agent were employed at all.

In the succeeding paper Mr. A. H. ALLEN offered a contribution to the solution of the difficult question of the *assay of aconite preparations.* Apparently the best method would depend upon the determination of the quantity of crystallizable alkaloid, but a difficulty arises in the uncertainty as to the extraction of all the crystallizable alkaloid in that condition. The method that commends itself to Mr. ALLEN depends upon the ready saponification of the aconite alkaloids. After extracting the alkaloid by FARR and WRIGHT'S process and converting it into hydrochloride it is saponified by boiling with sodium hydrate, the products being, in the case of aconitine, benzoic acid and aconine. The benzoic acid, dissolved out with ether, is titrated with $\frac{1}{50}$ normal baryta water in the presence of phenolphthalein, and the results are then calculated out on the assumption that each equivalent of benzoic acid represents an equivalent of crystalline aconitine. The correctness of this assumption was, however, afterwards questioned by Mr. J. C. UMNEY, who said that he could confirm the statements of WRIGHT and JURGENS, that *Aconitum Napellus* contains, besides crystalline aconitine, a gummy base that yields on saponification a proportion of benzoic acid, which would by this method be reckoned in terms of aconitine, although he had taken a grain of it without inconvenience.

The next paper, by Messrs. R. H. DAVIES and PEARMAN, apparently had its origin in an attempt to answer a question on the "blue list," as to whether the time has not arrived when it is possible to give a better definition of *Oleum eucalypti*, B. P. The authors recorded the results of a large number of experiments upon the chemical and physical properties of a series of essential oils from different species of *Eucalyptus.* A definite answer to the question has not, however, been arrived at; but if it be granted that eucalyptol is the most important constituent of eucalyptus oil, some indications as to the relative value of an oil may be given by its effect on polarized light, pure eucalyptol being practically inactive. An oil with a rotatory action equal to that exerted by ordinary "amygdalina" would therefore be relatively of low value. The "globulus" oil is known to contain a fair amount of eucalyptol, and to it may be added, according to the authors, the "oleosa" and "dumosa" oils.

The Conference then adjourned for luncheon, and on resuming Mr. JOHN MOSS read a communication upon *Cascara Bark and its Extracts*, which possibly may lead to a modification of the official formula for one of the preparations of this drug. The author has found that although boiling water does extract all the active constituent of the bark, the whole of these are not

retained when the decoction is concentrated, and the deposit is not redissolved upon the addition of rectified spirit as ordered in the official formula. He concludes, therefore, that an aqueous liquid extract does not represent the full activity of the bark. On the other hand, he states that proof spirit exhausts the bark completely, and throws down no deposit of therapeutic value, a proof spirit liquid extract being more powerful as a laxative and an aperient than one made by the official method. Further, from some observations made upon the therapeutic action of liquid and solid extracts of samples of cascara sagrada collected in the spring of 1888, 1889 and 1890, and in the summer of 1890, it appeared that bark collected in late summer is in no way inferior to that gathered in the spring, and that the older the bark the more benign is its action. The bark from South Oregon seems also to be preferable to that collected in North Oregon.

Mr. S. M. BURROUGHS then read a short note on a preparation of *castor oil and malt extract*, flavored with essential oil, in which the flavor of castor oil is hardly perceptible. It is made by rubbing up malt extract in a warm mortar until moderately liquefied and then triturating with it an equal volume of castor oil and flavoring according to taste. Mr. BURROUGHS was undecided as to whether the preparation is a solution or an emulsion, but on the addition of water it forms a milky emulsion.

The next paper read, on the *Opium used in Medicine*, by Mr. E. M. HOLMES, contained a suggestion that appears to be worthy the consideration of the Indian Government. It is well known that, apart from the efforts that are being made to persuade the Indian Government to discontinue the cultivation of opium for introduction into China, there is a probability that the Indian industry will soon be largely affected by the increased production of opium in China for home consumption. Mr. HOLMES points out that the opium used in Great Britain and her colonies for medicinal purposes is now almost exclusively obtained from Turkey. He thinks that an opium containing the requisite proportion of morphine could be produced in the hilly districts of India, and in view of the probable partial collapse of the trade in the drug with China, he suggests that attention should be paid in India to the production of a medicinal opium that should compete in appearance and strength with Turkey opium in the British and colonial markets.

In a report upon *Medicated Lozenges*, B. P., Mr. DAVIS gave the results of analyses of samples of the thirteen official lozenges obtained from six "leading manufacturers." In respect to weight it was found that the lozenges of the various makers differed from one another very materially, and, not only so, but that lozenges from the same makers, and even in the same parcels, varied to the extent of two grains. As to the quantity of active ingredient, when the average quantity in half a pound of lozenges was taken the result was satisfactory in some few cases and very unsatisfactory in others; but when individual lozenges were taken deficiency or excess of active ingredient became apparent. Tables were appended to the paper showing the weights of the lozenges and the quantities of the active ingredient found. Referring to the gum employed in making the lozenge, the author stated that three out of the six sets of samples contained no gum acacia, but either tragacanth, or tragacanth and dextrin. In two others a mixture of acacia and tragacanth had been employed, whilst in the sixth some of the acacia had been replaced by dextrin. Mr. DAVIS is not satis-

fied with this state of affairs, and he suggests that either the pharmacist should prepare his own lozenges so that each should have a definite weight; or that the Pharmacopœia should state the exact weight of each lozenge, instead of ordering a certain mass to be divided into a certain number of parts; or that the lozenges should be omitted from the Pharmacopœia altogether.

A short note by Mr. SHEPHEARD called attention to a possible danger that may attend the dispensing of prescriptions ordering *liquor strychninæ* together with an alkaline liquid. In the case mentioned Liq. Fowleri ʒiss was ordered with an equal quantity of Liquor Strychninæ, to be made up to ʒiv with distilled water. Fine acicular crystals were thrown down, which dissolved upon the addition of a few drops of hydrochloric acid and remained in solution. It was suggested that in such a case the prescriber should order Liquor Strychninæ Hydrochloratis.

The last paper read was the fifth in a series of communications by Messrs. FARR and WRIGHT on the *Solvent Action of Alcohol of Different Degrees of Strength on Drugs* used in making Pharmacopœial Tinctures. The subject of this paper was tincture of henbane, and from the authors' results it appeared that perfect exhaustion of the alkaloid from the drug may be effected by the use of either strong or dilute alcohol. The authors seem to favor the use of a 50 per cent. menstruum on the ground that it is desirable to exclude chlorophyll from a tincture where this can be done without lessening the medical activity. They recommend that the tincture should be standardized to contain 0·01 per cent. of alkaloid.

The PRESIDENT then proceeded to make the presentation of books provided from the BELL and HILLS Fund. This is usually made to the library of an association of chemists and druggists meeting in the town visited by the Conference. In Cardiff, however, there is at present no such local association, but an arrangement has been made to place the books in the reference department of the free library of the town, where they will be always accessible to any person who wishes to consult them.

The Unofficial Formulary Committee having been thanked and reappointed, an invitation conveyed by Mr. PETER BOA and Mr. D. B. DOTT in cordial terms to the Conference to meet in Edinburgh next year was accepted. Mr. PAYNE broached the question as to the advisability of meeting in the same town as the British Association, and after some conversation gave notice of a motion that will raise the question formally at the next meeting of the Conference.

The following gentlemen were then elected officers of the Conference for the ensuing year, after a protest from Mr. PAYNE that Ireland was not represented on the Executive, and an inquiry, by Mr. A. H. Mason, answered in the negative, as to whether Mr. MARTINDALE could not be persuaded to serve a second year:

President—E. C. C. Stanford, F.I.C., F.C.S., Dalmuir.

Vice-Presidents—M. Carteighe, London; W. Gilmour, Edinburgh; Dr. Thresh, Chelmsford; and J. R. Young, Edinburgh.

Treasurer—R. H. Davies, London.

Hon. General Secretaries—W. A. H. Naylor, London; and F. Ransom, Hitchin.

Members of Committee—D. B. Dott, Edinburgh; A. W. Gerrard, London; Professor Green, London; Alfred Coleman, Cardiff; J. Hodgkin, London;

E. M. Holmes, London; W. Kirkby, Manchester; J. Munday, Cardiff; and J. L. Ewing, Edinburgh.

Auditors—D. Anthony, Cardiff, and Thomas Thompson, Edinburgh.

Hon. Local Secretaries—Peter Boa and Claude F. Henry, Edinburgh.

Hearty thanks were then voted to the local members, and especially to Messrs. COLEMAN, MUNDAY, YORATH and ANTHONY, for making the arrangements necessary for the entertainment of the Conference; to the Mayor and Corporation of Cardiff for the use of the Town Hall Assembly Rooms for the reception, and to Principal V. JONES and the Council of the University College of South Wales for the use of the lecture theatre in which the meetings of the Conference were held. Lastly came the vote of thanks to the PRESIDENT, moved in happy terms by Mr. S. R. ATKINS and seconded by Mr. TYRER and adopted with an enthusiasm that must have convinced Mr. MARTINDALE of the general appreciation of the admirable manner he had fulfilled the duties of the chair.

After the conclusion of the business, a party, numbering about one hundred and fifty, were conveyed in brakes to Caerphilly Castle, where they were entertained to tea in the ancient banqueting hall by the Mayor of Cardiff, after which a lucid sketch of the history of the castle was given by Mr. ROBERT DRANE. The drive was through a beautiful district, but the enjoyment was again marred to some extent by the fall of several very heavy showers.

Thursday morning was fairly fine, and about one hundred and fifty of the members of the Conference and their friends met at the Great Western Station for the final excursion. The first stage was by the South Wales Railway *via* Newport and Chepstow to Lydney. Here vehicles were waiting, in which the party was driven through a beautiful country to the Speech House, in the Forest of Dean. An excellent luncheon having been disposed of, the opportunity was taken to thank the local committee of ladies and the managers of the excursion, and after a short interval the carriages were entered and a start was made for Symon's Yat. By this time, however, rain had again set in, and continued almost without cessation to the end of the day. It did not, however, spoil all the pleasure, and the wonderful view of the winding Wye from the top of the Yat, although obscured to some extent, won the admiration of all who saw it for the first time. Tea was served in the Rock Lea House, and that over, a special train conveyed the party past Monmouth, Tintern and Chepstow, back to Cardiff, which was reached soon after half-past eight.—*Phar. Iour. and Trans., August 22.*

EDITORIALS.

Female Pharmacists in Russia.—The State Council of Russia has decided to admit females to the study of pharmacy at all Russian universities; they must be not less than 16, or more than 40 years of age, and after three years' study may present themselves for the final examinations, the same as the male candidates.

So-called Eucalyptus Honey.—The history of the alleged discovery, in Tasmania, of honey charged with eucalyptol, was printed in this Journal for September, 1887, p. 472; and in the May number, 1889, p. 264, the fraudulent character of this product was exposed in an article taken from the Australian

Journal of Pharmacy. The Pharmaceutical Journal and Transactions of December 6, 1890, contains a paper by T. P. Anderson Stuart, M.D., Professor in the University of Sydney, in which it is shown that no such honey is known in any part of Australia or Tasmania; that the stingless black bee of Australia, Trigona carbonaria, *Smith*, builds its nest in a hollow tree, the hive rarely exceeding one foot cube; that the flowers of the eucalypts have not the odor of eucalyptus oil, which is procured from the leaves; and that the honey, even if taken from hives located in eucalyptus trees, never contains any appreciable amount of eucalyptol. During the discussion before the Pharmaceutical Society in London, following the reading of Dr. Stuart's paper, different samples of honey were exhibited, which were stated to have been gathered in eucalyptus districts, and of which none had the odor of eucalyptus oil; such true eucalyptus honey could not have the properties of eucalyptol, and whether its properties differed from those of good European honey had not been determined. More recently, the curator of the Technological Museum at Sydney, J. H. Maiden, has published a card (*The Chemist and Druggist*, July 11, page 60), declaring it as his intent, not to let the matter rest unsettled, and making the following offer: "Eucalyptus honey is said to contain 15 to 17 per cent. of eucalyptol. I will pay £5 to the Benevolent Fund of the Pharmaceutical Society if a sample of Australian natural eucalyptus honey can be produced containing only 5 per cent. even of eucalyptol. The only conditions I impose are that I receive herbarium specimens of the eucalyptus concerned, and be given the precise locality; and I will undertake that I (or a deputy) will visit the spot and examine the evidence in any part of Australia. . . . If I am proved to be wrong, I will acknowledge it like a man. . . . At present I pronounce this eucalyptus-honey romance to be one of the most impudent impositions on the credulity of medical men and pharmacists that I have heard of in connection with Australian products."

As far as we have been able to ascertain, the eucalyptus honey referred to is but little known in the United States.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Chemistry of the Carbon Compounds, or Organic Chemistry. By Prof. Victor von Richter, University of Breslau. Authorized translation by Edgar F. Smith, Prof. of Chemistry, University of Pennsylvania. Second American edition from the sixth German edition. With illustrations. Philadelphia: P. Blakiston, Son & Co. 1891. 12mo. Pp. 1040.

An excellent work is here presented to the student of organic chemistry, beginning with the scope of that discipline, the various methods of organic analysis, the chemical structure and the physical properties of the carbon compounds. The special part considers the various compounds arranged in two classes, the derivatives of methane or fatty compounds, and the derivatives of benzene or aromatic compounds. The subdivisions and grouping in both classes are in accordance with the most modern views of theoretical composition, and aid very materially in intelligently comprehending the chemical relations of the numerous compounds; theory and fact are blended together harmoniously and present to the student all that is essential to knowledge, while special details of methods and properties are frequently indicated by

references to prominent journals. Concise, but clear, in all its statements, whether they refer to practice or theory, the book is admirably adapted for the systematic study of the carbon compounds; the beginner finds an outline of the science indicated in the text by large type, and the advanced student is led to the study of other equally important matter through numerous paragraphs printed with smaller type. Thus the work becomes also a volume of reference for theoretical chemistry in general, and for most organic compounds in special. Moreover, the numerous processes and methods, tersely described, make the work useful as a practical guide in the laboratory. The external appearance is in keeping with the excellencies of the text.

A Short Manual of Analytical Chemistry, qualitative and quantitative—inorganic and organic. Arranged on the principle of the course of instruction given at the South London School of Pharmacy. By John Muter, M.D., Ph.D., F.R.S.E., etc. First American from the fourth English edition, edited by Claude C. Hamilton, M.D., Ph.G., etc. Philadelphia: P. Blakiston, Son & Co. 1891. 8vo. Pp. xii and 205.

Part I of this work, devoted to qualitative analysis, opens with a chapter on chemical processes, and then proceeds to the detection of the metals, which are arranged in groups, beginning with those precipitated from their solutions with hydrochloric acid, and terminating with the alkalies. The acidulous radicals and their separation are considered in Chapter III, and this is followed by the qualitative determination of simple salts and of mixtures of salts. Chapter V contains schemes for the systematic detection of alkaloids, glucosides and various other medicinal organic bodies, also for the isolation of poisons in mixtures.

In Part II, weighing, measuring and specific gravity are first discussed, including the methods for determining vapor densities. This is followed by volumetric analysis, the use of the nitrometer, and colorimetric analysis; then by the gravimetric determination of metals and acids; by ultimate organic analysis; by the analysis of water, air and certain articles of food; by special processes for drugs, urine and urinary calculi; and finally, by a chapter on the analysis of gases, by the polariscope and on spectrum analysis.

It will be observed that the scope of the work is a very extensive one for the limited space, which renders briefness necessary; but the methods and results are clearly described, and the arrangement of the extensive material is quite practical, as might be expected from the large experience of the author. The American editor, who is professor of analytical chemistry in the University Medical College and the Kansas City College of Pharmacy, has adapted the work to the requirements of the United States Pharmacopœia, enlarged the chapter on urine analysis, and made some other acceptable changes and additions. The proofreading has been carefully done, but very few typographical errors having been noticed by us. In a few instances, it would seem to be desirable for the complete characterization of certain compounds, to somewhat extend the descriptions; for instance, the solubility of jalapin in alkalies is mentioned, but it has been omitted to state that such a solution is not precipitated by acids; the partial solubility of podophyllin in boiling water, and the influence of light upon santonin have not been mentioned.

We regard the work as a very useful one, and as being well adapted for

analytical work by students under supervision of an experienced teacher, and for a trustworthy guide to those who are not novices in chemical analysis.

Experiments arranged for Students in General Chemistry. By Edgar F. Smith, Professor of Chemistry, University of Pennsylvania, Philadelphia, and Harry F. Keller, Professor of Chemistry, Michigan Mining School, Houghton. Second edition, enlarged, with 37 illustrations. Philadelphia: P. Blakiston, Son & Co. 1891. 8 vo. Pp. 56. Interleaved for notes; cloth, 60 cts.

Intended for beginners in chemistry, this little work aims at inculcating habits of correct observation, by means of experiments, and by directing attention to phenomena and results in such a manner, that the student will be required to note properties, alterations and distinctions in the materials placed in his hands. The experiments are judiciously arranged, beginning with such relating to apparatus and manipulations, and followed by others calculated to illustrate general principles of chemistry, after which the various non-metallic and metallic elements receive attention.

Tables for Doctor and Druggist. Compiled by Eli H. Long, M.D., Professor of Materia Medica, Buffalo College of Pharmacy, etc. Detroit: George S. Davis, 1891. 8vo. Pp. 133. Price, $2.

The following tables are contained in this book: (1) Table of solubilities, giving the behavior of water and alcohol, at 15° and 100° C., and of other solvents upon medicinal and other chemicals and upon certain plant-products. Among the latter are ammoniac, myrrh, guarana, etc., but not opium, asafœtida and gamboge. The statements have been compiled with care, and but few inaccuracies have been noticed; thus, ammoniac is not "insoluble" in water, a portion of its gum yielding a perfect solution; guarana is only partly soluble in alcohol, the vegetable tissues being insoluble. The word hæmatoxylon should be corrected to hæmatoxylin.

(2) Table of reactions and incompatibles; included are also a number of crude vegetable drugs, of which the prominent constituents are given, thus furnishing a guide to their behavior under certain conditions.

(3) Table of doses and uses; the doses are indicated in the metric system, and in apothecaries' weight and measure; of many of the Latin terms the genitive case is also noted. The list is very complete, and comprises a large number of extra-pharmacopœial drugs.

(4) Table of specific gravities; and (5) table of poisons and antidotes. The latter gives the toxic dose, the action of the drug, the prominent symptoms, and the antidotes or treatment.

The usefulness of the book is readily seen from the brief account of the contents given above. It has been prepared with care and good judgment, and the typographical arrangement and display facilitates its use.

OBITUARY.

Jules Leon Augustin Creuse, Ph. G., died in Paris, France, August 13, 1891, in the 56th year of his age. Born and educated in Paris, he came to the United States when he was 21 years of age, and in 1861 graduated from the New York College of Pharmacy. About twenty years ago he contributed a number of interesting papers to the American Journal of Pharmacy, and to the publications issued by the American Pharmaceutical Association, and by the Alumni

of the New York College of Pharmacy. From 1869 to 1884 he was connected with the *Druggists' Circular*, his editorial labors marked with good judgment and high ability. Owing to rheumatic affections having troubled him for some years, he withdrew from the editorial chair, and took up his residence in his native city, where his widow and his mother survive him.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received.

Walter E. Bibby, class 1875, died in this city August 29th last, the result of cocaine poisoning. He was born in Ripley, O., and some years after graduating in pharmacy studied medicine, and became a practicing physician in this city. He contributed several papers to this Journal in 1875 and 1876.

Emery G. Bissell, class 1877, died in Waterville, N. Y., September 2, 1891, after a long illness, from tumor on the brain, aged 41 years. He was born in Waterville, and was engaged there in the drug business in partnership with his father and brother. A widow and two children survive him; also his parents and four brothers. His graduating thesis on hop culture in New York and on some constituents of hops was published in this Journal in 1877. The deceased was a member of the New York State and of the American Pharmaceutical Associations, and took much interest in the advancement of pharmacy; at his home he was held in high esteem as an honorable and useful citizen.

Chas. W. S. Edenborn, class 1889, died suddenly at his father's residence in this city, August 24th, last.

Chas. B. Evans, class 1872, died suddenly at Memphis, Tenn., June 30, 1891. He was a native of Philadelphia, where he learned the drug business, and for the last few years had been clerking at Augusta, Ga.

Wesley J. Hibberd, class 1888, died at his father's residence at Bridgeport, Pa., September 5th last, aged 26 years. Bright's disease was the cause of his death.

Frank E. Miller, class 1873, died at St. Paul, Minn., September 6, 1891. He was born at Ankum, Hanover, January 19, 1848, and in the following year came with his parents to St. Paul, Minn., where he was educated and learned the drug business in his father's pharmacy, and where, after graduation, he spent the remainder of his life. His thesis on Anemone Ludoviciana was published in the Amer. Jour. Pharm., 1873, p. 298.

Talbot C. Murray, class 1863, died at Washington, D. C., September 18th, last. He was born in Philadelphia, and for a number of years had been in the employ of the Government.

Hans H. Sinne, class 1885, died at his residence in Trenton, N. J., of consumption, August 8, 1891, aged 28 years. He was a native of Prussia, learned the drug business in Philadelphia, after graduation in pharmacy studied medicine, and for several years was proprietor of the drug store at Eleventh and Buttonwood Streets. Afterwards he removed to Trenton, where he devoted himself to the practice of medicine.

James Wilson, class 1860, died July 10, 1891, at York, Pa., where he was born 53 years ago. For a number of years he had been in business in Philadelphia, at Sixth Street and Germantown Avenue, under the firm name of Curran & Wilson, and later as Wilson & Brother.

THE AMERICAN
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NOVEMBER, 1891.

A NEW COLOR REACTION FOR VANILLIN.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 95.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, October 20, 1891.

In the various reference books on organic chemistry, there is to be found especially one color reaction for vanillin, namely, a violet-blue color, with ferric chloride.

Some time ago, I had occasion to examine a vanilla substitute which proved to be a mixture of vanillin and coumarin and experienced some difficulty in obtaining the above color reaction, caused by using too much ferric chloride solution, and this solution containing free hydrochloric acid; by using a very dilute solution of ferric chloride containing no free hydrochloric acid, the test succeeded with vanillin solutions 1 : 2,000, in which dilution a faint but noticeable violet-blue color results.

Thinking that the test could be made more easily by using a ferrous solution and oxidizing this with bromine water, I was surprised at the intense bluish-green color resulting. The method of applying the test was to add to the aqueous vanillin solution a few drops of a 1 per cent. ferrous sulphate solution and then the bromine water, drop by drop; in very dilute vanillin solutions a single drop of bromine water is sufficient, in more concentrated solutions the color deepens with the addition of more bromine water until the maximum intensity is reached, when more bromine water causes a yellowish clearing of the bluish-green test. If the bromine water be added

rapidly drop by drop, until the yellow coloration results, and the test set aside for a few minutes, the original bluish-green color reappears with full intensity.

If too much bromine water be added at once, or if it be added slowly until the yellow color results, the bluish-green color will not reappear.

The test succeeds in solutions of vanillin 1 : 100,000 and then is more easily recognized than is the ferric chloride test with vanillin solutions 1 : 2,000.

It is also interesting to note that if to the vanillin solution be added a little of a dilute ferric chloride solution and then a drop of bromine water, a much more intense color is produced, but in this case a yellowish green; this color is discernible in vanillin solutions 1 : 50,000.

The presence of free acid does not interfere much with the intensity of these colors, and hence, the test would seem to depend upon the action of bromine upon vanillin and then the further action of this compound upon the salts of iron, especially ferrous salts.

That this is the case can be proven by carrying out the test in a manner which will enable one to detect one part vanillin in 200,000 parts of solution:

To the vanillin solution is added a drop of bromine water or sufficient to impart the odor of bromine, and then a freshly prepared solution of ferrous sulphate is carefully added in slight excess, that is, a drop or two are added after the bromine odor has disappeared. Coumarin not giving this color reaction, it can be used to estimate approximately the vanillin in mixtures of vanillin and coumarin as they are used in the vanilla substitutes; to do this the same weights of vanillin and the substitute (about 50 milligrams) are dissolved each in 100 cc. of water; of this solution 5 cc. are taken, diluted with about 10 cc. of water, and bromine water added drop by drop until, after agitation, the bromine odor is permanent, then add of a freshly prepared 1 per cent. ferrous sulphate solution until the bluish-green color no longer intensifies; lastly, dilute with water the two tests until they are of the same tint.

A comparison of the two volumes will give the percentage of vanillin in the substitute, if, for instance, the vanillin solution measures 75 cc. and the substitute solution 55 cc., then

$$75 : 50 :: 100 : x = 66\,66 \text{ per cent.}$$

There are a few other color reactions for vanillin which I find mentioned in "Die Farben-reactionen der Kohlenstoff-verbindungen," by Dr. Emil Nickel, but which I did not have an opportunity to compare with the above:

(1) Millon's reagent (a solution containing both mercurous and mercuric nitrates with some free nitrous acid) gives a reddish violet color.

(2) Mercuric chloride solution containing some potassium nitrite on boiling gives a fine violet color.

(3) Zinc sulphate and potassium nitrite in solution give a yellow coloration.

(4) Phloroglucin and hydrochloric acid produce a red color.

(5) Aniline sulphate produces a yellow color (not very delicate).

(6) Pyrrol with dilute sulphuric acid (1 : 4) produces a cherry red color.

(7) Indol with dilute sulphuric acid (1 : 4) produces a cherry red color.

(8) Carbazol with dilute sulphuric acid (1 : 1) produces a blue or bluish violet color.

(9) Fröhde's reagent (molybdate of sodium dissolved in concentrated sulphuric acid) produces a blue or green color.

THE ROOT BARK OF CELASTRUS SCANDENS.

By Jacob Hoch, Ph.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

The root bark was collected by the author in Montgomery County, Pennsylvania, and on drying at 100° C., lost 12·2 per cent. of moisture. A distillate was prepared from the bark by cohobation, and on examination, showed the absence of volatile constituents.

The powdered bark, treated with petroleum-benzin, yielded 5·5 per cent. of an orange-red, stiff, elastic mass. Water has no effect upon it, but alcohol dissolves from it a deep orange-red brittle substance which is inodorous, has (in alcoholic solution) an acid reaction, is soluble in ether, and yields with alkalies deep-brown solutions. The body insoluble in alcohol is nearly colorless, elastic and soluble in benzin and chloroform.

The bark exhausted by benzin, yielded to ether a hard resinous body, soluble in alcohol and in strong alkalies with a brown color.

Treatment with alcohol resulted in a tincture, which on evapora-

tion left a dark-brown extract, partly soluble in water. The aqueous solution gave with ferric chloride a greenish-black color, and after the removal of the tannin by means of gelatin, yielded with basic lead acetate a yellowish-white precipitate, from which a light-yellow extractive mass of an acid reaction was isolated. The aqueous solution also reacted with Fehling's solution, indicating the presence of glucose. The alcoholic extract insoluble in water was a brownish resinous substance.

The bark, exhausted as stated above, yielded to cold water some gummy matter, and to boiling water some pectin compounds and starch, the latter indicated by the blue color with iodine solution.

Experiments made in search of an alkaloid or glucoside had negative results. The ash obtained from the dried bark amounts to 7½ per cent.

The organic constituents determined by these experiments, are orange-red coloring matter, several resins, tannin, vegetable acid, glucose and starch.

See also analysis of Celastrus scandens, by C. H. Bernhard, in American Journal of Pharmacy, 1882, pp. 1–5.

PURSHIA.

By Dr. V. Havard, Surgeon U. S. A.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, October 20, 1891.

Purshia tridentata, DC. This monotypic genus of the order Rosaceæ (and named in honor of Pursh, one of our most successful botanical pioneers) is characterized by solitary carpels becoming dry akenes, exserted, conical-pointed and minutely grooved, and containing a dark brown seed, oblong-obovate, about three lines long, without albumen.

A diffusely-branched shrub, 3 to 5 feet high, with small fascicled leaves cuneate-obovate, 3-lobed at the apex, and solitary flowers, terminal on the short branches, the five yellow petals exceeding the calyx lobes.

Common throughout the Rocky Mountain region, covering foothills and slopes, from Arizona and New Mexico to the British boundary, and westward to the Sierra Nevada. "Almost the only shrub to be seen through an immense tract of barren soil from the head

sources of the Missouri to the falls of the Columbia, and from the 38° to the 48° of N. latitude." (Douglas.)

Between the thin and membranous epidermis of the seed and the opaque yellowish inner coat is a granulated resinous pulp, half a line thick, deep purple in color, and intensely and persistently bitter, which deserves attention either as a coloring or medicinal substance. It imparts its bitterness to water and alcohol without discoloring either menstruum, one seed being sufficient to render a tumblerful of water undrinkable. The bitter principle is apparently distinct from the coloring matter.

NOTE.—The small amount of material sent with the above description precluded a satisfactory examination. Alcohol removed the bitter principle with some fat, and in attempting to separate the latter by agitating the aqueous acidified solution with ether the bitter principle was also removed; this would almost exclude it from being an alkaloid, but further tests could not be tried to decide this. It gave no reactions indicating a glucoside. It is hoped that more of the material will be sent, on which to make a further examination. —H. TRIMBLE.

SOME INDIAN FOOD PLANTS—THE YAMP.

VI.—*Carum Gairdneri*, Bentham and Hooker.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 96.

Read at the Pharmaceutical Meeting, October 20.

This like the preceding food plants described in this Journal was received from Dr. V. Havard, U. S. Army Surgeon, at Fort Russell, Wyoming. He furnished with the material the following report:

"*Carum Gairdneri*, Benth. and Hook. (Yamp or Yampah, Yep or Yepah) of the Parsley Family (Umbelliferæ). Tall, erect, biennial herb, 1 to 4 feet high, rather smooth, with few pinnate leaves of 3 to 7 entire leaflets, and white flowers; the involucre of a single leaflet and the involucels of several bracts.

"Found mostly on low timbered bottoms from the western fork of Laramie River, Wyo., apparently its most eastern habitat, through the Rocky Mountains to Oregon and Washington; southward it extends to Utah, Nevada and South California. It gives

its name to several streams of which the Yampah, or Little Snake River, is the largest.

"The tuberous roots are in close clusters of 2 to 5, fusiform or conical, about an inch long and half an inch or less thick; they are covered with very thin brownish skin which, when scraped off, leaves an homogeneous, pure white, farinaceous substance. Eaten raw they have a delicious aromatic flavor without any bitterness or astringency, and with the blended taste of the nut and the parsnip.

"Among the Indians of the Rocky Mountains and those of the Snake River, more particularly among the Shoshonees, in whose former territory it is very abundant, this root was, and still is, considered one of the very best of the native esculent roots, either raw or cooked. Bears and pigs are very fond of it, the latter often tearing up large tracts of ground in their search for it.

"Several species of Peucedanum have larger edible tubers, but this plant yields the most delicately flavored root of our native umbellifers. There is little doubt that, if susceptible of enlargement by cultivation, it would soon become a favorite in the vegetable garden.

"Another species of Carum (*C. Kellogii*, Gray) is found in Central California, near the coast. It is a rather stouter plant, with larger flowers and fruit, and ternate or biternate leaves, cut and divided. The roots are likewise tuberous and clustered, probably larger, and used as food by the Indians. This species should also be tested in cultivation.

"To this same genus belong the caraway and the parsley of our gardens, both plants having more or less fleshy, pleasantly flavored roots, although but little used."

The tubers, when first received, were quite moist, having evidently not been out of the ground very long. They were allowed to become air dry and then submitted to a proximate analysis, with the following results:

	Per Cent.
Fat, wax and caoutchouc,	1·03
Resin, soluble in stronger ether,	·53
Saccharose,	10·98
Glucose,	5·32
Mucilage and Albuminoids,	29·20
Pararabin, etc.,	2·75

	Per Cent.
Starch,	5·35
Moisture,	14·66
Ash,	3·62
Insoluble and undetermined,	26·56
	100·00

This food is remarkable for the large proportion of cane sugar it contains. The alcoholic extract deposited clear white crystals of it on standing.

THE TRADE IN GINGER AND ITS ECONOMIC USES.

By P. L. Simmonds, F.L.S.

As ginger enters so largely into consumption for pleasant popular beverages and for other purposes in this country, some short account of the sources of supply, and the commerce in this spice, may not be without interest.

The manufacture of ginger beer and ginger ale form a large portion of the mineral water trade in the kingdom; indeed, some makers have acquired a special reputation for their production. Besides the large number of fermented and aërated ginger beers consumed at home, a good deal of ginger ale is shipped in glass bottles, from Belfast especially, to the United States. About 16,000 packages or casks are so exported annually, for it has become a fashionable beverage in America among all classes.

According to the American official returns, the imports in the two years ending June, were as follows (the duty being 20 per cent.):

	1888. Dozen bottles.	1889. Dozen bottles.
Ginger ale and beer,	231,721	261,828
Ginger cordial,	—	262
Preserved ginger (35 per cent. duty) value,	$14,289	$2,670
Raw ginger (duty free),	34,194 cwt.	27,718 cwt.

The value of the ginger ale and beer imported there was in 1887, $153,376; in 1888, $126,987; and in 1889, $92,001. The manufacture of ginger ale seems to have been commenced there also, for last year 3,512 dozen quarts were sent away from New York and New Orleans, besides what was locally consumed.

The number of uses to which ginger is applied besides as a spice, confection and medicine, are many; for instance, we have gingerade, ginger ale, ginger beer, ginger brandy, gingerbread, ginger

champagne, ginger cordial, ginger essence, ginger lozenges and ginger wine. We have also the gingerbread tree (the Doum Palm), which, though not a producer of the spice, bears a fruit, the husk of which is brown and mealy, and has both the taste and color of gingerbread, hence one of its common names.

On the Continent ginger is less used and appreciated than with us. Good ginger should be fresh, dry, heavy, not brittle, of a reddish-gray exterior. The interior, when broken, should be resinous and of a pungent taste. The finest bleached Jamaica ginger is always in demand at good prices, after which come Cochin and African bleached. Soluble essences of ginger are required for making good ginger beer, and Belfast and American ginger ales. There are aërated and fermented ginger beers; the best unbleached Jamaica ginger, well bruised, being used for the latter. Ginger is also used for a kind of cordial and champagne. It is administered medicinally as a tonic anti-spasmodic and carminative, in the form of powder, tincture and syrup. Its odor is due to an essential oil, and its hot taste to a peculiar resin. Ginger enters into almost every compound of the spice class, and is one of the most useful and least injurious members. It is generally considered as an aromatic, and less pungent and heating to the system than might be expected from its effects upon the organ of taste.

Ginger is cultivated in many parts of the world for local use, but only in a few localities on an extensive scale, for shipment, to supply commercial wants. Of this well-known flavoring condiment several varieties are common in trade, distinguished by their quality, place of growth, etc. Gingers are either coated with the shrivelled rind, or scraped by having it removed. Ginger is sometimes bleached by chloride of lime, or whitewashed with lime and water. The dried rhizomes are called by the dealers "races," or hands. The younger portions are amylaceous, and the older hard and resinous. Our supplies are drawn chiefly from the East and West Indies and Africa; the imports average about 70,000 cwts. per annum, of which 40,000 cwts. are consumed in Great Britain. The Jamaica ginger is considered the best, being pale and uncoated. Cochin ginger resembles it, but is of a pale brownish tint externally.

The total imports of ginger in the United Kingdom increased from 4,390 cwts. in 1831 to 63,511 cwts. in 1889, and the total consumption from 4,788 cwts. in 1831 to 44,307 cwts. in 1862, and to 39,681 cwts.

in 1889. The quantity retained for consumption is ascertained by deducting the re-exports, but of course there is always some stock in hand.

Ginger is extensively diffused throughout the islands of the Indian Archipelago, being indigenous to the East, and of pretty general use among the natives. It is, however, inferior in quality to that of Malabar or Bengal. Ginger is a good deal grown in China, and largely used in its fresh state as a condiment and also in medicine. Some small quantity is exported dried, but it is black and hard, and not much appreciated in commerce. In the young state the rhizomes are fleshy and slightly aromatic, and they are then used as preserves, or prepared in syrup. In a more advanced stage the aroma is fully developed, the texture is more woody, and they become fit for ordinary commercial ginger. The inferior sorts, when dried after immersion in hot water, form black ginger. The best roots are scraped, washed, and, after being dried in the sun, receive the name of white ginger. The East Indian and African are coated or limed gingers. The West Indian ginger is superior in quality to that of the East because more care is paid to the culture and drying; but the production is much smaller, and hence the trade is of less importance to commerce. Ginger is imported in bags and barrels weighing a little over 1 cwt. each.

At the close of the last century Barbadoes, Hayti and other West Indian Islands, cultivated ginger largely. Barbadoes then exported 21,000 cwts. But Jamaica alone now gives any attention to the culture, and even there the production has fallen off about one-half, and the common East Indian is flooding the market. In 1831 the bulk of what was received was from the West Indies, as India sent less than 1,000 cwts. then. In 1841, however, the East had surpassed the West by 1,000 cwts. Last year of 63,500 cwts. imported, India sent 53,500 cwts., Jamaica 5,900 cwts., and West Africa, 2,600 cwts. Still the production for export is falling off in India, judging by the exports, in the last few years.

The ginger plant is extensively cultivated in British India, from the Himalayas to Cape Comorin. In the Himalayas it is successfully reared at elevations of 4,000 or 5,000 ft., requiring, however, a moist soil. The Malabar ginger, exported from Calicut, is the produce of the district of Shernaad, situated to the south of Calicut. In the Dacca district the natives cleanse the roots in boiling lime

water, which probably injures much of the fragrant pungency, whereas in Jamaica they use simply plain water.

In order to dry ginger into what is called "sonth" in India, that is to enable it to keep, the fresh roots are put into a basket, which is suspended by a rope, and then two men, one on each side, pull it to and fro between them by a cord attached, and thus shake the roots in the basket; this process is carried on for two hours every day for three days. After this the roots are dried in the sun for eight days, and again shaken in the basket; the object of the shaking being to take off the outer scales and skin of the roots. Two days further drying completes the process, and the ginger sells at about a rupee, or 2 shillings, for 6 or 8 pounds. The value of the East Indian ginger exported went on increasing from about £63,000 (44,457 cwts.), in 1881, to over £199,000 (133,280 cwts.) in 1887; but in the last three years it has retrograded, having fallen to £70,398 (61,774 cwt.) in the financial year ending March, 1890.

There are, of course, fluctuations in the export, but the general increase of production has been very great in the last twenty years, the shipments having more than trebled. In 1871 England only received from the East Indies 13,014 cwts., valued at £28,200; last year 53,498 cwts. were received.

Passing now to the West Indian production the crop in Jamaica varies; sometimes over 320 acres are under ginger, in other years only 130 acres.

In 1738 so widely was the culture of this root diffused in Jamaica, that over 21,000 cwts. were shipped. In 1832, this quantity was again reached, but of late years the exports have been much smaller. In 1875 and 1876 there was a large export, averaging 13,400 cwts. Since then the exports and value have fluctuated from 5,932 cwts. and £11,952 in 1882, to 7,945 cwts. and £22,246 in 1880, and to 12,313 cwts. and £20,169 in 1885.

The sets used for planting are the small knots or fingers broken off the original root, as not worth the scraping or keeping. It throws out a pedicle or foot-stalk in the course of the second or third week. From my experience as a planter in Jamaica, the crop is got in in December and January, when the stalks begin to wither. The average yield may be taken to be from 1,500 to 2,000 lbs. per acre, but sometimes a much heavier crop is obtained.

The third producing district for ginger is the West African coast,

where it is principally grown at Sierra Leone. About half that produced comes to England, and the other half goes to America. The value of that exported in 1868 was £18,917, and in 1869, £14,008.

Lastly, young ginger is candied and preserved to a considerable extent in the East, and comes into commerce under the section of "succades." The quantity imported into England from India and China ranges from 300,000 to 600,000 lbs., of the value of £11,000 to £25,000. The mode of preserving it is to steep the rhizomes in vats of water for several days, changing the water once. When taken out it is spread on tables and well pricked or pierced with bodkins. The rhizomes are then boiled in a copper caldron, then steeped for two days and nights in a vat with a mixture of water and rice flour. After this they are washed with a solution of lime, then boiled with an equal weight of sugar, and a little white of egg is added to clarify.

After the ginger has been boiled a second time it is put in glazed jars of pottery, holding 1 pound, 3 pounds or 6 pounds, and covered with syrup. The syrup is changed two or three times, and then they are shipped in cases holding six jars. The quality called "Mandarin" is put up in barrels.

The syrup must not be applied hot in the first instance or the ginger will shrink and shrivel. In India the weak syrups after being poured off are not used again, but are fermented, and make a pleasant drink. The process of candying is simply that of drying the ginger preserved as above, a little dry powdered sugar being used to aid the drying.

The ginger that comes in from China dry-coated with sugar, is sent out in small squares of zinc.

GINGER AND ITS OLEORESIN.

By Samuel Jacob Riegel, Ph.D.

From an inaugural essay presented to the Philadelphia College of Pharmacy.

This subject was chosen for investigation with the view of ascertaining whether some other solvent than ether would satisfactorily extract the properties, and could be used in preparing the official oleoresin, and to determine the quantity obtainable from different varieties.

First.—1,000 grs. of unbleached Jamaica ginger were reduced to

No. 50 powder and exhausted with alcohol; the tincture thus obtained was evaporated at a moderate heat, and yielded 50 grs., or 5 per cent. of a clear, dark brown viscid liquid, closely resembling the pharmacopœial oleoresin; it was perfectly soluble in stronger and commercial ether and in chloroform, but only partially soluble in benzin. The residuary powder was dried and percolated with benzin, which did not extract anything.

Second.—500 grs. of unbleached Jamaica ginger were percolated with benzin, which, however, did not extract all the pungency. The residue was dried and exhausted with ether. The products, after evaporating the benzin and ether respectively, were similiar in physical properties, and equally pungent. The sum of the two represented 5 per cent. of the drug; the benzin extracted about half.

Third.—1,000 grs. of unbleached Jamaica ginger were exhausted with alcohol and percolated with ether. The alcohol extracted, as before, 5 per cent. of oleoresin, but the ether extracted nothing. The oleoresin was then dissolved in about 2 drachms of alcohol and shaken with 12 oz. of benzin in portions of 2 oz. at a time. The benzin dissolved all but a small quantity, which was free from pungency and odor.

Fourth.—1,000 grs. of East India ginger, having the epidermis removed from the flat side, were exhausted with alcohol, and yielded 80 grs. or 8 per cent. of oleoresin very much darker than that obtained from Jamaica ginger, but quite as pungent. It also was perfectly and readily soluble in stronger and commercial ether and in chloroform, but only partially soluble in benzin. The residuary powder was percolated with ether, but without extracting anything.

Fifth.—1,000 grs. of E. India ginger were exhausted with Squibb's stronger ether, and on evaporating yielded 80 grs. or 8 per cent. of oleoresin. This was completely soluble in alcohol and chloroform. When dissolved in alcohol and shaken with benzin, it required a much larger quantity to wash out all the pungency, and the insoluble portion was larger in quantity than that from Jamaica ginger.

After these experiments were concluded a portion of the oleoresins (which had been mixed) was treated with wood alcohol. This dissolved the pungent principles much more readily than did benzin, and left a considerably larger quantity undissolved. The insoluble portion was of a very dark, reddish-brown color, of a soft consistence, and quite free from pungency, while the pungent portion was not so dark in color and was not solid, but very viscid.

Summary.—Jamaica ginger yielded 5 per cent. of oleoresin, which can be extracted with alcohol, ether or chloroform.

East India ginger yields 8 per cent. of oleoresin, which can also be extracted with the same solvents. The oleoresin obtained represents all the medicinal virtues of the drug, and consists of two portions, a thick, viscid liquid, which contains all the pungency in a high degree, and a soft, resinous solid free from pungency and odor. The pungent portion is soluble in benzin, but cannot be extracted from the drug with it.

This investigation would indicate that alcohol could be used instead of ether in preparing the official oleoresin.

BASHAM'S MIXTURE.

By F. W. Haussmann, Ph. G.

Read at the Pharmaceutical Meeting of the Phila. College of Pharmacy, October 20.

Few formulas of the present pharmacopœia have experienced as much adverse criticism from both pharmaceutical and medical standpoints as the Mistura Ferri et Ammonii Acetatis. Every pharmacist, in following out the officinal method, has doubtlessly experienced the same result, namely, instability of the mixture and gradual precipitation of the iron as oxyacetate. When freshly prepared, the mixture presents an attractive appearance, but on standing several days, especially in warm weather, or only partly filled bottles, the above change takes place. It is generally noticed, when bottles which contained it are presented for renewal, when the bottom and sides of the vial are stained by the iron.

While recommending recent preparation in a number of the officinal mixtures, the pharmacopœia neglects this necessary order in this instance, a rule which whenever possible should be observed.

The reason for this decomposition may be found in the insufficient amount of acetic acid ordered, also the general very dilute condition of the preparation. While perhaps not often called for in some localities, in others it is continually in demand, and the pharmacist, to save both time and labor, is compelled to keep a supply on hand. It is in such instances that the above disadvantage is mainly felt.

The suggestion has been made, in the necessity of keeping a "stock" on hand, to prepare a concentrated mixture, according to the pharmacopœia, with the omission of the 50 parts of water,

which was to be added at the time the mixture was dispensed. This "concentrated" mixture does, however, not last much longer than the finished article, precipitating in almost the same time.

An increased amount of acetic acid is, perhaps, the only remedy.

From a medical standpoint, the exceedingly slight amount of active ingredients is the main objection, and frequently physicians prescribe this valuable remedy extemporaneously. Others again, in prescribing it, specify "Old formula."

An older edition of the National Dispensatory gives a formula which yields a preparation in medicinal efficacy improved and in stability more perfect. It is nearly 3 times the strength of the now officinal article and, while not without fault, is better than the pharmacopœial preparation. The following is the formula:

Liq. ammon. acetatis,	℥ivss
Ac. acetici dilut.,	℥i
Tinct. ferri chlorid.,	℥ss
Tinct. aurant. cort,	℥iss
Glycerini,	℥ss

The "modus operandi" is similar to the one of the pharmacopœia. When prepared by this method the mixture will be of a deep brown, almost black color, due to the action of the iron upon the tincture of orange peel. If elixir of orange, U. S. P., or better a mixture of it with simple syrup, about equal parts, be substituted for the tincture, the preparation will be, though slightly darker, very similar in appearance to the freshly prepared officinal mixture. It does not precipitate, unless under certain conditions to be mentioned.

A sample, one and a half years old, has not shown any change as yet.

In preparing the mixture, a few points are to be observed, viz: (1) The solution of acetate of ammonium should be freshly prepared, care being taken that it is not too alkaline. This happens frequently, especially as is often the case when made by this method, if the carbonate of ammonia is left too long in contact with the acetic acid. If the second pharmacopœial method is followed, namely, mixture of a solution of carbonate of ammonia with the corresponding strength of acetic acid, more satisfactory results may be looked for. (2) In summer an increase of acetic acid often becomes necessary, as decomposition, especially in very hot weather

and particularly before a thunderstorm, frequently takes place. It manifests itself by the gradual darkening of the mixture, which soon becomes of a thickish consistence, with final, bulky precipitation. It becomes necessary to recommend to the consumer to keep the medicine in as cool a place as possible.

A change of this nature often gives rise to suspicion, and by previous information possible distrust may be avoided. In the selection of the material employed some care is also necessary.

The acetic acid must be strictly U. S. P., free from empyreumatic impurities If the latter be present, on neutralization with the carbonate of ammonia, it will manifest itself both in odor and taste. Also, on the addition of tincture of iron, it will produce a considerably darker mixture. The same precaution may be observed in the ammonia salt, which is often of inferior quality.

In offering the substitute for the officinal Basham's Mixture, no new features are presented either in composition or method of preparation, merely slight alterations in an old and tried formula. But as improvement upon the pharmacopœial formula is a necessity, it may be worthy of consideration. It certainly has one advantage which the other does not possess, that of being stable.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Kamala.—In a recent report issued by Cæsar and Loretz, the results of sifting commercial kamala, with the view of separating as much as possible the portions containing much mineral matter, are given; of the lots purified during the past two years the best one gave percentage results as follows: 55 per cent. of worthless impurities, as dirt, fruit and bark particles;

	12,	10,	3,	2 and	18	per cent.	purified kamala
containing	20,	16,	10,	7·5	6	"	ash.

The last lot that was purified yielded 58 per cent. of worthless impurities; and

	5,	10,	4,	8,	9 and	4 per cent.	purified kamala
yielding	40,	35,	24,	21,	14 "	12·5 "	ash

These results are confirmed by examinations of various commercial samples of kamala made during the last year.—*Apotheker Ztg.*, 1891, 495.

Bleaching of animal fats.—10 grams powdered potassium permanganate are dissolved in one half liter of water and mixed with 10 grams concentrated sulphuric acid, also diluted to half a liter; 40 kilos of fat are melted and agitated for five minutes with the above solution; by moderate heat the fat is kept liquefied so as to facilitate separation from the brown magma of hydrated manganese dioxide. Should the fat have a yellowish or brownish color (due to a little dissolved oxide of manganese) the addition of a few drops of sulphurous acid will cause decolorization owing to the reduction of the hydrated manganese dioxide and formation of manganous sulphate. The advantages claimed for this method are that neither the physical nor chemical properties of the fat are changed even if a much larger quantity of the permanganate be used. The method is especially recommended for the bleaching of tallow, lard and margarine.—Dr. A. Jolles and F. Wallenstein, *Ztschr. f. Nahrungsm. Unters. u. Hyg.*, 1891, 162.

Essential Oils.—After the introduction of the concentrated essential oils by Hänsel (*Am. Journ. Pharm.*, 1888, 451), it was hardly deemed possible to prepare oils of superior quality inasmuch as these oils represent the natural oils freed from the non-odorous terpenes; H. Hager in *Pharm. Post*, 1891, 807, acknowledges the receipt of some samples of volatile oils which proved upon comparison to have a finer flavor and to be even better than the oils from the first mentioned source; they are also more soluble in dilute alcohol. For these oils the name "Ætherische Grundœle" (fundamental essential oils) is used: in Latin, the term *Protoleum* or *Protolum* is suggested, as for instance Protoleum Carvi. The preparation of this class of oils is the secret of the manufacturing firm of Altmann & Vogel, in Cotta-Dresden.

Assay of Cinchona.—A comparative examination of three methods of assay gave the following results: (1) The method of Haubensak (*Am. Journ. Pharm.*, 1891), 2·975 per cent. and 2·995 per cent; (2) The method of Schmidt (Pharmacopœa Neerlandica), 2·2093 per cent.; and (3) The method of the Pharmacopœia Germanica III 2·035 per cent. and 2·360 per cent. The conclusions arrived at are that Haubensak's method is the best, not only because of the higher figures obtained, but also because of the purity of the weighed alkaloids, they being entirely soluble in acidulated water.—Wegmüller, *Schwz. Wochenschr. der Pharm.*, 1891, 363.

Secale cornutum.—By macerating 300 grm. powdered ergot deprived of oil with 1,500 grm. 5 per cent. sodium hydrate solution for 48 hours, straining, mixing 500 grm. filtrate with 1,000 cc. 90 per cent. alcohol, filtering off the precipitate, triturating it with 300 cc. alcohol acidulated with hydrochloric acid, filtering, washing the insoluble part with alcohol until the filtrate passed through colorless, and drying at 40–50° C., Dr. A. Voswinkel obtained 15·8 per cent. of a brown, amorphous, hygroscopic substance which he proved by hydrolysis to yield mannose; the body itself is a hemi-cellulose to which the name "mannan" is given. Sclerotic acid and sclero-mucin found by Dragendorff in ergot were prepared according to Dragendorff and proven to be identical with "mannan;" the yield of these substances was only 4·8 %, and this is explained by mannan being less soluble in water than in sodium hydrate solution. The physiological action of sclerotic acid is doubted by Voswinkel because of the fact that mannan is also a constituent of salep and of coffee. Mention is also made of the extract of ergot as prepared by the Pharm. Germ. III: Two parts of ergot are exhausted with two portions of water, the filtrates are united, evaporated to one part, and one part dilute alcohol added; it is claimed that the alcohol added is insufficient to precipitate all of the mannan, that by the use of three parts of alcohol this can be effected and that such an extract would give a clear solution with 65–70 per cent. alcohol and also would be more effective.—*Pharm. Centralhalle*, 1891, 531.

Sodium bicarbonate.—A recent process of manufacture is as follows: Heavy spar or barium sulphate is reduced by heating with coal to barium sulphide, this dissolved in water and mixed with sodium sulphate, whereby barium sulphate is precipitated and sodium sulphide remains in solution; by passing natural carbon dioxide through this solution sodium bicarbonate is formed with escape of hydrogen sulphide, which is then burnt with a limited supply producing water and sulphur.—*Pharm. Centralhalle*, 1891, 536.

Tooth-wash.—Thymol, 0·25; benzoic acid, 3·00; tincture of eucalyptus, 15·00; alcohol, 100·00; oil of gaultheria, 25 drops; dilute one teaspoonful with half a wineglassful of water.

Tooth-powder.—Precipitated chalk, 120; cinchona bark, 60; prepared oyster shells, 60; powdered myrrh, 35; and oil of pepper-

mint, 15 drops. These preparations are recommended by Prof. Miller for the care of the teeth.—*Pharm. Ztg.*, 1891, 587.

For the detection of hydrocyanic acid and soluble cyanides.—Hilger and Tamba distil in a current of carbon dioxide avoiding a higher temperature than 60° C.; in the presence of ferrocyanides and ferricyanides tartaric acid is first added, and then sodium bicarbonate to faint alkaline reaction before distilling. The distillates are tested for hydrocyanic acid by adding to them in a porcelain capsule one drop of a freshly prepared tincture of guaiac and then a drop of copper sulphate solution.—*Fresenius Ztschr. f. an. Chem.; Pharm. Ztg.*, 1891, 586.

Antidote for hydrocyanic acid.—Prof. Dr. Kobert has proved experimentally that hydrogen peroxide is a valuable antidote for hydrocyanic acid poisoning. It is to be given internally as well as subcutaneously until the odor of the acid can no longer be recognized in the exhalations and the symptoms subside. He found that lethal or even larger doses could be given to animals daily for several weeks if hydrogen peroxide be injected in one cubic centimeter doses when the symptoms of poisoning appear. The antidote acts by changing hydrocyanic acid into oxamide.—*Pharm. Centralhalle*, 1891, 570.

The pharmacology of oxalic acid and its derivatives.—Former experiments by Prof. Kobert upon the mentioned compounds proving that their administration causes glycosuria having been doubted, he confirmed these and now states that not only the acid and its acid salts, but also the neutral salts cause glycosuria, if given even in small quantity; the internal use of extractum Syzygü Jambolani (*Am. Journ. Pharm.*, 1888, 339, 368; 1890, 50) promptly removes the glycosuria.—*Pharm. Centralhalle*, 1891, 569.

Saffron.—An examination of a number of samples of genuine saffron ascertained that the ash varied between 4·5 and 5·5 per cent. and that the moisture varied from 10 to 12 per cent. Attention is directed to the statement that saffron is frequently stored in damp places so as to increase in weight. In addition to a close inspection of this drug the above determinations are helpful in determining adulterations.—Cæsar & Loretz; *Apotheker Ztg.*, 1891, 509.

To detect mineral oils in fixed oils.—P. Soltsien treats the oil with concentrated sulphuric acid, and, after the action is complete, agitates thoroughly with petroleum-ether, separates the latter, evaporates it and examines the residue left on evaporation. The process depends upon the formation of compounds of the fixed oils and sulphuric acid which are not soluble in petroleum-ether, while the mineral oils are not changed and are therefore soluble in petroleum-ether. The presence of small quantities of rosin oil in boiled linseed oil was detected by this method.

Adulterations. — *Powdered cinnamon* is frequently adulterated with powdered sugar, from 10 to 16 per cent. having been found; the object of the adulteration being to disguise the bitter and sharp taste of inferior grades.

Powdered mace is often mixed with considerable quantities of Bombay mace (see Am. Journ. Pharm., 1890, 398; 1891, 188); the addition of powdered or ground nutmeg can be determined by the presence of starch in such mace.—P. Soltsien; *Pharm. Ztg*, 1891, 600.

The Hydrastis alkaloids are three in number, hydrastine, berberine and canadine; this last alkaloid, first discovered by F. Wilhelm, is easily isolated owing to its difficultly soluble salts. It forms white lustrous needles, melting at 134° C., has the formula $C_{21}H_{21}NO_4$, and is, chemically, dihydromethyl-berberine.

Papaveraceæ alkaloids.—Sanguinarine has been found to consist of *four* alkaloids: *chelerythrine*, *sanguinarine* (apparently identical with one of the alkaloids of Stylophoron diphyllum and of Macleya cordata), *β-homo-chelidonine* (yielding colorless salts), and *protopine* (yielding colorless salts); the latter is very probably identical with *macleyine* and one of the alkaloids from Eschscholtzia californica (see Amer. Jour. Pharm., 1891, p. 457).

Narcotine has been proven to be methoxylated hydrastine.

Scopolamine is the name given to an alkaloid which was supposed to be hyoscine but upon examination proved to be a new alkaloid having the formula $C_{17}H_{21}NO_4$; it contains two atoms oxygen more than apoatropine and atropamine; by boiling with baryta it yields tropic acid and a base having the formula $C_8H_{13}NO_2$ and melting at 110°. The commercial hyoscine hydrobromate consists essentially of scopolamine hydrobromate. Scopolamine has been found in small

quantity in belladonna and in stramonium, and in some specimens of the leaves of Duboisia the mydriatic alkaloid was found to be largely this alkaloid, while in other specimens largely hyoscyamine was found.—Ernst Schmidt, *Apotheker Ztg.*, 1891, 522.

The oils of cinnamon leaves and roots.—The oil of the leaves consists essentially of eugenol with traces of cinnamic aldehyde and small quantities of terpenes. The oil of the roots contains a large quantity of eugenol, considerable quantities of terpenes and safrol and a minute quantity of benzaldehyde.—J. Weber, *Apotheker Ztg.*, 1891, 522.

THE ACTION OF SULPHUROUS ACID ON THE ECONOMY.

The importance of a knowledge of the effects of sulphurous acid on the human organism has been of late very much increased by the frequency with which this agent is now employed for the preservation of wine and vegetables. It is known that after animals have been poisoned by breathing air impregnated with sulphurous acid, the highly irritating properties of the gas are manifested by the injected state of the blood-vessels of the mucous membrane of the respiratory tract where the sulphurous acid has come in contact with it, the blood of the viscera being found dark and coagulated. Also that animals that are not killed recover very rapidly, but after a few days show signs of bronchitis and pneumonia, and die. The subject has recently been examined by Dr. L. Pfeiffer, who in some experiments employed sulphurous acid in the form of neutral sulphite of sodium, and not in the free state, so as to avoid the caustic action. He found that both warm and cold-blooded animals recovered very rapidly from an almost moribund condition, which showed that there must be either very rapid elimination or a chemical change into some harmless substance. Experiments instituted with the object of elucidating this point showed that 96·5 per cent. of the sulphite was eliminated by the kidneys as sulphate, the remaining 3·5 per cent. only as sulphite. When a large quantity of sulphite had been administered it was nearly all eliminated in five hours. Dr. Pfeiffer believes that when vegetable feeders are made to breathe air containing free sulphurous acid for some considerable time, a reduction of the alkalinity of the blood is induced. In animals breathing air containing from one to three parts of sul-

phurous acid per thousand, intense inflammation of the tracheal and bronchial mucous membrane was produced, also inflammatory foci in the tissue of the lungs, the blood in the capillaries becoming black and coagulated. Injections of a 5 per cent. solution of sulphurous acid into the stomach set up very extensive and severe gastritis, not only all the coats of the stomach itself being affected, but also the superficial portions of neighboring organs, as the liver and the diaphragm, death occurring in from three to five minutes. It is suggested that this rapid and far-reaching action may be due to the disengagement of the gas by the heat of the stomach, so that it diffuses itself much more rapidly than a liquid could do. Dr. Pfeiffer finds that in some wines there is as much as eight parts of sulphurous acid, probably as bisulphite of lime, in 100,000, and that in preserved vegetables, such as are used in the army and on board ship, there is often a very appreciable quantity either free or combined with alkalies, this being especially the case with preserved asparagus.—*Lancet; Med. and Surg. Rep.*, Oct. 10, p. 579.

ON THE ACTION OF APOMORPHINE AND APOCODEINE.[1]

By W. Murrell.

Apomorphine, which is derived from morphine, has been largely and successfully used by the writer, who has long advocated its employment as an emetic, and during the last few years has administered it as an expectorant with successful results. Given hypodermically, $\frac{1}{10}$ of a grain acts promptly as an emetic, but when administered by the mouth as an expectorant much larger doses are required and well borne.

Dr. Gee, who first drew attention to the properties of apomorphine in 1869, regarded $\frac{1}{4}$ grain given by the mouth as a certain vomiting agent; but Dr. Murrell finds that the majority of his patients can take a grain of apomorphine three times a day without inconvenience, and that by many as much as $1\frac{1}{2}$ to 2 grains three times daily is borne without difficulty. Most of the patients treated by Dr. Murrell with large doses of apomorphine were suffering from bronchial catarrh or chronic bronchitis, and the drug exerted a powerful expectorant action without producing either nausea or emesis, the large doses being much more effective than smaller ones.

[1] *British Medical Journal;* Med. Chronicle, June, 1891.

At first Dr. Murrell began with small doses, such as $\frac{1}{20}$ of a grain, but sometimes he commenced with from three to six-tenths three times a day. In a few cases apomorphine given by the mouth produced nausea and vomiting.

Apomorphine made into an ointment is a valuable form of administration, especially useful in the case of children. To ascertain what the emetic dose would be if the drug were given in this way, three ointments were prepared with lard, vaselin, and lanolin, each containing $\frac{1}{10}$ grain of apomorphine to the drachm. These were given to different patients with instructions that the ointment should be rubbed on the chest before the fire at bedtime. No emetic effect resulted. Even when the quantity was increased by rubbing in $\frac{1}{2}$ grain in half an ounce of lard vomiting was not produced, but with that dose there was an expectorant action lasting some hours.

When used in the form of spray the expectorant action is very marked; $\frac{1}{10}$ to $\frac{3}{10}$ of a grain may be used in this way with a little water, the patient being told not to swallow the fluid which accumulates in the mouth.

In a few cases a narcotic effect has been described as occurring after apomorphine, but Dr. Murrell thinks this is either imaginary or due to a mixture of apomorphine with morphine.

Apomorphine has the advantage of compatibility with morphine. It may be given in cases of opium poisoning as an emetic, and as an expectorant the combination is very useful, especially in cases of phthisis.

In the majority of the cases treated by the author, the drug was given in mixture with syrup of wild cherry, syrup of tar and syrup of lemon.

It is well known that a solution of apomorphine changes color after a time, becoming dark green after exposure to light and air.

The author used both freshly prepared solutions and those which had been kept for months and had changed color. There was no perceptible difference in their action, and the change in color seems to have no harmful effect. The direction given with the B. P. injectio apomorphine hypodermica (1 in 50), that it should be made as required for use, is unnecessary.

Dr. Murrell has made experiments with apocodeine. Apocodeine ($C_{18}H_{19}NO_2$), bears the same relation to codeine ($C_{18}H_{21}NO_3$) as apomorphine does to morphine, containing an equivalent less of H_2O. It is made by acting on codeine with chloride of zinc.

Apocodeine is insoluble in water; the hydrochlorate is freely soluble. It is not crystallizable like the hydrochlorate of apomorphine, but is more stable and more easily made.

Dujardin-Beaumetz has described it as possessing the therapeutic properties of apomorphine in a modified degree, and Dr. Murrell's experiments lead him to a similar conclusion.

After $\frac{3}{10}$ of a grain injected subcutaneously in a chronic bronchitic patient neither sickness nor vomiting followed, but copious expectoration was produced. In another case half a grain subcutaneously did not cause sickness. Legg found great irritation follow its subcutaneous use. Dr. Murrell does not find this where a neutral solution is used.

Dr. Murrell has also administered hydrochlorate of apocodeine by the mouth as an expectorant in six cases with satisfactory results. In only one case did it cause sickness. It may be given in solution or as a pill. Three or four grains daily may be safely given.

POISONOUS CONSTITUENTS OF "TIMBÓ."[1]

By F. Pfaff.

Timbó is the name given in Brazil to several plants such as *Serjania cuspidata*, St. H., *Serjania lethalis*, and *Paullinia pinnata* of the order Sapindaceæ, and *Tephrosia toxicaria* and *Physalis heterophylla* of the order Leguminosæ, all of which are used for the purpose of stupefying fish. A decoction of the root is preferred as affording the more powerful poison. The material collected by the author consisted of root and branches, without flower or fruit, and could only be identified as coming from a leguminous plant. To isolate the active principle, an alcoholic extract of the plant was concentrated, washed with water, treated with ether, and the dark colored ethereal solution decolorized by means of sodium carbonate and dilute soda solution. After removing the ether and drying over sulphuric acid, solid crude timboïn was obtained, which softened when exposed to the air. A similar product was obtained by precipitating the alcoholic extract with lead acetate, and purifying the filtrate. Further treatment of the crude product with alcohol, light petroleum, and benzene or chloroform at length yielded a hard, yellowish-white, sandy substance, which, under the microscope, clearly indicates crystalline structure. *Timboïn*, $C_{27}H_{26}O_8$, melts at

[1] *Arch. Pharm.*, **229**, 31–48; Jour. Chem. Soc., Aug., 1891.

83°, is very soluble in ether, alcohol, benzene, glacial acetic acid, toluene, and carbon bisulphide, exceedingly soluble in chloroform; very sparingly soluble in light petroleum, and almost insoluble in water. Its alcoholic solution is not precipitated either by normal or basic lead acetate, iodine solution, or tannin. Its solution in acetic acid or in alcohol gives a white, flocculent precipitate with water; but these solutions give no coloration, either with ferric chloride or potassium chromate. The compound becomes first black and then reddish-brown with concentrated sulphuric acid. Sobieranski considers timboïn to be a chemically neutral, indifferent substance, and a nerve poison of the toxine class. *Anhydrotimboïn*, $C_{27}H_{24}O_7$, was obtained as slender, colored, needle-shaped crystals during the refining of the crude timboïn. It was also produced directly from timboïn by heating the alcoholic solution with hydrochloric acid. This compound melts at 215–216°, and is not poisonous. Light petroleum, boiling at 38–40°, extracted from the crude timboïn an oily compound, *timbol*, $C_{20}H_{16}O$, probably also a poisonous compound, occurring chiefly in the stem and branches of the plants.

RAPHIDES, THE CAUSE OF THE ACRIDITY OF CERTAIN PLANTS.

By R. A. Weber, Ph.D.

At the last meeting of the American Association for the Advancement of Science, Prof. W. R. Lazenby reported his studies on the occurrence of crystals in plants. In this report he expressed the opinion that the acridity of the Indian turnip was due to the presence of these crystals or raphides. This opinion was opposed by Prof. Burrill and other eminent botanists, who claimed that other plants, as the fuchsia, are not at all acrid, although they contain raphides as plentifully as the Indian turnip. Here the matter was allowed to rest.

The U. S. Dispensatory and other works on pharmacy ascribe the acridity of the Indian turnip to an acrid, extremely volatile principle insoluble in water and alcohol, but soluble in ether. Heating and drying the bulbs dissipate the volatile principle, and the acridity is destroyed.

At a recent meeting of Ohio State Microscopical Society this subject was again brought up for discussion. It was thought by some that the raphides in the different plants might vary in chemi-

cal composition, and thus the difference in their action be accounted for. This question the writer volunteered to answer.

Accordingly, four plants containing raphides were selected, two of which, the *Colocasia* and Indian turnip, were highly acrid, and two, the *Fuchsia* and *Tradescantia*, or Wandering Jew, were perfectly bland to the taste.

A portion of each plant was crushed in a mortar, water or dilute alcohol was added, the mixture was stirred thoroughly and thrown upon a fine sieve. By repeated washing with water and decanting a sufficient amount of the crystals was obtained for examination. From the calla the crystals were readily secured by this means in a comparatively pure state. In the case of the Indian turnip the crystals were contaminated with starch, while the crystals from the fuchsia and tradescantia were imbedded in an insoluble mucilage from which it was found impossible to separate them. The crystals were all found to be calcium oxalate.

Having determined the identity in chemical composition of the crystals, it was thought that there might be a difference of form of the crystals in the various plants, from the fact that calcium oxalate crystallizes both in the tetragonal and the monoclinic systems. A laborious microscopic examination, however, showed that this theory also had to be abandoned. The fuchsia and tradescantia contained bundles of raphides of the same form and equally as fine as those of the acrid plants. At this point in the investigation the writer was inclined to the opinion that the acridity of the Indian turnip and calla was due to the presence of an acrid principle.

Since the works on pharmacy claimed that the active principle of the Indian turnip was soluble in ether, the investigation was continued in this direction. A large stem of the calla was cut into slices, and the juice expressed by means of a tincture press. The expressed juice was limpid and filled with raphides. A portion of the juice was placed into a cylinder and violently shaken with an equal volume of ether. When the ether had separated a drop was placed upon the tongue. As soon as the effects of the ether had passed away, the same painful acridity was experienced as is produced when the plant itself is tasted. This experiment seemed to corroborate the assumption of an acrid principle soluble in ether. The supernatant ether, however, was slightly turbid in appearance, a fact which was at first ignored. Wishing to learn the cause of

this turbidity a drop of the ether was allowed to evaporate on a glass slide. Under the microscope the slide was found to be covered with a mass of raphides. A portion of the ether was run through a Munktell filter. The filtered ether was clear, entirely free from raphides, and had also lost every trace of its acridity.

The same operations were repeated upon the Indian turnip with exactly similar results.

These experiments show conclusively, that the acridity of the Indian turnip and calla is due to the raphides of calcium oxalate only.

The question of the absence of acridity in the other two plants still remained to be settled. For this purpose some recent twigs and leaves of the fuchsia were subjected to pressure in a tincture press. The expressed juice was not limpid, but thick, mucilaginous and ropy. Under the microscope the raphides seemed as plentiful as in the case of the two acrid plants. When diluted with water and shaken with ether, there was no visible turbidity in the supernatant ether, and when a drop of the ether was allowed to evaporate on a glass slide, only a few isolated crystals could be seen. From this it will be seen that in this case the raphides did not separate from the mucilaginous juice to be held in suspension in the ether. A great deal of time and labor were spent in endeavoring to separate the crystals completely from this insoluble mucilage but without avail. With the tradescantia similar results were obtained.

From these experiments the absence of acridity in these two plants, in spite of the abundance of raphides, may readily be explained by the fact, that the minute crystals are surrounded with and embedded in an insoluble mucilage, which prevents their free movement into the tongue and surface of the mouth, when portions of the plants are tasted.

The reason why the Indian turnip loses its acridity on being heated, can be explained by the production of starch paste from the abundance of starch present in the bulbs. This starch paste would evidently act in a manner similar to the insoluble mucilage of the other two plants.

So also it can readily be seen that when the bulbs of the Indian turnip have been dried, the crystals can no longer separate from the hard mass which surrounds them, and consequently can exert no irritant action when the dried bulbs are placed against the tongue. —Jour. Amer. Chem. Soc., Sptb., 1891, p. 215.

THE LIQUORICE PLANT AS FOUND ON THE BANKS OF THE TIGRIS AND EUPHRATES.

In a report on the trade of Bussorah, Consul Chenevix-Trench says: The great rivers of the Tigris and Euphrates, in the part where the liquorice root is found, flow through flat treeless prairies of uncultivated and nearly uninhabited land, capable with irrigation of producing any grain. For three months of the year hot winds blow, and the temperature reaches 104 degrees. For six months the climate is moderate and salubrious, and for three months bleak and wintry, the thermometer going down to 30 degrees at night. The liquorice plant is a small shrub, with light foliage, growing to about 3 feet high, invariably where its root can reach the water. It grows without any cultivation. No lands are leased for the purpose, and no objection is made to its being collected. It is found in abundance, from Ctesiphon, 20 miles from Baghdad, down to Kut-ul-Anara, 178 miles—the latter place being half-way between the ports of Bussorah and Baghdad. It grows on red earth soil, and also on light, almost sandy soil, where the wood is best—provided it has plenty of water, and the ground is not more than 50 yards from the actual river or stream. The one firm which works it in Baghdad is Messrs. Zerlendi and Essayie; and it is well known that the business is a prosperous one. The plant is dug up by Arab labor, which is, generally speaking, plentiful, and the men can be brought by boat to where the plant is growing. The laborers need superintendence. They are paid according to the quantity dug. The wood, after being once dug up and cut, grows again better afterwards. The time of collecting is, generally speaking, during the winter, but it is possible all the year round. The root when dug is full of water, and must be allowed to dry; this process takes the best part of a year, especially in hot weather. After it is dry, or during the process, it is sawn or cut into small pieces 6 inches to 1 foot long. The good and sound pieces are kept, and the rotten bits removed for firewood. A local tax of 10 per cent. is claimed by the Government, which may be taken in money or kind from roots cut from the Sultan's lands, and 20 per cent. from Government lands. It is then shipped in river native boats for Bussorah, where there is a wool hydraulic press. It is afterwards shipped in pressed bales to London, and again shipped from there to America, where it is used largely in the manufacture of tobacco. The trade is capable of expansion. The demand in America is great, and shipments are easily disposed of.—*Phar. Jour. and Trans.*, Sept. 26, p. 247.

CHEMICAL COMPOSITION OF THE FRUIT OF TOMATOES.[1]

G. Brissi and T. Gigli (*Staz. Sper. Agrar.*, **18**, 5–34), separated the ripe fruit of tomatoes into skin, seeds and pulp. The pulp was further separated, by filtration through calico, into a red, insoluble substance and a yellow liquid, both of which were examined qualitatively, and then the various constituents determined quantitatively. The results given below are the averages of several analyses.

The pulp itself forms 85·4 per cent. of the whole fruit; it contains: total dry matter, 4·725; soluble substance, 3·735; and insoluble matter, 1·093 per cent.

The following numbers show the percentage composition (I) of the dry matter of the red insoluble substance, and (II) of the dry matter of the yellow filtrate:

	I.	II.
Total nitrogen,	4·002	2·254
Proteïds,	25·012	2·43
Coloring matters,	21·128	—
Cellulose,	34·390	—
Ash,	7·959	10·96
Levulose,	—	46·68
Citric acid,	—	14·03
Amide-nitrogen,	—	0·641
Amido-acid nitrogen,	—	1·224

The percentage composition of the ash of the two products is as follows:

	K_2O.	Na_2O.	CaO.	MgO.	Cl.	SO_3.	P_2O_5.
I,	—	—	18·127	1·423	—	—	15·866
II,	58·554	1·425	1·315	0·169	8·842	0·781	7·182

	CO_2.	SiO_2.	Not Determined.
I,	—	—	64·584
II,	18·832	0·451	2·449

N. Passerini (*Staz. Sper. Agrar.*, **18**, 545–572), found the fresh fruit of tomatoes to consist of skin (1·3), pulp and juice (96·2), and seeds (2·5 per cent.). The pulp contains two coloring matters, a yellow, amorphous substance and a red, crystalline substance. They are both insoluble in water, soluble in amyl alcohol, and very soluble in ether, and both are decolorized by chlorine and bromine-water. The red crystals are almost insoluble in cold alcohol, whilst the

[1] From Jour. Chemical Society, August, 1891, pp. 955, 956.

yellow compound is very soluble. Hydrochloric acid has no action on either compound.

The sap of the fruit has a sp. gr. = 1·01833 at 15°, and is lævorotatory. It contains a yellow coloring matter, which differs from that of the pulp in being soluble in water, insoluble in alcohol, ether, chloroform, and light petroleum, and in not being decolorized by chlorine-water or bromine-water. The acidity of the sap is due chiefly to citric acid; it contains also a small amount of an alkaloid, which, like the acid, decreases as the fruit ripens.

The following table shows the percentage of dry matter (1) in the skins, (2) in the pulp, (3) in the sap, and (4) in the seeds, as well as the percentage composition of the dry matter in each case.

	Dry matter.	Organic matter.	Ash.	Porteïds.	Carbohydrates. and fat.
Skins, ...	40·50	99.20	0·80	1·85	97·05
Pulp, ...	6·35	89·56	10·44	15·15	74·41
Sap, ...	2·44	74·52	25·48	21·80	52·72
Seeds, ...	53·70	95·56	4·40	25·40	70·16

The carbohydrates of the skins are chiefly in the form of cellulose.

The numbers in the last column for sap refer to carbohydrates and acids.

The following analyses are given of the entire fruit collected (1) in September, 1888, and (2) August, 1889; (1) was unripe, and (2) ripe. The percentage of dry matter was 93·50 and 91·01, respectively. The numbers show the percentage in the fruit dried at 105°.

	Glucose.	Citric acid.	Proteïds.	Fat and coloring matter.	Cellulose.	Ash.
1, ...	2·68	48·53*	11·25	11·73	7·83	8·05
2, ...	41·54	9.07	11·48	7·02	18·14	12·73

* Citric acid and substances not determined.

The ash of the fruit has the following percentage composition:

K_2O.	Na_2O.	CaO.	MgO.	Fe_2O_3.	P_2O_5.	SO_3.	SiO_2.	Cl.
59·46	5·99	1·34	3·09	0·22	12·93	3·49	0·27	19·14

Having regard to the large amount of potash in the fruit, and the large amount of lime in the stems and leaves (the crude ash of the stems contains 28·32 per cent. of lime) the following manuring is recommended for tomatoes: Farmyard manure, 5,000 kilos., calcium superphosphate (18 per cent.), 30 kilos.; potassium chloride (50 per cent.), 60 kilos. per hectare.

OIL OF POLEI.[1]

By. E. Beckmann and M. Pleissner.

Spanish oil of Polei, from *Mentha Pulegium*, is a light yellow or green, rather thick liquid with an odor recalling that of peppermint. On fractionating the oil (62 grams), under the ordinary atmospheric pressure, considerable decomposition takes place; a small portion (3 grams), consisting principally of water, passes over below 212°, the principal portion (50 grams) between 212° and 216°, and a small quantity of a dark yellow liquid (4 grams) between 216° and 223°, leaving a brownish residue (5 grams).

A compound of the composition $C_{10}H_{16}O$, named by the author *pulegone*, can be isolated from the portion boiling at 212–216° by repeated fractional distillation under reduced pressure (60 mm.); it is a colorless liquid, of sp. gr. 0·9323 at 20°, boils at 130–131° (60 mm.), and has an odor recalling, but distinct from, that of oil of peppermint. Its specific rotatory power is $[\alpha]_D = 22·89$, but this value is slightly diminished when the oil is treated with sulphuric acid or distilled with steam, probably owing to resinification. Pulegone quickly turns yellow, even when kept in closed vessels, and it does not solidify when cooled in a mixture of ice and salt; it is gradually resinified by hot alcoholic potash, and it does not give an ethereal salt with benzoic or stearic anhydride; it gives some, but not all, the reactions of aldehydes, and with phenylhydrazine it yields only oily or resinous, very unstable compounds. Molecular weight determinations gave results in accordance with those required by the molecular formula $C_{10}H_{16}O$; its molecular refractive power was found to be $M_D = 45·55$, whereas the value calculated for the formula $C_{10}H_{16}O''$ is $M_D = 45·82$.

Pulegoneoxime, $C_{10}H_{19}NO_2$, can be obtained by treating pulegone with hydroxylamine in boiling alcoholic ethereal solution; it crystallizes from ether in long needles, melts at 157° with decomposition, and is only sparingly soluble in cold alcohol, benzene and light petroleum; its specific rotatory power is $[\alpha]_D = -83·44$. Molecular weight determinations showed that the compound has the molecular formula given above. Pulegoneoxime is more readily soluble in dilute acids than menthoneoxime, and, unlike the latter, it is not acted on by cold sulphuric acid of sp. gr. 1·17; it dissolves

[1] *Annalen*, **262**, 1–37; Jour. Chem. Soc., August, 1891, p. 936.

freely in hydrochloric acid, yielding a solution which gradually turns brown, but it is only very sparingly soluble in alkalis. It reduces ammoniacal solutions of silver and copper on warming. The *hydrochloride*, $C_{10}H_{19}NO_2HCl$, separates from alcoholic ether in well-defined rhombic crystals, $a : b : c = 0.6048 : 1 : 1.0477$, melts at 117–118° with decomposition, and is readily soluble in water; its specific rotatory power is $[\alpha]_D = -32.43°$. The *benzoyl* derivative, $C_{10}H_{18}O{:}N{\cdot}OBz$, prepared by treating the oxime with benzoic chloride in ethereal solution, crystallizes from dilute alcohol in colorless needles melting at 137–138° with decomposition. The *acetyl* derivative, $C_{10}H_{18}O{:}N{\cdot}OAc$, is formed when the oxime is warmed with acetic chloride; it crystallizes in long needles, and melts at 149°.

Pulegoneamine, $C_{10}H_{19}ON$, is obtained when the oxime is treated with hydriodic acid, and the crystalline hydriodide obtained in this way warmed with excess of the concentrated acid; it is a yellowish oil having a bitter taste and an amine-like odor, and it decomposes when heated; it is only sparingly soluble in water, but readily in ether and alcohol. The *hydrochloride*, $C_{10}H_{19}NO,HCl$, was prepared, but only in an impure condition, by treating the base with hydrogen chloride in ethereal solution; it crystallizes from alcohol in long needles, melts at 117°, and is readily soluble in water, alcohol, benzene, and glacial acetic acid, but only moderately easily in light petroleum, and sparingly in ether. *Pulegoneamine phenylthiocarbimide*, $C_{10}H_{18}O{:}N{\cdot}CS{\cdot}NHPh$, is precipitated in colorless plates on warming a benzene solution of pulegoneamine with phenylthiocarbimide; it melts at 198°. The *benzoyl* derivative, $C_{10}H_{18}O{:}NBz$, separates from warm, dilute alcohol in colorless, feathery crystals, melts at 100.5–101°, and is sparingly soluble in water, ether and benzene, but readily in alcohol. The *methyl* derivative, $C_{10}H_{18}O{:}NMe$, prepared by boiling the amine with methyl iodide, and decomposing the product with potash, is a light-yellow oil; its *platinochloride*, $(C_{11}H_{21}NO)_2,H_2PtCl_6$, crystallizes in well-defined yellow needles, and is sparingly soluble in alcohol and ether. When pulegoneamine is boiled with concentrated potash, it is decomposed into pulegone and ammonia; methylpulegoneamine, under the same conditions, yields pulegone and methylamine.

An additive compound of the composition $C_{10}H_{17}BrO$ is deposited in colorless crystals when hydrogen bromide is passed into a well-

cooled solution of pulegone in light petroleum; it separates from dilute alcohol in well-defined, colorless crystals, melts at 40·5°, and is readily soluble in alcohol and ether. It gradually decomposes on keeping, and it is converted into pulegone by freshly-precipitated silver oxide and lead hydroxide, but it is not acted on by cold dilute soda or by warm sodium carbonate; its specific rotatory power is $[\alpha]_D = -33{\cdot}88°$. When treated with hydroxylamine, as described in the preparation of pulegoneoxime, it is converted into a compound which crystallizes in quadratic plates, melts at 38°, and has probably the composition $C_{10}H_{18}BrNO$; on keeping this substance for some time, it first changes into a mass of needles melting at 110°, which are free from bromine, but contain nitrogen, and then into pulegoneoxime. When the additive compound is reduced with zinc-dust in alcoholic solution, it yields very small quantities of pulegone and a considerable quantity of an oil, which has the same molecular formula as, and possesses all the properties of, the levomenthone described by Beckmann (1889), except that its oxime melts at a higher temperature, namely, at 84–85°; when this isomeride of menthone is treated with sodium in ethereal solution, it is converted into a mixture of isomeric menthols, from which a considerable quantity of the benzoyl derivatives of natural lævomenthol can be isolated in a crystalline condition. Lævomenthol is also obtained, together with resinous products, when pulegone is reduced with sodium under the same conditions.

The author gives three possible formulæ for pulegone.

ON SOME DERIVATIVES OF BENZOIC SULPHINIDE (SACCHARIN OR BENZOYL SULPHONIC IMIDE) AND THE CHANGES CAUSED IN THEIR TASTE BY CHANGES IN COMPOSITION.[1]

By R. De Roode.

The most characteristic property of parabromosulphinide is that it possesses two distinct tastes, a bitter and a sweet, and the corresponding chlorine compound has the same peculiarity in even a more marked degree. The author has, therefore, investigated the other para-halogen-sulphinides, and the substances from which they are made, and observed their effect upon the nerves of taste.

[1] From the *Amer. Chem. Journ.*, xiii, 217–232. Reprinted from the *Journ. of the Soc. of Chem. Ind.*, July.

The starting point for their preparation was paradiazotoluene-orthosulphonic acid, which was converted into parafluortolueneorthosulphonic acid by heating with concentrated hydrofluoric acid in a platinum dish until the decomposition was complete, evaporating to a syrupy consistence, diluting with a large quantity of water, and neutralizing with barium carbonate (the calcium salt not being easily crystallizable). From the barium salt the potassium compound was obtained by treatment with potassium carbonate. This latter salt crystallizes from water in large glistening scales, containing two molecules of water of crystallization. The corresponding chlorine and bromine salts were prepared in a similar manner, potassium chlortoluenesulphonate crystallizing in light yellow needles containing no water, and the bromtoluenesulphonate in thin lustrous scales containing 1 mol. of water of crystallization. For the preparation of the iodo-salts the diazo compound was decomposed by hydriodic acid in presence of alcohol, the flask being kept cool; after the evolution of nitrogen had ceased the contents were warmed and the alcohol distilled off. The residue was diluted with a large quantity of water, neutralized with lead oxide and filtered hot. The lead salt, being insoluble, could not be easily freed from the excess of oxide, and was converted into the potassium salt, which crystallized from aqueous solution in transparent "whetstone-shaped" crystals containing 1 mol. of water and corresponding to the potassium salt of the β-iodotoluenesulphonic acid described by Glassner (*Berichte*, viii, 561). Accompanying the insoluble lead salt was another which was very soluble; it was not examined as such, but was converted into the potassium salt, and on analysis gave figures corresponding to potassium toluenesulphonate.

From these four potassium salts, the corresponding amides were prepared by the action of phosphorus pentachloride, followed by aqueous ammonia. The solutions were evaporated to dryness on the water-bath, alcohol added, and after treatment with animal charcoal, crystallized out. With the exception of the iodo salt, all are easily soluble in hot water and alcohol, sparingly soluble in cold water. The melting-point of the fluorine salt is 155°, of the chlorine salt, 145°, and of the iodine salt, 185–187° (uncorrected). From these amides, the sulphinides (sulphonic imides) were prepared by oxidation with alkaline permanganate, the most successful

method of working being found to be as follows: 20 grams of the amide and 8 grams of caustic potash were dissolved in 2 litres of water in a large flask and placed on the water-bath. A concentrated solution of 35 grams of potassium permanganate was then added by degrees, the flask being kept hot until only a slight pink color remained, an operation lasting about six or eight hours. A little alcohol was then added, and the liquid filtered and evaporated to about 75 cc. While still hot, the sulphinide, together with some unaltered amide, was precipitated with strong hydrochloric acid; to separate them the mixed precipitate was boiled with water, neutralized with chalk, filtered and allowed to cool, the amide crystallizing out in long white needles. On further evaporation the calcium salt of the sulphinide was obtained. These all crystallize in radial groups of white needles, having the same tastes as the sulphinides themselves, and containing 7½ molecules of water of crystallization. From these calcium salts the pure sulphinides were obtained by precipitation with strong hydrochloric acid.

Parafluorosulphinide, thus prepared, crystallizes from hot water in long white needles, which break up on drying into granules; from a dilute solution it may be obtained in small transparent rhombs. Its melting-point is 200–202° (uncorrected). Its taste is almost purely sweet, a slight bitter after-taste being perceptible. It is probably as sweet as benzoic sulphinide.

Parachlorosulphinide crystallizes in thin pearly scales, melting at 218°. It is slightly less soluble than the fluorine compound. It has both a sweet and a bitter taste, the latter being the more intense.

Parabromosulphinide also possesses both tastes, but in a less marked degree, and *para-iodosulphinide* has only a slight bitter taste. The latter crystallizes in fine white needles and melts at 230–232°. On boiling with dilute hydrochloric acid, *p*-chlorosulphinide is converted into the acid ammonium salt of *p*-chlororthosulphobenzoic acid, just as benzoic sulphinide is into that of orthosulphobenzoic acid.

With regard to the tastes of these halogen derivatives, it is found difficult to describe the differences accurately; they have been tasted by several, the majority of whom agree with the author in his description. "It is, however, impossible to make accurate comparison between a sweet and a bitter taste as regards the relative intensity of the two."

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for The American Journal of Pharmacy.

A new reagent for albumin in urine.—M. and Ad. Jolles (*Union pharmac.*; *Nouv. Remèd.*, 1891, No. 7), propose the following method for testing for albumin: 8–10 cc. urine are mixed with an equal volume of concentrated hydrochloric acid and to this mixture are added from a pipette a few drops of a saturated solution of chloride of calcium in such a manner that the liquids will not mix. In presence of even traces of albumin the dividing line will show a distinct white cloudiness.

Derivatives of Salol in urine.—Lacroix (*Répertoire de Pharmacie; Bull. de Thérapeut.*, 1891, cxx, 284) calls attention to the fact that patients taking salol internally or using it externally pass a urine having the property of reducing certain metallic oxides (copper, silver and bismuth) just as is the case with diabetic urine. The examination with the saccharometer can also not be depended on, the rotatory power of these salol compounds being opposed to that of glucose. The author gives an optical and a chemical method for distinguishing between the two. After treating the urine with subacetate of lead, a test tube holding 15 cc. is half filled with the same; to this is added ·05 gm. phenylhydrazin hydrochloride and ·2 gm. pure acetate of sodium. The test tube is then heated to 100° C. (212° F.) on a water-bath for half an hour. The contents are then poured into some water and allowed to cool. The precipitate formed is examined with the microscope. Glucose gives a crystalline precipitate while the salol compound gives an amorphous one. The other method is as follows: 100 cc. urine are shaken with 1 gm. sulphuric acid and about 50 cc. pure ether; it is then permitted to separate. The upper layer, containing the derivatives of salol, is evaporated, the residue dissolved in water and a few drops of perchloride of iron are added to it. This would give rise to a violet color in case salol were present. The lower layer, after separation from the ethereal solution, is treated with subacetate of lead, filtered, and the glucose then estimated in the usual manner.

Iodol.—Dr. Trouchet, of Larochelle (*Nouv. Remèd.*, 1891, p. 298), publishes the following formulæ for the exhibition of iodol (1) in the form of an *emulsion*: iodol 1 gm., glycerin 10 gm., water 20

gm., gum arabic 2·50 gm.; (2) in the form of a *solution:* iodol 10 gm., oil of sweet almonds or olive oil 150 gm., yielding a clear and limpid liquid; (3) as *crayons* or *bougies:* iodol 5 centigm., lanolin, wax, gum āā 0·25 gm.; (4) as a *salve:* iodol 1 gm., petrolatum 10 gm.

Sulphonal for the sweats of consumptives.—Erede (*Rif. med.*, 22 May, 1891) draws the conclusion, based on a large number of observations, that medium doses (½ to 1 gm.) of sulphonal suppress the phthisical night sweats with certainty, the effect continuing for some days after the cessation of the medicine.

Preparation of chlorine.—A Reychler (*Revue Scientif.*, through *Nouv. Remèd.*, 1891, 419) publishes a new method for the technical preparation of chlorine, based on the action of hydrochloric acid on two salts of magnesium. A solution of one part of manganese chloride, one part of magnesium chloride and one or two parts of sulphate of magnesium is evaporated to dryness and heated to dull red heat with access of air. The mixture gives off hydrochloric acid containing a small quantity of chlorine. The residue, consisting of sulphate and manganate of magnesium, is treated with hydrochloric acid; this liberates about one-quarter of the chlorine contained in the hydrochloric acid and yields the same solution with which the process was started. This is then treated like the original solution.

The hypnotic action of chloralamide.—Triis (*Hospitals-Tidente* 1891, No. 12) has used chloralamide (chloral-formamide) in 29 cases (413 doses) and draws the following conclusions: With women the hypnotic action manifests itself with certainty on the exhibition of 2 gm.; males on the other hand are rather refractory. In cases of delirium tremens and chronic alcoholism it is usually without effect.

Influence of tobacco on healthy persons.—J. Ydan Pouchkine (*Wratch*, No. 48, 1890) arrived at the following conclusions on the action of tobacco after experimenting with seven non-smokers. The latter smoked twenty-five cigarettes every day for three days. (1) Tobacco increases the quantity of the gastric juice, but reduces its acidity; (2) it reduces the quantity of hydrochloric acid in the gastric juice; (3) as the quantity of free hydrochloric acid is diminished so is the digestive force of the gastric juice reduced; (4) it

retards the action of the rennet ferment; (5) the modification of the gastric juice produced by tobacco lasts for some time; (6) the mobility of the stomach and its resorbing power are augmented under the influence of tobacco; (7) it has no effect on the acidity of the urine.

HYPODERMIC INJECTIONS OF CORROSIVE SUBLIMATE IN DIPHTHERIA AND SCARLATINA.—Dr. J. Jacontini (*Morgagni*, 1890) administered by injections 1 centigram of corrosive sublimate in eight or nine days during an epidemic of scarlatina. The fever was reduced and at the same time the manifestations in the throat were modified. Encouraged by these results the author used this treatment in two cases of diphtheria with the satisfaction of obtaining a rapid attenuation of the morbid phenomena and followed by cure.

MOUTHWASH FOR CARIOUS TEETH.—A mouthwash said to prevent dental caries is as follows: tannin 5 gms., tincture of iodine and tincture of myrrh, of each 2·5 gm.; potassium iodide, 1 gm.; rose water, 180 gm. The mouth is rinsed every morning with one teaspoonful to a glass of warm water.—(*Bull. de Thérapeut.*, 1891, cxx, p. VIII.)

EXAMINATION FOR ADULTERATIONS OF TOMATO PRESERVES.—Capdeville (*Bull. de Thérapeut.*, 1891, cxx, p. 277) divides the analysis into an optical or microscopical and a chemical portion. The adulterations which are looked for by the first method are carrot and pumpkin, and this is done by comparison with sections of these vegetables. The chemical method takes cognizance of the presence of coloring matters such as eosin, cochineal and grenadin. *For eosin:* 5 gm. of the preserve are treated in a test tube with a mixture of 25 cc. of distilled water, 1 cc. ammonia and 25 cc. amylic alcohol. The mixture is then filtered, and in case the filtrate is rose-colored eosin is present which is also shown by the fluorescence. *For cochineal:* 5 gm. preserve are treated for 24 hours with 30 cc. alcohol of 95 per cent.; the liquid is then filtered and the alcohol evaporated on a water-bath. Should this residue on treatment with ammonia give a red color, cochineal is present. *For grenadin:* The preserve is treated with alcohol, the solution filtered and the filtrate evaporated to dryness. The residue is treated with water which dissolves the grenadin, and this aqueous solution is used for dyeing silk. Hydrochloric acid does not, while a solution of chloride of lime does, decolorize the silk even at ordinary temperatures.

ALUM IN BREAD.—Cohen (Il Selmi through *Bull. Thérapeut.*, 1891, CXX, 281) triturates the bread with water until disintegrated, and places in this mixture a piece of pure gelatin which he allows to remain for twenty-four hours. It is then washed with cold water containing a few drops of tincture of hæmatoxylon (1 : 10) and of a solution of carbonate of ammonium (1 : 10). Should the gelatin after this treatment assume a blue color alum was present.

DETECTION OF POTASSIUM BROMIDE IN POTASSIUM IODIDE.—This method is based on the insolubility of bromide of mercury in boiling alcohol. The potassium salt is dissolved and carefully precipitated with corrosive sublimate solution. The precipitate is treated a number of times with boiling alcohol in which the iodide of mercury is soluble.—(*Bull. de Thérapeut.*, 1891, CXXI, p. 93.)

POTASSIUM PERMANGANATE is formed, according to J. W. Retgers (*Rec. trav. chim.*, x, 1), when a solution of potassium manganate is mixed with a solution of ammonium sulphate, or other ammonium salt, containing much free ammonia; manganic acid is liberated, which, being unable to combine with ammonia, is decomposed into permanganic acid and manganic dioxide.

THE IDEAL PRECEPTOR.

BY GEO. M. BERINGER, PH.G.

Read at the Pharmaceutical meeting of the Philadelphia College of Pharmacy, October 20.

Before attempting to describe our ideal preceptor, it is, perhaps, advisable to explain that the writer is not a proprietor. But for years it has been my lot to be daily in contact with pharmaceutical students and become more or less acquainted with their shortcomings. From this neutral ground I venture to criticise, as an unbiased observer, those who have largely the making of the future of pharmacy in America. I have no interest at stake and fear that I have not yet learned to accept the advice of Mr. Bigelow:

> The fust thing for sound politicians to larn is,
> Thet Truth, to dror kindly in all sorts o' harness,
> Mus' be kep' in the abstract—for come to apply it,
> You're ept to hurt some folks's interists by it.

Our *ideal* preceptor is not he who possesses the finest store, the largest trade, or the most fashionable patronage. Nor is it he who endeavors to impress you with the fact that he is making money and knows how to spend it; whose team is little "faster" than himself, and whose diamond is brighter than his eyes. Nor is our *ideal* he who confidentially tells his clerk that "it won't do to be too scrupulous," and who, perhaps, keeps a private bottle behind the prescription counter for the benefit of the patronizing physician. Who tipples himself and don't object to his clerks doing likewise. The contemptible, the

intemperate and the dishonest are found in the drug trade as elsewhere, as well among the employers as the employed. To such we need not address ourselves. Our *ideal* is not necessarily, he who allows the largest liberties, nor yet he who pays the best salaries. For some can afford to pay better salaries than others, and he who does the most questionable trade could pay the best. In this respect, the student in pharmacy must bear in mind that while serving his apprenticeship, he is working for knowledge which is more valuable to him in the end than his salary, and while acquiring this knowledge he must be willing to give a portion of his labor for the same.

It may be asked how many proprietors are really preceptors or teachers in the true sense of the word. It seems to me that in engaging a young man in the drug business, the proprietor assumes a moral obligation to impart certain information of a practical and scientific character which is necessary to our craft, and this information, as stated before, is considered as valuable and given in lieu of an adequate compensation.

It is our desire to adhere closely to the subject announced for discussion, the aid the preceptor should give the student, and to indicate some of the means by which he can assist the college in her aim at a higher educational standard, and to place pharmacy upon that scientific basis which it is bound to acquire.

The first reform must come in the selection of apprentices. Something is wanted more than the standing or wealth of the parents to make a successful pharmacist. I hold that it is the duty of the employer to select only such assistants as have, at least, that amount of common school education which is essential to their being able to grasp the more advanced studies. I do not believe that at the present time, with the acknowledged advancement of English literature, that an extended knowledge of the dead languages is necessary, but sufficient should be required to enable our students to work intelligently and profit by the course of instruction given.

It is a hopeless task for a student who is deficient in such ordinary branches as orthography, English grammar and common arithmetic, to attempt to master the teachings of the College of Pharmacy. In this respect, it will be a great stride in the right direction when all colleges of pharmacy will require matriculants to pass a satisfactory examination in the elementary branches before admission to instruction. I believe that more practical aid would be given to true pharmacy by this simple and apparently unimportant move, than all the efforts heretofore made to suppress cutting and the illegitimate selling of drugs. Raise the initial standard of pharmacy first, and the final standing will be proportionately higher.

The second thought that occurs is, where should the instruction of the student commence? Surely the duty of the preceptor does not end with teaching his assistant how to make a neat parcel, to politely wait on customers, to profitably sell proprietary and toilet articles and to be exact and neat. All of these are important, but something more is necessary. A systematic course of reading in elementary works, gradually leading up to the accepted standard text books, should be mapped out for the student from the day he enters the drug business.

I am compelled to believe that many of them come to the college with little or no idea of the branches taught, and no preparatory reading in the same. And many after having been two or three or even five or six years in the drug

business appear to be entirely ignorant of even the Pharmacopœia. Our official guide being to them a sealed book.

Our colleges would be rendering a great service which would redound to their credit a hundred-fold, if such a course were mapped out and published in their announcements. That such information is needed is proven by the frequent inquiry from intended students, "What course of reading would you recommend before attending lectures?" I know that the various announcements all contain a list of advised text books, but to the majority of students, at first they are just one limb too high. Give them the elementary foundation first to build on, and the superstructure will be sound.

I am firmly convinced that Lowell's words apply with equal force to others as to poets.

> Jes' so with poets, wut they've airly read
> Gits kind o' worked into their heart an' head.

There are a number of short cuts to pharmaceutical knowledge published under the title of quiz compends, etc. Their principal claim to popularity is that they aid the student in passing examinations. They are certainly not educators—not more so than a parrot is a teacher of a child. Their influence is harmful as they serve only to fix a few points in the mind, with much that is essential to proper education wanting. A veritable porous plaster education characterized by the size of the pores. The true student desires something more than just sufficient knowledge to pass an examination, and this is the class to be encouraged by both preceptor and teachers.

That this guidance in studies and formation of habits is necessary, to a certain degree, all through the course of apprenticeship is apparent. The theory of pharmacy may be taught by lectures, but the practical knowledge can only be obtained in the store. The teachings of one must supplement the other. One practical application in the store of the use of the metrical system of weights and measures is worth more to the student than hours of talk on the same. The opportunities for instruction occur daily, nay hourly. An unusual prescription is received necessitating some peculiar manipulation or perhaps an incompatibility in the same. A minute spent in explanation fixes it permanently in the student's mind. Some preparation is wanted. Don't send and buy or prepare it from a purchased fluid extract, but have it prepared, the first time, if possible, under your supervision. Call attention to the peculiarities, the various steps in the process, as, for instance, the character of powder, the amount of packing required, the menstruum necessary, the valuable constituents of the drug which it is desired to extract and maintain, its pharmacognosy and pharmacology. But a moment or two is required in imparting a most valuable lesson. But few of our pharmacists attempt to-day to prepare their remedies from the crude drugs, and so our students become deficient in their knowledge of materia medica. Surely he who teaches his clerks those slip-shod methods of making tinctures, syrups, infusions, etc., from fluid extracts is not a true preceptor. His teachings tend to the downfall of pharmacy instead of its elevation. See that your clerks become at least familiar with such officinal crude drugs as enter in the preparations in your store, and those who are fortunate enough not to be in large cities can frequently impress this lesson by pointing out indigenous medicinal plants. Attention should be called to the new medical agents, rare chemicals, etc., their actions, doses and

properties pointed out. Surely, these are as important to both employer and employé, as the newest toilet article and latest product of the perfumer.

These might be called store lessons about little things, but they are the very essence of true pharmacy and those in which the student has a right to expect instruction. It is not sufficient to stifle your conscience with the remark that you have paid for the instruction of the student at the College of Pharmacy. This is practical information which cannot be acquired entirely from the college lecture courses, but which is valuable not only to the clerk, but equally so to the proprietor, as it is necessary to the economical and successful management of his business.

As some one says this will necessitate a great deal of labor on my part to keep up with the new methods and the new ideas. It will necessitate my reading the current literature of pharmacy that I may be posted on the advances made. But this is not our *ideal preceptor*, for he, in the language of the street, "is there already." He considers this knowledge as essential.

Our ideal preceptor is not afraid that he will learn too much. I believe that not only "three-story larnin' is pop'lar now," but certainly more valuable than a single story.

Another subject to which attention has already been called by one of our Professors is the writing of the thesis; but I believe it is a question which will bear repetition. One of the requirements of our college in general with most other similar institutions, is that an original dissertation should be presented by each student. The character of these, while admittedly improving, is yet worthy of great improvement. How can the preceptor aid in such improvement? Our ideal suggests to the student that it is advisable to select a subject early, and refers him to work already done in the same line of investigation. If his student is unable, for want of time or ability, to undertake any original research as would be entailed by, for example, a plant analysis, he suggests that the process for making some preparation could be improved. Possibly he suggests certain simple experiments with various menstrua, or a comparison of methods. This is a valuable field of pharmaceutical work which is generally neglected, and there are even a number of officinal preparations in need of just such simple experimentation carefully performed. While it is desirable that the student should be given the widest liberty in selecting a subject for a thesis, in order to develop the peculiar bent of his mind, the writer has often hoped that the college would maintain some supervision over the subjects selected; to at least decide what are desirable or undesirable subjects for investigation.

I am aware that in writing the above, but one side of the subject has been discussed. The ideal student is perhaps harder to find than the ideal preceptor, but he has not been under discussion to-day. Do not underestimate the value of example and aid to your clerk, nor forget that there is a certain magnetism in example which stimulates others to action.

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

PHILADELPHIA, September 28, 1891.

A stated meeting of the College was held this day at o'clock P. M.—Charles Bullock presiding—fifteen members present.

The minute of the previous meeting was read, and on motion, adopted.

The minutes of the Board of Trustees for July, August and September were read, and on motion, approved.

On motion of Mr. Boring, seconded by Mr. Webb, it was resolved that the subject of changing the time of holding the lectures of the College, from evenings to afternoons, be referred to the Board of Trustees for consideration.

The terms of the following Trustees, Edward C. Jones, William E. Krewson, and Dr. Chas. A. Weidemann, expiring with this date, it was made necessary to go into an election, the following names being placed in nomination. Dr. C. A. Weidemann, William E. Krewson, Edward C. Jones and James Buckman. Tellers being appointed, and a vote cast, it was announced that Edward C. Jones, Dr. C. A. Weidemann and Wm. E. Krewson had received the highest number of votes, and they were thereupon declared elected.

Charles Bullock, Wallace Procter and Gustavus Pile were elected members of the Committee on Deceased Members.

A copy of the Hand-Book of Industrial and Organic Chemistry, by Professor Saml. P. Sadtler, was presented to the College by the author, as a donation to the Library, and directed to be received with a vote of thanks.

Meeting hereupon adjourned.

WILLIAM B. THOMPSON, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 20, 1891.

The first of the present series of pharmaceutical meetings was held this day. Dr. A. W. Miller was asked to preside; in the absence of Mr. Wiegand J. W. England acted as Secretary.

The minutes of the last meeting were read, and no corrections being required they were approved as read.

Mr. G. M. Beringer presented on behalf of Mr. C. Bullock some very fine crystals of *chrome alum.* Mr. England donated some *molybdenum-glanz* or bisulphide of molybdenum; also some very fine samples of *cinchona barks* of various kinds; to some of them the results of alkaloidal assays were affixed.

Professor Trimble read a paper upon an *Indian food* plant, the material having been furnished by Dr. Havard, Surgeon U. S. A.; the root was particularly rich in cane sugar, containing nearly ten per cent. Prof. Maisch suggested that the root might possibly be suitable for obtaining sugar on a large scale if not too much contaminated with coloring matter, and if the plant could be readily cultivated; the roots of some umbelliferæ, like the carrot, had become quite saccharine under cultivation. Prof. Trimble also described some seeds of *Parshia tridentata*, which are intensely bitter, the bitter principle being not a glucoside. Professor Maisch likened the intensity of the bitter taste to that of strychnine.

Dr. Miller said the effect of cultivation of *Carum Gairdneri* would probably result in the enlarged growth of the tuberous roots and make it desirable as a food product; the result of such cultivation is well illustrated in what is now commonly known as the Irish potato, that in its wild state was a very inferior substance in a food point of view.

Mr. Beringer said that this plant had been classified in two genera before it was placed among the Carums; and the species found in Central California, C. Kelloggii, Gray, was likewise used as a source of food by the Indians.

Fred. W. Haussmann, Ph.G., read a paper upon *Basham's mixture;* his experiments were directed principally to obtaining a more permanent preparation.

Professor Maisch said that solutions of *acetate of iron* had been in the European pharmacopœias for more than a hundred years, and their tendency to spontaneously decompose was well known, being influenced by the amount of acid, by increase of temperature, by direct sunlight and by diffused daylight; hence such solutions should be kept in a cool and dark place.

Prof. Remington said that when introduced into the pharmacopœia, it was well known to be of perishable character, and was expected to be prepared freshly when wanted. Mr. A. B. Taylor had paid a great deal of attention to this preparation, and thought it was best to prepare it frequently, using glycerin in place of the syrup. All the evidence about the preparation seemed to point to the propriety of having the acid somewhat in excess and protecting the solution from heat and light; in this way the proposed formula was, perhaps, quite as good as any that could be given; tincture of orange peel was objectionable in producing a dark colored preparation, while simple syrup and simple elixir together were a better flavoring agent.

A paper on a *color reaction of vanillin* was read by F. X. Moerk, Ph.G., and illustrated with tests showing the delicacy of the test. Professor Remington inquired if a preparation made from vanilla bean itself would give these same reactions, and whether the coumarin was a synthetical product or obtained from some of the natural sources in plants; he also asked if these color reactions could detect vanillin in a fluid extract of vanilla. Experiments in the direction indicated have not been completed.

Mr. Beringer exhibited specimens of the smallest blooming plant known, *Wolffia Columbiana*, which is of the size of a pin's head; it was found in Gloucester County, N. J.

In answer to a question what should be dispensed in an ointment when *Sal sedativum Hombergi* was ordered, Prof. Maisch said that this was the old name for boric acid.

Inquiry was made as to the proper dose of *sulpho-carbolate of zinc*, and it was stated that it would be proper to give from one to three grains.

Mr. England, in reply to a question as to which of the *salicylates of bismuth* was the better for internal use, suggested that the acid salt was the better in typhoid conditions.

Mr. England alluded to the complaints sometimes made about *blistering cerate* failing to act promptly and said it was often due to the faulty mode of applying the plaster; that he had a small direction label printed, instructing the attendant to wash the part to which the blister was to be applied with soap and warm water, wipe dry, then moisten with vinegar and apply the plaster without drying the skin. Mr. Wiegand said he had been in the habit of sending a similar label out with blisters some thirty years ago. Mr. Procter was in the habit of strengthening the blister by brushing the surface of it with a concentrated ethereal tincture of cantharides.

Professor Remington said that some time ago a friend of his had occasion to visit the island of Barbadoes, and he asked him to procure some of juice of the *aloe plant* as grown there; he exhibited a sample and stated that crystals were readily observable in the bottom of the bottle which were undoubtedly Barba-

loin. Dr. Miller said that in veterinary practice Barbadoes aloes is the only one at all used.

Mr. Beringer read a paper upon the *ideal preceptor*, which was well received; and on motion all the papers read were referred to the committee on publication.

JOS. W. ENGLAND, *Sec'y.*

REVIEWS.

A Hand-book of Industrial Organic Chemistry, adapted for the use of manufacturers, chemists and all interested in the utilization of organic materials in the industrial arts. By Samuel P. Sadtler, Ph.D., author of "A Hand-book of Chemical Experimentation," etc. Philadelphia: J. B. Lippincott Company. 1891. 8vo. Pp. 519.

The field covered by this work comprises those industries working with raw materials of organic origin, namely, petroleum, fats, volatile oils, resins, sugar, starch, fermentation products, milk, textile fibres, animal tissues, destructive distillation, coloring matters, bleaching, dyeing and textile printing. It was the author's aim within the compass of a moderate sized volume to show in language capable of being understood even by those not specially trained in chemistry the existing conditions of a number of the more important chemical industries. These conditions are explained, in a brief but very lucid and thorough manner, in the different chapters under the following headings: raw materials; processes of manufacture; products; analytical tests and methods; bibliography and statistics. It will be observed that the information imparted by the text is quite comprehensive. It gives the outlines of the processes, tests, etc., with sufficient minuteness to be of practical usefulness to the intelligent reader, and in addition refers those in quest of still greater details to the most available sources. The 127 well executed illustrations which are scattered through the text, are, with few exceptions, representations of apparatus employed in the manufacture of the products treated of, and will materially aid in comprehending the working processes. The diagrams will likewise be appreciated by the student, as they show at a glance the manipulations for carrying out the processes thus illustrated, and the results to be obtained. The appendix contains useful tables explaining the metric system, thermometric equivalents and specific gravity tables; a good index occupies the last 19 pages. The mechanical make-up of the book is in keeping with its intrinsic literary value.

Influence of Heredity in producing disease and degeneracy. The remedy. By Gonzalva C. Smythe, A.M., M.D., of Greencastle, Ind. 8vo. Pp. 24.

The presidential address delivered before the Indiana State Medical Society, June 10, 1891.

The following printed Proceedings of State Pharmaceutical Associations have been received;

Georgia. Sixteenth annual meeting. Pp. 88. See July number, p. 369. Next meeting at Columbus, May 10, 1892; J. P. Turner, Local Secretary.

Nebraska. Tenth annual meeting. Pp. 136. Next meeting at Grand Island, June 7, 1892; F. S. Hazard, Local Secretary.

New Jersey. Twenty-first annual meeting. Pp. 82. See July number,

p. 371. Next meeting at Plainfield, in May next; H. P. Reynolds, Chairman of the Local Committee.

New York Thirteenth annual meeting. Pp. 174. See September number, p. 467. Next meeting at Syracuse in the month of May; J. C. Auchampaugh, Local Secretary.

Oregon. Organization and first annual meeting. Pp. 80. See this Journal, 1890, p. 429, and 1891, p. 417. Next meeting at Salem in June next; J. C. Smith, Local Secretary.

Pennsylvania. Fourteenth annual meeting. Pp. 140. See July number, p. 372. Next meeting at Hotel Shikellimy, Susquehanna Heights, near Sunbury, June 14, 1892; D. M. Krauser, Milton, Assistant Secretary.

Rhode Island. Seventh annual and semi-annual meetings, held January 14, and July 8, 1891. The officers are James O'Hare, president; H. M. Dudley, Woonsocket, vice-president; W. E. Cates, secretary; and A. W. Fenner, Jr., treasurer. The annual meeting is held on the second Wednesday of January, and the semi-annual meeting on the second Wednesday of July.

Texas. Twelfth annual meeting. Pp. 73. See July number, p. 372. Next meeting at Waco, May 10, 1892; H. L. Carleton, Local Secretary.

Gechiedenes der Pharmacie in Nederland. In opdracht van de Nederlandsche Maatschappi ter Bevordering der Pharmacie, bewerkt door U. Stoeder, Oud-Voorzitter en Honorair lid van genoemde Maatschappij, etc. Amsterdam, D. B. Centen. 1891. 8vo. Pp. xvi and 448.

History of Pharmacy in the Netherlands.

This work contains, as an introduction to the special history, a brief sketch of the general history of pharmacy, beginning with the oldest known pharmaceutical document, the celebrated Papyrus Ebers, written about 3,500 years before Christ, and now preserved in the University Library at Leipzig; and with the Aqur Veda Susrutas, the oldest Sanskrit work on Indian materia medica, dating from the eighth century before Christ; and tracing its progress down to modern times. From the history of pharmacy in the Netherlands, we learn that previous to the XIV century, and to some extent for a long time afterwards, the practice of pharmacy was united with that of medicine; from the archives preserved at Hertogenbosch, it is learned that in 1320 Theodorius, the apothecary, conducted a separate establishment for the preparation of medicines; and in 1341, the town of Zwolle had an apothecary store placed in charge of Lambert.

The first book on pharmacy, printed in Holland, was "De groten Herbarius," which made its appearance at Utrecht in 1538, and was followed in 1554 by the "Kruydeboek," of Rembertus Dodenaeus. The first university or "Hoogeschool" was established at Leuven in 1426 (discontinued in 1792), while that of Leiden dates back to 1575, and Utrecht to 1636. After the publication of the pharmacopœias of London (1618, 1627), Augsburg (1622), and Cologne (1628) Nicolaus Fontanus, physician at Amsterdam, published "Institutiones pharmaceuticæ" in 1633 and two years later Dr. Nicolaas Tulp, of the same city, associated with a number of other physicians, undertook the preparation of a pharmacopœia, which received the official sanction of the Senate of Amsterdam and appeared in 1636 under the title "Pharmacopœa Amstelreda-

mensis." With this and the organization of the "Collegium Medicum" at Amsterdam, in 1637, closes the first period of the history of pharmacy in the Netherlands.

The second period dates from 1637 to 1798, and the third period from the latter year to 1851. We have not the space to follow the author even by giving a mere outline of his most interesting work, which carefully records all that is of interest relating to the progress of pharmacy: literature, associations, legislation, education, cinchona culture in Java, etc., and as a matter of course, gives biographical notes of many men prominently connected with the development of pharmacy.

Modern Materia Medica for Pharmacists, Medical Men, and Students. By H. Helbing, F.C.S. Second enlarged edition. 1891: The British and Colonial Druggist, London. Sole agents in the United States: Lehn & Fink, New York. 12mo. pp. 115. Price, cloth, 75 cents.

This work is confined to synthetic remedies, with the exception of eucalyptol, myrtol, and a few other similar compounds which are considered in the appendix. The remedies are arranged in alphabetical order, beginning with acetanilide and terminating with urethane. Under each head are given the various synonyms, the chemical composition, the mode of preparation, the physical and chemical properties, with tests of identity and purity, and finally the medicinal uses and doses. Derivatives which are, apparently, of less importance as medicinal agents, are briefly mentioned at the end of the paragraphs treating of the more important remedies, to which they are chemically related; in the same place are also enumerated various mixtures which under special names have been put forward by some enterprising firms. The author states that in dealing with the "medicinal uses" it has been a constant endeavor to indicate its therapeutical importance, where possible, rather by a careful balancing of the whole literature of the subject, than by a detailed quotation of individual experiences and conclusions.

The work will prove to be very useful to those for whose use it is intended, the information being comprehensive and reliable, and easily available, owing to the arrangement, and by means of an index, which includes also all compounds not placed in alphabetical order.

The Apothecary. Published by Illinois College of Pharmacy. Oscar Oldberg, Editor, Chicago. 8vo. Issued quarterly. Price, $1.

The first number of this periodical, issued in August, contains 48 pages, and furnishes, among other information, three papers by Professors Oldberg, Bastin and Long. It is intended to contain only original articles, editorial notes, and book reviews, and not to give space to discussion of trade interests, or to reprints or abstracts from other journals.

The Climatologist. Edited by J. M. Keating, M.D., F. A. Packard, M.D., and C. F. Gardiner, M.D. Philadelphia: W. B. Saunders. Price, $2.

This new monthly, containing 82 pages of text, is devoted to the relation of climate, mineral springs, diet, preventive medicine, race, occupation, life insurance and sanitary science to disease. The field intended to be cultivated is extensive, and the six original papers published in the first (August) number show that it is full of interest.

Eighth Annual Report of the Board of Control of the State Agricultural Experiment Station at Amherst, Mass. Boston: 1891. 8vo. pp. 325.

No. 33 of the Public Documents of Massachusetts. The station is under the directorship of Prof. C. A. Goessmann; J. E. Humphrey, S.B., is the mycologist.

VARIETIES.

Hydrofluoric acid, kept in gutta-percha bottles, becomes contaminated with other compounds, chiefly iron. R. Benedikt (*Chemiker Ztg.*, June 24, 1891, p. 881), recommends bottles of hard rubber (vulcanite) as being very serviceable for the purpose. 25 cc. of an acid kept in such a bottle for over a year, left a residue amounting to only 0·0005 gm. Hydrofluosilicic acid can likewise be kept in such bottles.

Death by antikamnia.—Dr. E. P. Easley, New Albany, Ind., has communicated the following to the *Amer. Practitioner and News*, Louisville, Sept. 12, 1891:

"On the 6th of last April, Mrs. Z., a stout, robust woman, weighing one hundred and sixty-five pounds, twenty-two years old, took, by mistake, for a slight headache, twenty-four grains of antikamnia. In a few minutes she became wildly delirious, then unconscious, and died in ten hours after swallowing the medicine. A careful, methodical *post-mortem* examination failed to discover any lesion, death being the result of the action of the drug alone. The greater portion of her body was cyanosed. The membranes of the brain were of a sky-blue color, as were all the fibrous structures wherever found. The right ventricle was filled with clotted blood very much bleached."

For the results of analyses of this mixture, see Amer. Jour. Phar., April, p. 181, and June, p. 290.

For preparing tincture of iodine, Vauthier recommends placing the iodine upon a glass sieve and suspending this in the alcohol contained in a colored glass bottle, in order to avoid the influence of heat, light and organic matter, whereby hydriodic acid would be formed; moreover, the tincture should not be kept on hand for a long time.—*Pet. Mon. de la Phar.*, June. See also this Journal, April, p. 195.

Hydrastis canadensis has been found beneficial in night sweats of phthisis by Dr. Cruse (*Med. Neuigk.*, July 11); he gives the fluid extract in the evening, commencing with thirty drops and increasing the dose if necessary.

Microcidin is a new antiseptic, recommended by Prof. Berlioz, of Grenoble. Extreme solubility, harmlessness and rapidity of action are claimed for it. It is a compound of naphthol and soda, is neither poisonous nor irritant, and has the form of a grayish-white powder. Its solution of three grams per liter is very slightly colored, and does not stain either the hands or bandage.—*Science.*

Safran Algeri (*extra*), a French substitute for saffron, is an orange-yellow powder of faint saffron odor, soluble in water, producing a solution identical in color with one made from pure saffron; under the microscope small quantities of powdered saffron can be recognized. It is a mixture of Martius-yellow (dinitro-naphthol), and tropæolin 000 N.2, with a small quantity of saffron.

Lolium temulentum, known as *darnel*, contains, according to Dr. P. Antze (*Centralbl. f. d. ges. Ther.*, May, 1891), a volatile alkaloid, *loliine*, and a solid base, *temulentine;* the latter is probably a decomposition product of *temulentic acid*, for which he has determined the formula $C_{12}H_{42}NO_{19}$. The poisonous properties seem to reside in the acid and in temulentine, while after loliine has been given there is no reduction of temperature and no staggering.

Pistoia Powder.—There is a powder made in a convent near Pistoia, Italy, which is used very extensively as a protective against gout. The following is said by Mr. Chastaing to be its composition :

℞ Bryonia Root,
Gentian,
Chamomile, } āā gm. x
Colchicum Root, gm. xx
Betony, gm. j

This is made into 365 powders, one of which is taken each day of the year in a full glass of cold or hot water.—*Quart. Therap. Review.*

Menthol in Hay Fever.—Dr. Lennox Wainwright (*British Medical Journal*, July 18, 1891) has found *menthol*, mixed with carbonate of ammonium and used as smelling salts, the most useful remedy in hay fever. The patients say that all irritability disappears, and in many cases they get no return of the symptoms.

Naphthalin according to Dr. Mirovich (*The Lancet*), is an admirable remedy for ascarides and for tape worm, and is much more certain and far less poisonous than most of the other vermifuges. For adults he prescribes a fifteen-grain powder, to be followed immediately by two ounces of castor oil. For two days before this dose the patient is directed to live on salt, acid and highly-seasoned food, then the naphthalin is given fasting early the following morning. In all the cases the whole tænia was expelled with its head after the first dose. —See also *Amer. Jour. Phar.*, 1887, p. 128, and 1890, p. 407.

Randia dumentorum is regarded by Sir James Sawyer (*The Lancet*, 1891, p. 656) as a useful addition to our repertory of nervine antispasmodics and cardiac excitants. The active principle of the unripe fruit is a saponin-like body. An ethereal tincture is recommended to be made of one part of the drug to five parts of spirit of ether.

Common Thyme, which was recommended in whooping-cough three or four years ago by Dr. S. B. Johnson, is regarded by Dr. Neovius (*The Lancet*, May 9, 1891), as almost worthy the title of a specific, which, if given early and constantly, invariably cuts short the disease in a fortnight, the symptoms generally vanishing in two or three days. He gives from one ounce and a half to six ounces per diem, combined with a little marsh-mallow syrup. He never saw any undesirable effect produced, except slight diarrhœa. It is important that the drug should be used quite fresh.

THE AMERICAN
JOURNAL OF PHARMACY.

DECEMBER, 1891.

SYNTHETICAL CARBOLIC ACID.

By H. W. Jayne.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Nov. 17.

It has been known for some years that carbolic acid could be produced by numerous synthetical methods, but interest in the subject has been especially manifested recently on account of several firms, in response to the constant demand for purer preparations, having undertaken its manufacture on a commercial scale. Of the many reactions by which phenol can be produced, only two are, at present, commercially practical; both using pure benzol as the starting point.

The first or sulphonate method is applicable to the preparation of all phenols and has been used for some years, producing on an immense scale naphthol, the phenol of naphthalin. In this method pure benzol, free from thiophene, is placed with about five times its weight of strongest commercial sulphuric acid (67° B.) in closed cast-iron pots, provided with stirrers and lead coolers and capable of being heated by a steam jacket. While the mixture is slowly stirred, the vessel is gently heated with steam in such a manner that the vapors of benzol which pass into the cooler are continually returned to the kettle. After a number of hours the reaction is finished, and the benzol not acted on, is collected as it flows from the cooler. The crude benzol-sulphonic acid, mixed with the excess of sulphuric acid used, is allowed to cool and then diluted with water in a lead-lined tank. Slaked lime is added to the hot solution in sufficient quantity until it is faintly alkaline. This removes the excess of acid by forming calcium sulphate, which is then filtered

off by means of a filter press. The clear liquor containing calcium benzolsulphonate is treated with sufficient sodium carbonate to precipitate all the calcium as carbonate, which is removed by filtration, and the liquor is now evaporated to dryness, leaving the sodium benzolsulphonate as a white powder.

In a large cast-iron kettle, heated by a coal fire, caustic soda is melted, and small portions of the dry sodium salt, prepared as above, are gradually added and finally the whole is kept in quiet fusion for some time. The melt now contains sodium carbolate and sulphite together with the large excess of caustic soda used—

$$C_6H_5 — SO_3Na + 2NaOH = C_6H_5ONa + Na_2SO_3 + H_2O$$

It is ladled from the kettle into pans and allowed to cool, broken up, dissolved in water and acidified with sulphuric or hydrochloric acid. The phenol thus liberated separates from the concentrated salt solution, and can be collected and distilled.

In melting the sodium benzolsulphonate with caustic soda it is necessary, in order to obtain a good yield, to use a very large excess of the latter. A greater yield is obtained with caustic potash, and if as large a quantity as six parts are used to one of the soda or potash salt a nearly theoretical yield can be obtained, but as this would greatly increase the cost, caustic soda is used instead.

It has been proposed to treat the melt after dissolving in water with carbonic acid gas, which would liberate the phenol equally well as a stronger acid, and in addition would form carbonate of soda or potash, which together with the sulphite already present could be converted into the hydrate by treating with lime, concentrated, and used for a second operation. It does not appear, however, that this has been carried out in practice.

The second method is much simpler. A pure aniline oil, preferably that grade called aniline for blue, is dissolved in water in a lead-lined tank covered with a hood and provided with stirrers and leaden steam coils. The solution is acidulated very strongly with sulphuric acid, and to the hot liquid a solution of commercial nitrite of soda is gradually added, phenol being at once formed.

In this reaction the sodium nitrite, in contact with the acid solution, liberates nitrous acid, which forms diazobenzol sulphate with the aniline sulphate—

$$(C_6H_5NH_2)_2H_2SO_4 + 2HNO_2 = (C_6H_5N = N)_2SO_4 + 4H_2O$$

but as the solution is hot it at once decomposes into phenol with evolution of nitrogen—

$$(C_6H_5N = N)_2 SO_4 + 2H_2O = 2C_6H_5OH + H_2SO_4 + 4N$$

Neither of these synthetical methods can, at the present time, compete in price with the extraction of carbolic acid directly from the coal tar oils.

A good grade of crystal acid can be purchased abroad in large quantities at this time at about eleven cents per pound, while the pure benzol used in the first method is worth at the English refineries about fourteen cents per pound and aniline oil about twenty cents, without taking into consideration the other expensive chemicals necessary to carry out the reaction.

When the synthetical acid was first placed upon the market it excited much interest, and purchasers were willing to pay the high price it commanded, believing that they were getting a much purer article than could be produced by the ordinary methods. This interest has, however, considerably abated since the acid has been found to redden just as easily as the best commercial grades.

It could scarcely be expected that an acid obtained by either of the complex reactions just described would not be contaminated by products formed by side reactions in the process. In its preparation by the sulphonate method, sulphur compounds (thiophenols, etc.) are likely to be formed; and its manufacture from a substance like aniline, which so readily produces coloring matters, could scarcely be carried out without at the same time forming bodies which at once, or later under the influence of light and air would discolor it.

In addition, commercially pure benzol or aniline oil always contain small quantities of, respectively, toluol or toluidine. These bodies being submitted to the same treatment as their homologues give cresylic acid. It is true that this acid would be present only in minute quantities, but sufficient to reduce the melting point of the resulting carbolic acid.

Lunge has shown that the addition of 1·3 per cent. of cresylic acid to pure phenol reduces the melting point eight degrees to 32½°, and in the preparation of a high grade carbolic acid a difference of a part of a degree is of great importance.

Forty degrees acid is at present a commercial article sold at excessively low prices, and if a small part of the attention and labor

which is used in producing a synthetical acid was expended in the further purification of this 40° acid, without doubt just as good if not a purer article could be produced direct from tar oils and at a very much lower cost.—Laboratory of the H. W. Jayne Chemical Company, Nov. 14, 1891.

A COLORIMETRIC ESTIMATION OF VANILLIN.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.—No. 97.

Read at the Pharmaceutical Meeting, Nov. 17, 1891.

"Will natural vanillin give the same color reaction as the synthetical product?" and "Is this test applicable to the assay of vanilla extracts?" were questions asked of me at the last Pharmaceutical Meeting after reading a paper on a new color reaction of vanillin answers to these queries will be given in the following paper.

Without having any doubt that the vanillin of different origin would react similarly, I received from Mr. Beringer a small quantity of vanillin which had been removed from the bean, and with this obtained the same reaction, thus showing by another test the identity of the natural and synthetic vanillin.

To determine the applicability of this test in examining vanilla extracts and their substitutes, Mr. Beringer prepared for me a number of mixtures of vanillin and coumarin, some of which were colored with various vegetable coloring substances. A pure extract of vanilla, largely diluted with water, will give with salts of iron a peculiar violet-brown coloration, which interferes notably with the test, and to remove this disturbing influence it is important to decolorize the extract before proceeding with the development of the characteristic color.

To effect the decolorization various methods were tried. Adding lead nitrate solution to the diluted samples, and then by the addition of magnesium oxide, suspended in water, precipitating lead hydrate, which carried along with it the coloring matter; it was found that by this procedure considerable of the vanillin was also removed from the solution (as much as three-fourths in some cases). Instead of the lead salt, alum and ferric sulphate were then used with somewhat better results, but still with loss of vanillin; agitating the diluted extract with freshly precipitated ferric hydrate was not suc-

cessful because of the filtrate having the peculiar violet-brown coloration; lastly, and with best results, freshly precipitated lead hydrate was agitated with the samples and after standing a short time the mixture filtered.

The lead hydrate is most quickly and conveniently prepared by dissolving one gram lead nitrate in 25–30 cc. water, adding a few drops of phenolphthalein and then a dilute potassium hydrate solution until a permanent pink color results; by the cautious addition of a dilute solution of lead nitrate the pink color is discharged and then the precipitate washed two or three times by decantation, and lastly water added to make 100 cc. of the mixture.

The determinations were made as follows: 2 cc. of the samples were diluted with about 50 cc. water, 10 cc. of the lead hydrate mixture added, and then sufficient water to make 100 cc.; after standing a few minutes the mixture was filtered through a dry filter, 50 cc. removed to a flask of 100 cc. capacity, bromine water added, drop by drop, until after agitation the bromine odor was permanent, then a 1 per cent. ferrous sulphate solution until the intensity of the color was reached, lastly, water added to make 100 cc. and, after standing about an hour, filtered. One cc. extract by this test will form 100 cc. of a more or less colored solution; two standard solutions were made; one containing 0·002 and the other 0·0005 vanillin in 100 cc. of the test; the comparisons were made in large test tubes, the different height of the columns being inversely proportional to the amount of vanillin present. With colorless solutions of vanillin there is no difficulty in accurately determining the amount of vanillin present, but in colored solutions there is a yellowish tinge to the test which renders accurate comparison impossible. While this color reaction is not suited for the accurate estimation of vanillin in extracts and colored substitutes, still it allows a reliable comparison of these preparations; this was found to be the case in the samples prepared for me by Mr. Beringer, while the true amount of vanillin would not be given by the test, still I could invariably say which contained more than another. An important point to be noted in this connection is that while the odor of vanillin is destroyed in this test, that of coumarin is not affected, so that the test will serve to give an idea as to the value of a vanilla preparation and also to detect small quantities of coumarin in presence of vanillin.

Two of the samples examined were from reliable manufacturers,

and in these the vanillin was easily recognizable by the bluish-green color produced in the test; a third specimen was made from a bean that had been kept for at least twenty years, and in this the color produced was also characteristic of vanillin, showing that age does not cause deterioration of the bean; with these three samples the completed tests were odorless. A fourth sample obtained from a grocery had a strong odor of coumarin after the completion of the test, while the color of the test excluded more than minute quantities of vanilla in its preparation.

NOTE ON BISMUTH SALICYLATE.

By Joseph W. England, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Nov. 17.

Since salicylic acid is a monobasic acid, true acid salts of it are impossible. What is meant by "acid" bismuth salicylate in commerce is a mixture containing a very varying amount of free or uncombined salicylic acid. It is in no sense a true, definite compound. The existence of the so-called "acid" salt arose through the imperfections of early manufacture, salicylic acid being so readily precipitated from solutions of its salts by acid solutions. Lately there has been an improvement in purity, but the writer believes that there exists still further room for better quality. A prominent firm of manufacturing chemists has kindly furnished me with the following list of analyses made by themselves of bismuth salicylates. The first one examined was of foreign make, the second of domestic origin; both were made in 1883; the others were all made in 1891.

In making comparison it should be remembered that anhydrous normal bismuth salicylate ($BiOC_7H_5O_3$) should yield 64·46 per cent. of Bi_2O_3 on ignition. The yield of Bi_2O_3 of the samples examined was as follows: No. 1 (Foreign acid), *27·2* per cent.; No. 2 (Domestic, basic), *66·3* per cent.; No. 3 (Acid), *43·4* per cent.; No. 4 (Foreign, basic), *67·4* per cent.; and No. 5 (Domestic, basic), *61·2* per cent.

The wide differences in composition will be noted, as well as the steady improvement towards the normal basic salt. If simply bismuth salicylate is ordered, manufacturers supply the basic compound and not the acid, arguing that the former is the true normal compound, and that if the "acid" compound is the more active one, therapeutically, as is believed, it is far less confusing to supply the basic compound, and let the physician add salicylic acid in any pro-

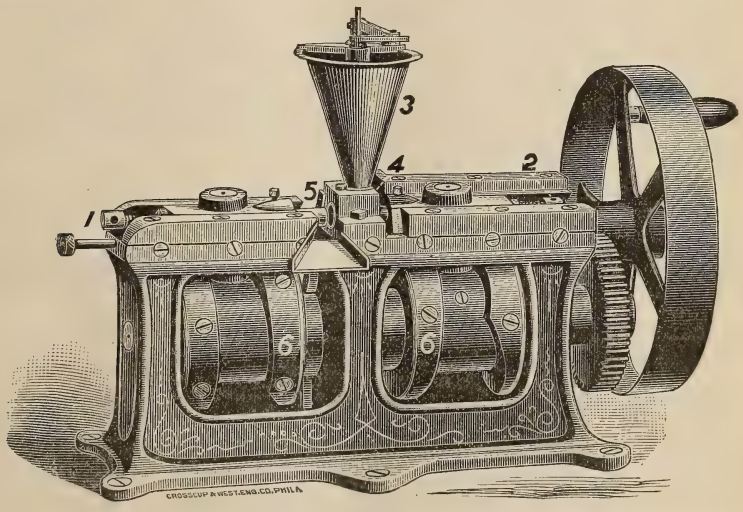
portions that he may wish, than to supply a product containing a very indefinite quantity of free salicylic acid. A process for preparing bismuth salicylate was described in the August number of the "Journal," page 401.

A NEW TABLET MACHINE.

By J. R. Witzel, M. D.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Nov. 17.

Realizing the great demand for compressed tablets, the writer has endeavored to bring before the profession a tablet-compressing machine that is simple, powerful, compact and, as nearly as possible, perfect in every respect. The accompanying cut shows the appearance of the machine, the motions of which are positive and automatic.



The frame is one solid casting; the hand machine weighs about 125 pounds, occupies a counter space of 10 x 17 inches and stands 9½ inches high; power machines have an additional stand to give clearance for the large fly wheel. The capacity is from 55 to 95 tablets per minute, and is increased in proportion to the number of plungers in operation. The pressure can be regulated to any desired degree, is direct and comes to bear between the cams which impart the desired motions to the sliding blocks. The steel

plungers, if necessary nickel plated, have a projecting shoulder on the lower part and may be of any size or shape, and hopper and mould are stationary. There being absolutely no waste, a saving of material results, and the absence of friction from feed makes the machine run easy.

Ample provision is made for taking up lost motion from wear of moving parts. The dies and moulds can be easily changed from one size to another, and the regulations being few and simple, they are readily understood and easily manipulated. The working parts being inclosed, accumulation of dust is prevented, wearing of the parts is lessened and foreign matters are not rubbed into the mould for compression; hence, the tablets are kept clean and unobjectionable for hypodermic medication.

Tablets are formed by the following motions: When the plungers are below the hopper, they receive the proper amount of material, which is conveyed under cover into the mould; one plunger is held stationary, while the other advances and compresses the material into the shape desired; then both dies recede, thus loosening the tablet in the mould and bringing it to the end of the mould, where it is ejected by the wiper.

TACONY, PHILADELPHIA, November, 1891.

NOTE ON FLUID EXTRACT OF TRITICUM REPENS.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Nov. 17.

Some time ago my attention was attracted towards the variability in properties of commercial fluid extracts of couch grass. The differences were so marked that an examination was made of a number. In the six samples examined, four different shades of the normal ruby red color were presented. The odor and taste was the same in all cases save one (No. 2), which gave evidence of containing considerable caramel. The specific gravities ranged from 1·069 as the lowest, to 1·154 as the highest. Assuming that the menstruum used in their making was the officinal one, of one part alcohol and four parts of water; the relative value of the fluid extracts in the amount of solids dissolved, ranged from 92·6 to 100; the latter figure representing the highest specific gravity.

The results in tabular form are as follows:

No.	Made.	Sp. gr.	Relative Value in Extractive.
1, ...	Fall, '84	1·112	96·4
2, ...	April, '90	1·154	100·
3, ...	Aug., '90	1·093	94·7
4, ...	Oct., '90	1·085	94·
5, ...	Sept., '91	1·069	92·6
6, ...	June, '91	1·148	99·4

The chemical character of commercial fluid extracts of couch grass is of interest for the reason that it is now being employed quite frequently in certain renal and bladder troubles, with asserted success. What constituent its medical properties are due to is uncertain. Flückiger and Hanbury[1] state that the constituents of couch grass include no substance to which medicinal powers can be ascribed, and that Müller has found the juice of the rhizome to contain 3 per cent. of sugar and 7 to 8 per cent. of triticin, an inulin-like body, amorphous, odorless, tasteless and very hygroscopic and readily transformed into sugar, if its concentrated solution be kept for a short time at 110° C. Triticin, it should be noted, is readily changed by heat, especially in the presence of dilute acids, and since the drug is rich in acid malates, it is probable that this change often ensues in fluid extracts where heat is employed in concentration and there is thus an increase in the percentage of the sugar normally present in the drug. Ludwig and Müller[2] claim that there are three sugars present in couch grass, fruit sugar, levulose and a dextrose not identical with cane sugar. Later, Plauchud[3] found 3 per cent. of crystallizable sugar, 4 per cent. of uncrystallizable sugar and 14 per cent. of starch. Mannite is not constant in its presence, save only probably as a result of fermentation in the extract. Pectin and resinoids are absent.

The presence of caramel in one of the samples examined, probably arose from overheating in drying, a very moist drug containing a large amount of natural sugars, since the preparation, as well as the others, was obtained from reliable houses. The variations

[1] Pharmacographia, p. 730.

[2] Nat. Disp., 1884, p. 1553.

[3] Zeitschr. Oest. Ap. Ver., 1877, p. 457; vide Proc. A. P. A., 1878, p. 181.

in the percentage of extractive, probably arose to a large extent, from the fact that the pharmacopœial injunctions to use spring collected couch grass was not observed.

MULLEIN OIL.

By George M. Beringer.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Nov. 17.

The object of the present note is to call attention to some of the products in the market under this name. The pharmacopœias and dispensatories of a century ago nearly all contained formulas for *Oleum Verbasci*, the formula given in the Universal Pharmacopœia directing to digest, at a gentle heat, mullein flowers one part, in olive oil two parts, until extracted, and then express.

The National Dispensatory (p. 1601) evidently refers to a similar preparation, stating that olive oil saturated with mullein flowers during prolonged exposure to the sun or fire for several days in a corked bottle is a popular remedy in Germany for bruises and is used for bleeding piles. Its use has recently been revived in this country. The best results are obtained from fresh flowers. In the absence of these, a good preparation can be obtained by using the commercial dried mullein flowers, which are imported from Germany, by the following process:

Take of dried mullein flowers one part; alcohol one part; macerate for a few hours and then add olive oil four parts, digest on a water bath for several hours until the alcohol is entirely evaporated and the extraction is completed, then express.

A prominent homœopathic pharmacy has recently advertised mullein oil as a remedy for earache, deafness, difficult urination, enuresis, coughs, and as an application to inflamed surfaces, ulcers, piles and sore eyes. Their article was advertised in ½ oz. bottles at 60 cents; 1 oz., $1.00. A sample of this "valuable product," in original vial, was procured by the writer. It was a thin liquid of a brown color, with the pleasant odor characteristic of the dried German flowers. It had an acid reaction to test paper and showed a specific gravity of ·9815. The stain on bibulous paper was neither oily nor resinous in character. It was miscible with water, the solution becoming but slightly opalescent. It formed a perfectly clear solution with alcohol and diluted alcohol. It was not miscible with benzin, ether or chloroform. On evaporation on the

water bath three per cent. of residue remained and on incineration 0·3 per cent. of ash was obtained. This preparation was apparently only a weak alcoholic tincture containing a small quantity of acid, most likely acetic.

A sample of another product, prepared by a prominent essential oil house in New York, was also procured for examination. It was a neutral limpid liquid of a bright green color, had a specific gravity of ·835. On evaporation on the water bath 3·724 per cent. residue was obtained and 0·267 per cent. ash was left on incineration. The stain on bibulous paper was resinous. With water an opalescent mixture was produced, which after standing deposited a green precipitate. With strong alcohol it yielded a clear solution without any precipitation, but with dilute alcohol the solution was not clear. With chloroform it yielded a clear solution. Its action with ether precluded it from being ethereal extract or oleoresin, as it formed a clear solution with concentrated ether and a cloudy one with commercial U. S. P. ether and from both of these solutions there was a slight precipitate of a brown color deposited.

The preparation is evidently only a tincture prepared with strong alcohol from the flowers, and from the amount of chlorophyll present, I would suppose that these had been admixed with a portion of the leaf or possibly the calyx.

Neither of these preparations have any claim to the title of an oil under the generally accepted definition of that term, and it is a matter of surprise that such reputable houses should lend themselves to this form of petty deception to introduce an article at exorbitant prices. Another objectionable feature, is that if such preparations are advertised under the same name as a preparation known for a century, an element of doubt is introduced as to the physician's intention in prescribing. As many of our physicians see only the advertisements and do not know the preparations, it is doubtful if they could decide which they really intended.

ON THE PRODUCTION OF OIL OF BIRCH.

By William H. Breisch, Ph.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

The oil of birch was first distilled in Luzerne County, Pa., about the summer of 1865, shortly after that of oil of wintergreen, and now the manufacture of oil of wintergreen is almost entirely super-

seded by that of the former, owing to the difficulty experienced in procuring pickers of the wintergreen leaf. There are, within an area of six or eight miles, not less than five or six distilleries which produce annually between three and five thousand pounds of the oil. After being distilled, it is either brought to White Haven, the nearest shipping point, and sent to New York parties; or else it is sold to the merchants of the town and sent by them to New York.

The manufacture is quite a simple one.

The wood gathered for the purpose is the black birch saplings; another variety, the white birch, not being used, owing to its very small yield of the oil. The saplings are gathered principally in the summer months, the yield being the greatest at that time; but they are also gathered in the winter. The birch is cut into small pieces, varying from two to four or five inches in length, by a very ingenious device of home manufacture, which consists of one or more knives fastened to the end of the shaft, while the other end is connected with a large wheel, and by means of a belt fastened to a water wheel. The birch is pushed under the knives, by hand, through a box or trough similar to that of a hay cutter, and when cut it is ready for the still.

The still is box-shaped, about eight feet long, four feet wide and four feet high, with a copper bottom, and stayed with bolts. The head of the still is made of copper and connects with a circular worm made of copper or sometimes of tin, placed in a barrel which is filled with water, with a continuous stream of water flowing through it by which the vapors that come over are condensed. The still is filled with the birch wood to within about twelve inches of the top, and a sufficient quantity of water is then added to cover the wood. This is allowed to macerate from eight to twelve hours. The fire is then started and the distillation commences and continues for about eight or sometimes ten hours; but during the first two hours ninety per cent. of the oil has passed over.

For collecting the distillate a common fruit jar is generally used, fitted with a cork having two holes; a small funnel is put into one of the holes, so that the beak of the funnel is about two inches below the bottom of the cork, and connected with the other hole is a suitable pipe forming an outlet.

The distillate passes through the funnel into the receiving vessel,

where the water and oil separate, the oil going to the bottom being heavier; and the water being lighter and in excess, passes through the pipe into a larger receiver, where it is reserved for the maceration of the next quantity of birch to be distilled. This is repeated a number of times before fresh water is used.

The yield, which is about one per cent., is most abundant during the months of July and August.

On taking a sample of the oil from the receiver only a short time after the separation of the water, I found the specific gravity to be 1·17; another sample from the same distillate, which was allowed to stand between 48 and 60 hours, so as to get more thoroughly separated, had the specific gravity 1·18, which I think conclusively proves that the lower specific gravity of pure oil of birch is due to water imperfectly separated.

The color of oil of birch when first distilled is very light or almost colorless, but on standing a while becomes very much darker. Occasionally, the oil is found to be highly colored, due to traces of iron from the oxidation of the tin worm or the can with which the oil comes in contact.

There are three ways of clearing the oil: by decolorization, filtration and redistillation. The easiest method is decolorization, by putting the oil in a bottle, adding a few crystals of citric acid and agitating occasionally, until the oil is colorless, or nearly so.

See also paper on the distillation of oil of birch in Amer. Jour. Pharmacy, 1882, p. 49.

SALIX LUCIDA, *Muhlenberg.*

Shining Willow.

By Robert W. Beck, P.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 98.

This species of willow is a shrub or small tree ten to twenty-five feet in height, and is found along the banks of streams from New England to Pennsylvania and westward. According to Gray it is closely allied to the S. pentandra of Europe. The material for the following investigation was collected by the author in the western part of Pennsylvania.

The following is a summary of the results obtained by extracting the finely powdered bark successively with the different solvents:

	Per Cent.
Petroleum ether,	0·37
Stronger ether,	1·30
Absolute alcohol,	4·39
Water,	4·09
Sodium hydrate (·2 per cent.),	4·04
Hydrochloric acid (1 per cent.),	4·48
Chlorine water,	13·82
Cellulose,	37·60
Ash,	5·40
Moisture,	9·70
Loss and undetermined,	14·81
	100·00

The petroleum ether extract was found to consist of a trace of volatile oil, wax and caoutchouc.

Stronger ether extracted an organic acid resin and sufficient salicin to give a red color with sulphuric acid.

Absolute alcohol removed an aromatic brown resin, tannin and salicin.

The usual plant constituents were obtained from the remaining solvents.

In order to determine whether a satisfactory yield of salicin could be obtained from this bark, a number of assays were made.

(1) A decoction of the sample was treated with lead hydrate, filtered and the filtrate saturated with hydrogen sulphide and the lead sulphide removed by filtration. On evaporation no salicin was obtained.

(2) Thirty grams of the powder were extracted with boiling water, twenty grams of lime stirred in, and the solution filtered. The filtrate on evaporation yielded but few crystals.

(3) A hot infusion of one hundred grams of the powder was treated with lime, filtered and evaporated rapidly to a syrupy consistence. The residue was treated successively with several portions of alcohol, and the mixed alcoholic solutions passed through animal charcoal. On concentrating beautiful crystals of salicin were obtained, amounting to 1·09 per cent.

This process was then employed for further assays, by which 0·30 per cent. of salicin were obtained from the leaves of S. lucida; 0·56

per cent. from the bark of S. alba, and 0·73 per cent. from the bark of S. nigra.

The same specimens were examined quantitatively for tannin, with the following results:

Leaves of S. alba,	6·48 per cent. tannin.
Bark of S. alba,	3·58 " " "
Bark of S. alba,	4·26 " " "
Bark of S. nigra,	3·29 " " "

NOTES ON INSECT POWDER.[1]

By F. A. Thompson, Ph.C.

Having had seven samples of insect powder, representing six eastern wholesale firms and one western one for examination, I thought the result of such analysis might be of some interest to this society, and therefore present to you the practical tests as applied.

Mr. P. MacOwen, F.L.S. (Pharm. Journ. and Tran., Feb., 1890, p. 695), of the "Capetown Botanical Garden," points out that plants yielding Persian insect powder are being cultivated in the colony, and it is hoped may be a source of supply of the genuine, as the flowers and powder are largely adulterated; also that *Pyrethrum cinerariæfolium* likes an open, dry soil, not too clayey, as both the seed and plant are killed by excessive moisture.

Mr. G. M. Beringer (Amer. Jour. Pharm., Jan., 1889, p. 1), reports that in 1889, a number of bales of Hungarian daisies were entered at the New York Custom House as insect powder, and were evidently intended as a sophistication of the Dalmatian insect powder. He states that the similarity in size and appearance of the flowers of the Dalmatian powder would easily deceive the careless or unguarded observer. A microscopical examination of the two varieties as whole flowers rendered the distinction comparatively easy, while in the powdered form the identification of the admixture was impossible. The ash of the Hungarian daisy amounted to 9·3 per cent., that of the Dalmatian 6·5 per cent., while the amount soluble in petroleum ether and ether seemed to be about the same. Alcohol extracted more from the former.

In the examination of the various samples, the color of powder,

[1] Read before the Detroit Chemical Society, November 10, 1891.

amount and constituents of ash, and behavior of the chloroform extract towards reagents, were the essential tests taken up, the practical "insecticide" test, as applied to flies and cockroaches, being omitted for want of time and insects.

The color of the samples coincided with the chemical examination, samples one to five being quite alike in color, while number six was of a deep yellow and number seven less so.

The dealer in buying should insist upon securing a fawn or light yellowish brown colored powder and look with suspicion upon the deep and bright yellow ones.

The ash of a genuine insect powder should not run over eight per cent. Anything above this should be examined carefully for some lead or barium salt. The ash should be almost entirely soluble in hydrochloric acid, but if part is insoluble and the clear fluid becomes green upon boiling, H_2S produces a black precipitate and KI a bright yellow crystalline one, it may be accepted as conclusive proof that lead chromate is present.

Recapitulation of analyses:

Name.	Color.	% Ash.	Constituents of ash.	Chloroform Extract			Adulteration.	Microscopical Examination.
				Color.	and Boracic acid for Turmeric.	and Hydrochloric Acid.		
Dalmatian,	Fawn.	6·5	Normal.	Greenish brown.	Negative.	Slightly green.	None.	No foreign starches.
Dalmatian (uncolored)	Yellowish brown.	6·6	Normal.	Yellowish brown.	Negative.	Greenish.	None.	No foreign starches.
Dalmatian (extra),	Light yellowish brown.	6·9	Normal.	Yellowish green.	Negative.	Slightly green.	None.	No foreign starches.
Dalmatian,	Lightfawn.	6·59	Normal.	Brownish green.	Negative.	Greenish.	None.	No foreign starches.
Dalmatian,	Light yellowish brown.	6·2	Normal.	Greenish.	Negative.	Deep green.	None.	No foreign starches.
True insect powder,	Deep yellow.	12·6	Normal and lead chromate.	Pale yellow.	Negative.	Slightly green.	Chrome yellow about 6 %.	No foreign starches.
Dalmatian,	Dark yellow.	26·8	Normal and lead chromate.	Greenish.	Negative.	Distinctly green.	Chrome yellow about 20 %.	No foreign starches.

Parke, Davis & Co., Analytical Laboratory, Nov. 6, 1891.

ANALYSIS OF PUMPKIN SEEDS.

By Wm. E. Miller, Ph.G.

From an Inaugural Essay presented to the Philadelphia College of Pharmacy.

The seeds were deprived of their integuments, and these and the kernels ground separately into a No. 40 powder.

The shells yielded to benzin 2·8 per cent. of extract, from which strong alcohol took up a fixed oil, leaving behind a dark reddish-brown mass. By means of ether the powder now gave 0·9 per cent. of extract, a small portion being soluble in water, yielding a neutral solution; and a resinous substance dissolving in alcohol with a greenish fluorescence, leaving an oily residue. The alcoholic extract from the powder, exhausted as described, amounted to 0·5 per cent., and was a greenish-brown solid of a bland oily taste and liquefying at the boiling point of water. The powdered shells yielded 2·17 per cent. of ash, of which 60 per cent. was soluble in water, and about one-half of the remainder insoluble hydrochloric acid.

The ash of the kernel weighed 4·4 per cent. Petroleum benzin extracted from the powdered kernels 33·6 per cent. of fixed oil, which was obtained of a dark reddish color, and having but little odor, but a rank and somewhat bitter taste. The oil is freely soluble in ether, chloroform and in hot absolute alcohol; but in 95 per cent. alcohol it is almost insoluble. With NaOH a soft brownish soap is obtained.

No indications could be obtained of the presence of a glucoside or alkaloid.

FERRIC PHOSPHATE U. S. P. AND FERRIC PYROPHOSPHATE U. S. P.

By Julius Stieglitz, A.M., Ph.D.

In the September number of the "Pharmaceutische Rundschau," Dr. F. B. Power proposes, in an excellent paper on the official iron salts, to change the official method for the quantitative estimation of the iron in ferric phosphate U. S. P. and ferric pyrophosphate U. S. P.

On having a large number of preparations of these salts to examine from the principal manufacturing houses in the country, I have found the present official method for the qualitative examination to be unsatisfactory in many cases. Therefore, I would suggest that a change also in the qualitative requirements be taken into

consideration. The frequent use of pyrophosphate as even a better preparation than the phosphate and the desirability of having the pharmacopœial requirements perfectly reliable in all cases caused me to examine the subject somewhat extensively.

The present pharmacopœia distinguishes the two preparations by the silver salts of phosphoric and of pyrophosphoric acid, which is satisfactory; but by neglecting first to effect the separation of the respective acid from the citric acid, also present, before making the silver test, its directions prove inadequate to any one examining the salts frequently and carefully. Citric acid gives, under the conditions of the test, also a white precipitate with silver nitrate: At the same time I have never had a sample of pyrophosphate of iron U. S. P. which was entirely free from the corresponding phosphate, and yet the contamination is sometimes so slight that the preparations could not be condemned. Now the consequence of the precipitation, with silver nitrate, of phosphoric acid in the presence of citrates, and on the other hand of pyrophosphoric acid in the presence both of citric acid and varying amounts of phosphoric acid is, that the behavior of both salts is nearly identical. By total precipitation a *very pale* yellow salt is obtained, which one is loth to regard as either phosphate or pyrophosphate. By fractional precipitation both preparations give white, yellowish and yellow tints, the phosphate often giving first a white precipitate of silver citrate, and only with a larger amount of silver nitrate a yellow precipitate. The presence of acetic acid makes the reaction yet worse. Phosphate of silver appears to be more soluble in this acid than silver citrate or silver pyrophosphate: If after complete precipitation a little ammonia is added, bright yellow silver phosphate is thrown down both in the case of phosphate and generally of commercial pyrophosphate.

My time was too limited to investigate whether the appearance of phosphate in the pyrophosphate of iron is due to any converting action during the course of preparation; it probably is due to the use of an impure sodium pyrophosphate. But certainly it would hardly be advisable to condemn every pyrophosphate of iron containing a slight amount of phosphate.

In order to do away with this uncertainty, and especially to have a positive reaction for pyrophosphate without the possibility of mistaking the citric acid present for it, I tried several different methods of proceeding.

As for other phosphates, solution of ammonium molybdate in nitric acid forms an excellent reagent for quickly demonstrating the presence of phosphoric acid in such a scale salt. The amount of citrate in the samples tested did not interfere with the reaction. The yellow precipitate must appear in a few moments if phosphate is present. By taking the same amount of the solutions of definite strength, when applying the test, a practised eye can see by the quantity of precipitate after a few minutes whether a true phosphate is present or phosphoric acid only as a slight contamination of a pyrophosphate. In the few minutes the test requires a solution of pure pyrophosphate of sodium acidified with nitric acid gave no precipitate with the molybdanic solution. This test of the salts under consideration is shorter than the U. S. P. test and is better because citric acid does not give any reaction with the reagent used. But it suffers from the same defect inasmuch as the presence of pyrophosphate is also here demonstrated only by the negative result, viz: The absence of any considerable quantity of phosphates.

By careful addition of acid to the aqueous solution of these scale salts, real iron phosphate and pyrophosphate are precipitated. This reaction could serve to remove the citric acid before making the silver test. It was found, however, that the precipitates are very difficult to filter and wash. Even after thorough washing, an examination showed that they still held back citrates, ether chemically or mechanically. So this reaction proved unavailable.

The separation from the citric acid by means of a calcium salt was tried briefly, but proved too unpromising for me to proceed further in this direction.

The test involving the use of excess of magnesium sulphate for separating the acids proved satisfactory; I obtained good results by adding to the alkaline solution of the acids, called "A" below, as obtained from the scale salts, an excess of ammonium chloride, and pouring the fluid into quite a large excess of concentrated magnesium sulphate solution (33 per cent.) The magnesium ammonium phosphate, precipitated in the cold, was identified further, as below, by being converted into silver phosphate. In case iron pyrophosphate was present, even with some iron phosphate, the filtrate from the precipitate of $Mg(NH_4)PO_4$ yielded magnesium pyrophosphate by boiling. The latter was identified by its silver

reaction and the reaction with acetic acid on boiling. This method of proceeding leaves the chemist very much more satisfied than the U. S. P. process, as the former gives us a positive proof for pyrophosphoric acid, and I can recommend it to the attention of the Committee for the Revision of the U. S. P.

I found, however, that a yet more convenient and satisfactory test could be based on the separation of the acids by means of acetic acid, as described in the next article. The test is not affected by the citrates present. A solution of alkali citrate acidified with acetic acid in any proportion gives no precipitate with magnesium sulphate in the cold or on boiling. At the same time the presence of citrates was shown neither to prevent the precipitation of magnesium pyrophosphate in acetic acid solution by boiling nor to cause the precipitation of magnesium phosphate under these conditions.

The manner of testing the scale salts in question by this method is as follows:

5 cc. of a 20 per cent. aqueous solution of the salt are added to about 9 cc. of a ten per cent. solution of potassa, previously heated to boiling, and the boiling continued for a moment; after cooling and filtering, one can use the filtrate which I will call "A" for the following tests:

(1) If phosphate of iron is before us, to a few cc. of the alkaline filtrate, some ammonium chloride and 1 to 2 cc. of 10 per cent. solution of magnesium sulphate are added. The easily recognized crystalline precipitate of magnesium ammonium phosphate thus produced is best filtered, washed with water and converted into the silver salt. It may be dissolved in a few drops of nitric acid, ammonia added just till the precipitate reappears and the precipitate taken up with a drop of acetic acid. Addition of silver nitrate solution now produces, if the salt examined is really iron phosphate, a bright yellow precipitate of pure silver phosphate, not mixed with white silver citrate. A practised chemist will not have to convert the magnesium precipitate into the silver salt, easily distinguishing the crystalline $Mg(NH_4)PO_4$ from the amorphous pyrophosphate which would be thrown down if the original salt were pyrophosphate of iron. If the quantity and nature of the precipitate of $Mg(NH_4)PO_4$ or a whitish color of its silver salt makes the chemist suspect that by an error pyrophosphate of iron has been furnished, he can test another portion of the alkaline filtrate "A" for pyrophosphates in the manner just to be described.

(2). If the salt to be tested purports to be pyrophosphate of iron U. S. P. a portion of the alkaline filtrate "A" is tested first for contaminating phosphates, by the method described above, only using instead of an excess of solution of magnesium sulphate, two to four drops of the same. In this way magnesium pyrophosphate, which is precipitated at the first admixture of the reagent, redissolves in the excess of alkali pyrophosphate, while phosphates, if present, are precipitated as magnesium ammonium phosphate. A good preparation should not yield more than a very slight turbidity of phosphate. If a precipitate is formed, it is filtered after five minutes, washed and converted into the silver salt. In this way the admixture of one part of phosphate to nine parts of pyrophosphate of iron could be easily detected.

(3). Another part (3 cc.) of the alkaline filtrate "A" is now tested for pyrophosphates by neutralizing with acid and then adding an excess of five to six drops of acetic acid (36 per cent.) and 1·5 cc. magnesium sulphate solution. On boiling the clear solution, magnesium pyrophosphate is precipitated, if present, while if the salt was a phosphate no precipitation occurs. For further identification the precipitate can be filtered hot and washed with hot water till the washings are neutral. If it be dissolved in a drop or two of nitric acid, reprecipitated with ammonia and redissolved with a drop of acetic acid, silver nitrate will produce white earthy pyrophosphate of silver. A very slight yellowish tinge may occur from insufficient washing, but there is no possible mistaking of the precipitate, the citric acid having been removed from the solution. For further particulars of this test reference may be made to the next article. In this manner the presence of pyrophosphate is proved beyond doubt, the demonstration resting on positive reactions. The whole examination can be completed very nearly as quickly as the present U. S. P. test. Samples have been tested showing contaminations with phosphates which we have had no hesitation in accepting, having proof positive of the pyrophosphate present. The samples have also been examined which were sold as pyrophosphate U. S. P., but which proved to be phosphate, by the U. S. P. test, the white precipitate of silver citrate seemed to be proof of pyrophosphate. The yellowish and yellow tints also obtained by fractional precipitation were no unusual accompaniments of the pyrophosphate of silver; but by the test described no pre-

cipitate could be obtained of pyrophosphate of magnesium. The quantity of magnesium ammonium phosphate precipitated, and the color of the silver phosphate obtained from it, confirmed the result of the pyrophosphate test.

I would therefore suggest that either the method of separating the acids by means of the acetic acid reaction, or of the excess of magnesium sulphate solution, be adopted for the U. S. P. The acetic acid test appears to me to be preferable and the handier to work.

Detroit, Anal. Laboratory of Parke, Davis & Co.

NOTES ON PYROPHOSPHORIC AND PHOSPHORIC ACID.

By Julius Stieglitz, A.M., Ph.D.

The general text books of pharmaceutical laboratory libraries give very little information concerning methods for distinguishing pyrophosphoric and phosphoric acid in presence of each other, although their special reactions are generally briefly noted. Such short notices are of little help in the course of work, for special phenomena, limits, and favorable and unfavorable circumstances attending reactions are often as important as reactions themselves. In seeking a practical reaction for quickly and easily separating the two acids for the purposes mentioned in the previous article, I found the usual reactions in very different degrees serviceable.

The test most commonly employed is the silver test. Of course, without separating the acids, a small percentage of pyrophosphate in phosphate does not perceptibly change the color of the silver precipitate, and can therefore not be detected by it. A larger percentage (50 per cent.) very distinctly changes the usually bright yellow precipitate of silver phosphate to a very pale yellow or a yellowish white. On the other hand a very small percentage (1 to 5 per cent.) of phosphoric in pyrophosphoric acid can be detected by precipitating in acetic acid solution with an excess of silver nitrate, filtering from the white precipitate and adding to the filtrate a drop of ammonia. Bright yellow silver phosphate will then appear, undimmed by the pyrophosphate.

The test with molybdanic acid in nitric acid solution is very convenient for finding a small percentage of phosphate in pyrophosphates. The result of the test must be taken at the end of a few minutes, as

pure pyrophosphoric acid is slowly converted even in the cold by the nitric acid employed in the test.

The solubility of magnesium pyrophosphate in alkali pyrophosphate gives a convenient test for demonstrating pyrophosphate in the presence of only a small proportion (Ca. 10 per cent.) of phosphate, even in the presence also of an acid like citric acid which has a white silver salt. If to an ammoniacal solution of the acids named, some ammonium chloride and only a few drops of magnesium sulphate solution are cautiously added as long as the original precipitate of magnesium pyrophosphate redissolves, magnesium ammonium phosphate will slowly separate out, especially on rubbing with a glass rod. On filtering after a little while and boiling the filtrate, a heavy precipitate would indicate pyrophosphate, which can now be tested with silver nitrate without the disturbing influence of either of the other acids. This process is naturally very limited, presupposing, as was said, only a very small percentage of phosphates. If considerable phosphate is present, magnesium pyrophosphate would be precipitated together with the phosphate by the addition of sufficient magnesium sulphate, the remaining alkali phosphate being insufficient to keep the magnesium salt in solution. This method is best combined with the previous method for testing and identifying pyrophosphates.

The fact that magnesium pyrophosphate dissolves in excess of magnesium sulphate and is not precipitated from such a solution by ammonium salts, forms a foundation for another well-known method for separating the two acids. The method was found practical, but a very large excess of magnesium sulphate was required for dissolving the pyrophosphate of magnesium. On adding concentrated magnesium sulphate solution (20 G salt in 60 cc. H_2O) to a solution of sodium pyrophosphate, one volume of the former solution effecting total precipitation of the pyrophosphoric acid, 15 volumes were required to redissolve the precipitate. On the other hand, by pouring the solution of sodium pyrophosphate into concentrated magnesium sulphate solution, an excess of eight volumes of the latter was required to give a clear solution. This very large excess of concentrated solution of magnesium sulphate makes the test rather inconvenient; but it is reliable and otherwise practical.

The quickest and most convenient method for separating the acids for qualitative work appears to me to rest in their behavior

towards acetic acid. The pyrophosphates of the alkaline earths are stated to be difficultly soluble in acetic acid: magnesium pyrophosphate, the salt I worked with, proved comparatively easily soluble in the acid when freshly precipitated in the cold, although much less easily than the phosphate salt; its precipitation is prevented with still less (about half the quantity) acetic acid if the latter is added before the addition of magnesium sulphate. But I found that on boiling such an acetic acid solution of magnesium pyrophosphate, the latter is easily precipitated, unless strong acid is used in very large excess. Magnesium phosphate is precipitated by boiling from solutions containing only the *slightest* excess of acetic acid, but is not precipitated at all from solutions properly acidified. The pyrophosphate precipitated by boiling from acetic acid solution is very much more difficultly soluble in this acid than when precipitated by any means in the cold, and then may even more properly be called "difficultly soluble." But the phosphate obtained by boiling in the presence of very little acetic acid is exceedingly easily soluble in the latter, even in the cold. The method is applied by adding to the solution of the alkali salts an excess of acetic acid (1 to 10 mg. for every 1 mg. P_2O_5 present) and boiling. Phosphate of magnesium will remain dissolved and the pyrophosphate be precipitated. The latter is washed with hot water and can then be used in the pure state for any further test desired. To convert it into the silver salt, it is, on account of its difficult solubility in acetic acid, first treated with nitric acid and ammonia and then easily dissolved in acetic acid before the addition of silver nitrate.

In a solution containing one part of P_2O_5 as $H_4P_2O_7$ to 20 parts of P_2O_5 as H_3PO_4, the pyrophosphate could be easily detected by this method without special precautions. From a solution containing only one part (50 mg) of P_2O_5 as $H_4P_2O_7$ to one hundred parts of P_2O_5 as H_3PO_4, the pyrophosphate was separated pure by this process after making two fractional precipitations by using an insufficient quantity of acetic acid for keeping all the phosphate in solution on boiling (for the first precipitation only 1 mg $C_2H_4O_2$ for 4 mg. P_2O_5 present was used). A sufficient quantity of pyrophosphate was obtained for further tests. This compares very favorably with my experience with the preceding method.

The precipitation of magnesium pyrophosphate by boiling its

acetic acid solution (see above) serves also as a convenient qualitative test for distinguishing the phosphate and pyrophosphate after separation.

DETROIT, ANAL. LABORATORY OF PARKE, DAVIS & CO.

PREPARATION OF PULQUE IN MEXICO.

By ALFONSO MENDIZABAL.

The agave plantations in Mexico are laid out in the following manner: Agaves of a height of about 1 meter are bought and left lying on the field or elsewhere for six months. Then holes of about 2 square meters are dug in the ground, the soil therein is manured, and the agaves are planted. It requires 7 to 8 years for them to fully develop, and during this time they must be manured twice yearly.

As soon as the agaves have reached the above age, they can be used for the preparation of the Mexicans' national drink, "pulque." The manipulation is in this manner: first the middle of the plants, that is the point of vegetation, with the younger portions are cut away. If these, however, are in too advanced a state, it is not possible to prepare the "pulque" from them. After the agave has been cut in this manner, it is not touched for eight days, but after that time, the place where the excision was made, is scratched and scraped, until a sweet aqueous juice, called "aguamiel," or honey-water, begins to flow; the scraping is done twice daily, in the morning about eight o'clock, and in the evening about six.

This water must be collected in containers of ox hide, as it spoils in contact with wood or metal. The juice is now left in the closed containers for eight days, by which time "semilla," probably by a process of fermentation, is produced; then one-half of this fermented juice, contained in the vessel is replaced by fresh aguamiel, and the beverage "pulque" is completed. It never keeps longer than two days, and must therefore be used at once; the number of vessels is always doubled, one half is sold, the other half retained, and is afterward brought back to the former volume by the addition of fresh aguamiel.

In this work it is very necessary that all utensils used be perfectly clean; the utensils necessary for the entire process are the following: For the extraction of the aguamiel a sort of a pipette or suction pipe called "acocote" is the instrument used; this is

apparently the fruit of a cucurbitacea, a tube which bulges out at the lower end, into which a hole is pierced. The aguamiel is extracted by sucking at this hole after the opposite pointed end has been inserted into the incision; when the vessel is full the little opening is closed with the finger, and the contents poured into the leather bags.

For the scraping of the agaves, a rasp (raspador) of the shape of a spoon is used. The vessels of hide in which the beverage is transported from the field to the habitations are called "bolambres." —Translated from *Gartenflora*, October 1, 1891, p. 525, M. A. M.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for The American Journal of Pharmacy.

Antiseptic and sedative treatment of hemorrhoids.—This treatment has been successfully used by Dr. Kassobudski for external and also internal hemorrhoids. (1) For internal hemorrhoids: chrysarobin 1 gm., iodoform 30 cg., extr. belladonna 50 cg., cacao butter 20 gm.; to be made into six suppositories. One suppository to be used a day. (2) For external hemorrhoids: a lotion of corrosive sublimate (1 : 1,000) or phenol (1 : 50) is used several times a day, succeeding which chrysarobin salve is applied, made of the same ingredients as the above suppositories, except that cacao butter is replaced by vaselin 30 gm.—Revue d. Thérapeut., 1891, p. 49.

Combretum Raimbaultii, *Heckel.*—This arborescent plant is indigenous to Western Africa along the coast, where it is known as *kinkeliba*, the leaves being used in hematuric biliary fever, to which the whites and also the natives of those climates are subject. The plant is furthermore used in cases of severe colic and to arrest vomiting, and the fruit in treating purulent ulcers. The leaves, in the form of decoction (4 : 250), are said to be strongly tonic, diuretic, to produce emesis at first, but then to prevent the return of the same, and lastly to call forth a biliary diarrhœa.

Petroleum ether extracts 2·66 per cent. of a yellow waxy matter; alcoholic extraction yields 27·12 per cent. of substances consisting principally of tannin; inorganic constituents (ash) present about 3 per cent.—Heckel and Schlagdenhauffen, *Nouveaux Remèdes*, 1891, p. 229.

SULPHATE OF SPARTEINE AND IODIDE OF SODIUM.—In endeavoring to make a solution of 2 gm. of the latter and 20 centigrams of the former in 120 cc. of water, L. Julliard (*Union Pharmaceut.*) found that if the salts are mixed and then the water added, a clear mixture at first results, which, however, is quickly blackened by the formation of a precipitate, which takes some time to settle. If solutions of each are made and then mixed, the liquid remains clear only a short time, gradually becomes cloudy and of a dirty yellow, and after a few hours a black colored precipitate collects on the bottom of the vessel. This dark precipitate is not iodine, but very probably iodosulphate of sparteine. The iodide used was alkaline, while the alkaloidal salt was acid in reaction.

LINAMARIN.—A. Jorissen and E. Hairs (*Acad. roy. de Belgique* (3) **21** (1891), 529) have isolated a glucoside, linamarin, from the germs of *Linum usitatissimum*. The germs, coarsely powdered, were treated repeatedly with boiling 94 per cent. alcohol, the latter recovered and the residue taken up with warm water. The resin and fat are separated and the aqueous solution treated with a slight excess of lead acetate. After filtration and precipitating the lead with H_2S the liquid is evaporated to a syrupy consistency. This residue is extracted with boiling alcohol, the solvent recovered for the greatest part, and the remaining liquid mixed with ten times its volume of ether under constant agitation. The residue remaining on distilling off the ether is taken up with water and this solution concentrated. Standing over sulphuric acid for some time the concentrated solution is converted into a crystalline mass of linamarin. For purification it is again treated with ether and alcohol as above. Lastly, the principle is dissolved in two parts of warm absolute alcohol, and the solution cooled under agitation. The germs yield about 1·5 per cent. of the glucoside, which forms colorless needles possessing a refreshing but very bitter taste, is soluble in water and alcohol, but almost insoluble in ether. Concentrated sulphuric acid does not color it; dilute mineral acids decompose the glucoside into hydrocyanic acid, a fermentable sugar reducing Fehling's test, and a volatile compound possessing some characters of ketones, and giving with iodine and potassium hydrate the iodoform reaction. Boiling barium hydrate liberates ammonia. Linamarin contains C 47·88 per cent., H 6·68 per cent., N 5·55 per cent., O 39·89 per cent.

CRYSTALLINE PRODUCTS OF LEMON AND BERGAMOT OIL.—L. Crismer (*Bull. Soc. chim.* (3) **6** (1891), 30) treated the residue from the distillation of oil of lemon at 10 mm. pressure with petroleum ether, until a precipitate began to form and put the mixture aside in a cool place. After a few days warty crystals had formed which were recrystallized from absolute ether. The crystals fuse at 143–144° C. (289–291° F.), are colorless and odorless. Concentrated sulphuric acid colors it yellow; on addition of a drop of nitric acid a green color, with a trace of permanganate of potash a blue changing to a green is developed. The formula of these crystals is $C_{10}H_{10}O_4$ (isomeric with Hoffmann's hesperetinic acid). The petroleum ether used above leaves a butyraceous mass on evaporation which on purification with alcohol melts at 50° C. (122° F.). Oil of bergamot treated in a like manner yields a white substance fusing at 183–184° C. (371–373° F.).

CHANGE IN MOULDED NITRATE OF SILVER IN CONTACT WITH SEEDS.—A. Barillé (*Rép. de Pharm.* (1891, **47**, 403), has examined the cause of the change in moulded silver nitrate when kept with coriander or linseed to prevent breakage. The change which takes place consists in the corrosion of the sticks and the blackening of the seeds. The cause seems to be the presence of volatile and fatty oils or mucilaginous compounds, these causing decomposition in the silver salt especially in light. The author recommends the use of powdered pumice stone for preservation.

PHYLLANTHIN.—M. Ottow (*Nederl. Tijds. voor Pharm.*, 1891, **3**, 128), isolated from *Phyllanthus Niuri*, euphorbiaceæ, indigenous to Java and there used in medicine, a bitter principle *phyllanthin*, $C_{30}H_{37}O_8$. This crystallizes in colorless needles or flakes, possesses an intensely bitter taste and is almost insoluble in water, easily soluble in alcohol, petroleum ether, ether, chloroform, benzene and glacial acetic acid. At 200° C. (392° F.) it is volatilized and condensed as an amorphous mass in the cooler portions of the vessel. In a few days the amorphous variety changes to the crystalline state.

EXPLOSIVE COMPOUND OF BARIUM AND CHROMIUM.—E. Péchard (*Compt. rend.*, 1891, **113**, 39), obtained an explosive body on mixing hydrogen peroxide in excess with a cold, aqueous solution of chromic acid (8 gm. to 1 L.) and adding to this a cooled solution of baryta until an alkaline reaction is obtained. A precipitate is formed which is yellowish, but gradually changes to brownish. As

soon as an evolution of oxygen begins the mixture is thrown into a large amount of water. The precipitate is washed by decantation, and then dried over sulphuric acid. On heating this body detonation takes place, a mixture of barium chromate and baryta remaining behind; water has no action on the body; sulphuric acid causes a rapidly disappearing blue color. The composition of the body is possibly $BaCrO_5 + \frac{1}{10} BaO_2$.

Oil of lemon.—V. Olivieri (*Gazz. chim.*, xvi, 318) found in oil of lemon besides the limonene (Wallach), also another terpene $C_{10}H_{16}$ boiling at 170–170·5° C. (338–339°F.), the tetrabromide of which fuses at 31°C. (88°F.), but the dihydro-chloride showing the characteristics of limonene. From the higher boiling portions the author has furthermore isolated a sesquiterpene $C_{15}H_{24}$ boiling at 240–242°C. (464–468°F.), which increases in quantity with the age of the oil. For detecting adulteration with turpentine the author recommends the use of the polarimeter. Lemon oil is lævogyre $(a)_D = -55°$ while oils of turpentine are more or less dextrogyre. (French oil of turpentine is lævogyre).

Volemite.—M. Bourquelot (Rép. de Pharm., 1891, 338) isolated from *Lactarius volemus*, a fungus, a saccharine body to which he has given the name of volemite. He extracted the fungus with 90 per cent. alcohol recovered the alcohol, and treated the residue with 95 per cent. alcohol. Volemite crystallizes in colorless needles which are radially arranged, fuses at 140°C. (284°F.) and is more soluble in water and alcohol than mannite. It possesses no reducing power, does not ferment, is not altered by dilute sulphuric acid, and does not yield an osazone. Its rotatory power is $\alpha_D = +2·4°$.

Helixin.—G. Joulin (*Jour. de Pharm. et de Chim.*, 1891, **11**, p. 20), has isolated the glucoside helixin from the ordinary ivy, *Hedera Helix*. The leaves and stems of the ivy in the form of a very coarse powder are boiled with water, the decoction filtered and then treated with lead acetate. The precipitate is collected on a filter, washed with cold distilled water and decomposed with sulphuretted hydrogen. The resulting liquid is filtered and evaporated on a water bath to the consistency of an extract and this taken up with 85 per cent. alcohol. The alcoholic solution on spontaneous evaporation leaves helixin, a reddish yellow syrupy mass, possessing an astringent slightly bitter taste. It is acid to test paper, without action

on Fehling's test except on inversion with an acid. Helixin is soluble in water and alcohol, insoluble in ether, chloroform and benzene. The color reactions are as follows: concentrated sulphuric acid, a brilliant red; concentrated hydrochloric acid, yellow; ammonia, yellow; pyridine, olive green precipitate; iron salts, green; sulphocyanide of potassium, rose disappearing quickly; bichromate of potassium and sulphuric acid, red then green; caustic soda, green. The aqueous solution of the glucoside foams just like solutions of saponin.

MIXTURE FOR ASTHMA.—Huchard (*Rev. gén. de Clin. et de Thérap.*, 1891, No. 26) prescribes the following mixture in cases of asthma: Iodide of potassium, Tinc. lobeliæ, Tinct. polygalæ, (*senega*) āā 10 gm. Extr. opium 0·1, Distilled water 900 gm. Dose, one teaspoonful morning and night with ¼ glass of water.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Water of ammonia will absorb carbon dioxide from the air, but in doing so there is very little carbonate of ammonium formed, the greater portion going to form carbamate of ammonium. J. Hertkorn, in calling attention to this, states the requirement that water of ammonia should not become immediately turbid when mixed with lime water, is not sufficiently exacting as indicating absorption or presence of carbon dioxide; the test should require that the mixture of water of ammonia and lime water should not show more than a faint turbidity *after boiling*, this procedure changing the carbamate into carbonate. Attention is also called to this presence of carbamate as a source of error in quantitative analysis; if carbon dioxide be absorbed in such a water of ammonia and then precipitated at a boiling temperature as calcium or barium carbonate by the addition of a barium or calcium salt, the results will of course be too high.—*Chemiker Ztg.*, 1891, 1493.

Examination of spices.—At the recent meeting of food-chemists and microscopists in Vienna, the following maximum and minimum figures for the examination of spices were proposed: *Allspice*, not more than six per cent. ash, of which not more than 0·5 per cent. should be insoluble in hydrochloric acid; *cinnamon* should not yield more than 5 per cent. ash, not more than 1 per cent. insoluble in hydrochloric acid; should yield not less than 1 per cent. volatile oil; *cloves* not more than 7 per cent. ash, not more than 1 per cent.

ash insoluble in hydrochloric acid, not less than 10 per cent. volatile oil; *black pepper*, not more than 6·5 per cent. ash, not more than 2 per cent. ash insoluble in hydrochloric acid, not more than 15 per cent. nor less than 12·5 per cent. moisture; *white pepper*, maximum ash percentage 3·5 per cent., 1 per cent. ash insoluble in hydrochloric acid, moisture as above; *saffron*, not more than 8 per cent. ash, 0·5 per cent. ash insoluble in hydrochloric acid, 13–14·7 per cent. moisture, 6–7 per cent. chloroform extract.—*Chemiker Ztg.*, 1891, 1543.

Boric acid, according to Jaenicke, has only a slight disinfecting or sterilizing action, but on the other hand has the power of preventing the growth or multiplication of bacteria etc.; to realize this property of boric acid the wound should be kept filled with a saturated solution of boric acid until it has healed. Better than the boric acid, because of greater solubility, is a compound made by boiling together equal portions of boric acid, borax and water; upon cooling, the compound crystallizes in large crusts which at ordinary temperature will dissolve to form a 16 per cent. solution (boric acid 4 per cent.) or at blood temperature a 30 per cent. solution (boric acid, 7 per cent.); the solution has a neutral reaction, and is more certain and longer in its effectiveness than is boric acid in solution. Because of its non-irritating action, its non-poisonous nature and its unchangeable effectiveness it is superior as an antiseptic to all other substances.—(*Therap. Monatsh.*) *Chem. Repert.* 1891, 289.

Pental is the name under which *amylene* or *trimethylethylene* C_5H_{10} is re-introduced by Prof. v. Mering as an anæsthetic. It is made chemically pure by Kahlbaum, Berlin, from amylene hydrate by heating with some acid; it forms a very volatile, colorless liquid, boiling at 38° C.; it is insoluble in water, but miscible in all proportions with alcohol, chloroform and ether. It is stated to be superior to chloroform and ethyl bromide in that there is no danger attending its inhalation, it is more reliable and there are no bad after-effects.—Holländer (*Therap. Monatsh.*) *Chem. Repert.*, 1891, 289.

Tuberculocidinum is the name given by Prof. Klebs, Zurich, to a purified *tuberculin;* the impurities to be removed are *organic bases* or *alkaloids* which are the cause of the intense febrile reaction. The method followed in its preparation is precipitating the tuberculin with

alcohol, dissolving in water, and extracting the alkaloids by agitation with chloroform (Pictet) or benzol (crystallized); a more recent process depends upon the precipitation of the alkaloids (no reagent or precipitant is mentioned. F. X. M.), and extracting the tuberculocidinum from this precipitate with water; by this process its properties, such as being precipitated by absolute alcohol and ammonium sulphate, also its physiological action, and its behavior towards albuminoidal reagents, are not impaired. The use of this substance is harmless; it does not produce fever, and speedily shows an improvement in the condition of the patients; the hectic fever and night-sweats disappear, the appetite increases, the catarrhal process in the lungs with its symptoms, cough and expectoration, is noticeably arrested, the bacilli in the expectoration become granular and the portions capable of absorbing dyes become smaller and smaller, and finally disappear entirely. In some thirty patients treated no objectionable symptoms could be discovered; to thoroughly test its action, a number of physicians have been supplied with the remedy.—*Deutsch. Med. Wochenschr.;, Pharm. Ztg.*, 1891, 700.

Eserine salicylate is readily made from the sulphate by the following process: 100 parts eserine sulphate are dissolved in a suitable quantity of water, and an excess of a solution of sodium bicarbonate added and agitated with several portions of absolute ether; the ethereal solutions are filtered into a beaker containing 35·5 parts salicylic acid dissolved in ether, thoroughly mixed and the eserine salicylate collected upon a filter, washed with absolute ether and dried, protected from sun-light and air. Any excess of salicylic acid that may have been present, is removed by the washing with ether; the theoretical quantity of the salicylate is 106·5 parts; in practice this is a little too high. The success of this method depends upon rapid manipulation and preventing exposure to sun-light, otherwise the salt obtained will be of a red color due to the decomposition of eserine and formation of *rubeserine*; washing the crystals with alcohol will remove any red color but with loss of eserine salicylate. P. Birkenwald, *Pharm. Ztschr. f. Russl., 1891, 657.*

Phenerythen, the red coloring substance of carbolic acid, has been more thoroughly examined by its discoverer, E. Fabini; it forms, when pure, an amorphous, resinous, odorless and tasteless, dull black powder, having the composition $C_{30}H_{30}NO$ and melting at 98 °C.;

it is soluble in carbolic acid with beautiful red color, in ether with yellow, in toluol, ethyl-alcohol, amyl-alcohol and acetic acid with browish-red color; it is difficultly soluble in benzin and carbon disulphite and insoluble in water. Plant and animal-fibres are dyed directly with a brownish-red color. Its formation is explained as follows: If metals act upon carbolic acid containing ammonia there is formed by reduction a quinone-like body of a dirty-brown color, which later by oxidation is converted into phenerythen. Acting like a weak base it forms a sulphate of indigo-blue color, a nitrate of red color and a hydrochlorate of reddish violet color. Phenerythen in an alcoholic, acetic acid solution is decolorized by treatment with zinc dust forming a leuco-base; red carbolic acid in like manner can be obtained colorless by the action of nascent hydrogen, but exposure to air will cause the red color to speedily reappear. —(*Pharm. Post*, 1891, 903) *Pharm. Ztg.*, 1891, 701.

Gallacetophenone, a substitute for pyrogallol in dermatology, is recommended by v. Rekowsky; it is also a triatomic phenol having the formula $C_6H_2(CH_3CO)(OH)_3$ (pyrogallol $C_6H_3(OH)_3$). In alkaline solutions it is, in distinction from pyrogallol, only slowly oxidized; it is relatively non-poisonous. Only slightly soluble in cold water (0·18 parts in 100 parts), it is easily soluble in boiling water, alcohol and ether; in glycerin it is soluble in all proportions. The solubility in cold water can be increased to 4 parts in 100 parts if it be dissolved in warm water and 30 parts sodium acetate added. It melts at 170° C.—*Pharm. Ztg.*, 1891, 628.

New alkaloid in the areca nut.—In a recent communication, E Jahns announces the discovery of a new alkaloid which he calls *guvacine* (from Guvaca, the old Indian name for the areca palm); it has the formula $C_6H_9NO_2$ and differs from *arecaine* and *arecaidine* by minus CH_2 and from *arecoline* by minus $(CH_2)_2$. It crystallizes in small, lustrous scales, easily soluble in water and dilute alcohol, insoluble in strong alcohol, ether, chloroform and benzol; at 265° C. it becomes dark in color and melts at 271–272° with decomposition. It forms salts of acid reaction having the same solubilities as the base.—(*Ber. d. D. Chem. Ges.*) *Pharm. Ztg.*, 1891, 671.

Phenacetine can be distinguished from acetanilide and antipyrine by the action of hot, dilute nitric acid. If the finely powdered phenacetine be covered with a 10–12 per cent. nitric acid and heated to the boiling point for a short time, the liquid as well as the powder

will assume an intense yellow color due to the formation of a nitrophenacetine; acetanilide and antipyrine under the same treatment are not altered.—W. Autenrieth and O. Hinsberg, *Arch. der Pharm.*, 1891, 456.

Detection of oil of geranium in oil of rose.—1. If two or three drops of oil of geranium be agitated in the cold with two cubic centimeters of a fuchsin solution decolorized by addition of sulphurous acid there will be obtained at first a bluish violet, after two hours a beautiful blue coloration. Oil of rose by the same test after 24 hours' standing shows a red coloration. With mixtures of the two oils there is no difficulty in recognizing the blue color due to oil of geranium since this reaction is produced before the color reaction due to the oil of rose.

2. If equal quantities of oil of geranium and concentrated sulphuric acid be mixed in a watch-crystal heat is developed with formation of dense, white fumes of a disagreeable tarry odor; a brown-red viscid liquid remains which on addition of 95 per cent. alcohol becomes *turbid* and separates yellow, fatty flakes, the solution at first being red but passing into a yellow after standing. With oil of rose the test also forms a brown-red viscid mass which, however, dissolves *completely* in alcohol forming an almost colorless solution. —G. Panajotow (*Ber. d. D. Chem. Ges.*) *Pharm. Ztg.*, 1891, 685.

Alkaloids of the Solanaceæ.—A careful investigation of the important plants of this natural order, with the view of ascertaining which of the alkaloids existed pre-formed in them, is summarized as follows:

Belladonna root: Young, uncultivated roots contain only hyoscyamine; older, uncultivated roots contain atropine in minute quantity with the hyoscyamine; the same alkaloids were found in older cultivated roots. *Belladonna berries:* The ripe, cultivated Atropa Belladonna nigra contain both alkaloids, the uncultivated only atropine; the unripe, uncultivated berries contain chiefly hyoscyamine, with very little atropine; the ripe berries of Atropa Belladonna lutea contain atropine with another alkaloid probably identical with atropamine. *Belladonna leaves:* Both species contain both alkaloids, hyoscyamine and atropine, the latter in minute quantity only. *Stramonium seed:* Fresh and old seeds contain chiefly hyoscyamine, with small quantities of atropine and skopolamine. *Solanum tuberosum* contains a mydriatic alkaloid along with *betaine*. *Lycium*

barbarum and *Solanum nigrum* contain mydriatic alkaloids in very minute quantity, which appear to be identical with the alkaloids of Solanum tuberosum. *Nicotiana Tabacum:* The leaves contain traces of mydriatic alkaloids. *Anisodus luridus:* The seeds, herb and root collected in autumn contain pre-formed only hyoscyamine. —W. Schütte, *Arch. der Pharm.*, 1891, 492.

Andromedotoxin.—In connection with his continued researches on this poisonous principle of certain ericaceæ, Prof. Plugge gives in *Arch. d. Pharm.*, 1891, 552, a complete list of the plants examined in this respect. The lists published in Am. Jour. Pharm., 1889, 360, 361, may now be extended as follows:

The poison is present in Kalmia angustifolia, *Lin.*, Monotropa uniflora, *L.*, Pieris formosa, *Don*, P. ovalifolia, *Don*, Rhododendron Falkoneri, *Hook.*, R. grande, *Wight*, R. barbatum, *Wallich*, R. fulgens, *Hook.*, R. cinnabar, *Roxb.*, and R. punicum, *Smith.* The poison is absent from Arbutus Andrachne, *L.*, A. canariensis, *Lam.*, A. integrifolia, Lam., A. Unedo, *L.*, Arctostaphylos alpina, *Spr.*, A. glauca *Lindl.*, Erica arborea, *L.*, Pyrola maculata, *L.*, P. rotundifolia, *Lin.*, Ledum latifolium, *Lam.*, and Rhodo. ferrugineum, *L.*

Test for cerium salts.—To the solution or salt to be tested add a slight excess of sodium hydrate and evaporate to dryness and then a few drops of a solution of strychnine in concentrated sulphuric acid (1 : 1,000); in the presence of 0·01 mg. cerium salt a faint and vanishing blue violet coloration will result; if 0·1 mg. be present at first a blue and later a permanent red coloration results. This test is the reversed strychnine reaction proposed by Sonnenschein.—Prof. P. C. Plugge, *Arch. der Pharm.*, 1891, 558.

The alkaloid of Sophora tomentosa, L., (Am. Journ. Pharm., 1891, 231) according to a preliminary note by Prof. Plugge is very likely to be proven identical with *cytisine;* the chemical as well as physiological tests with a small quantity of material gave all tests for cytisine.—*Arch. der Pharm.*, 1891, 561.

Detection of Traces of Copper in Distilled Water. By H. Thoms. —Copper to the extent of 1 : 200,000 in distilled water gave no indications with either ammonia or potassium ferrocyanide, but with potassium iodide solution a faint yellow color appeared which gave a distinct blue tint with starch paste. A comparative test with pure distilled water showed no coloration with iodide. —*Phar. Centralh.; Jour. Chem. Soc.*, May, 1891.

TUBERCULIN.

Considerable interest has been recently excited by the publication of a further communication upon tuberculin, in which Dr. Koch makes known the results of his attempts to obtain the *active principle* in a purer form (*Deut. med. Wochensch.*, October 22, p. 1189). In Dr. Koch's first attempt to purify tuberculin it was mixed with five times its volume of absolute alcohol, which caused a separation of a brown resinous mass that adhered to the bottom of the vessel. Both this deposit, however, and the clear supernatant liquid showed the tuberculin action to nearly the same degree. When a greater excess of alcohol was used instead of the resinous mass, a fine granular precipitate was thrown down, which after being washed repeatedly with absolute alcohol and dried in a vacuum over sulphuric acid, gave an almost white powder. But in this powder the tuberculin was still contaminated with extractive matter insoluble in alcohol, and many fruitless attempts were made to remove it. Either, as when ammonium sulphate was used, the tuberculin was thrown down still contaminated with other matters, or it lost its activity, or it could not be separated in an active condition from its precipitant. For instance, tannin threw down all the active principle from tuberculin, and the precipitate brought into solution by the addition of sodium carbonate possessed still its full activity, but the active substance could not be again separated from the tannin. Eventually it was found that by using a much smaller proportion of absolute alcohol (two parts to three of tuberculin) no separation of brown resinous substance was caused, but that at the end of twenty-four hours a white flocculent precipitate was formed. The brown supernatant liquid was decanted and replaced by the same quantity of 60 per cent. alcohol, the whole stirred and allowed to stand, and this was repeated until the alcohol remained uncolored, when the precipitate was washed once with absolute alcohol and dried in a vacuum exsiccator. The product was a snow-white mass, which after drying at 100° C. appeared when powdered of a light gray color, and was considered to represent the pure or nearly pure active principle of tuberculin. It dissolved fairly easily in water, but an aqueous solution appeared to lose some of its activity in a fortnight. The evaporation of such a solution also was found liable, as the concentration increased, to cause the separation of curdy flocks, which did not redissolve when more water was added. On the

other hand, a 50 per cent. solution of the purified tuberculin in glycerin appeared to be very stable. From a consideration of its chemical reactions, and the results of three elementary analyses, it would appear that tuberculin is closely allied to the albumoses, but differs from them, and especially from toxalbumen, by its resistance to high temperatures; it also differs from the peptones in several respects, especially in being completely precipitated from a solution by ferric acetate. From the results of a number of physiological experiments, made first upon guinea pigs and afterwards on human patients, Dr. Koch has arrived at the conclusion that the purified tuberculin does not differ markedly in the nature of its action from the crude tuberculin, but that the former has, in fact, diagnostically and therapeutically the same effect as the latter when it is used in such quantities that the reaction symptoms, especially that of temperature, attain the same degree of intensity. In respect to this point, it has been found that whilst the action of purified tuberculin upon guinea pigs is about fifty times as strong as that of the unpurified, upon human patients its action is at most forty times as strong. From these results, therefore, it would appear that Dr. Koch and his coadjutors have not been so successful in the attempt to purify tuberculin as Dr. William Hunter, who claims to have succeeded in removing from it the constituents giving rise to fever and inflammation, leaving a product which in the hands of Dr. Watson Cheyne has proved capable of inducing local reaction, followed by healing change around tuberculous lesions, unaccompanied by any constitutional disturbance.

In an appendix to this communication, Dr. Koch gives some further information as to the method adopted in *preparing tuberculin.* It is generally understood that tuberculin is a product of the cultivation of tubercle bacilli obtained in the form of a glycerin extract. As may be supposed, a principal difficulty has been the cultivation of the bacilli free from admixture with other organisms. Originally the tubercle bacilli were sown upon "glycerin-peptone-agar," and when the culture had attained its full development it was washed off, collected on a fine wire gauze, extracted with a 4 per cent. glycerin solution, the solution evaporated to one-tenth, filtered, and the filtrate used. When a large demand arose for tuberculin, the agar cultivation was found unsuitable, as it gave relatively small results. A previously abandoned attempt to cultivate the bacilli in a liquid

medium was therefore resumed, but at first without success, until some small flat pieces of cultivation which had been left dry and unmoistened in the upper part of the flask, were observed swimming on the top of the liquid, where they developed most luxuriantly. In the course of a few weeks they formed over the entire surface a tolerably thick whitish skin, dry on the upper side, which eventually became moistened, broke up and sank to the bottom. The product from such a culture proved considerably greater than that developed on solid media. The cultivation liquid used is an infusion of veal made faintly alkaline and with one per cent. of peptone and 4 or 5 per cent. of glycerin added. The bacilli sown give practically the same results, whether taken from fresh or old cultivations, from a tuberculous patient, or after passing through a series of animals. When the culture is quite mature, which occurs at the end of six or eight weeks, and has been ascertained to be absolutely pure, it is extracted by means of the cultivation liquid itself, and the extract is evaporated on a water bath to one-tenth of its original volume and filtered through porcelain. It then contains from 40 to 50 per cent. of glycerin, and is tested as to its activity by experiments upon guinea pigs.—*Phar. Jour. and Trans.*, Oct. 31, p. 345.

DETECTION OF FORMLESS FERMENTS AND POISONS IN BLOOD.

By Prof. R. Kobert.

Both the physiological and the chemico-legal demonstrations of unstable poisons in blood encounter difficulties depending mainly on the fact that the coloring-matter of the blood (if the red globules are dissolved by putrefaction, morbid processes, or improper treatment such as the addition of water) forms a tarry mass which it is difficult to treat chemically and which is perfectly useless for physiological experiments. The removal of this tarry coloring-matter is generally effected by plentiful dilution and boiling with acetic acid, or precipitation with alcohol, with potassium ferrocyanide and acetic acid, or with uranium nitrate.

In all these cases the serum albumen present in the blood along with the blood-pigment as well as all albuminoid enzymes and toxalbumins are simultaneously precipitated, and thus the detection and the isolation of the enzymes and toxalbumins is rendered impossible. But if we had an agent which would throw down the

coloring-matter of the blood, leaving all other substances in solution, and chemically unaltered, we should have made an important step towards the isolation and detection of the enzymes and tox-albumins.

Zinc-powder may be regarded as such a precipitant for hæmoglobin. In forensic chemistry which is generally concerned with stale, offensive blood, this agent has the advantage that it renders the specimen almost inodorous even if several weeks old. The completeness of the precipitation is not interfered with by the age of the blood. The following conditions are essential for successful precipitation :

(1) In quite recent blood, freshly drawn from normal men or other animals, which is always alkaline, the alkalinity must be neutralized before the addition of the zinc-powder. The same holds good of the blood of dead bodies a week old in which ammonia has been formed. On exposure to the air, or remaining in the body, the normal alkalinity of the blood is lost within 1 to 2 days. Diseases—especially fevers—often reduce the alkalinity before death to such a degree that the zinc may be added directly.

(2) The blood must be free from methæmoglobin. If this substance is present the blood is allowed to remain in an open vessel without dilution or shaking until the last trace of methæmoglobin has disappeared. It is known that this disappearance often ensues within 24 hours, whether in the corpse or in jars, even when the original quantity of methæmoglobin was very considerable.

(3) The blood must be diluted with at least 3 to 5 volumes of water.

(4) The zinc-powder must be as pure as possible, containing nothing but zinc and zinc oxide.

(5) The quantity of the zinc-powder must be equal to a quarter or a half of the original weight of the blood.

(6) The mixture must be energetically shaken for a considerable time.

If these conditions are observed a complete separation of the coloring-matter of the blood is almost always effected, so that even on washing the precipitate with much water in the filter-press or in the filter-pump nothing returns into solution. The yellowish-brown coloring-matter contained in the serum of some kinds of blood is not thrown down, but remains in the filtrate. Distinctly recog-

nizable quantities of zinc are to be found in the filtrate only if compounds of organic acids were present in the blood. Otherwise mere traces of zinc exist as zinc albuminate, in smaller proportions the more the zinc-powder is free from zinc oxide. As the deposit —a solid, reddish-brown, bulky mass—retains no organic poisons except traces of hydrocyanic acid and carbon monoxide, we have in the filtrate all the glycosides, alkaloids, ptomaines, toxalbumins, enzymes, amides, etc.; in short, the examination of the filtrate is exclusively important for forensic chemistry. Concerning the solid residue we need merely remark that the hydrocyanic acid may be removed from it by extraction with alcohol and carbon monoxide by exhaustion in the air-pump.

The filtrate is incomparably more suitable than the original blood as well for the chemical as for the physiological detection of poisons. If its action upon animals is to be examined it is only requisite to shake up a portion with a drop of solution of sodium sulphide, and to filter off the precipitate of zinc sulphide. If the proportions are duly adjusted the liquid, free from zinc and sodium sulphide, can be injected subcutaneously into a mouse or into the circulatory system of a kitten. However, the filtrate can often be applied without the elimination of the zinc. The bacteria which swarm in putrid blood are almost entirely left behind in the residue. Where an absolute determination of bacteria is required the filtrate may be again passed through a Chamberland filter, and thus the last residues of the germs may be removed. If the animal experimented upon exhibits grave phenomena of poisoning, a second portion of the original filtrate is mixed with a drop of solution of potassium ferrocyanide and a little acetic acid, the precipitate, which includes all the zinc and the albuminoids, is filtered, the filtrate is neutralized and injected into a second animal. If this animal, in contradistinction to the former, exhibits no phenomena of poisoning, the symptoms observed in the former subject must have been occasioned by an albuminoid poison, as in such dilute liquids other poisons are not precipitated by potassium ferrocyanide, or at most a portion of strychnine, which can be easily detected in the precipitate.

The isolation of the poisonous albuminoid substance can be undertaken only in the main portion of the original filtrate, either by treatment with alcohol in the ordinary manner or by "salting out" with ammonium sulphate. In those toxalbumins, however,

which do not admit of the above-mentioned methods of precipitation, *e. g.*, those of venomous spiders, a more complete isolation of the poison is not yet practicable.

If the second experimental animal does not remain in health, but is taken ill like the first, we have a proof that the poison in question does not belong to the albumins—at least not to those precipitable by ordinary means. The entire filtrate is then freed from albumin and the limpid filtrate is examined for other poisons by Dragendorff's method.—*Chemiker Zeitung; Chemical News*, Oct. 23, 1891, p. 206.

THE SEPARATION OF RESIN FROM FATTY ACIDS.

By J. Arthur Wilson.

The detection of resin and its separation from fats and oils was at one time a very difficult problem to the analyst, and in many cases was impossible. Amongst many processes we have those of Henderson, Barfoed, and Gladding, the latter of which has found the greatest favor. It suffers from one very serious defect, however, and that is the correction for solubility of the fatty acids and silver salts in ether. This is a very variable factor, and, of course, is dependent on the nature of the fatty matter used in the fabrication of the soap. With small quantities of resin the error thus introduced may be as much as 20–30 per cent., but of course in soaps of high resin content—say 20 per cent.—the error diminishes.

Mr. R. Williams (*Analyst*, vol. xv., p. 169) obtained very good results by the process; thus, in a soap which actually contained 30·0 per cent. of resin, he obtained 30·7 per cent., but no mention is made as to whether the amount remaining in the lyes, after precipitation of the soap, was determined. As to the simple detection of resin, no doubt the best test is to boil the dry fat or fatty acids (10 drops) with 5 cc. acetic anhydride, cool, and add 2 drops of pure sulphuric acid (1·84 specific gravity), when the reddish violet color due to resin is easily observed, one per cent. of which can thus be detected.

It seems that all the above processes must make way for the admirable process of Twitchell (*Analyst*, Oct., 1891), who found that whereas fatty acids are, as is well-known, converted into eutral ethers on passing dry hydrochloric acid gas into their alco-

holic solution, the acids constituting resin are not attacked. The process obviously may be either gravimetric or volumetric, but chemists will prefer the latter on account both of speed and accuracy. The description of the process is as follows:—2·5 to 3 grms. of the dried fatty and resin acids are dissolved in from 25–30 cc. of perfectly absolute alcohol, and a current of dry hydrochloric acid gas passed in constantly. The flask containing the mixture must be kept cool by immersion in cold water. When the etherification is complete the ethers separate and the gas is no longer absorbed. The flask is removed, corked well, and allowed to stand half an hour. It is diluted with about 100 to 125 cc. hot water, then cooled, transferred to a separatory funnel, and agitated with 75 cc. of ether. The watery layer is removed, and the ethereal layer washed with cold water till neutral to delicate litmus solution (twice always is sufficient). The ethereal liquid is received in a flask, the separator washed out with about 50 cc. of neutral spirit, and the whole titrated by standard alcoholic alkali, using phenolphthalein as indicator. The alkali should be standardized by an accurate solution of half normal HCl, and should be either one-fifth or one-half normal according to the amount of resin in the fatty acids. Taking the mean combining weight of resin as 347, then the percentage is easily calculated; it is reported both on 100 of dry fatty matter and on 100 of soap.

Twitchell's test experiments are eminently satisfactory, and I have now pleasure in confirming them by my own tests:

(1) Sample of distilled fatty acids containing no resin, when treated as described showed 0·7 per cent. resin.

(2) The above distilled fatty acids, to which were added common resin to the extent of 22·5 per cent., showed, when treated as above described, 23·3 per cent. of resin, which, after deducting the 0·7 per cent. found in No. 1, gives exactly 22·5 per cent., or the amount which was added.

(3) Soap made from palm oil and other fats, but no resin, gave 0·8 per cent. resin.

(4) Another soap made from fatty matter of unknown origin, but no resin, gave 1·0 per cent. resin. This, it should be observed, was of a dark color, and evidently contained some altered or oxidized oily matter.

(5) Soap which showed by Gladding's test 6 per cent. of resin, gave 4·9 per cent. by Twitchell's process.

The above results are all that may be desired, and I have now to show how the process may be still further shortened without any sacrifice of accuracy. This can be done by leaving out the washing and dissolving in alcohol direct. A few drops of methyl orange are then added and alkali till neutral to this indicator; phenolphthalein is then added, and the titration completed as before. The alkali required in the first case is for the neutralization of the free hydrochloric acid, and is of course neglected. That required to neutralize to phenolphthalein is, of course, due to the resin, and is calculated as such.—*Chemical News*, Oct. 23, p. 204.

TOTTINGTON MILLS, Oct. 6, 1881.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 17, 1891.

The meeting was called to order, and Dr. C. B. Lowe was elected Chairman. The minutes of last meeting were read and approved.

Mr. Beringer presented a specimen of the flower of the vanilla plant for the museum.

The registrar presented a number of works from Prof. Maisch, and the report of the Geological Survey of the State of Pennsylvania, in four volumes, from Prof. Sadtler.

G. M. Beringer, Ph.G., read a paper upon *Synthetical Carbolic Acid*, by Dr. H. W. Jayne, who was unable to be present.

Mr. Witzel, of Tacony, exhibited a *tablet machine* and demonstrated its working facilities before the meeting.

Joseph W. England, Ph. G., read a paper on *Fluid Extract of Triticum repens*, or couch grass. It was remarked that couch grass had been greatly lauded in medical journals some eight or ten years ago, and then lost sight of, and was now being revived; there is still a large demand for it as one person has an order for three tons of it. Prof. Remington said that the specific gravity was not a very good test of commercial fluid extracts, as each manufacturer was a law to himself as far as the menstruum was concerned, and that there is a large consumption of the drug.

Mr. Thompson said agricultural journals stated that sheep seek it out in pastures, and that they are relieved in passing biliary calculi. Prof. Maisch stated that in Europe there are two preparations in use, a soft extract and a liquid extract made by dissolving the former in a little water or weak spirituous liquid; the drug had been popularly employed for many centuries and was generally given in decoction.

J. W. England, Ph.G., spoke of *Ehrlich's Test for Typhoid Fever Urine.* It consists of two solutions: Solution A is made by dissolving one part of *nitrite of sodium* in one hundred of distilled water; Solution B, by mixing 10 cc. of chemically pure hydrochloric acid with 190 cc. of distilled water, and adding sufficient sulphanilinic acid to saturate, about two and a half grammes will be requisite. It is used by adding a small quantity of Solution A to the suspected

urine, and then Solution B following with ammonium hydrate ; should a typhoid condition exist, it will occasion a wine coloration.

G. M. Beringer, Ph.G., read a paper upon *Mullein Oil* and its uses.

F. X. Moerk, Ph.G., read a paper upon the *Colorimetric estimation of Vanillin*, showing the great delicacy of this test. The question was asked whether vanillin from artificial sources could be distinguished from that obtained from the fruit. Mr. Moerk said it could not. Fluid Extracts of Vanilla which had no foreign color added to them gave the color reactions.

A letter from A. L. Beck, Ph.G., inquiring what should be the strength of *dilute Lactic Acid*, was read. The U. S. Pharmacopœia only gives the 75 per cent. as officinal ; two different makes which he had examined gave respectively 36 per cent. and 6·3 per cent. of absolute acid. He says that he has made it 10 per cent. to have it uniform with the other dilute officinal acids ; he expresses the opinion that manufacturers should indicate the strength of the preparation on the label.

J. W. England read a note upon *salicylate of bismuth*. A motion was made to refer the papers read to the Publication Committee. Mr. England called attention to the use of *Menthol and Carbonate of Ammonia* in colds in the head, hay fever, etc., to be employed as smelling salts ; they should be mixed in about equal quantities. Dr. Miller said that it was important that the carbonate of ammonia should not be in too great excess.

Inquiry was made why *abstract of belladonna* was made from the root when the pharmacopœia directed the extract and tincture to be prepared from the leaves ; the reason was that in preparations so well-known as the extract and tincture, any change would produce great dissatisfaction, while it is well-known that the root is far more active and hence was employed.

On motion, adjourned.

T. S. WIEGAND,
Registrar.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The P. C. P. Alumni Report.—Published under the auspices of the Alumni Association of the Philadelphia College of Pharmacy.

Heretofore the Report of the Alumni Association made its appearance once a year. With the present season a change has been made, so that a report will reach the alumni eight times a year, each containing the minutes of the last social meeting, and information on other College matters. The publication is in charge of Jos. W. England, Ph.G., as editor, and Wm. Nelson Stem, Ph.G., as business manager. The first issue contains 24 pages, and including a number of editorial notes and discussions, makes attractive and interesting reading matter. The periodical is published at the subscription price of $1 a year.

Exercise Book of Junior Pharmaceutical Laboratory Work.—Division one. Arranged for use in the Massachusetts College of Pharmacy, Boston, Mass. By Edgar L. Patch, Ph.G., Professor of Theory and Practice of Pharmacy, and Director of Pharmaceutical Laboratory. 1891.

A very conveniently and systematically arranged book, containing typical processes and manipulations arranged for the practical instruction of tyros in pharmacy. Beginning with the testing of thermometers and the taking of

specific gravities under various conditions, the exercises proceed to the exsiccation of salts, the purification of crystals by recrystallization, and the preparation of chemical solutions, crystals, tinctures, fluid extracts, syrups, plasters, etc., and conclude with the reading and dispensing of prescriptions. As will be observed it is a work for practical use, and it is designed to be used as a note and memorandum book, being interleaved, and upon the printed pages, at the end of each exercise, provided with a series of printed memoranda, containing blanks to be filled out by the student. Aside from the usefulness of these memoranda as a check upon the correct execution of the work, they will inculcate habits of observation, which must be of lasting value to the students in the future.

Twenty-second annual Report of the State Board of Health of Massachusetts. Boston: 1891. 8vo. Pp. 588.

The publication contains reports on water supply, sewerage, food and drug inspection, mortality, etc. Reports on food were made by Dr. Harrington and Davenport; on milk by Prof. Goessmann, Davenport and Worcester; and on drugs by Prof. Davenport.

History of Circumcision from the earliest times to the present; moral and physical reasons for its performance, with a history of Eunuchism, Hermaphrodism, etc., and of the different operations practised upon the prepuce. By P. C. Remondino, M.D. (Jefferson), etc. Philadelphia and London: F. A. Davis. 1891. 12mo. Pp. x and 346. Price, cloth, $1.25 net.

The title, as given above, explains the scope of the work, which deals with a custom of great antiquity, having originated under certain climatic conditions, and being practised to some extent as a religious rite, but much more extensively as an inherited custom and, according to the author, in modern times also as a measure of hygiene. The subject is treated with delicacy and frankness, the historical information being of general interest, also the hygienic discussions, while obviously the chapters relating to surgical operations and the like are intended especially for physicians. The book forms No. 11 of the Physicians' and Students' Ready Reference Series.

Ueber Einwirkungen des Cyanwasserstoffs, des Chloralhydrats und des Chloralcyanhydrins auf Enzyme, auf keimfähige Pflanzensamen und auf niedere Pilze, von Ed. Schär, Professor der Pharmacie am Eidgenössischen Polytechnikum in Zürich. Zürich: Albert Müller's Verlag. 1891. Fol., p. 25.

On the effects of hydrogen cyanide, of chloral hydrate and of chloral cyanhydrin upon enzymes, upon fertile plant-seeds and upon some low fungi.

An interesting series of experiments demonstrating that certain seeds are not prevented from germinating when under the influence of solutions of definite strength of the chemicals named, while other seeds showed little or no power of resistance in this respect. The essay forms one of the contributions to the jubilee volume, issued by the higher educational institutions of Zurich, in commemoration of the fiftieth anniversary of the doctorates of Professor Carl Wilhelm von Nägeli, in Munich, and of Professor Albert von Kölliker, in Würzburg.

All around the Year.—A calendar for 1892. Designs by J. Pauline Sunter. Boston: Lee & Shepard. Price, in box, 50 cents.

This calendar is composed of heavy, gilt-edged cards, 4¼ x 5½ inches,

tastily tied with white silk cord, and a delicate silvered chain attached, by which they may be hung on the wall or elsewhere, and are so arranged on rings that they may be turned over as each month shall be needed for reference. The designs are appropriate and quite attractive, and in each case suggestive of the season represented.

The Physicians' Visiting List for 1892. Philadelphia: P. Blakiston, Son & Co. Price, for 25 patients, $1.

This is the forty-first year of the issue of this Visiting List, and it is arranged in the usual convenient style. The several tables contained in the preliminary part, are each credited to some one, with the exception of a "Table for converting apothecaries' weights and measures into grams," and this happens to be an old acquaintance; for fifteen years ago we made the calculations and published the tables in the Amer. Jour. Phar., 1877, p. 92, and they have also since been published in the National Dispensatory, and in many other publications—not unfrequently without proper credit having been given. This has not, however, been detrimental to their usefulness.

Hand-book of Materia Medica, Pharmacy and Therapeutics, including the physiological action of drugs, the special therapeutics of disease, official and practical pharmacy, and minute directions for prescription writing. By S. O. L. Potter, A.M., M.D., etc. Third edition, revised. Philadelphia: P. Blakiston, Son & Co., 1891. 8vo. Pp. 767. Price, cloth, $4; full leather, $5.

In the present edition some new remedies, like creolin and somnal, have been added in the part treating of materia medica, several changes have been made in the arrangement, and some of the articles have been partly rewritten. On comparing this with the previous edition, we must repeat what we then said in this Journal, 1890: "Most of the errors which we noticed in the first edition, to some of which we referred in the previous review, remain uncorrected. * * * The general correctness of all that belongs to the therapeutical uses and the physiological action of medicines, will render the book of as great practical value to the physician, as the preceding edition has been."

Copies of the printed Proceedings of the following State Pharmaceutical Associations have been received:

Louisiana.—Ninth annual meeting, held at New Orleans, April 29 to May 1. Pp. 138. See July number, p. 370. The next meeting will take place in New Orleans, April 13, 1892. Mrs. E. Rudolf, Corresponding Secretary.

Virginia.—Tenth annual meeting, held at Roanoke, September 8 and 9. Pp. 58. The officers for the current year are: M. E. Church, Falls Church, President; C. B. Fleet, Lynchburg, Secretary, and C. H. Lumsden, Lynchburg, Treasurer. The next meeting will be held at Fredericksburg, September 13, 1892. M. C. Hall, Local Secretary.

Wisconsin.—Twelfth annual meeting, held at Milwaukee August 11 to 13. Pp. 75. The pamphlet contains, in addition, the tenth annual report of the State Board of Pharmacy, occupying 48 pages. The officers for the present year are: C. Widule, Milwaukee, President; W. P. Clarke, Milton, Treasurer, E. B. Heimstreet, Janesville, Permanent Secretary. The next meeting will be held at Oshkosh, August 9, 1892.

OBITUARY.

William G. Buchanan, Ph.G., died in Germantown, Philadelphia, October 28; he graduated in 1862, and was for many years in the employ of Rosengarten & Sons.

George D. Coggeshall, Ph.G., died at Orange, N. J., November 5, aged 84 years. For many years he had been the oldest living Graduate in Pharmacy in the United States, having graduated at Philadelphia in 1828. He was active in organizing the New York College of Pharmacy, served that institution faithfully for many years in various positions, and was one of its representatives at the Convention of Colleges of Pharmacy in 1851, and also at the National Pharmaceutical Convention in 1852, serving in that year as the first recording secretary, and in the year following, 1853, as first vice-president of the American Pharmaceutical Association. For many years preceding his death he had retired from active business.

Edward Donelly, Ph.G., M.D., died at Piedmont, Cal., in November, in the seventieth year of his age. He was born in Londonderry, Ireland, and came to Philadelphia in 1831, accompanying his widowed mother. He graduated in pharmacy in 1843, and afterwards joined the exploring expedition of Passed Midshipman I. G. Strain, U.S.N., returning to the United States in 1852. He graduated in medicine in 1854, and during the civil war served as surgeon with high merit. After the war he went to Pittsburgh, and in 1879, he removed to San Francisco, where he continued in practice as a physician until a few months before his death. Volumes XV and XXIII of this Journal, contain two papers—on poke root, and on cowrie resin—from Dr. Donelly's pen, and the Proceedings of the Amer. Phar. Assoc., 1860, contain a valuable paper on Theobroma Cacao, which was intended as the precursor of some other papers, that remained unfinished at the breaking out of the war.

Howard Grant Jones, Ph.G., died near Oxford, Pa., November 20, aged 39 years. Born and educated in Philadelphia, he learned the drug business with his father, Daniel S. Jones, and graduated with high honors in 1875. Afterwards he devoted his time chiefly to the study of chemistry, mineralogy and geology, the studies, however, being interrupted by a severe attack of brain fever. With returning health he resumed his mineralogical excursions, and it was upon one of these that he was suddenly prostrated.

Professor Dr. Eduard Reichardt died at Jena, October 26, aged 64 years. He was born at Camburg, became a pharmacist, studied at Jena, where, in 1854, he accepted a professorship at the Pharmaceutical and Agricultural Institute, became connected with the University of Jena as private lecturer in 1854, and in 1862 was called to the chair of technological and pharmaceutical chemistry. In 1855 he had published a valuable monograph on the chemical constituents of the cinchona barks, and in 1860 one on the Stassfurt mines. Later on his investigations were devoted to agricultural chemistry, to disinfectants, to potable waters, etc. After the death of Professor Hermann Ludwig in 1873, Professor Reichardt was elected his successor as editor of *Archiv der Pharmacie*, and continued as such until the close of 1889, when he retired from these editorial labors.

Professor Dr. Victor von Richter died suddenly in Breslau, October 8, in the fifty-first year of his age. He was the son of a Lutheran pastor in Doblen, Courland, Russia; studied physics and chemistry at Dorpat, was assistant to Mendelejeff from 1862 to 1872, and for two years professor at the Academy at Nowo-Alexandria, Poland; in 1875 he became private lecturer, and since 1879, professor of chemistry, at the University of Breslau. The deceased was an indefatigable investigator in synthetical chemistry; but his name is most familiar as the author of a work on inorganic chemistry, and one on the chemistry of the carbon compounds, both of which have been translated into several languages; one of these was only recently noticed in our October issue, page 517.

VARIETIES.

Bleaching of Beeswax; Composition of White Wax. By A. BUISINE and P. BUISINE.—In the bleaching of beeswax, light is the chief factor, since the bleaching goes on in a vacuum, or in an atmosphere of carbonic anhydride, nitrogen, etc., but ceases in the dark even in an atmosphere of ozone. Pure beeswax becomes brittle when bleached by exposure; and to prevent this, it is customary to add 3–5 per cent. of suet, which also expedites the bleaching process; the addition of turpentine oil has a similar effect. Other agents made use of are: Potassium permanganate, potassium dichromate, hydrogen peroxide and animal charcoal.—*Bull. Soc. Chim.* [3], **4**, 465–470.

Estimation of Boric Acid in Milk and Cream. By C. E. CASSAL.—The usual tests suffice for the detection of boric acid and borates in milk and cream, but for their estimation the milk or cream is rendered alkaline, evaporated and incinerated, and successive small quantities of methyl alcohol are distilled from the ash previously acidified with acetic acid. The distillate is collected on a known quantity of ignited lime, which is subsequently re-ignited and reweighed: the increase in weight is boric acid.—*Analyst*, **15**, 230–232.

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TO VOL. LXIII (VOL. XXI, FOURTH SERIES), OF THE AMERICAN JOURNAL OF PHARMACY.

State Pharmaceutical Associations: