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## EDITORIAL.

### Karl Remigius Fresenius

WAS born in Frankfort-on-Maine, on Dec. 28th, 1818. When eighteen years of age, he entered upon a pharmaceutical career, attended lectures on chemistry and botany at the Senkenberg Institute, and afterwards the regular lectures on chemistry at the universities of Bonn and Giessen. At the latter place he had the good fortune, in 1841, to become Liebig's assistant, and in 1843 he became Privat-Docent, a position which he filled until September, 1845, when he accepted a call to the Agricultural Institute at Hof Geisberg, near Wiesbaden, as professor of chemistry, physics, and technology. Previous to this period, he published a number of important investigations, and not less than three editions of his *Anleitung zur Qualitativen Analyse.* During the winter of 1845–6, he delivered a private course of lectures on chemistry, illustrated by experiments, before the Duke of Nassau, and thereby formed the acquaintance and friendship of the most influential and prominent persons at the court, which circumstance afterwards largely contributed to the success of his efforts to establish a model school of chemistry. The facilities for teaching chemistry at that time were generally very meagre, except in the laboratories of a few universities; and the want of proper laboratory accommodations was severely felt by Prof. Fresenius, particularly as a large demand was made upon him for numerous investigations, both by private persons and by officials; besides, after the publication of the fourth edition of his Qualitative Analysis and the first edition of his Quantitative Analysis, it would have been utterly impossible for him to continue his investigations and to study new processes and methods without ample laboratory facilities. He therefore made a proposition to the Government, by which he offered to establish a laboratory, equipped with all improvements at that time available, in a house purchased by himself, if he would receive the support of Government by the grant of a small annual subsidy, the payment of a portion of the cost of fitting up, and the assignment into his charge of the apparatus of the technological institute. His propositions having been favorably entertained, Dr. Fresenius at once proceeded to execute them, but, before their official sanction could be obtained, the revolution of March, 1848, broke out, in consequence of which the ministry was completely changed. Nevertheless, a new application made to the new ministry was successful, and the promises of their predecessors were redeemed. The laboratory was opened on May 1st, 1848, with five pupils and one assistant, namely, Dr. Erlenmeyer, now professor in Munich. Without attempting to recount the history of this famous institution in detail, suffice it to say, that it grew from year to year, so that successive enlargements became necessary, and that it was finally supplemented by a pharmaceutical school which attracted many students, but which was afterwards crippled in its usefulness by a failure of proper recognition on the part of the authorities after Nassau had been incorporated into Prussia in 1866. During 1868, an experimental station for agricultural chemistry, more especially for œnology, was founded in connection with the laboratory, and Dr. Fresenius' principal assistant, Prof. C. Neubauer, placed in charge thereof, whose name is doubtlessly familiar to our readers as one of the authors of the well-known Handbook of Urinary Analysis. During 1862, Dr. Fresenius had begun to publish the *Zeitschrift für Analytische Chemie*, a journal which has done more for the development of analytical chemistry and the exchange of experiences and criticisms on this field than any other publication.

It is needless to inform our readers that Prof. Fresenius is an authority of the first rank in analytical chemistry. His pupils are scattered over the whole civilized world, and not a few of them reside among us here. Nor will it be necessary to recall to the memory of our readers

the complete titles of his two most important works, his Handbooks of Qualitative and Quantitative Analysis, for these have long been in their hands. The last-named handbook is at present appearing in a new, much improved, condition. Of great value and interest are his many published analyses of important mineral waters; they are models of painstaking care and exactness, from which even advanced chemists can draw much profit.

Prof. Fresenius at present enjoys the active assistance of his two sons, Dr. Heinrich Fresenius (since 1872), and Dr. Wilhelm Fresenius (since 1880), and under their joint care the laboratory bids fair to maintain the high reputation which it has acquired.

### Female Pharmaceutical Students.

AMONG the items of news in this number will be found the decision of the managers of the St. Louis College of Pharmacy to grant to women all the facilities possessed by that school for acquiring a knowledge of pharmacy. The fitness of women for that profession has repeatedly been a subject of remark; and in this country, at least, there has been no opposition, of which we are aware, to their admission to pharmaceutical schools on precisely the same footing as men. The New York College has already granted degrees to female students, and one of these has since taken high honors in medicine. The trouble, however, is not so much opposition on the part of the schools as the disinclination of women to adopt a vocation involving several years of preliminary training, and which in its performance places them behind a counter. Single women, as a class, have not yet acquired the desire for independence which would lead them to choose a means for gaining a livelihood without regard to whether it will or will not affect the character of the marriage which they naturally expect to contract. If they succeed in becoming the wife of a man able to support a family, their natural duties as managers of the household would render their knowledge of pharmacy comparatively useless. This fact will prevent any overcrowding of the profession by female pharmacists. Meanwhile, our St. Louis friends may be congratulated upon having deliberately adopted a course which is manly and liberal in every sense.

### To Correspondents.

WE occasionally receive letters asking for information, in which the writers fail to give a post-office address. Not unfrequently it is desirable to obtain from them further particulars in order to answer intelligently. In other cases the information is not of a character to warrant its publication in a journal devoted to special subjects, but might readily be answered by letter if the addresses of the inquirers were known.

## MATERIA MEDICA, PHARMACY, AND THERAPEUTICS.

[ORIGINAL COMMUNICATION.]

### HISTORICAL NOTES ON ACETIC ACID.

BY PROF. JAMES F. BABCOCK, BOSTON.

VINEGAR must have been known in the very earliest times, for, as is well known, wine or beer when exposed to the air undergo a second fermentation (acetic) by which this acid is developed.

Vinegar is frequently mentioned in the Bible, Moses (B. C. 1600) speaks of it in Numbers vi. 3; it is referred to also in Prov. x. 26; Ps. lxix. 21; Prov. xxv. 20; Ruth ii. 14; Matt. xxvii. 34; Mark xv. 23.

Hippocrates (born probably about 456 B. C.) recommends its use both internally and externally as a medicine.

Mixed with water, and sometimes with eggs, it formed the *posca* or common drink of the Roman soldiers, and it was extensively used both by the Greeks and Romans in their cooking and at meals.

Pliny (A. D. 23–79) gives twenty-eight remedies derived from vinegar, and makes particular mention of the preparation still used in pharmacy, known as "vinegar of squills." (Lib. xxiii. 28.*)

The same writer makes frequent allusion to its use as a menstruum in the preparation of medicines (Lib. xxiv.); he also speaks of its employment for the corrosion of lead in the manufacture of *cerussa* or white lead. (Lib. xxxiv. 54.)

Pliny refers to crude pyroligneous acid in his description of *cedrium* which he states is made by chopping the wood of the torch-tree into small billets, and putting them into a furnace heated by fires on every side. He says, "the first steam that exudes flows in the form of water into a reservoir made for its reception." (Lib. xvi. 21.)

He also says of vinegar, "poured upon rocks it has the effect of splitting them when the action of fire alone has had no effect." (Lib. xxiii. 27.)

Livy states that Hannibal softened rocks by fire and vinegar in his passage over the Alps. (Livy, l. xxi., ch. 37.)

The belief that vinegar possessed the property of reducing mineral substances to powder by quenching them after heating was very common among the Romans. (*Pliny Nat. Hist.*, Lib. xxxiii., ch. 21.)

Galen (born A. D. 131) alludes to the irritant action of strong vinegar.

Geber (Eighth Century) was acquainted with the purification of vinegar by distillation and its use as a solvent. (*Investigation of Perfection*, ch. iii.)

* The references to Pliny are according to the arrangement of chapters in Bohn's edition, London, 1857.



Basil Valentine (1400–1430) described a product obtained by the distillation of verdigris which he called *spiritus æruginis*, noticing at the same time that the first portions of the distillate were weaker than the following. The production of pyroligneous acid (*spiritus acidus* or *acetum*) by the destructive distillation of wood is first clearly described by Glauber. In his *Furni novi philosophici*, 1648, he declares that the product when purified is "fit for the preparation of medicines and all other uses to which vinegar is applicable."

Boyle in his *Chemista scepticus* (1661) mentions *acetum* among the products produced by heating wood in a close vessel.

Stahl, as early as 1697 and 1702, obtained a stronger acetic acid than was known before, both by allowing a weaker acid to freeze, and also by distillation of acetates with sulphuric acid, and in 1723 he found that the acid thus obtained from verdigris was inflammable. Boerhaave in 1732 speaks of *aceta acetosa*, and gives the details of a process originally suggested by Glauber (1648) for the production of vinegar. In this process two casks are partly filled with twigs and leaves, and a quantity of wine is directed to be alternately drawn from one to the other. (*Elementa chemiæ*, ii., Proc. 50.)

A similar method is given in the *Philosophical Transactions* for 1670, p. 2002.

Crystallized (glacial) acetic acid was first noticed by de Lauragais in 1759 and afterwards described by Courtenvaux in 1768. (*Mém. de l'Académie*, lxxii.)

The first practical process for the preparation of glacial acetic acid (by fractional distillation) was published by Lowitz in 1790. (*Crell s Annal.*)

Westendorff obtained the pure hydrated acid in 1772 by the dry distillation of crystallized acetate of copper. (*Diss. de Opt. acet. conc.*)

As early as the Sixteenth Century, Crato von Krafftheim (1519–1585) had called attention to the danger attending the use of metallic vessels for holding vinegar, and this warning was repeated by Vauquelin in 1799. (*Ann. de Chim.*, xxxii., 243.)

Although, as above stated, the existence of an acid in the products of the dry distillation of wood was known to Glauber, it was not clearly recognized as identical with the acetic acid of vinegar till the beginning of the present century. It was called *acetum*, but this expression was a generic term applicable to all acids.

The products of the destructive distillation of various organic bodies, as gum, starch, sugar, wood, etc., were regarded as peculiar acids until Fourcroy and Vauquelin, in 1800, showed that they were simply impure acetic acid.

Berthollet in 1785 endeavored to show that the acid obtained by destructive distillation and called *acetic acid* was different from that existing in vinegar which was called *acetous acid.*

Chaptal in 1798, and Dabit in 1800, took the same view. (*Ann. de Chim.*, xxviii., 113; xxxviii., 66.)

Adet in 1787 claimed that the only difference was in the degree of concentration. (*Ann. de Chim.*, xxvii., 299.)

Darracq in 1802 conclusively showed that these acids are identical. (*Ann. de Chim.*, xli., 264.)

The chemical constitution of acetic acid was determined by Berzelius in 1814.

In 1822 Doebereiner proved that acetic acid resulted through the oxidation of alcohol by the means of platinum black, and that no carbonic acid was produced in this reaction.

The results obtained by these investigations paved the way for the discovery of the quick method for making vinegar by Schützenbach in 1823, which was afterwards improved by Wagenmann, Ham, and others.

Trichloracetic acid was discovered by Dumas in 1838. (*Ann. de Chim. et Phys.* (2), lxxii., 101.)

By the action of nascent hydrogen upon this compound, Kolbe in 1845 achieved the synthesis of acetic acid. (*Ann. der Chem. u. Phar.*, liv., 153.)

Anhydrous acetic acid was prepared by Gerhardt in 1853. (*Ann. de Chim. et Phys.* (3), xxxvii., 311.)

Wanklyn in 1859 produced acetic acid synthetically by passing a current of carbonic anhydride into a solution of sodium-methyl. (*Ann. der Chem. u. Phar.*, cxi., 234.)

Pasteur in 1861 proved that the production of vinegar by the atmospheric oxidation of alcohol depends upon the presence of a species of fungus (*Mycoderma aceti*) previously described by Mulder.

### The Eulachon Fish and its Oil.

[*Thaleichthys Pacificus* (Richardson) Girard.]

BY PROF. D. S. JORDAN.

THIS species, common in the North Pacific, resembles the capelin, and is usually known by the Indian name Eulachon, or Outachon, more commonly pronounced Hoolakins, by the English at Victoria. Those salted and sent South are commonly called candle-fish by the trade. In the Columbia River, and elsewhere southward, it is known as smelt, being confounded with the other species. It reaches a length of less than a foot. It ranges from Oregon northward to Kamtschatka. It occurs in some abundance in the Columbia River, where little notice is taken of it. In Frazier's River, and streams to the northward, it runs in enormous numbers in spring. The euchalon run up the rivers and deposit their spawn on gravel-beds, at no great distance from the mouth of the stream, probably not above thirty miles. Their run is from the last of March to the middle of May, probably varying in different streams. During the run, they are beset by all sorts of enemies, halibut,

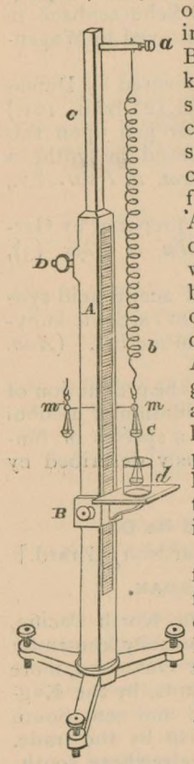
sharks, sea-birds, Indians, porpoises, and all manner of predatory fish, some of which chase them in the ocean only; others pursue them up the rivers. Even the sturgeons and the rays have their stomachs full of them.

The euchalon are greatly valued on account of the oil which permeates their flesh. As a pan-fish, they have no superior.

A factory has been established on the Nass River for the manufacture of euchalon oil, which is intended to be used as a substitute for cod-liver oil. It has the drawback of becoming solid and lard-like at ordinary temperatures.*

*Nature*, the chief London journal of science, remarks, May 12th, 1881: "A new medicinal oil has just been introduced into this country by Messrs. Burgoyne & Burbidge, the well-known chemists of Coleman street. It is known as oolachan oil, and is said to be scarcely distinguishable from cod-liver oil. It is obtained from a fish called by the North American Indians 'Oolachan,' or candle-fish, from the fact that when dried the fish itself can be used as a candle on account of the large amount of oleaginous matter it contains. . . . In America, the oil has already a great reputation as a valuable and efficient substitute for cod-liver oil,† and there is every probability, as it becomes known in this country, of its taking a prominent place as an important medicine."

(Advance extract from the forthcoming Fishery Report for the U. S. Census, kindly communicated by Prof. G. Brown Goode, Assistant Director, U. S. National Museum.)



Spiral-wire Balance.

**A Delicate Spiral-Wire Balance.**

Mr. C. F. Cross being engaged in experiments which necessitated rapid and frequent weighings of a substance in an atmosphere saturated with aqueous vapor, found the ordinary balances unsuited for his purpose, and had recourse to the spiral-wire balance of Jolly, which has the following construction:*

The spiral is fastened by means of a binding screw at *a*, and carries below, suspended at *b*, two small pans, *c* and *d*, connected as shown in the drawing. Of these, *d*, which is of glass, is kept immersed in water, and serves to steady the whole and bring the spiral, together with the index *m*, rapidly to rest after displacement, and is also used in cases of weighing beneath the surface of the liquid, as in determinations of specific gravity. The glass containing the water in which *d* is immersed is supported on a bracket, B, which is movable over the hollow upright, A, and may be fixed at any height by means of a binding screw. C, the rod which carries the spiral, fits loosely into the hollow portion of A, and is of the same length; it can be raised out of A by any portion of its length, and is fixed by means of the binding screw D. The base of the instrument is a tripod, provided with levelling screws, as shown in the figure. The elongations of the spiral are observed by means of the index *m*, which is a small bead of opaque white glass, and a mirror scale (millimeter), which is let into one of the sides of A. The position of *m* is read off with accuracy with the naked eye, by bringing *m* exactly to cover its image in the mirror, which, occurring upon a graduation or between two, is easily observed to 0.5 mm. Previously to making an observation, it is necessary to adjust *m* by moving C either to the zero of the scale or to a point sufficiently high to allow of the elongation to be followed on the scale. Prof. Jolly gave the following among the examples:

*a. Determination of Absolute Weight.* The spiral consisted of 36 turns of No. 6 piano wire.

| | |
|---|---|
| Original reading of *m* | 2.5 |
| With a load of 1 gram | 374.7 |
| With the object to be weighed | 213.6 |

The absolute weight of the latter therefore is:

$$\frac{213.6-2.5}{374.7-2.5} = 0.5611 \text{ grams.}$$

*b. Determination of Spec. Grav. of a Solid.*

| | |
|---|---|
| Original reading of *m* | 64.2 |
| Loaded with a crystal placed in pan *c* | 275.3 |
| Loaded with same placed in pan *d* | 220.8 |

$$\text{Sp. gr.} = \frac{\text{Absolute weight}}{\text{Loss of w. in wat.}} = \frac{275.3-64.2}{275.3-220.8} = 3.85$$

with the probable error in the second decimal place.

*c. Determination of Spec. Grav. of a Liquid.* In this case, the lower pan, *d*, is removed, and replaced by a small cylinder of glass of about 1 cc. capacity. The loss of weight experienced on submerging the latter beneath the surface of the respective liquids is expressed in scale divisions, as in the preceding instances, and the quotients of such numbers are the relative weights.

Mr. Cross was compelled to make certain alterations in the construction of this balance, in order to accommodate it to his special purposes, namely, the investigation of the rehydration of metallic oxides. The scale pan, *c*, was replaced by a circular mica plate, extremely thin and perfectly smooth, supported by means of a tri-radial arrangement of thin wire. This carries, below, suspended from the centre, a small disc of thin metal, as a substitute for the heavy watch-glass, *d*. The mica plate is easily slipped in and out of place, and supplies a movable scale-pan of 70 millimeters diameter. The whole arrangement, as modified, weighs less than 3 gm., and, therefore, allows 2 or 3 gm. of substance to be weighed without exceeding the limits of elasticity of the spiral. The cost of the apparatus in its original form is about 30*s.*, in the modified form somewhat less than £2.*—*Chem. News*, Aug. 26th.

* We have been favored with a specimen of the oil by Prof. Goode. On cooling it to 0° C. (32° F.) the oil only becomes thicker, without losing its transparency. At or near −7° C. (19.4° F.) it begins to become opaque, owing to the separation of the more solid fats. On carefully warming, the oil resumes its transparency again at or near −1° C. (30° F.).—Ed. N. R.

† This is probably true only so far as it may be used *locally* where the fish is found. So far as we know, the medical profession in this country have made no experiments with it.

* Sitzungsber. d. Bayer. Akad., 1864, I., 162.



**The Synthetical Production of Urea from Benzene, Benzol, Ammonia, and Air by the Action of Heated Platinum.**

Mr. E. F. Herroun having noticed that a coil of platinum wire, heated to bright redness, when placed in a flask containing some benzene and ammonia, became covered with a white substance, and having modified the apparatus so as to produce a larger quantity of the product, the latter turned out, on analysis, to be urea.

In order to obtain as large a quantity of the substance as possible, he finally adopted another form of apparatus, in which two tubes containing heated platinum are used, and the product is collected in a central bulb.

Air enters a globular receiver by two opposite tubes, impregnated with ammonia and benzene vapor by bubbling through two bottles, containing strong ammonia solution and benzene respectively; the proportion of air which is admitted is regulated by two screw-clips. Another tube delivers air, dried by passing through a calcium chloride apparatus. This dry air removes the excess of ammonia and most of the carbonate of ammonium and water.

When this form of apparatus is used, all the ammonium cyanate generated is converted into urea. The maximum product is obtained when a slow current of air is passed through the ammonia and benzene, because if much air is used, the benzene appears to be entirely converted into carbon dioxide and water.

The resulting urea is not pure, but mixed with ammonium carbonate and sulphate (derived from carbon disulphide in the benzene), and with an organic impurity apparently of a resinous nature, the presence of which, curiously, prevents the precipitation of urea by oxalic acid. This impurity is soluble in ether. To purify the the urea, the solution which collects in the bulb is evaporated to dryness, the residue extracted with absolute alcohol, filtered, evaporated to a small bulk, and the urea precipitated by excess of ether. This should be repeated, or the urea may be recrystallized several times from alcohol. —From *Journ. Chem. Soc.*, Oct., 1881.

* May be obtained from Mr. K. Berberich, Preparator, University of Munich.

**Rosenwasser's New Method and Apparatus for Percolation.**

Mr. Nathan Rosenwasser, at the late meeting of the Ohio State Pharmaceutical Association, described a method and apparatus for percolation, of which the essential features are as follows:

1. Percolation through cellular structures should be a succession of macerations proceeding downward and may be either slow and continuous or interrupted for short periods, according to circumstances, and then allowing of a greater rapidity of flow.

2. The fineness of powder must be adjusted to the menstruum, so as to offer sufficient resistance to the liquid to prevent its too rapid flow, yet not enough to stop it.

3. The powder must be packed with greater force toward the top than toward the bottom, to cause a more even flow of the liquid.

4. It should be sufficiently moistened with menstruum before packing to cause an even flow of liquid and to partially soften or dissolve the material within the cells, so that a more rapid osmosis can take place.

5. Glycerin is of questionable value as a means of penetrating cells, or in assisting solution, compared with water and alcohol, since it is not likely to assist osmosis.

6. The menstruum should be adjusted to the drug, keeping in view the best and cheapest solvent without wasting alcohol or other expensive menstrua except when practical results are unattainable without them.

If it is possible to increase the downward pressure of the liquid sufficiently to overcome the lateral pressure of the drug, we obtain a means of percolating without resorting to the necessity of employing a stronger alcohol or reducing the fineness of the powder.

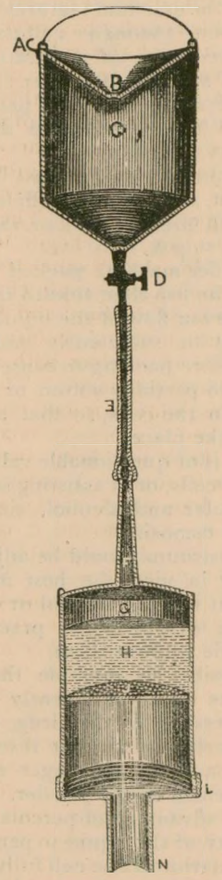
Also, as the advantage of percolation is based upon the ability of the liquid to penetrate by absorption the interior of the cell fully or nearly as rapidly as to pass by and around them, one of the tests of merit in conditions must be, the ability to reach *the interior* while retarding the flow *between the cells*. A menstruum can reach the *interior* better when the drug is well packed than when loosely packed, since then each drop will have its attraction of gravitation largely overcome by capillary and osmotic attraction and must, in a comparative sense, go through the cells and into them at nearly the same rate as it goes around and by them.

The apparatus described by Mr. Rosenwasser consists of an ordinary percolator reversed; a

tube (India-rubber will answer) is attached to the nozzle and connects it with a reservoir for the menstruum. A funnel will answer the latter purpose.

The cut represents the percolator in position ready for the liquid to flow.

The porous diaphragm, B, is first placed in position, the drug is, after previous moistening, packed tightly into the percolator, occupying the dotted space, H; a porous diaphragm, J, is placed on the drug and fastened to the body




Rosenwasser's Percolator.

of the percolator by a lock and key working on an eccentric (not shown in the drawing) which firmly holds the diaphragm in any position in the cylinder made necessary by the varying height of the drug.

The bottom plate, L, is easily secured to the body of the cylinder, and the bottom or outlet tube is closed with a cork or rubber tube and pinch cock. The percolator having been packed very tightly on the bottom and less so proceeding upward, the diaphragm holding the drug in place, having a piece of muslin or filtering medium placed between it and the drug, the percolator is reversed and attached to the menstruum reservoir C, by means of the tube E, and suspended by the handle of the menstruum reservoir. The menstruum is poured into the reservoir, the opening to which is closed with a notched cork, and percolation begins.

As the drug is held in place on all sides so that it cannot expand beyond its limits, it presses within upon itself so as to be almost solid in some instances. Thus the greatest possible compactness is secured, and as the height of the column of liquid increases, the pressure and velocity of the liquid increases, we have called into play a force that can compete with lateral pressure, no matter how much this may increase by the subsequent swelling of the drug; thus percolation can now go on at the will of the operator, not as heretofore at the will of the drug.

Instead of being obliged to unpack the percolator and repack it more loosely, it is only necessary to increase the height of the tube and reservoir. On account of the compactness given to the drug, and its inability to swell in any direction but upon itself, only a minimum quantity of liquid will be able to lodge between the cells and within them, so that, instead of being able to absorb and retain by capillary and osmotic attraction the usual large amount of menstruum before a drop comes through, the amount absorbed is reduced to a minimum and with many drugs long before the full quantity of liquid (1 pint for 16 troy ounces) is used the liquid begins to drop.

With this percolator no waste in alcohol or other menstruum occurs, since we can overcome by pressure what heretofore had to be overcome by a liquid occasioning less pressure and of greater limpidity; thus water can be forced through the drug in spite of expansion of the cells.

A glance at the pharmacopœia will show that in making fluid extracts, particularly after pouring on the requisite quantity of strongly alcoholic menstruum to make a pint of finished product, a slightly weaker alcoholic menstruum is added to force the first through, the latter being absorbed in the place of the former. This is its object.

With the apparatus here described, the author states this forcing of the first liquid through is equally as well accomplished with water. Using an ounce more of menstruum than is desired to be obtained in the finished product, to insure against upward diffusion, and, if necessary (according to the swelling to be expected) increasing the height of the reservoir, we can, when the menstruum is all absorbed, collect the full amount of finished product by pouring in water.

We thus obtain a thoroughly reliable fluid extract without the use of a tincture press or still (to reclaim the alcohol absorbed in the drug or evaporated according to the U. S. P.) and without more waste than the one ounce additional of menstruum, and without exposing the drug and menstruum to the air during the process. While of course some time is needed for proper maceration and for regular and slow percolation, a far greater economy of time is secured than under ordinary circumstances, for, whereas it often takes days and weeks for a percolation as heretofore conducted,—by this process, and with some drugs only a few hours or a day, at the most, is needed for practical exhaustion. With a process of repercolation reduced to a single reserve, still less time would be needed to secure the best results.

Such drugs as rhubarb, squill, colombo, dandelion, etc., have been percolated with proof spirit, and percolation finished with water according to the above plan with excellent results. The author has not found it necessary to use a longer tube than one of five feet including percolator and reservoir, except in working with rhubarb and squills, when a tube eight feet long answered very well.

The new process of cold percolation for making syrups, for filtering large quantities of liquids such as oils, elixirs, syrups, etc., works well with this percolator. In making tinctures this process results in rapid work and economy.

Another noticeable feature is the absence of evaporation from the surface by this method of percolation. In percolating on a large scale the economy of time and material is even more apparent, when after each percolation it is necessary to empty the percolator of its contents and pack it loosely into another larger one, to wash out the alcohol with water and then recover the alcohol by redistillation. Here, this occurs in one operation and the drug which usually becomes partly decomposed and is exposed to the air during the time it is washed with water, has the water reach it from a closed end and never gives rise to foul gases, etc., while only the fluid extract or that and the proper amount of reserve need be collected, leaving no alcohol to speak of in the dregs.*



### The Gathering of Rubber in Colombia.

REPORT BY U. S. CONSUL EDMUND W. P. SMITH, AT CARTHAGENA.†

In this country the rubber hunters have the wasteful custom of cutting down every rubber tree from which they extract the rubber instead of tapping them. For this reason all the rubber trees near the rivers have been destroyed years since, and the rubber hunters have now to go five days' or more journey into the forests, crossing swamps and mountains, before they can find the rubber and bring it out on their backs over these rough trails. Each succeeding year the quantity of rubber gathered is lessened. Unless the people begin planting rubber trees this trade will become a thing of the past. It has been a matter of surprise that the Colombian Government does not carry into effect its regulations against the further destruction of one of its most valuable forest trees. The importance of the rubber tree in connection with the many and useful purposes to which it is now applied can hardly be estimated. The attention of the planters of this country has never been turned to the cultivation of the rubber tree. A good chance for American investment exists in this direction. A plantation of rubber trees would prove a more valuable source of profit than that of any other. There are places on the Sinu River where rubber trees will grow from eight to ten inches in diameter in three or four years from planting of the seed. The trees require but little attention, and begin to give returns sooner than almost any other tree. The trees which yield the largest supply of rubber flourish along the banks of the Sinu and Aslato Rivers.

The rubber hunters, before entering the woods, provide themselves with guns, ammunition, flour, salt, and tobacco. The flour is made from plantains, which are cut into slices, dried, and ground, and is generally mixed with cornmeal. This flour will keep sweet for months even in this climate. I have eaten "bolls" made of this flour which has been in camp over six months, and have found it quite palatable. For meat the hunters depend upon the game they can kill.

A roof of palm trees is quickly made, and every man starts out with his gun and *machete*, each one in a different direction and alone, hunting for rubber and game. As soon as one finds a rubber tree he cleans a space around the trunk, cutting away all vines, underbrush, etc., and marches on again in search of more rubber trees, not returning to camp until night. According to the immemorial custom, a tree belongs to him who has cut around it. The hunt is continued until all the trees in the vicinity of the camp are thus secured. Then begins the work of gathering the rubber. A hole is dug in the ground near the rubber tree, unless some other party is encamped near, in which case the holes are dug near the camp. The bark of the tree is first hacked with a *machete* as high as a man can reach, the cuts being made in form of a V, and the milk (sap) collected as it exudes, and put into the hole which has been dug for it.

After the milk ceases to flow from the cuts, a pile of wood or brush is made at the foot of the tree and the tree is chopped down, the branches keeping one end of the tree off the ground, and the piles of wood at the foot of the tree doing the same for the other end. Thus the trunk is

* For prices the reader is referred to the advertisement elsewhere, or to Mr. N. Rosenwasser, 273 Woodland Ave., Cleveland, Ohio.

† *Commercial Relations of the United States*, July, 1881, 10.

suspended. The hunter, after carefully placing large leaves on the ground under the tree, proceeds to cut gashes in the bark of the tree throughout its whole length. The milk is collected from the tree and from the leaves placed under it, and added to the milk first collected. The sap, when it first exudes from the tree, is as white as milk and about as thick as cream; but it soon turns black on exposure to air and light, if not properly watched and cared for. The quantity of milk which is put into one hole depends not only on the size of the trees and their distance apart, but also on the strength of the man who is to carry the rubber from camp to the river and the track and trail he must carry it over. As soon as a hole has all the milk a hunter intends to put into it he coagulates the rubber, by adding some substance, such as the root of "*mechoacan*," by hard soap, etc., and these substances cause the milk to coagulate so fast as to prevent escape of the water which is always present in the fresh sap; and as the rubber and water will not mix, a piece of rubber coagulated this way is full of small cells containing water. Of course a piece of rubber full of holes is not as valuable as a piece of homogeneous rubber. For this reason Carthagena rubber is worth less than Para rubber. I have seen the rubber of this country made perfectly homogeneous, clear and transparent as amber. It costs no more to make such rubber than to make it full of holes, water, and dirt. It also costs no more to "pack" one pound of such rubber out of the woods than to pack one-half pound of porous rubber with its half pound of water and dirt.

As soon as all the rubber trees are cut down and the rubber coagulated, the pieces are strapped on the backs of the hunters by thongs of barks, carried by them out to the bank of the river, and brought to market by canoe or raft.

The value of the rubber exported for the year ending December 31st, 1880, was $335,113.24; an increase over the previous year, due to the fact of the recent high price of the product. Of this amount the United States bought to the value of $238,393.24.

There are yet many square miles of rubber trees that have never been touched, but access to these valuable forests is very difficult.

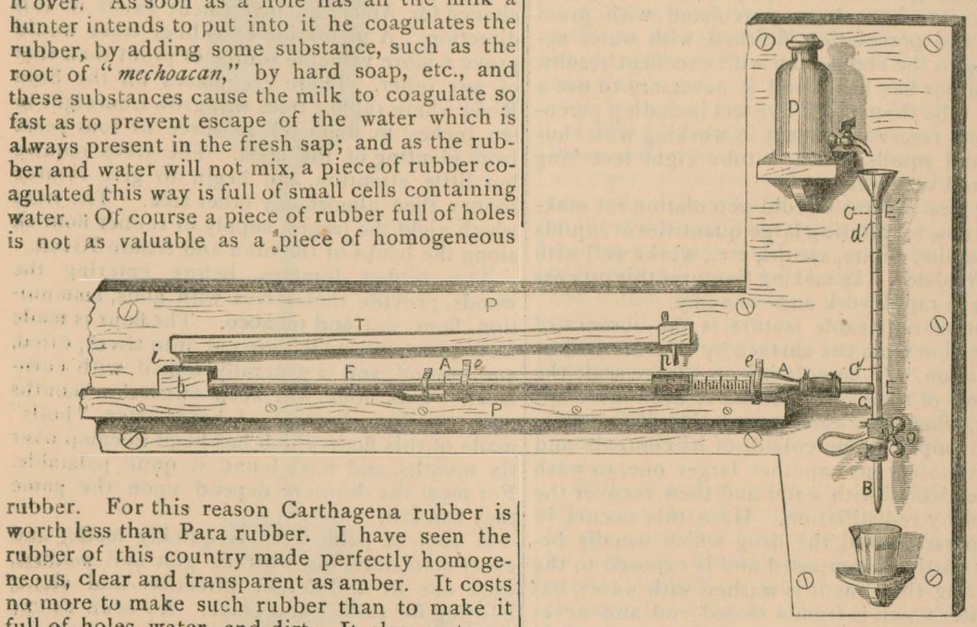
EDMUND W. P. SMITH, Consul.

UNITED STATES CONSULATE,
Carthagena, June 4th, 1881.

### New Graduating Apparatus.

THIS apparatus was designed to facilitate the accurate graduation of glass tubes—burettes used in volumetric analysis, technical assays, pharmaceutical work, etc.

The tube, A A′, to be graduated is secured by brass clamps, *e e*, to the wooden frame, P. The piston, S, of brass, loosely packed with rubber, is rigidly connected by the brass rod, F, with the block, *b*. The smaller end of the glass tube, A′, is tightly connected by a piece of rubber-tubing with the glass tube, G, which joins, at right angles, the small upright graduated glass tube,




Apparatus for graduating tubes.

E E′. This tube is continued downward, and connected by a short piece of rubber-tubing with the feathered delivery tube, B, a pinch-cock serving to stop the tube at O. The upper part of the tube, from *c* to *c′*, is graduated to contain one cubic centimetre of water, and this space is subdivided into tenths of a centimeter. Water from D is introduced into the tube through the small funnel. The hard-wood rod, T, has a fine steel point rigidly affixed at *i*, the other end being similarly fitted with a wedge-shaped blade, *p*.

In using the apparatus, the tube to be graduated is uniformly coated with a thin film of white wax or collodion. A small quantity of water is then put into it, the piston adjusted so as to fit snugly but loosely, and the tube securely clamped in position, connection having been made with the tube, G, the pinch-cock at O is opened,



and the piston forced up to the end, A′, of the tube, expelling the water (and air) through G and B. The pinch-cock is then closed, and water (at 60° Fah. or 16 C.) let into the tube, E, from D, until it is filled to the mark, C, any excess being drawn off through B.

The block, *b*, is then grasped and slowly drawn back until the water in E E′ has fallen to *a′*, the first mark on the scale. The steel point, *i*, on the rod, T, is then inserted in a fine hole, nick, or cut line on the upper side of the block, *b*, and held in position, while the blade, *p*, at the other end of the rod is brought down on the coated tube, and a fine line cut through the coating to the surface of the glass. The block, *b*, is again drawn back until the water in E E′ falls to the next line on the scale, when the rod is brought into requisition, as before, and another mark made on the tube. These operations are repeated until the water in the tube, E E′, falls to C′, when it is again filled to C from the reservoir, D, and so on, until the graduation of the tube, A A′ is completed.

The lines are etched in by exposing the tube to gaseous hydrofluoric acid—evolved from a mixture of powdered fluospar and warm oil of vitriol contained in a suitable leaden dish, or by the use of liquid hydrofluoric acid. Wherever the film of wax or collodion has been cut so as to admit of contact between the acid and glass, the glass becomes sufficiently etched in a few minutes.

The wax may be removed from the glass by washing with benzin; the collodion by hot water and a brush.

Tubes graduated in this way are much more accurate than those graduated by the usual methods, or where variations in internal diameter of the tube are not taken into consideration. The time required in the operation is reduced nearly one-half over the older methods of volumetric graduation.

### Qualitative and Quantitative Determination of Fusel Oil in Alcohol.

BY H. HAGER.

PROBABLY the best means of recognizing fusel oil or amylic alcohol is its characteristic odor, while chemical tests will be mostly restricted to cases in which some amylic ether capable of exact identification is present.

*Qualitative Test.*—The sample of alcohol which is to be examined is to be diluted with an equal volume of water. If it contains over 60% of absolute alcohol, a piece of blotting-paper is moistened with it, and, after half an hour, when all the alcohol has evaporated, the odor remaining on the paper is examined. This odor may be fixed more permanently by adding to the diluted alcohol about one-tenth of its volume of glycerin. If any fusel oil is present, the odor adheres to the paper for several hours.

In case the quantity of fusel oil is very small, it is necessary to concentrate the odor. This is done in the following manner: A roll of strong filtering paper, 15–18 *cm.* (about 6–7 inches) long and 8–10 *cm.* (about 3-4 inches) wide, is pushed into a glass-tube of 17–20 *cm.* (about 6½–8 inches) in length and 1.5 *cm.* (about ⅝ of an inch) in diameter, so that the ends of the roll of paper are about 1 *cm.* (about ⅜ of an inch) inside of the ends of the tube. This is now filled with the mixture of alcohol, water and glycerin (that is, the diluted alcohol to which the glycerin has been added), one end of the tube being closed by the finger, and again emptied. The tube is placed for about 15 minutes in a perpendicular position, and afterwards laid horizontally. After 24, 36, or 48 hours, the odor is examined by applying the end of the tube to one of the nostrils, closing the other, and then inhaling air through the tube. Conclusions can be drawn only after the alcohol has evaporated. If time is an object, the tube must be laid in a warm place, where the temperature does not exceed 25° C. (77° F.). The odor of the fusel oil is retained in the tube for from 3 to 5 days, and even for weeks, if the two orifices of the tube are closed with cork. It is to be recollected that fusel oil and amylic alcohol differ in odor; although the former consists mostly of amylic alcohol, yet it has a stronger and more disagreeable odor than the latter.

The preceding method is inapplicable, if the alcohol contains essential oils. In this case, 50 *cc.* of the alcohol are mixed with 5 *gm.* of glycerin, and then distilled under the precautions to be indicated below. The residue in the flask is mixed with an equal volume of water, and filtered through a wetted filter. The filtrate will then retain only a trace of essential oil. If no odor of fusel oil is perceptible, it is mixed with ¼ volume of pure alcohol, and the mixture poured into a glass tube charged with paper as before described. In most cases the odor of fusel oil predominates over that of essential oils, if the latter are present only in traces.

*Quantitative Determination.*—One method depends upon the different tension of the vapors of amylic and ethylic alcohols, and upon their different boiling-points. A sharp separation is possible by distillation. Mixtures of 100 gm. of pure 90% alcohol and 10 gm. of amylic alcohol, subjected to distillation, under certain precautions, yielded residues amounting to 9–10 gms. If glycerin was added to the alcohol, the full amount of 10 gm. was obtained, while, under the same circumstances, but in absence of the glycerin, only 9.2 gm. had been left behind. But the process of shaking the glycerin residue with ether is very tedious and liable to cause loss of material. It is, therefore, better to work without the glycerin, and to use instead of it a double distillation. 100 gm. of pure alcohol and 10 gm. of amylic alcohol gave, at the first distillation, 9.48 gm. of residue. The distillate,

on being once more distilled, yielded 0.43 gm. more. Total, 9.91.

The precautions to be observed consist in the construction of the apparatus, and its proper adjustment in the water-bath. The distillation is performed in a tared glass flask of 150–200 *cc.* capacity, to which is joined a glass tube of a diameter of 5–7 *mm.* ($\frac{1}{5}$–$\frac{1}{4}$ inch). The flask is set into a water-bath by means of a cork, cut in half, and a metallic ring, so that the portion projecting over the water-bath is at most 20 *cm.* (about $7\frac{7}{8}$ inch.) high. The projecting portion of the neck of the flask should be about 8 *cm.* $3\frac{1}{8}$ inch.), and the height of the glass tube from the edge of the neck of the flask to the top of the bend, about 12 *cm.* ($4\frac{3}{4}$ inch.) high.

Under these circumstances the fusel oil is completely retained in the flask during the distillation. Identical mixtures were distilled under varying conditions in the height of the apparatus, and it was found that at 18 *cm.* 9.98 gm. (out of 10 gm.) of fusel oil were obtained, while at 20 *cm.*, 10.2 gm. were left behind. A height of 19 *cm.*, therefore, appears to be the most favorable for obtaining accurate results. Still, the percentage of absolute alcohol present in the sample is of considerable influence. If it contains 70–80%, it will be best to give the apparatus (from the level of the water-bath to the top of the bent glass-tube) a height of 17 *cm.* ($6\frac{5}{8}$ inch.); if 81–90%, 18 *cm.* (7 inch ); if 91–95%, 19 *cm.* ($7\frac{1}{2}$ inch.); and if over 95%, 20 *cm.* ($7\frac{7}{8}$ inch.). In the case of alcohol below 70%, a double distillation, and in the case of very weak alcohols, even a triple distillation would be necessary.

If the quantity of amylic alcohol present is very small, and as much as a whole liter of it must be distilled, the flask is to be provided with a funnel, in order to be able to add fresh alcohol. This funnel may be closed with a cork. It is of advantage to maintain the temperature of the water-bath, during the first distillation, at 90°–95° C. (194°–203° F ), and to raise it to 100° C. (212° F.) only during the second distillation. The operation is finished whenever the descending leg of the glass tube feels quite cool.

On thus distilling alcohol below 70%, the residuary fusel oil contains water. The separation of the latter by shaking with ether may be avoided by collecting the first fourth of the distillate, and adding it afterwards to the residue in the flask before repeating the distillation. Should the quantity of water be large, the shaking with ether cannot be avoided. The ethereal solution is subjected to distillation, the temperature of the water-bath being raised up to 60° C. (140° F.) towards the end of the operation. The height of the apparatus over the water-bath may be about 10 *cm.* in this case [100? or 40?—Ed. N. R.]. If volatile oils are present in the alcohol, it is to be first diluted with water to 70%, and then to be mixed with 4–5% of glycerin. The residue from distillation is mixed with about 20% of its quantity of 45% alcohol, and after standing for half a day, passed through a wetted filter, upon which all but traces of the ethereal oil are retained. In one experiment there were 6 gm. of ethereal oil in a residue (containing glycerin) of about 16 gm. This was first shaken with 3.5 gm. of 45% alcohol, in order to insure the solution of the fusel oil in the glycerin; then set aside for one day, and the supernatant oil removed by pouring ether on top, and again pouring off. Then the liquid was mixed with 5 times its volume of 95% alcohol, and again subjected to distillation. The residue contained scarcely any traces of essential oil, and the fusel oil was then shaken out with ether. One liter of "schnapps" yielded 0.32 gm.

Another method of separating the ethereal oil from the liquid, which contains, besides of glycerin, a little alcohol, water, and fusel oil, is the following. Pour the liquid into a beaker-glass, which should be filled thereby to about one-fifth its height; then add some paraffin or fine shavings of wax, close the vessel (best by means of a closed funnel without stem), and heat it in a sand-bath until the wax is melted, taking care that the upper part of the beaker and the cover scarcely become hot. The melting wax completely absorbs the ethereal oil, and, on cooling, congeals to a solid mass, from which the liquid may be poured off, and which may be washed and dried with blotting-paper, after which its increase of weight, representing the absorbed essential oil, may be determined. If the residue of the distillation is very impure (containing salts, sugar, mucilage, etc.), it is to be shaken with ether, and the ethereal solution to be exposed to spontaneous evaporation in a tared beaker-glass, covered like that last described, since this permits the evaporation of the ether, but prevents that of the amylic alcohol. This was confirmed by several experiments, but, in absence of a cover, there was always loss of the latter.—*Pharm. Centralh.*, No. 215.

### Trichloracetic Acid as a Sensitive Reagent for Albumen in the Urine.

BY A. RAABE, MAG. PHARM.

The detection of albumen in urine may be accomplished with certainty and dispatch by means of trichloracetic acid. It is used in the following manner:

Into a narrow test-tube pour about 1 *cc.* of clearly filtered urine, add to this a small piece of crystallized trichoracetic acid, and, without shaking, put the whole aside for a little while. The acid very soon dissolves at the bottom of the test-tube, and at the line of contact of the two liquids a most distinct, sharply defined, and cloudy zone becomes visible.

The great advantage this method offers is that the reagent is applied in a solid form, and is very easily transportable. For this reason I would recommend it to the practising physician, who is often called upon to make investigations of this kind himself. Two small test-tubes, one for making the test and the other containing a little of the reagent, may be carried in the instrument case, and are all that is required if the urine is clear; if not, a little filtering paper and a very small funnel must be added.

Another great advantage consists, as I shall prove further on, in the great sensitiveness of the reaction. Even the smallest amount of albumen can be detected in a very short time, since the cloudy zone is very distinctly set off in the otherwise clear liquid.

Trichloracetic acid produces no precipitate in normal urine. Only if the latter is very rich in urates, a slight cloudiness will be perceptible after some time, which distributes itself over the whole liquid, and, therefore, can be very readily distinguished from the limited zone of the albumen.

| Albuminous Urine. | Trichloracetic Acid. | Nitric Acid. | Metaphosphoric Acid. |
|---|---|---|---|
| 1 cc. urine diluted to 10 cc. | Cloudiness. | Cloudiness. | Cloudiness. |
| 1 " " 40 " | do. | do. | Slight cloudiness. |
| 1 " " 50 " | do. | do. | No cloudiness. |
| 1 " " 100 " | do. | Slightly cloudy. | ..... |
| 1 " " 150 " | do. | Cloudy after some time. | ..... |
| 1 " " 200 " | do. | No cloudiness. | ..... |
| 1 " " 250 " | do. | ..... | ..... |

To remove all doubt, it is only necessary to heat the liquid a little, which can be done by immersing the test-tube in hot water. The cloudiness, caused by the presence of the urates, disappears immediately, and the urine becomes perfectly clear, while, if albumen was present, the cloudiness remains. To prevent the separation of urates, the urine can be previously diluted with three times its volume of distilled water, and then the reaction effected in the above manner.

To test the sensitiveness of the reaction for albumen, a series of trials were made with nitric acid and with metaphosphoric acid, which latter has recently been recommended by Hinderlang, and finally with trichloracetic acid. The test with concentrated nitric acid was made after the well-known method of Heller. Since the solution of metaphosphoric acid, according to its concentration, precipitates more or less albumen, I proceeded to dissolve the reagent by shaking one part of the glacial acid with six parts of distilled water for five minutes, and then pouring off the solution. In this manner I hoped, at least approximately, to effect solutions of equal concentration. The urine used for these tests contained 0.295% albumen. It was diluted with the quantities of water indicated in the table, and then tested with the three reagents. The results were as in the table.

The reaction with trichloracetic acid, therefore, is far more sensitive than with the two other reagents, for which reason it is much to be preferred to the latter.—*Pharm. Zeitsch. f. Russl.*, 1881, No. 26.

## RECENT PAPERS.

**Actinium; another new Element.**—Dr. Phipson reports a new element, of which he so far obtained the oxide and the sulphide. The oxide of actinium is white, with a tinge of salmon color; it is very slightly soluble in caustic soda, and in this way is separated from oxide of zinc. It does not change color when exposed to the air, like oxide of manganese, nor does it appear to be affected by sunlight. It is not precipitated by ammonia from solutions containing ammoniacal salts. The *sulphide*, as precipitated from neutral or alkaline solutions by sulphide of ammonium, is pale canary yellow, not soluble in acetic acid, but readily so in mineral acids, even somewhat dilute. It darkens in about twenty minutes when exposed to sun-light, and then becomes quite black; this does not occur if the sulphide is protected by a piece of ordinary window-glass. It is this curious property which led to its discovery and induced Dr. Phipson to call the new metal actinium.

He was led to this discovery by noticing a gate-post which had been painted with a newly introduced zinc paint to gradually become dark in color when day-light struck it, and to turn white again during the night. The pigment had been prepared by precipitating a solution of sulphate of zinc with a solution of sulphide of barium, and the product has a very pure and brilliant white color. The pigment was found free from silver, but contained traces of lead, arsenic, and manganese.

The quantity of actinium sulphide obtained from the white pigment amounts to no less than four per cent. This yield is enormous. The presence of this new element in zinc will account, probably, for the discrepancies noticed in the equivalent of this metal, as determined by various observers. It exists, evidently, in considerable quantities in some kinds of commercial zinc.—*Chem. News.*, 43, 283; 44, 73; 138.

**Purification of Naphthalin.**—(G. Lunge.) The author has found a method of rendering naphthalin permanently white and pure, which resembles that used for

accomplishing the same end in the case of carbolic acid. Hitherto, the secret of turning out perfectly pure naphthalin, which would not become pink or dark-colored by age, was confined to a few large works. Suspecting that the change in color of ordinary commercial naphthalin was caused by the gradual oxidation of higher homologues, he conceived the idea of oxidizing them to the utmost before the final distillation of naphthalin, and, on trial, met with complete success.

Crude naphthalin is mostly obtained from the oils which remain after treating the "middle-oil" with caustic soda, for the purpose of extracting the phenol. Such naphthalin may be purified, as stated below, by beginning to treat it with acid at once. Such naphthalin, however, as has been obtained by direct crystallization from the tar-oils, should first be treated with soda to remove phenol. The naphthalin is then melted and intimately mixed with 5 to 10% of sulphuric acid of 66° B., or a correspondingly larger quantity of 60° B. To the mixture is gradually added finely ground manganese dioxide, amounting to five per cent of the weight of the naphthalin, and the whole heated on a water-bath [or at the usual temperature of the water-bath] until no further action takes place. The operation lasts from fifteen to twenty minutes. If regenerated oxide of manganese, so-called Weldon mud, is available, this is preferable to the crude oxide. After cooling, the cake is several times melted with water, lastly with addition of a little soda-lye, and finally with pure water. On a large scale, the washing need not be interrupted by cooling off the naphthalin. The resulting cake is then distilled, and most of it passes over as pure naphthalin.—*Ber. Deutsch. Chem. Ges.*, 1881, 1755.

**On Coniine and some of its Salts.**—DR. J. SCHORM reports that the increasing demand for this alkaloid and its salts has made it necessary to bestow more attention upon its manufacture, so as to obtain a purer product. There are two methods in use for preparing coniine, which are as follows:

1. Conium seed is moistened with boiling water, and after swelling, treated with a small quantity of carbonate of sodium. The latter may, of course, be added at once to the boiling water, but experience has shown that the yield is increased by first using the water alone. Caustic alkalies must be excluded. Four kilos of carbonate of sodium, dissolved in a corresponding quantity of water, are used for one hundred kilos of seed. The swelled seed is uniformly mixed with shovels, and transferred to an apparatus resembling that used for distilling ethereal oils, and holding about four hundred kilos of seed. It is heated by steam (about 45 lbs.). The distillation is continued as long as the distillate has an alkaline reaction. The crude coniine partly separates as an oil, and partly remains in solution. Curiously enough, the coniine distilled from *ripe* seeds mostly separates as an oil, while that distilled from green, unripe seeds—*though more abundant*—separates less freely as oil, and requires a longer distillation. The obtained distillates are neutralized with hydrochloric acid, evaporated to a syrupy consistence, and shaken with two volumes of strong alcohol which dissolves the hydrochlorate of coniine and leaves chloride of ammonium, etc., behind. The alcohol is then distilled off, a calculated amount of solution of soda added, and the coniine shaken out with ether. The residuary solution develops after standing, particularly in summer, some trimethylamine. The ethereal solution of the crude coniine, when strongly cooled, separates long needles of conhydrin, which is but difficultly soluble in ether. This substance is also volatilized together with the vapors of ether, on distilling the ethereal solution of coniine, and is found in the receiver.

2. The other process begins with the extraction of the ground seeds, in a vacuum-extractor, with water acidulated with acetic acid. The liquid is evaporated to a syrupy consistence, the residue treated with magnesia, and the coniine shaken out with ether. This method yields a smaller product, but the latter is purer and more suitable for preparing salts. After the ether has been distilled off, on the water-bath, the residuary crude coniine is dehydrated with dry carbonate of potassium, and distilled on an air-bath, when three fractions pass over, about 10 per cent at 110–168° C., the next, which is pure coniine, at 168–169° C., amounting to 60 per cent, and a third fraction, 20 per cent, at 169–180° C. The dark, viscid residue yields conhydrine.

Coniine, thus prepared, is a colorless, oily liquid, volatile at ordinary temperature, and of the spec. grav. 0.886. It takes up as much as 25% of water, which is again separated by heating. It is soluble in ninety parts of water, and is unalterable by exposure to air. Salts prepared from this coniine are not deliquescent nor altered by light.

The *hydrobromate of coniine*, $C_8H_{15}NHBr$, crystallizes in needle-shaped, or in large transparent, vitreous crystals, unaltered by air or light.

The *hydriodate of coniine*, $C_8H_{15}NHI$, which must be prepared from hydriodic acid made from resublimed iodine (to get rid of traces of iron which spoil the product), crystallizes in large, flat columns, likewise permanent.

The *bitartrate of coniine*, $C_8H_{15}N.C_4H_6O_6.2H_2O$, forms large, magnificent crystals.—*Ber. d. Deutsch. Chem. Ges.*, 1881, 1765.

**Quinoline (or Chinoline); its Physiological Effects and Behavior.**—(JULES DONATH.) [Quinoline, which is known to be one of the derivatives of quinine, etc., and is assumed to form a portion of the quinia-molecule, and the artificial production of which has been successfully accomplished, has for some time been the subject of physiological study to ascertain the antiseptic and antimalarial power supposed to reside in it in consequence of its close relationship to quinine.] The results which the author obtained may be summarized as follows:

I. Quinoline is an energetic destroyer of bacteria and fungi. It can prevent lactic fermentation already in 0.2-per-cent solution.

II. It does *not* arrest alcoholic fermentation, even in 5% solution. But, contrary to Liebig's statement, quinine does not possess this power either.

III. *Reactions:* 1. An aqueous solution of a salt of quinoline yields a white precipitate with *potassa*. The precipitate is difficultly soluble in an excess of potassa, but easily in ether, benzin, strong alcohol; less easily in carbon disulphide, chloroform, and amylic alcohol. *Carbonate of sodium* likewise throws down white quinoline, while carbonic acid escapes.

2. *Ammonia* produces a white precipitate, tolerably soluble in an excess of the precipitant. *Carbonate of ammonium* behaves similarly.

3. *Iodine in iodide of potassium* (7 parts KI and 5 parts I in 100 parts water) produces a red-brown precipitate, insoluble in hydrochloric acid. Limit 1 in 25,000.*

4. *Phosphomolybdic acid* (10 parts of sodium phosphomolybdate in 100 parts of water and addition of nitric acid to strongly acid reaction) yields a yellowish-white precipitate (soluble easily, and without color in ammonia) in a solution of quinoline acidulated with hydrochloric or nitric acid. Limit 1 in 25,000.

5. *Picric acid* (1% sol.) produces a yellow, amorphous precipitate, soluble in alcohol, less so in hydrochloric acid, easily in potassa with reddish-yellow color. Limit 1 in 17,000.

6. *Mercuric chloride* (5% sol.) produces a white, flocculent precipitate, easily soluble in hydrochloric acid, difficultly in acetic acid. Limit 1 in 5,000.

7. *Potassium-mercuric iodide* (5 parts KI, 1.4 parts $HgCl_2$ in 100 parts water) produces a yellowish-white, amorphous precipitate which, on addition of hydrochloric acid, is converted into slender, amber-colored crystalline needles (*characteristic reaction*). Limit 1 in 3,500.

8. *Ferrocyanide of potassium* imparts a reddish color to solutions of salts of quinoline. On the addition of a mineral (not acetic) acid, a reddish-yellow, amorphous, afterwards crystalline, precipitate is produced. Limit about 1 in 1,000.

9. *Bichromate of potassium*, carefully added, forms slender, dendritic needles, soluble in an excess.

10. *Tannic acid* or *ferric chloride* produce no precipitates. Neither *nitric* nor *sulphuric* acid, with or without oxidizing agents, produces any color-reactions.*

IV. *Physiological Observations.* Quinoline, when taken internally, is altered in some manner, as it cannot be detected in the urine.

Quinoline and its salts may be administered in doses amounting to about 2 grams (30 grains) per 24 hours, without injury.—Abstract from *Ber. d. Deutsch. Chem. Ges.*, 1881, 1769.

* These limits are only correct if a definite amount of the reagent, as well as of the solution to be tested, are used. It is understood that in all cases (but one) 5 cc. of the reagent were added to 45 cc. of water, and the diluted quinoline solution of known strength was added drop by drop. In the case of phosphomolybdic acid, 40 cc. of water were mixed with 5 cc. of the reagent.



**Copying Ink for readily Copying Letters without a Press.**—(PROF. ATTFIELD.†) The author stated that, for the past thirteen years, all letters, reports, etc., that he has written had been transcribed into an ordinary thin-paper copying book with no more effort than was employed in using a piece of blotting paper. It had only been necessary to place the page of writing (note size, letter size, or even foolscap) in the letter book, just as one would use a leaf of blotting paper. The superfluous ink that would go into the blotting paper went on to the leaf of the letter book, and showing through the thin paper, as usual, gave on the other side of the leaf a perfect transcript of the letter. Any excess of ink on the page, either of the letter or of the copying paper, was removed by placing a sheet of blotting paper between them and running one's hand firmly over the whole in the ordinary manner. This ready transcription was accomplished, as would be anticipated, by using ink which dried slowly. Indeed, obviously the ink must dry sufficiently slowly for the characters at the top of a page of writing to remain wet when the last line was written, while it must dry sufficiently to preclude any chance of the copied page being smeared while subsequent pages were being covered. The drying must also be sufficiently rapid to prevent the characters "setting off," as printers term it, from one page on to another after folding. The author then alluded to some difficulties attending the employment of the ink which had prevented its becoming an article of wholesale trade; but he said any chemist and druggist could make it and sell it, giving directions for use to customers. He himself had used it from year's end to year's end without any trouble whatever. It would be particularly useful to professional men and private persons. The principle of the method of preparation consisted in dissolving a moderately powerful hygroscopic in any ordinary ink. After experimenting on all such substances known to him, he gave the preference to glycerin. Reduce by evaporation ten volumes of ink to six, then add four volumes of glycerin. Or manufacture some ink of nearly double strength, and add to any quantity of it nearly an equal volume of glycerin.—*The Chemists' Journal.*

**What Kind of Cinchona Bark should be used in Pharmacy.**—(E. M. HOLMES.†) It is practically impossible at the present time to obtain in retail commerce, with regularity and certainty, cinchona bark of uniform quality. In the first place, South American barks are so various in characters and appearance that none can be trusted unless analyzed; and second, all good barks are generally absorbed by quinine manufacturers. Now, the cultivated cinchona barks, which come from exactly known districts, are not mixed with false barks, but some time will still elapse before any good cultivated yellow or red bark will be obtainable. One variety, however, of cultivated *red bark* (*Cinchona succirubra*) is easily obtainable in almost unlimited quantity and of very good quality. This is due to the following facts. The tree grows at a lower elevation, and being hardy and easily propagated, is cultivated over a much wider area than the others, and is consequently met with in larger quantities in commerce. Owing to the comparatively large amount of red coloring matter it contains, it is less sought after by quinine makers, and the supply of bark is therefore likely to increase instead of decrease. It appears, therefore, desirable that the cultivated cinchona barks should replace those of South America for the following reasons, viz.: the larger average yield of alkaloids—their freedom from false barks—the increasing supply which tends to render it easy to obtain bark of good quality. With respect to the variety of cinchona bark which can be most advantageously used in medicine and pharmacy, the author thinks that the cultivated *C. succirubra*, as it is of good quality, contains all the cinchona alkaloids, is less liable to be mixed with hybrids, and is more easily distinguished by its external characters than any other species. The author wisely suggests that the retail purchaser should be furnished by the wholesale druggist with a statement of the percentage of alkaloids on the label of the packages of bark he purchases. Pharmacopœia preparations made from the *renewed* bark of *C. succirubra* thus guaranteed as to the percentage of quinine it contains would probably give most satisfaction to the medical profession. —*Pharm. Journ.*

MR. W. DE NEUFVILLE, who read a paper on the same subject, takes the opposite view, and contends that the South American barks should still be used for officinal purposes. As it has been asserted and proved that, at present, American *flat* calisaya is not sufficiently rich in alkaloids, the author advocates the substitute of calisaya *quill*, which has this advantage over all kinds of Indian barks, that it is most easily extracted, and can be had regularly all through the year.

DR. PAUL (in the discussion of the preceding paper) thought that Indian *red bark* and American *quill calisaya* would be sufficient for pharmaceutical purposes.—*Pharm. Journ.*

**Hydrobromic Acid.**—Several interesting papers on this subject were read at the late British Pharm. Conference, of which we abstract the more interesting portions:

1. By J. C. THRESH and R. WRIGHT. Some little time ago, the authors had occasion to prepare a little bromide of sodium, required in dispensing a prescription, and were surprised to find that upon adding hydrobromic acid to the requisite quantity of solution of bicarbonate of sodium a copious precipitate of cream of tartar was thrown down. This sample of acid had been obtained from a wholesale house, they therefore prepared a quantity themselves by what is known as Fothergill's process, and this acid reacted with alkalies in a similar manner. In order, therefore, to really determine the hydrobromic acid strength of acids prepared by this process the authors prepared three samples, with the proportions of acid and bromide theoretically required to produce solutions of *five*, *ten* and *fifteen* per cent respectively. The authors then determined to ascertain the strength and kind of acid now found in commerce and employed in dispensing. Of eight examined, four were evidently made by distillation, and four by Wade's or Fothergill's process. The former contained from *eight* to *ten* per cent of hydrobromic acid, three of the latter were evidently intended for *five* per cent solutions, but only contained about *two* per cent, whilst the fourth was labelled five per cent, and although containing less than that amount was evidently intended for a ten per cent solution. The results of the author's experiments show that the acid made by the action of tartaric acid on potassium bromide is undoubtedly, the authors say, a

* We draw the attention of physicians, who desire to experiment with quinoline or chinoline, to the tartrate of quinoline (*Chinolinum tartaricum*) made by Hoffmann & Schoetensack (successors to Saame & Co.), of Ludwigshafen. This is in handsome crystals, not hygroscopic, has a faint odor of bitter almonds and a pungent taste, which can, however, easily be masked.

†Abstract of a paper read at the late British Pharm. Conference.

most unsatisfactory preparation and should be discarded by pharmacists. It is easily recognized by adding to it, drop by drop, a little liquor potassæ, and shaking. The fluid remains clear at first, then, as more alkali is added, abundance of cream of tartar suddenly precipitates. When only a little alkali is added a precipitate will form if the tube is set aside for a time.

2. By F. W. FLETCHER. After recounting the various processes heretofore proposed for making hydrobromic acid, this author describes the method which in his experience yielded the best results. It consists in passing hydrosulphuric acid gas into bromine in presence of water, and separating the hydrobromic acid by subsequent distillation. The following were the details given for the preparation of about fourteen pounds of acid containing thirty-four per cent HBr.

Into a flask of about 300 ounces capacity place 120 fluid ounces of water and five pounds of bromine. Connect the flask with the wash bottle of a sulphuretted hydrogen generator and pass a brisk current of $H_2S$ through the apparatus for about an hour, or until the bromine has entirely disappeared. This may be known to have taken place when on shaking the flask no red color is imparted to the liquid. Transfer the entire contents of the flask to a retort connected with a Liebig's condenser, and distil until the residue in the retort is reduced to about ten fluid ounces, or if necessary until a slight trace of sulphurous acid (instantly recognized by its odor) begins to come over. Filter the product and dilute to a sp. grav. of 1.300. Hydrobromic acid of this density contains (as already pointed out by Mr. Gilmour) thirty-four per cent of HBr., the gravity of 1.275 as given by Squibb having been proved by careful experiment to be an error.—*Pharm. Journ.*

**Glycelæum: an Emulsifying Agent.** — (T. B. GROVES.*) Fourteen years ago, at the Dundee meeting of the conference, a paper on "Glycelæum, a Proposed Basis for Ointments," was contributed by the author, but he was unable to be present, and as his specimens were not forthcoming, the matter attracted little attention, and was soon forgotton. Recently his attention had been again directed to the subject, and the preparation required being for outward application only, he was led to experiment on the *meal of the bitter almond*, which, for such purposes, answers nearly as well as that of the sweet almond. In the present experiments, he also used diluted glycerin instead of the concentrated, believing that the latter is, from its aptness to absorb moisture, from the surface to which it may be applied, liable to cause irritation. The formula, recommended by the author for the emulsifying agent, is as follows:

| | |
|---|---|
| Finely powdered almond cake..... | ℥iss. |
| Pure glycerin..... | ℥ij. |
| Water..... | ℥i. |

This mixture should be prepared, if possible, some little time beforehand, so that time may be given for the emulsin to enter into solution. Three-quarters of an ounce of the emulsion can be made readily to combine with one and a half fluid ounce of most oils by merely stirring them together in a mortar. Castor-oil, however, which, *prima facie*, appears so emulsible, refuses to form a glycelæum ricini, thus accentuating the peculiarities of its chemical composition. Which of its constituents it is which effects the precipitation of the emulsion, the author has not ascertained. Spirit of turpentine, paraffin oil, benzol, and such bodies are somewhat stubborn, but, by using the spatula instead of the pestle, they can be made to form glycelæa, containing about two-thirds of their bulk of the respective oils. In his former paper, the author assumed that glycelæa might be stiffened by combining them with chemically inert powders. He now finds, however, that whenever such powders are added in sufficient quantities to affect the extensibility of the emulsive, the combination is at once broken up, and its constituents assume their original liquid form. This happens when such substances as prepared chalk or licorice powder are employed. Tannic acid, oxide of zinc act chemically as well as mechanically. Amongst substances incapable of being added to glycelæa except in restricted proportions, are wood tar, carbolic acid, creasote, Peruvian balsam. This last substance, however, can be made to take its place in almost any proportion, by first causing it to part with its resin. This is done by warming together olive oil and the balsam until separation takes place. The liquid portion consisting mainly of olive oil plus cinnamein, is strained when cold, and then can be as readily combined with the emulsive as pure olive oil. Such a preparation would be found useful as an application to chapped hands, for winter use. Glycelæum olivæ is not disturbed by addition of one-twelfth finely powdered borax nor by sulphate of zinc in the proportion of sixteen grains to the ounce.—*The Chem. Journ.*

* From a paper read at the late British Pharm. Conference.

**Note on the Sulphate of Bebeeria.**—(D. B. DOTT.*) The commercial sulphate of bebeeria is not a definite salt, but a purified extract of greenheart bark. It contains about 15% of water (lost at 110° C.) and 7.80% $SO_3$, which is equivalent to 63.8% of bebeeria hydrate. The percentage of bebeeria is not, however, nearly so great as that, since a large proportion of the $SO_3$ is combined with other alkaloids capable of neutralizing acids. It is extremely difficult to determine exactly the amount of bebeerine present in the mixture. This arises principally from the amorphous nature of the alkaloids and the impossibility of getting the hydrochloride to crystallize unless nearly pure. Although we do not know the exact amount of bebeeria in the "sulphate," there is good reason to believe that the proportion is much higher than that indicated by Prof. Flückiger (*Pharm. Jour.* [2], xi., 193), whose method of purifying by repeated precipitation with potash is attended with serious loss, on account of the solubility of the base in the alkaline lye. In any case, it is certain that there are present in the commercial article alkaloids capable of neutralizing acids, amounting to about six per cent of the preparation, and that they all contribute to its value as a tonic is more than probable. Indeed, it is doubtful whether a much better preparation of the bark could be obtained than the Pharmacopœia "sulphate," at least with our present knowledge of its chemistry. At the same time, it would be advisable to alter the name, which does not indicate the real nature of the substance—the expression "sulphate of bebeeria" properly applying to a compound of definite chemical composition.

* From a paper read at the late British Pharm. Conference.

## Analysis of Public Water-Supplies.

(Instructions for water analysis in England, prepared by a Committee appointed by the Society of Public Analysts.†)

(Continued from page 335.)

6. *Ammonia, free and albuminoid.*—The estimation of ammonia present in the water in a free or saline form, and of that yielded by the nitrogenous matter present in the water (commonly called albuminoid ammonia) is to be made on the same portion of the sample to be analyzed. Take not less than 500 cc. or 7,000 grains (one decigallon) of the water for these determinations, and distil in a forty-ounce stoppered retort, as this is large enough to prevent the probability of portions of the water being spurted over into the condenser. The neck of the retort should be small enough to pass three or four inches into the internal glass tube of a Liebig's condenser. If the fit between the retort and the inside tube of the condenser is good, the joint may be made by wrapping a small piece of washed tinfoil round the retort tube, so as to pass just inside the mouth of the condenser tube. Many analysts prefer, however, to work with a retort fitting loosely into the condenser; and, in such cases, the joint between the two may be made in one of the two following ways: first, either by an ordinary india-rubber ring, such as those used for the tops of umbrellas, which has been previously soaked in a dilute solution of soda or potash, being stretched over the retort tube in such a position that, when the retort tube is inserted in the condenser, it shall fit fairly tightly within the mouth of the tube, about half an inch from the end; 2d, preferably, when the shape of the large end of the condenser admits of it, by a short length, say, not more than two inches of large-size India rubber tubing, which had been previously soaked in a dilute solution of soda or potash, being stretched outside both retort-tube and condenser-tube, so as to couple them together, so that the tube of the retort still projects some inches into that of the condenser. It is very desirable to have a constant stream of water round the condenser whenever it can be obtained. Before distillation, a portion of the water must be tested with cochineal, in order to ascertain if it shows an alkaline reaction. The portion so tested must, of course, be rejected, and not put into the retort. If the water does not show an alkaline reaction, a sufficient quantity of ignited sodium carbonate, to render the water distinctly alkaline, must be added. The distillation should then be commenced, and not less than 100 cc. or, say, 1,400 grains distilled over. The receiver should fit closely, but not air-tight on to the condenser The distillation should be conducted as rapidly as is compatible with a certainty that no spurting takes place. After 100 cc. or, say, 1,400 grains have been distilled over, the receiver should be changed, that containing the distillate being stoppered to preserve it from access of ammoniacal fumes; 100 cc. measuring flasks make convenient receivers. The distillation must be continued until 50 cc., or say 700 grains more are distilled over, and this second portion of the distillate must be tested with Nessler's reagent to ascertain if it contains any ammonia. If it does not, the distillation for free ammonia may be discontinued, and this last distillate rejected; but, if it does contain any, the distillation must be continued still longer, until a portion, 50 cc., or say, 700 grains, when collected, shows no coloration with the Nessler test. The whole of the distillate must be nesslerized as follows: The standard solution for comparison must be such that it contains 0.317 parts per 10,000 of chloride of ammonium (= one part of ammonia in 100,000). The distillate is transferred to a clean Nessler glass, and one-twentieth of its volume of Nessler solution added. The Nessler solution must be clear and of a pale straw-tint, when seen in an eight-ounce bottle. No turbidity must ensue on the addition of the Nessler solution to the water, as such turbidity would be a proof that the distillate was contaminated, and must, therefore, be rejected, and the determination repeated. After thoroughly mixing the water and Nessler solution in the glass, an approximate estimate can be formed of the amount of ammonia present by the amount of coloration produced in the solution. It will now be necessary to mix one or more standard solutions with which to compare the tint thus obtained. These solutions must be made by mixing the standard solution of chloride of ammonium with distilled water absolutely free from ammonia, and subsequently adding some of the same Nessler solution as was previously added to the distillate. This precaution is essential, because the tint given by different samples of Nessler solution varies. A colorimeter may be used, if preferred, instead of Nessler glasses. As soon as the distillation of the free ammonia has been started, the alkaline solution of permanganate of potash should be measured out into a flask, ready for addition to the water under examination for the distillation of the albuminoid ammonia. The volume of the alkaline permanganate solution to be taken must be at least one-tenth of that of the water which is being distilled, and should not exceed that proportion unless the water is of very bad quality, and the solution must be made in accordance with the directions contained in these instructions. This solution must be diluted with four times its own volume of water and must be placed in a flask and boiled during the whole time that the distillation of the sample for free ammonia is being carried on, care being taken that the concentration does not proceed to too great an extent. There must be enough of the boiled and diluted alkaline permanganate solution to make up the residue in the retort to about 500 cc. or 7,000 grains. When the distillation of the sample of water for free and saline ammonia is completed, the alkaline permanganate solution which has been thus diluted and boiled will be ready for use and the distillation for albuminoid ammonia may be proceeded with as follows: To the residue left in the retort from which the free ammonia has been distilled, add the alkaline permanganate solution to make it up again to a volume of at least 500 cc. or say 7,000 grains, and the lamp being replaced the distillation must be continued and successive portions of the distillate again collected in precisely the same way as during the process of distillation for free ammonia. After 200 cc. or 3,000 grains, say two-fifths of the volume contained in the retort have been distilled over, the receiver should be changed and further portions of 50 cc. or 700 grains collected separately, until the distillate is practically free from ammonia. The distillates must then be mixed and nesslerized in the same way as previously directed for free ammonia. The result so obtained must be calculated to ammonia in grains per gallon, and returned as *albuminoid ammonia*. Special care must be taken that the atmosphere of the room in which these distillations are performed is kept free from ammoniacal vapors, and that the receivers fit close, but not air-tight to the end of the Liebig's condenser. It is also specially necessary to observe that the color of the distillate deepens gradually, after the addition of the Nessler reagent, and that it is not possible to read off the amount of color correctly, until the nesslerized liquor has stood for at least three minutes and been intimately mixed with the Nessler solution. Special care must be taken that the retort, condensers, receivers, funnels, Nessler's glasses, etc., used are all rendered perfectly free from ammonia before use. Where the water in use in the laboratory is good, this may be used to thoroughly rinse the apparatus two or three times, draining out the adhering water; otherwise, pure distilled water must be used. These ammonia and albuminoid ammonia determinations should be made as soon as possible after the water has been received for analysis.

8. **Oxygen absorbed.**—Two separate determinations have to be made, viz., the amount of oxygen absorbed during 15 minutes, and that absorbed during four hours; both are to be made at a temperature of 80° F. It is most convenient to make these determinations in 12-oz. stoppered bottles, which have been rinsed with sulphuric acid and then with water. Put 250 cc. or 3,500 grains into each bottle, which must be stoppered and immersed in a water-bath or suitable air-bath until the temperature rises to 80° F. Now add to each bottle 10 cc. or 100 grains of the dilute sulphuric acid, and then 10 cc. or 100 grains of the standard potassium permanganate solution. Fifteen minutes after the addition of the potassium permanganate, one of the bottles must be removed from the bath and two or three drops of the solution of potassium iodide added to remove the pink color. After thorough admixture, run from a burette the standard solution of sodium hyposulphite, until the yellow color is nearly destroyed, then add a few drops of starch water, and continue the addition of hyposulphite until the blue color is just discharged. If the titration has been properly conducted, the addition of one drop of potassium permanganate solution will restore the blue color. At the end of four hours remove the other bottle, add potassium iodide, and titrate with sodium hyposulphite as just described. Should the pink color of the water in the bottle diminish rapidly during the four hours, further measured quantities of the standard solution of potassium permanganate must be added from time to time so as to keep it markedly pink.

[To be continued.]

† Reprinted from the *Analyst*, London.

# NOTES, QUERIES AND ANSWERS.

*Under this heading we shall, to the best of our ability, endeavor to answer such questions addressed to us, as come within the scope of this journal, provided they are accompanied by the name and address of the writer. Answers to queries received after the 5th of the month will lie over until the next issue. Unless special instructions to the contrary accompany the query, the initials of the correspondent will be quoted at the head of each answer.*

*When asking for the formula of an unusual, patented, or proprietary compound, always accompany the query with any information you may already possess regarding the locality in which it is used, its use and reputed effects, in order to enable us to make inquiry without waste of time and labor. When it can conveniently be done, send also a specimen of the label used on packages of the compound.*

**No. 967.—Hydrochlorate of Quinia and Urea** (U. B.).

This compound, also known as "chininum bimuriaticum carbamidatum," has been described fully in this Journal, volume for 1878, page 334. Its mode of preparation is here repeated in a more practical form.

I. *Preparation of pure Urea.*

Take of commercial urea any convenient quantity. Dissolve it, with a gentle heat, in absolute alcohol, filter while warm, and allow it to crystallize.

II. *Preparation of Hydrochlorate of Quinia and Urea.*

Take of

| | |
|---|---|
| Quinia hydrochlorate (muriate) | 793 parts. |
| Hydrochloric acid (spec. grav. 1160) | 222 " |
| Distilled water | 278 " |
| Urea, purified | 120 " |

Mix the hydrochloric acid with the distilled water. Pour the mixture upon the hydrochlorate of quinia, contained in a porcelain capsule, and, when the salt is dissolved, filter through a pellet of pure cotton placed in the neck of a funnel. To the filtrate add the urea, and, when it is dissolved, set the capsule aside in a cold place for twenty-four hours, so that crystals may form. Then transfer the crystalline mass to a funnel, allow the mother-liquor to drain off, wash the crystals with a very little *ice-cold* distilled water, spread them out on plates, and dry them at the ordinary temperature. They may be dried more rapidly on the funnel by using an aspirator.

**No. 968.—Quintessential Oils** (Subscriber).

This is a name, very appropriately (we think) given to a new class of essences, which constitute (usually) the more volatile portion of the essential oils. Almost all of the latter are composed of two separate constituents, one of which is highly aromatic and quite soluble, while the other is less so. It has also been found that these "essences" are much more soluble in water than the essential oils from which they are derived; so that, comparatively concentrated solution may be made in dilute or even weaker alcohol. Among the most useful of these, at present kept in stock by Fritzsche Brothers, 51 Barclay street, New York, and made by Schimmel & Co., Leipzig, are the "quintessential oils" of anise, caraway, cassia, ginger, juniper, and peppermint. Their price is comparative high, but they go a great deal farther than the ordinary oils.

**No. 969.—Sulphur; Salicylic Acid and Acetate of Potassium** (W., N. Y.).

Our correspondent asks: 1, how a solution of sulphur may be made; 2, how it can be held in suspension; and 3, whether a product so formed is miscible with a solution of salicylic acid and acetate of potassium.

1. The best solvent of sulphur is carbon disulphide. It is also soluble in fatty oils, and in oil of turpentine.

2. Either of the latter two solutions might be incorporated into an emulsion, but their taste is so repulsive that it would be very questionable whether they could be administered.

3. If it is absolutely necessary to administer sulphur in connection with the above-mentioned ingredients, we think the wisest course would be to use precipitated sulphur in substance, and to choose a rather thick vehicle, so that it would remain in suspension while a dose is being measured out. Or else, to select a compound containing *active* sulphur (that is, one in which the therapeutic properties are chiefly and directly owing to the *sulphur*, in some form like sulphurous or hyposulphurous acid), such as the hyposulphite of sodium or the sulphite of sodium. Addition of an acid, even acetic acid, to a solution of hyposulphite of sodium sets sulphur free, in a very finely divided condition, so that it will remain in suspension for a long time. (This is not the case with sulphite of sodium.) By mixing acetate of potassium and salicylic acid together, a transfer of acid radicals takes place, salicylate of potassium and acetic acid being formed. The free acetic acid will act upon the hyposulphite of sodium, and set free part of the sulphur. We do not attempt to write out a formula, as we do not know your object. But the above hints may be sufficient to enable you to work out your problem yourself.

**No. 970.—Prescription** (M. R. H.).

This correspondent wants to know whether the following prescription would be considered incompatible:

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|---|---|
| ℞ Zinci sulphatis | gr. xv. |
| Potassii bromidi | gr. xxv. |
| Sacchari | gr. xx. |

Misce. S.: Use as directed.

We presume this is intended for internal administration; and as no directions are given to subdivide the mixture, it must have been meant as *one* dose. We can only say that when the ingredients are brought together in the presence of water, or in the liquids in the stomach, there would be a total or partial transpositions of radicals resulting in the formation of bromide of zinc (which is very soluble), and of sulphate of potassium (which is soluble in ten parts of water). If the transformation is complete, there will be produced 21.2 grains of bromide of zinc, which is certainly an excessive dose, and would act as a powerful irritant to the stomach. At all events, we do not think that the stomach would be able to retain it, and for the reasons mentioned, the mixture must be declared to be both chemically and therapeutically incompatible.

**No. 971.—Alizarine Ink** (W. S. F.).

That which is called in trade "Alizarine Ink" has nothing in common with alizarine, either natural or artificial. The name was applied to an improved kind of ink, over thirty years ago, probably because the manufacturers of the ink desired to mislead the public as well as experts. The name "alizarine ink" is applied to a writing fluid, in which the iron is maintained in a *ferrous* (protoxide) condition, and in perfect solution, which is accomplished by slightly acidulating the liquid with acetic, or sometimes with sulphuric acid. The liquid has usually a rather pale greenish or bluish color, and the writing is at first green, not black. Not long afterwards, however, the acid menstruum evaporates, leaving a very thin layer of the ferrous tannate, which gradually oxidizes in the air and turns to black ferric tannate. Contrary to what might be expected, steel pens are not usually much corroded by properly prepared alizarine inks; the first coating of oxide which is produced upon the pen generally adheres so firmly that further action is very much retarded. The very pale tint of such a writing fluid is frequently heightened by the addition of some indigo-solution, best in form of indigo-carmine (see last number, page 338). A good formula for making so-called alizarine ink is the following:

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|---|---|
| Powdered nutgalls | 40 parts. |
| Solution of acetate of iron | 15 " |
| Gum arabic | 10 " |
| Wood-vinegar | 10 " |
| Indigo-carmine | 5 " |
| Water | 100 " |