OFFICIAL AND OTHER TINCTURES.

M. I. WILBERT, PH. D.

Tinctures have been variously defined, but all attempts to differentiate them, clearly, from other galenical preparations, by a concise restrictive description have failed, because of the necessary exceptions that are involved in any now-available list of official tinctures.

Broadly speaking, they may be designated as hydro-alcoholic solutions of organic, or of inorganic, principles used as medicine or, perhaps even better, as alcohol containing solutions of medicinal substances.

For many years tinctures held the leading place in galenical pharmacy, because of the fact that they represented perhaps the most efficient and most acceptable mode for the administration of the medicinally active constituents of vegetable drugs. It is safe to say, however, that tinctures no longer occupy the preponderating position accorded them two or three decades since, despite the fact that they may be made to represent, in rather a fairly concentrated form, all of the active principles of the drugs from which they are made and are, on the whole, the most stable and most reliable of all fluid preparations of vegetable drugs.

The reasons for the gradual disuse of tinctures are, no doubt, many and varied. Not the least important of these reasons, however, is the fact that, as dispensed at the present time, they are far from being uniformly reliable and, very frequently indeed, physicians using them fail to obtain the desired results.

This failure of a tincture to induce the medicinal action expected of it, or, as sometimes happens, its causation of a secondary or untoward action, may be due to a number of factors, of which I desire to call your attention to but two:—the variability of tinctures of potent drugs, owing to the menstruum employed in their manufacture and the generally objectionable nature of tinctures in which alcohol is the preponderating active ingredient.

Up to the time of the publication of the eighth decennial revision of the Pharmacopœia of the United States, less than a decade ago, no concerted attempt had ever been made on the part of the pharmacopœial revision committees of different countries, to bring about any degree of uniformity in the drug-strength of tinctures, or in the composition of other medicinal substances.

Continued agitation, for a period of half a century or more, by men interested in the improvement of galenical pharmacy, has finally resulted in the development of a marked degree of uniformity in the tinctures of widely-used potent drugs, so that with the publication of the new British Pharmacopœia, these preparations will be practically uniform in every country of the civilized world.

The first International Pharmaceutical Congress held in Brunswick, Germany, in 1865, was called together at the instigation of French and of German pharmacists, who, in 1864, just 50 years ago, began to discuss the practicability of securing some manner of agreement to bring about greater uniformity in the strength of pharmaceutical preparations of potent drugs. In some more or less modified form, the same problem was the basis for discussions at succeeding International Congresses and at the Fifth Congress, held in London in 1881,

Peter Squire outlined a definite and reasonable proposition, for the equalization of the strength of pharmaceutical preparations included in the pharmacopœias of the different countries. He specifically called attention to the very marked differences in the strength of potent tinctures in the several pharmacopœias, and suggested the desirability of making them uniform.

It was not, however, until 1901, that a definite plan of action was found acceptable to the majority of representatives of the different countries, and this plan was later developed at the Brussels Conference held in 1902, and finally put into operation through the international treaty signed by representatives of the several powers, in Brussels in 1906.

Unfortunately, the revisers of our own Pharmacopœia of the United States, because of the inherent conservatism of American pharmacists, have failed to take advantage of perhaps the most important suggestion made in connection with the tinctures included in the Brussels Conference Protocol; that is, the suggestion to use approximately 70 percent. alcohol, in place of the 45 or 50 percent. alcohol as a menstruum.

In a paper reporting a series of experiments on the practicability of adopting the suggestions embodied in the Brussels Conference Protocol, reported in the American Journal of Pharmacy for 1903 (p. 2027), I called attention to the desirability of using the higher strength alcohol and enumerated among other advantages of the international standard menstruum:

That the menstruum used would be uniform in strength for all extractive tinctures of potent drugs.

That the 70 percent. alcohol readily extracts all of the active properties of the drug, while the total extract-content of the resulting preparation is distinctly lower.

That the keeping qualities of the preparation would be greatly improved by the increase in alcohol-content.

That the resulting preparations were elegant in appearance and promised to be quite permanent.

In a discussion on the relative compliance of the various pharmacopœias with the protocol of the Brussels Conference, read at the Richmond meeting of the American Pharmaceutical Association, (Proc. Am. Pharm. Assoc., 1910, v. 58, p. 1145), I reported that the tinctures made in 1902 were still clear and evidently satisfactory, while corresponding preparations made with the U. S. P. VII menstruum of diluted alcohol had generally precipitated badly. I also called attention to the fact that, approximately, 70 percent. of alcohol was then recognized as being a much more efficient antiseptic and preservative than either the more dilute or more concentrated mixtures of alcohol and water and that this one property of 70 percent. alcohol alone, should warrant its careful consideration on the part of the U. S. P. Committee of Revision for adoption as a routine menstruum in place of the diluted alcohol now generally prescribed.

What was said of the preparations four years ago still holds good, with the addition that both the color and odor of the tinctures made with 70 percent. alcohol are as characteristic of the drug now as then. This is particularly true of the tinctures of the leaf drugs, which still retain their original green color, while the

preparations made with 50 percent. alcohol long since became muddy, dark and brown.

The economic reasons that have induced American pharmacists to adopt and to adhere so tenaciously to the use of the weaker alcoholic menstruum are not of sufficient importance to warrant the continuance of the use of the weaker menstruum when the medicinal activity of a preparation is at stake.

Uniformity in the activity of the heart tonic group of drugs, particularly, is a matter of considerable importance because of the fact that, in connection with these drugs, we have no active principles that adequately serve as substitutes for the galenical preparation. Digitalis, more especially, is a drug that offers difficulties in this direction and a recently published paper by H. C. Hamilton (Am. J. Pharm., 1914, v. 86, p. 56-61) emphasizes the desirability of materially increasing the alcohol-content of the menstruum used for extracting this drug and presents data that shows the imperative need for an increase in the alcoholic strength of the menstruum. A preparation reported on by Worth Hale in 1911, (Hyg. Lab. Bull., No. 74) bears out the same contention.

What is true of digitalis is also true of belladonna, hyoscyamus, nux vomica, colchicum and other potent drugs. The tinctures made with 70 percent. alcohol have uniformly demonstrated better-keeping qualities than have the preparations made with dilute alcohol and while, at this late date, it may be impractical to reverse any decision made by the Committee of Revision, it is to be hoped that a sufficient number of pharmacists will interest themselves in the subject to at once prepare a line of international standard tinctures with 70 percent. alcohol, and to preserve them for a decade, in comparison with the preparations made according to pharmacopœial directions and report on them in time for the succeeding revision.

One other feature of considerable importance to pharmacists who expect to practice their profession in years to come, is the retention in the Pharmacopœia of preparations that can be or are being used in prohibition-territory as "tipples." The existing Federal statutes and the regulations based on the internal revenue tax laws, adequately define the limitations of the use of alcohol for medicinal purposes, and recent Treasury decisions clearly indicate that, in the course of time, preparations included in the Pharmacopœia and in the National Formulary, must be subjected to the same critical scrutiny that is now accorded to proprietary remedies marketed for sale as medicines.

Of the 58 tinctures now official in the Pharmacopœia of the United States, not more than 25 are at all widely used and of these 25, at least 4 could be spared. One of the more objectionable of these preparations is Tincture of Ginger, which has acquired a very widespread reputation as a "tipple" and has few or no legitimate uses as a medicine.

One other factor in connection with tinctures, that should be taken into consideration at this time, is the possibility of developing a line of simple extractive preparations of opium that cannot be used in place of smoking-opium. A recent Treasury decision even now classifies the formerly official aqueous extract of opium as smoking-opium and it is quite probable that it will presently be found necessary to include in this classification, the now widely used simple tinctures

of that drug, unless ways and means can be found to restrict the sale of these preparations for use as legitimate medicine.

In conclusion I wish to reiterate the statement that the international standard menstruum of 70 percent. alcohol, is more satisfactory as a solvent for the active constituents of potent drugs than is 50 percent. alcohol. The resulting tinctures retain their appearance and activity for a much longer period of time. So that quite apart from the question of efficiency, they are in reality more economical.

Alcohol-containing preparations that can be or are used as substitutes for alcoholic beverages, should be deleted from future revisions of the Pharmacopœia and the sale and distribution of preparations that are in any way subject to misuse or abuse should be safeguarded in a thoroughly efficient manner.

DISCUSSION.

MR. GORDON: In support of Mr. Wilbert's suggestion that a stronger alcohol would be better for extracting and preserving the active principles of plant drugs, I would cite the practice of the Homeopathic Pharmacopoeia, which uses strong alcohol menstrua for extracting the active principles of plants and a weaker alcohol for dilutions. Experience has proven in this school, that strong alcohol is most efficient for preserving the strong tinctures of vegetable drugs, the dilutions of the strong, or "mother tinctures" being made with an alcohol of weaker strength. The so-called "strong alcohol" corresponds with the 95 per cent. alcohol of the U. S. P., the "dispensing alcohol" is about 88 per cent. absolute alcohol, weaker alcoholic dilutions are used for special preparations. In making tinctures of fresh vegetable drugs the normal amount, or proportion, of moisture is always considered as a part of the menstruum used for extraction.

MR. WM. P. KIRCHGESSNER, of Grand Rapids, Michigan:—Do I understand that by this method the content of moisture of a plant is taken as being 25 per cent.?

MR. GORDON:—Oh, no, the content of moisture in the fresh, green plant from which many homeopathic preparations are made is carefully determined in the following manner: A weighed quantity of the drug is carefully dried, powdering it if necessary at the latter stage, and the amount of plant moisture contained is then determined by the difference between the weight of the fresh drug taken and the dried product. This moisture is, of course, the natural water in the juices of the fresh drug, and it is taken as part of the menstruum used for extracting the active principles of the plant. For example, suppose we were making the "mother tincture" of aconite, the term "mother tincture" being used to denote the strongest tincture made from the drug for further dilution as required. The directions of the Homeopathic Pharmacopœia, we will say, call for a menstruum consisting of 700 parts of alcohol and 300 parts of water. If the fresh, succulent plant is used, the amount of water contained in the fresh leaves would be estimated as just mentioned and that water taken as part of the menstruum used for extraction. Say the leaves contained 20 per cent. of moisture, then to make a tincture of aconite the following proportion would be observed: Alcohol—700 parts, water—100 parts, plant moisture—200 parts, to make 1000 parts of tincture. It must be understood that more of such menstruum will be required to make the final product an exact ten per cent. tincture, but little menstruum is wasted if the drug is exhausted slowly and the marc expressed. Of course in case of a dried drug, the proportion of water does not amount to much and is usually disregarded, unless in cases where it exceeds a certain percentage, I think it is about five per cent., but for tinctures of fresh drugs the moisture is invariably calculated.

MR. KIRCHGESSNER:—I understand the homeopathic school has two pharmacopœias. Which is used?

MR. GORDON:—There is only one official homeopathic Pharmacopœia, that issued under the auspices of the American Institute of Homeopathy, an association of homeopathic physicians which corresponds to the American Medical Association in relation to the two schools of medical practice. However, several different pharmacopœias have been published, just as have different Dispensatories, but all are based on the homeopathic list of drugs recognized by this school. I have prepared a brief history of the evolution of the homeopathic pharmacopœia of the present day which I have presented to the Historical Section, in which I hope the answer to this question will be found. In the early history of homeopathy in this country many of the text books were translations of foreign works, the firm of Boericke and Taefel leading in this enterprise. That is where the confusion may arise, just as if you were to ask me which is the official Dispensatory. Now, the official pharmacopoeia is the "Homeopathic Pharmacopoeia of the United States," issued under the sanction of the American Institute of Homeopathy, but any physician is of course privileged to use any book of reference and to prescribe as he sees fit. The last edition was published in 1914.

after revision by a committee of physicians and pharmacists of the homeopathic school. Radium emanations just spoken of as being effective in such small doses remind me of being near akin to homeopathy.

MR. W. JAY SCHIEFFELIN, JR., of New York:—Referring to radium, it seems to me that when we are considering minute doses, that radium water, or emanation water, ought to be put in the homeopathic pharmacopoeia.

MR. GORDON:—The use of radium in homeopathic hospitals is common. I know of one that has at least $50,000.00 worth.

MR. SCHIEFFELIN:—I remember years ago hearing a receipt for homeopathic punch. You take a little rum, the less you take the better, drop it in the lakes of Wenner and of Wetter. You stir the mixture well, lest it prove inferior, and put one drop of it into Lake Superior. Stir again and then lest it makes you groggy, you place one drop of it into Lake Winnepesaukee, and then every other day you take a drop of that in water. That will make you well, or at least it ought to. (Laughter.)

When you take the mother tincture and make it up to a sixtieth or one hundred and twentieth potency, you actually dilute it as much as the punch. An atom of helium is very minute. An atom of helium is to a drop of water as is a walnut in size to the globe. So you can see what there is in small doses.

MR GORDON:—I can beat that. One of the old tests as to the truth of Homeopathy was the following: Put one teaspoonful of whiskey into a bucket full of water and give an old sailor teaspoonful doses of the dilution until you got him drunk. I have seen it tried, but there was too much water to suit the sailor. (Laughter.) He takes his straight. But to be serious, I have had the privilege of studying a little into the doctrines of Hahnemann, and I am surprised how near he came to our own modern doctrines. We boast of our vaccines and prophylactic serums; what are they but an exemplification of Hahnemann's famous doctrine "Like cures like"? We give the same germs that caused the disease, to cure it. Take the theory of dilution of drugs. It is but the ionic theory in embryo. The homeopathic school does not teach that the weaker a drug is the more powerful it is, just the contrary. The basis of its teachings is that a drug in a finely divided state, dilutions or triturations, is more active than when in mass. Is not that the ionic theory? Does sodium chloride as NaCl exert any chemical action until it is disassociated by solution in water into sodium and chlorine ions?

PROF. L. E. SAYRE, of Lawrence, Kansas:—How about those substances which do not ionize? Do they act?

MR. GORDON:—Not to be ironical I answer yes, just as a flatiron does when applied to the head. How, I don't know from experience.

NOTES ON THE ANALYSIS OF SOME ESSENTIAL OILS.

FRANCIS D. DODGE.

1. *Detection of Pinene in Oil of Lemon.*

To demonstrate the presence of pinene among the terpenes of oil of lemon, or of similar oils, reliance is generally placed on the well-known nitroso-chloride reaction, the crystalline product being identified by its melting point, or the melting point of nitrolamine derivative. As a rule, however, a mixture of nitroso-chlorides is obtained, and the recognition of the pinene derivative is attended with some uncertainty. We have found it convenient, for this purpose, to utilize the reaction of the nitroso-chloride with anilin.

Wallach (Ann. 252, 132) has shown that pinene nitroso-chloride, on heating with anilin, regenerates pinene, with formation of amido-azo-benzene:

$$(C_{10}H_{16}NOCl)_2+6C_6H_5NH_2=$$
$$2C_{10}H_{16}+2C_6H_5—N_2—C_6H_4NH_2+2C_6H_5NH_2HCl+2H_2O.$$

whereas limonene nitroso-chloride passes under similar conditions, into a nitrol-anilide:

$$(C_{10}H_{16}NOCl)_2+4C_6H_5NH_2=$$
$$2C_{10}H_{15}NOH.NHC_6H_5+2C_6H_5NH_2HCl.$$