THE PHARMACY AND MATERIA MEDICA OF THE BRITISH PHARMACOPŒIA OF 1914.*

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The appearance of a revised pharmacopœia of one of the leading nations is an event of general pharmaceutical interest. The importance of such a revision from an American view-point, is greatly enhanced if the pharmacopœia revised is that of a nation whose consanguinity, language and practices are so closely allied to our own as are those of the British Isles. Hence, the appearance of a new British Pharmacopœia during the past year becomes one of the most important pharmaceutical events.

It is apparent that any attempt to review the pharmacy and materia medica of the Fifth Edition of the British Pharmacopœia within the time allotted for a paper presented to a pharmaceutical meeting, must necessarily be cursory and incomplete. Moreover, one is too prone to consider the volume from the view-point of American practice without realizing what has been the aim of the Medical Council and which, in the following statement in the preface, they claim to have accomplished: "has now been able to produce a British Pharmacopœia suitable for the whole Empire." This statement indicates to what extent that ideal of the British government, the solidarity of all of the people of the numerous divisions of the British Empire, has progressed. The present edition displaces not only the edition of 1898, but also the Indian and Colonial Addendum of 1900. The dismissal in the revision of so many of the drugs used exclusively, or nearly so, in the oriental British possessions, indicates the advancement of the movement for uniformity of medical standards and practice throughout the British Empire.

In this revision the Medical Council departed somewhat from the methods of the previous revisions and sought the co-operation of pharmaceutical, chemical and botanical authorities by instituting conferences and committees on reference and thus aimed to obtain information, advice and investigation from many experts outside of the Council.

In this revision the metric system of weights and measures is used throughout, even for the statement of doses, "in the expectation that in the near future the system will be generally adopted by British prescribers." "At the present time students and practitioners of medicine are accustomed to use the metric system in connection with the work of chemical, physical, physiological, pathological and pharmacological laboratories; it will doubtless facilitate the application of science to practice when the same system is used for therapeutic purposes also." We sincerely trust that in this respect the British practitioners of medicine, veterinary medicine, and pharmacy are more ready to adopt this innovation than have been their American brethren in these professions. The term "cubic centimeter" is displaced by "millilitre" and in the statement of doses in the metric system this is abbreviated to "mil" and the fractional portions are "decimil" and "centimil."

In the preface, it is recommended that prescribers cease to employ the long-used

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symbols for drachm and ounce as they are apt to be misread, and are used at times to convey different meanings. The symbol ℥ for example "is to represent sometimes 480 grains, sometimes 437.5 grains and also to represent 1 fluid ounce."

The preface likewise defines what is meant by a percentage solution; "thus a solution of '1 in 10' or '10 per cent.' means that one gramme of a solid or one millilitre of a liquid is contained in ten millilitres of the solution." This statement is not strictly accurate nor is it in accord with the exact meaning of the word percentage.

In considering synonomy, only the most important of the synonyms employed in prescribing have been inserted. Abbreviations of the Latin titles have been adopted and published as a table in the Appendix. In this the revisers were undoubtedly influenced by a foreknowledge of the intent of the U. S. P. IX in this direction.

The acceptance of the principles of "The International Agreement" promulgated by the International Congress for the Unification of the Formulæ for Potent Drugs and Preparations held at Brussels in 1902, has necessitated some changes in this edition of the British Pharmacopœia. The practice of Great Britain as well as America has been to measure liquids by volume and solids by weight and this has been maintained instead of following the custom of continental practice and endorsed by that Agreement, of weighing liquids as well as solids.

The substances added are not numerous and are covered in a list of 43 titles. Cantharidin replaces Cantharis and Mylabris and is used in all of the galenicals in which these drugs were formerly directed, on the basis of the average content of 0.5 percent. of cantharidin in Cantharides which quite likely is the average yield of the pure active principle. This change has necessitated a change in titles of preparations to Acetum Cantharidini, Emplastrum Cantharidini, Tinctura Cantharidini, and Unguentum Cantharidini.

Diluted Hydriodic Acid is admitted for the purpose of making the syrup which is likewise on the list of admissions.

Cassia Fructus, cassia fistula pod, is admitted for the purpose of giving a formula for "Cassia Pulpa," which should more correctly be entitled an Extract.

Senna Fructus, the senna pod, is another new title. Senna pods are official in several of the European pharmacopœias and their use is extending likewise in the United States.

Under the title of Ipomea Radix the Orizaba Jalap Root is admitted with the synonym of Mexican Scammony Root. This has been done to permit its use as a substitute for the true Scammony Root for the preparation of Scammony Resin.

Scammony resin is defined as a mixture of resins obtained from Scammony Root or from Orizaba Jalap Root. This is an unfortunate exhibition of legalizing a specious fraud that has been extensively carried on in the substitution of the chemically different resin of ipomea for that of Scammony. The requirement of "not less than 75 percent. soluble in ether" shows how deliberate the purpose.

Cresol is one of the additions and as a preparation Liquor Cresol Saponatus made with castor oil and potassa soap, a good preparation with which we are not unfamiliar.

Formaldehyde is admitted and Liquor Formaldehydi Saponatus is a soft soap,

(from olive oil and potassium hydroxide), hydro-alcoholic solution of formaldehyde and should prove a useful addition to the antiseptics.

Among Ointments and Ointment bases we note that a formula for benzoinated prepared suet has been introduced and it is recommended that in India this should be employed instead of Benzoinated Lard in making ointments. Unguentum Lanæ Compositum, a mixture of prepared lard 40, wool fat 40, paraffin ointment 20, is a recruit with the synonym of Emollient Ointment. A veteran in American practice, Goulard's Cerate, with a modified formula with camphor omitted, is admitted under the title of Unguentum Plumbi Subacetatis.

The list of deletions is a formidable one of 168 titles. A number of these are oriental drugs that probably have gone out of use because of the change of medical practice in the colonies. There are, however, in this category a number of titles of old friends such as Camboge, Cimicifuga, Coca Leaves, Conium Fruit and Leaves, Crocus, Elaterium, Humulus, Jaborandi, Lupulin, Mezereum, Musk, Pareira, Physostigma, Sarsaparilla and Sumbul.

Among the preparations dismissed, we note a number of decoctions and infusions and the concentrated liquores introduced in the edition of 1898 for the purpose of permitting of the extemporaneous preparation of decoctions and infusions. It would seem that the "Liquores Concentrati" met with little favor and further that English practice is gradually being weaned from the copious draughts of infusions and decoctions of drugs.

Our British brethren have shown some further appreciation of the advantages of powdered extracts and have adopted the powdered form for a few additional extracts, notably, the extracts of belladonna, hyoscyamus, nux vomica and opium. The diluent directed in the extracts of belladonna and hyoscyamus is the powdered respective drug of determined alkaloidal content. In the extracts of nux vomica and opium, calcium phosphate is directed as the diluent and in the extract of strophanthus, milk sugar. The degree of fineness of the powder specified under extract of belladonna is a number 20 sieve. This certainly will yield a rather coarse powder. The menstruum directed for extract of belladonna and hyoscyamus is 70 percent. alcohol. A stronger alcoholic menstruum is necessary to obtain a powdered extract of proper strength and permanent fineness of powder. Where formulæ are given for both the liquid and the dry extracts of the same drug, the word "Siccum" is added to the title of the latter. It would seem to have been preferable to have uniformly used this term in the titles of all such dry extracts.

In the Latin titles 38 changes have been made. Most of these are of a minor character and for the purpose of more exactly defining the official articles or preparations. Aloe now covers both Aloe Barbadensis and Aloe Socotrinæ of the previous edition, and Senna Folia includes the former Senna Alexandrina and Senna Indica. Kino Eucalypti replaces the less appropriate Eucalypti Gummi, and Oleum Chaulmoogræ replaces Oleum Gynocardiæ. Among preparations, we note that Tinctura Iodi Fortis replaces Liquor Iodi Fortis and Tinctura Iodi Mitis replaces Tinctura Iodi. The stronger contains 10 Gm. of Iodine and 6 Gm. of Potassium iodide in 100 millilitres and corresponds closely to the Tincture of Iodine of the International Agreement. The Tincture of Iodine of the British

Pharmacopœia 1898, contained only 2.5 Gm. each of iodine and potassium iodide per 100 millilitres; hence, this is now to be known as the "weak."

Important changes in the strength of 41 preparations have been made. The reason for many of these is apparent; for some, however, the reason is not evident. The endeavor to harmonize the potent galenicals with the standards of the International Agreement accounts for the changes in Syrup of Ferrous Iodide, a number of the tinctures and in Mercury Ointment.

Syrup of Ferrous Iodide contains 5 percent. of ferrous iodide and 10 percent. of glucose as a preservative.

Tincture of Aconite is about twice as strong as that of the Pharmacopœia of 1898, and is directed to be made with 70 percent. alcohol and then assayed and standardized so that 100 mils contain 0.04 Gm. of the ether soluble alkaloids. This formula agrees in the menstruum with that directed by the Brussels protocol, and starts with 150 Gm. of aconite yielding doubtlessly a good preparation, but it would be difficult to establish that it is "approximately the same strength as the Tincture of Aconite of the International Agreement."

Tincture of Belladonna is to be made by percolating 100 Gm. of the powdered leaves with 70 percent. alcohol and in addition is standardized to contain 0.035 Gm. of the alkaloids in 100 millilitres.

Tinctures of Colchicum and Digitalis likewise agree closely with the requirements of the protocol.

Tincture of Nux Vomica is to be made from the Liquid Extract by diluting and is standardized so that 100 millilitres contain 0.125 Gm. of strychnine.

Tincture of Opium is made from the Gum Opium and standardized so that 100 millilitres contain 1 Gm. of anhydrous morphine. The product will correspond to the International Agreement in alkaloidal (not alcoholic) content and will be about one-third stronger than the Laudanum of the previous edition.

In Tincture of Strophanthus, we have a straddle. In attempting to comply with the requirement of the protocol 100 Gm. of ground seeds and 70 percent. alcohol are directed, but the de-fatting of the drug with ether is prescribed. The foot-note states that "this tincture is made with four times the proportion of seeds ordered by the previous pharmacopœia and it is approximately the same strength as the Tincture of the International Agreement." This formula is, however, subject to several criticisms. It is entirely proper to de-fat the drug before making the tincture, but the de-fatting should be with purified petroleum benzin and not with ether because the latter extracts a portion of the strophanthin. The percolation with ether should not be "until the liquid passes through colorless," but should be continued until a few drops evaporated from filter paper leave no greasy stain. Alcohol of 90 or 95 percent. will not entirely extract strophanthus in the proportion directed and much less will alcohol of 70 percent. serve this purpose. A more serious error is the direction to discontinue the percolation with the alcohol when 500 millilitres are obtained and then to add sufficient 70 percent. alcohol to obtain 1 litre. Under these conditions, the drug will probably be not more than one-half extracted.

The diluted acids, with the exceptions of Diluted Acetic Acid (5 percent. $H C_2H_3O_2$ and Diluted Hydrocyanic Acid (2 percent HCN), are now uniformly

10 percent. of the respective absolute acids, instead of the odd proportions of the 1898 Pharmacopœia which had Diluted Hydrochloric Acid 10.58 percent. HCl.; Diluted Nitric Acid 17.44 percent H NO_3; Diluted Phosphoric Acid 13.8 percent H_3PO_4; and Diluted Sulphuric Acid 13.65 percent H_2SO_4.

In the text, the Aromatic Waters are directed to be made by distilling the water in some cases with the drug and in other cases with the volatile oil. In Chapter XII of the Appendix under Alternative Preparations Sanctioned for Use in Tropical, Sub-tropical, and Other Parts of the British Empire, it is stated, "Aquæ Olei Anethi, Anisi, Carui, Cinnamomi, Foeniculi, Menthæ Piperitæ, Menthæ Viridis.—Each of these Waters may be prepared by triturating the corresponding oil with twice its weight of Calcium Phosphate and five hundred times its volume of Distilled Water and filtering the mixture. In tropical and sub-tropical parts of the Empire, these Aquæ Olei may be used in place of the corresponding Aquæ of the Text of the Pharmacopœia."

It is exceedingly doubtful if this territorial restriction will be observed by the practical pharmacists of Great Britain, once they become as fully acquainted as are their American brethren, with the easy and practical method of preparing saturated aqueous solutions of these aromatic oils by the use of an insoluble distributing medium. It will be difficult to convince the practical pharmacist that such waters as peppermint and spearmint must be prepared by distilling the oil and water instead of a simple process of solution or that these waters of the British Pharmacopœia are superior because of such exposure to heat.

The unsatisfactory and tedious process for Extract of Ergot of 1898, is replaced by a process in which the ergot is extracted by water, the aqueous extract concentrated and alcohol added; after standing the liquid is filtered off and evaporated to proper consistence.

Extractum Filicis Liquidum is made with ether and corresponds to our oleoresin of male fern. Description, tests and assay process for filicin are introduced and the product is standardized as containing 20 percent. of filicin.

Extractum Glycyrrhizæ is to be made by macerating liquorice root with chloroform water, expressing and heating the expressed liquid to 100°, then straining and evaporating. The Liquid Extract is made by a similar process, the alcohol being finally added only as a preservative.

Extractum Hydrastis Liquidum is to be prepared with 60 percent. alcohol (instead of 45 percent. in 1898) and to be standardized to contain 2 Gm. of hydrastine in 100 mils of the product.

Extractum Ipecacuanhæ Liquidum is to be prepared by extracting with 90 percent. alcohol without the treatment with lime as directed in the pharmacopœia of 1898 and is to be standardized so that 100 mils shall contain 2 Gm. of alkaloid.

Extractum Nucis Vomicæ Liquidum is to be prepared with 70 percent. alcohol, the fat removed by treatment with melted hard paraffin, and the product standardized to contain 1.5 Gm. strychnine in 100 mils. No attempt is made to recover the alkaloid removed by the paraffin de-fatting.

Four formulas are given for hypodermic injections. While there may be good reason to endorse a standard formula for a hypodermic injection of ergot, there is a better reason that would require that this be directed to be dispensed in steril-

ized and sealed ampoules. In this day of universally used, well prepared and stable hypodermic tablets, it seems unnecessary to include in a modern pharmacopœia formulæ for hypodermic injections of morphine, strychnine, etc.

Liquor Ethyl Nitritis is retained as the title for a preparation containing from 2.5 to 3 percent. of ethyl nitrite in a mixture of 95 volumes of absolute alcohol and 5 volumes of glycerin. There is also official the Spiritus Ætheris Nitrosi containing 1.53 to 2.66 percent. by weight of ethyl nitrite in alcoholic solution. The need for both is not understood.

The volatile oils are well defined and generally the necessary tests for identity and quality are clearly given. The assay processes are the simplest that can be satisfactorily applied. Instead of an elaborate process for determining the amount of cineol, the Oils of Cajeput and Eucalytus are assayed by the phosphoric acid method and for pharmacopœial purposes this is probably all that is necessary. In Oil of Lemon, the citral is determined by the hydroxylamine method.

For several decades, at least, the trend of pharmaceutical authorities has been toward a clearer differentiation of the classes of galenicals, toward defining within proper lines each class of preparations and the grouping of the individual formulæ, wherever possible, under such defined classes. It was to be expected that in this revision, these proper classifications would be respected and followed. Yet we find Oleo-Resin of Male Fern, "an oily extract" entitled "Extractum Filicis Liquidum" and printed along with the extracts despite the statement in the preface that "Most of the Liquid Extracts are of such a strength that one hundred millilitres represent one hundred grammes of the drug employed." An acacia emulsion of Castor Oil is classed with the Mistura and printed with such formulas as Chalk Mixture and Compound Mixture of Iron.

The treatment of the botanical drugs is disappointing. There is lacking that thoroughness of description that one would expect in a modern pharmacopœia prepared by those who have every opportunity to be acquainted with the progress of science and the great advances in pharmacognostic knowledge since the appearance of the previous edition sixteen years ago.

The names of the authors of the binomials adopted are given, but in no case is the family or other botanical classification given. The references to the works where the medicinal plants are figured, a feature of the Pharmacopœia of 1898, is omitted and there is good reason to consider that such information is out of place in a pharmacopœia.

In some cases the definition of the drug assumes the style of a rubric and states the alkaloidal standard, in other cases, with equally important drugs this is omitted, as occurs for example in the definitions of Belladonna Root, Hydrastis and Hyoscyamus.

Any one who has occasion to examine crude drugs knows that they are very rarely free from admixtures. Sometimes these admixtures are other portions of the plant yielding the drug and at other times they are unavoidable or accidental foreign substances. No attempt whatever is made to either recognize the presence of such admixtures or to fix limitations therefor.

The descriptions of the macroscopical characters of the drugs show very little improvement over those of the former edition. It is rather the exception that the

description of the histology or microscopical structural characteristics of the drug or of its powder are given with any degree of thoroughness, and the common adulterants and their characteristics are not even mentioned.

While in some drugs a limit of ash has been added, in many others equally important this has been ignored. As examples, the ash of Lobelia has been fixed in this revision at "not more than 12 percent.," but for Hyoscyamus no limit of ash is given.

The tenacity with which the English people adhere to the tenets and practices of their fathers and forefathers, their aversity to innovations and the making of radical changes, is a recognized trait of the English. This conservatism of the nation, is reflected in their pharmacopœia and while we criticize in a friendly spirit some of its defects and lack of progress, we recognize that it is a safe and practical book of standards for most of the substances prescribed in British medical practice.

MILS VS. CUBIC CENTIMETERS.*

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The new United States Pharmacopœia will authorize the use of the word Mils to replace the word Cubic Centimeters, and at first there will be undoubtedly some criticism and comment upon the change. The last United States Pharmacopœial Convention recommended publicity of changes of this kind in order that users of the United States Pharmacopœia would become familiar with the subject in advance.

The use of the word Mil is not new, but the first use in a Pharmacopœia occurred in 1914, when the British Pharmacopœia adopted it, and it is likely that its use will become universal in time, at least in the English language. Mil is, of course, the first three letters of the French name originally given to the thousandth part of a liter—Milliliter. The use of the word Cubic Centimeter is really an anachronism and the United States government through its bureau of standards (see Bulletin No. 47, page 12) has declared the word Cubic Centimeter as a misnomer.

Very careful experiments by the government physicists have determined the fact that the Cubic Centimeter is larger than the Milliliter by the inconsiderable fraction of 0.000027. In pharmacy, in chemistry, and in applied chemistry, this difference is negligible, but everyone must have regretted the cubic centimeter blot on the harmony and beautiful simplicity of the metric system. The unabbreviated word Cubic Centimeter is too long for everyday use by the chemists and pharmacists of the world.

In America nine out of every ten scientific men mispronounce the word and use "sontee-meter," and it seems that this habit is very difficult to break up. It should properly be called "centi-meter" as the word is anglicized. It is a gross grammatical error to use a word which is half Franch and half English. If one must use the French, it should be pronounced "sonte-matr."

* Read at the meeting of the Pennsylvania Pharmaceutical Association, June, 1915.