BERINGER (G.M.)

A CRITICAL REVIEW

OF

THE SEVENTH DECENNIAL REVISION

OF THE

Pharmacopœia of the United States of America

BY

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With Compliments of the Author.

THE

United States Pharmacopœia of 1890.

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The appearance of the seventh decennial revision of the Pharmacopœia of the United States has been patiently awaited by the pharmacists of America. The labors of the committee, extending over a period of more than three years, suggested the hope that the present revision would be perfect. The committee cannot be accused of hastily completing their work and the product, a book of over six hundred pages, gives evidence throughout of the desire to make this the most scientific of all the national pharmacopœias. The acknowledged talent of the gentlemen composing the committee of revision, assured in advance the scientific character of the work, but there is no lack of evidence of the want of that *practical* knowledge of the pharmacy of to-day acquired only by personal contact with customers.

That errors should have crept into a book of such vast scope and numerous titles is but natural, and the committee have added a final page of errata and addenda which they have discovered, but these are by no means all. After a careful examination of the book, the writer is forced to conclude that it is far from perfect and that the mistakes of the present revision will furnish ample work for the revision of 1900.

The typography of the work and binding are fair and the price at which the book is sold is satisfactory and should tend to make it

much more popular than the previous revision of 1880. From January 1, 1894, it becomes the legal authority for all official products, and it is to be noted that *official* and not *officinal* has been stamped authoritatively by the committee.

The present review is offered from the unbiased standpoint of a practical pharmacist, whose daily companion the volume will be and it is supposed to be mainly prepared for the use of this class.

I would suggest that, in the future revisions, the proceedings of the convention authorizing that revision alone be published as the history of the earlier conventions and pharmacopœias can be obtained from the previous revisions. This would have eliminated ten pages from this edition. The book is replete with tables and lists as aids in the various calculations and testings, giving it much the appearance of a modern text book of chemistry. In this respect very little more could be desired, and some might have been here omitted as they will appear in the dispensatories and various compends. That most practical and often enquired after *Official table of doses* is omitted. In the writer's experience, this is quite as much needed by our medical brethren as by those of the pharmaceutical craft. In the table on page LVIII, we are informed that the strength of decoctions and infusions in the Pharmacopœia of 1890 is "about 1 in 5" instead of 1 in 20, or about five per cent. as in the text of the book. The Pharmacopœia of 1880, stated the weight of a fluidounce of water as 455·7 grains, that of 1890 states "456·392 grains at maximum density in vacuo," and this method is generally adopted in the tables. Scientifically accurate, but the pharmacist needs these tables as aids to his commercial operations, which are not conducted in vacuo and rarely at the temperature of maximum density, and it would have been more to the purpose to have supplied him with tables of equivalent weights and measures computed for normal temperature and pressure instead of at 4° C. and in vacuo.

It is regretted that in the adoption of the Centigrade scale for temperatures that the equivalent in the Fahrenheit scale is added after each statement of temperature. The adoption of the metrical system of weights and measures is commendable and in harmony with scientific works over the entire globe. The system of parts by weight adopted by the Pharmacopœia of 1880 was regarded only as a compromise, a step in the education of the pharmaceutical and medical professions toward the universal adoption of the metrical

system. With but few exceptions, such as making the dilute acids and mucilage of acacia, parts by weight have been dropped and the "un-American" idea of weighing liquids as a principle has been relegated to the past. If the pharmaceutical and medical writers will now refrain from transposing these weights and measures, they will compel the masses to think in the metrical system. This point attained, they will soon learn to understand and appreciate its usefulness.

Prior to, and at the time of, the convention in May, 1890, much had been written and said regarding standardization of the preparations of the organic drugs. After careful consideration, the committee have introduced methods of assay for cinchona and opium and for preparations of opium and nux vomica. We endorse the reasons assigned for such limitation on page XXX. The lime method for assay of opium, of the U. S. P. 1880, is discarded and Squibb's process is adopted, with the following slight modifications: Tared filters are not used. The crystals of morphine, after washing with water, are washed with alcohol saturated with morphine (it is apparent that at this part of the process the evaporation of the alcohol must be guarded against or a slight error will be introduced), subsequently washed with ether and dried at 60° C. and transferred to a tared watch crystal and weighed. No test is applied for the purity of the resulting morphine.

For the assay of cinchona, the process of 1880 was also discarded and a modification of Prollius' method for total alkaloids adopted. The product from the first extraction by a mixture of alcohol, chloroform and ammonia is purified by conversion into sulphate. The filtered solution rendered alkaline by potassa, is extracted with chloroform. The evaporated chloroformic solution, dried and weighed gives the *total* alkaloids. For determining the percentage of quinine, the purified chloroformic solution, from 5 grm. of bark is evaporated on powdered glass and then extracted by slow percolation with ether until 10 cc. of percolate is obtained, this is evaporated and weighed. The percolation with ether is continued until another 10 cc. is obtained and this is likewise evaporated and weighed. The weight of the second deducted from the weight of the first portion and the result is assumed to give approximately the weight of quinine, and multiplied by twenty, the percentage.

For the assay of extract of nux vomica, the following process is

adopted: 2 grm. of the extract dried at 100° C. is treated with a mixture of alcohol and water and water of ammonia and the alkaline liquid is extracted with chloroform. The chloroformic solution is evaporated and the residue extracted with 10 cc. $\frac{n}{10}$ sulphuric acid and hot water and then titrated with $\frac{n}{100}$ potassic hydrate solution using Brazil wood solution as an indicator. The number of cc. of the $\frac{n}{10}$ sulphuric acid found to have been neutralized by the alkaloid, multiplied by the factor 1·82, gives the percentage of the total alkaloid. A. H. Allen has recommended methyl orange as the indicator in strychnine titration. The process should direct *distilled* water, as the degree of hardness of natural water, would materially affect the results in such delicate determinations.

The descriptions of the official chemicals and many of the vegetable products, are accompanied by copious tests for identification and determination of purity and in this respect very little more could be desired, and in many cases the requirements are too stringent for medicinal chemicals.

Ninety-two articles have been dismissed from the Pharmacopœia. The list published on pages XLIX and L contains but ninety titles but we suppose that tinctura ferri acetatis and vinum aromaticum were dismissed and not inadvertently omitted. It is significant of the present tendency of medication towards the use of chemical remedies that of these, twenty-seven were of vegetable origin and but thirteen of chemical derivation, and of the latter æther, chloroformum venale and sodii bicarbonatis venale represent but titles as the purified products remain. The same may be said of the title cinchona flava, dismissed as the title cinchona now includes the bark of cinchona calisaya, cinchona officinalis and of hybrids of these and other cinchonas. It is to be noted that the alkaloidal requirement for all official cinchonas has been increased to five per cent. total alkaloids which conforms with the *best* grades of cinchona now in the market. None of the vegetable drugs dismissed were sufficiently used to be retained, and the following should also have been excused from the official list as they would not be missed, cascarilla, chelidonium, illicum, melissa and sabina.

It is not a new proposition but a well-founded one, that the Pharmacopœia should not recognize any drug that is not prescribed in the crude state without introducing some official preparation of that drug. This would exclude caulophyllum, inula and marru-

bium of which fluid extracts should be official and staphisagria, pulsatilla and toxicodendron of which tinctures should have been introduced.

Inspissated ox-gall is the only drug of animal origin dismissed and this was unnecessary as the purified ox-gall answers all requirements.

Fifty-one preparations have been dismissed. The entire class of abstracts have been abstracted. This grand experiment of the Pharmacopœia of 1880, proved a most miserable failure. It must not be lost sight of, that those who are to use the Pharmacopœia, are practical medical practitioners and pharmacists and that their desires and needs must be supplied and not theories and experiments offered in their stead. They want powdered extracts and will prescribe them and use them daily and hourly. The Committee knows this, yet, with the exceptions of extract of opium and extract of nux vomica, this demand has been unheeded. The consumption of dry or powdered extracts of aconite, belladonna, cannabis, colchicum, conium, gentian, hyoscyamus, stramonium, etc., is enormous. Was the working out of formulas for these too non-scientific, too practical to engage the attention of the Committee? Manufacturers would most likely have furnished the necessary information.

Acetum lobeliæ and acetum sanguinariæ both excellent preparations for exhibiting the action of their respective drugs, having become neglected by the medical fraternity, are dismissed. The dismissing of infusion of kousso, was surely an error. The action of this drug is admittedly largely mechanical and the Pharmacopœia of 1880, directed rightly that this infusion should be dispensed unstrained. It is now dismissed and the almost unused and probably inert fluid extract retained. Liquor pepsini has been dismissed, nor has any liquid preparation of this remedy been introduced, although several are greatly used.

Mistura Magnesia et Asafœtidæ has been dropped. Dewee's Carminative is again relegated to its proper position along with Godfrey's cordial, Bateman's drops, British oil and the other semi-proprietary remedies of the past generations.

I cannot refrain from noting here that the Mistura Potassii Citratis, 1880, has been dismissed. Under Liquor Potassii Citratis, Mistura Potassii Citratis is given as a synonym. That Mistura Potassii Citratis, 1880, is superior to Liquor Potassii Citratis, is beyond dispute, and

both physicians and pharmacists have been taught to discriminate in favor of the former. The reason for such change is not apparent, as disuse cannot be urged and the Pharmacopœia cannot be presumed to endorse that substitution of the solution for the mixture, that has been indulged in by some mean-spirited druggists. I would suggest that physicians desiring Mistura Potassi Citratis made with lemon juice, should in future write Mistura Neutralis, which synonym, fortunately, remains unconfiscated, and that pharmacists recognize this intent.

Eighty-eight titles compose the list of additions to the Pharmacopœia But three drugs are of animal origin, namely, Adeps Lanæ Hydrosus (the official name for what is generally known by the proprietary name Lanolin), Pancreatin and Pepsin. It is significant that thirty-four of these additions are of chemical origin and but thirteen of vegetable, while thirty-eight are preparations of which fourteen are fluid extracts.

The chemicals introduced are, as a rule, those whose use warrant recognition. The old notation has been discarded in the chemical formulas, it was already obsolete when introduced in 1880.

Surprisingly few are the changes in the titles of chemicals. Arsenious acid is now *arsenous*, and the titles of the official arsenical products changed in spelling to correspond. The Committee have deemed the changes in the spelling and pronunciation of chemical terms proposed by the American Association for the Advance of Science[1] too radical, and have contented themselves with such minor changes as placing the metallic or basylous radical first in the English names, as sodium chloride instead of chloride of sodium, and in using the terminations *ous* and *ic* in the salts of mercury and iron to denominate the atomicity of the basic element in combination. Would it not have been more in accordance with established ideas to have written sodic chloride, potassic nitrate, plumbic carbonate, etc.? Surely, the titles of alkaloidal salts should have been changed, so as in each case to indicate the true composition. Cocaine hydrochloride, morphine hydrochloride, and hyoscine hydrobromide are correct names and such a change would have been endorsed.

The following are among the few vegetable drugs introduced,

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[1] See American Journal of Pharmacy, 1893, 178.

Quebracho bark, Convallaria rhizome and rootlets, Yerba Santa and Cascara Sagrada. It is generally admitted that the action of cascara is modified and improved by keeping for one year after collection. This is officially required for Frangula, but has been overlooked for Cascara. Barbadoes Aloes is reintroduced and Strophanthus and Viburnum Opulus are deserved additions, and under the title of Zea, corn silk is introduced.

Saigon Cinnamon has been admitted, but it is to be noted that it is not directed to be used in a single formula; each formula carefully specifying either Cassia Cinnamon or Ceylon Cinnamon to be used. It is well known that the bulk of the powdered cinnamon sold in the drug trade is saigon, and that this is used to prepare pharmaceutical preparations of fine quality. Its use should have been sanctioned officially, at least, where cassia is ordered, otherwise there is no reason for its introduction.

Notable changes in titles are Cusso for Brayera, Coca for Erythroxylon, Oleum Bergamottæ for Oleum Bergamii. A number of the changes made are not indicated by the titles. Amylum is now corn starch and not wheat-starch, as heretofore. Long-leaved buchu is no longer recognized. Calendula is rightly florets only and Euonymus, bark of Root. Colchici Radix, on page 96, is stated to be "the *corm* of Colchicum autumnale, L.," now a corm is recognized as part of the *stem system* and not of the root, so the title should be Colchici Cormus.

Granatum is the bark of both the stem and root of Punica Granatum, L., in accordance with what has been in commerce for years. Grindelia includes both species, robusta and squarrosa. In the Pharmacopœia of 1880, a curious mistake was made regarding Witch-hazel. Under the title of Hamamelis, the leaves were introduced and a formula for a fluid extract thereof. True, the so-called distilled extract or water had been made from the freshly-gathered twigs and leaves, but under the official title of the drug, the dispensatories described the medicinal action of the bark. The writer knows that the bulk of the fluid extract, made up to that time, and even since, has been made from the bark. In the report of the Committee on Pharmacopœia of the Philadelphia College of Pharmacy, which was presented to the Convention in 1890, it was recommended that the bark be admitted into the Pharmacopœia and that a fluid extract of the same be also introduced. Yet the present revision continues this error.

Oil of Anise, from Anisum, is alone recognized under that title, the description being such as to exclude the oil from Illicium. Although the oil from anisum has, in recent years, been produced in very much larger quantities than formerly and at greatly reduced prices, the bulk of the oil consumed is still that obtained from the star anise.

Our Western pulsatilla from Anemone patens L. var., Nuttalliana, *Gray*, is no longer recognized. Pilocarpus includes both the Rio Janeiro and the Pernambuco Jaborandis. In the botanical classification of the plants it is to be noted that sub-orders are not given and that several of the natural orders given in the U. S. P. 1880 have been reduced from their ordinal standing, so that plants previously classified as natural order Zingiberaceæ are suppressed into Scitamineæ, Granataceæ into Lythrarieæ, Erythroxylaceæ into Lineæ, Melanthaceæ into Liliaceæ, and Aurantiaceæ into Rutaceæ.

The extreme conservatism of the chemical nomenclature, is in marked contrast to the radical changes that have been adopted in giving the botanical names of plants and the citation of authors for such names. The committee have adopted the rules of the Botanical Club of the A. A. A. S. which were adopted as recently as August 19, 1892, and have published these rules on page XXXII, adding another unnecessary page to an already too large volume. The Pharmacopœia is not intended as a botanical text-book, much less as a botanical authority, and it is presumed that the committee were fully acquainted with the unsettled state of botanical nomenclature, before lending their apparent weight of authority by endorsing these rules.

In recent years, the battle of nomenclature caused by a disagreement as to the meaning of "the law of priority of publication," has so obscured the botanical horizon, that botany has appeared more as a study of plant names than of plants, and a science already loaded down with a mass of technical terms, is being buried with synonyms. The Paris code of 1867, stated that *in transferring* a species from one genus to another, the specific name is maintained. The strict nomenclaturists have contended that, in accordance with the idea that priority of publication alone should give authority, the new binomial should be made by using the oldest specific name commencing with Linnæus Species Plantarum, 1753, and for generic with

the Linnæus Systema of 1735.[1] They would have no regard for the appropriateness, or what Watson has termed the *convenience* of the name. It is apparent that such a rule destroys stability of names, as new discoveries of older names would cause continual changes.

It is hoped that the committee were aware that the more conservative botanists, whose authority had been heretofore recognized, were not in sympathy with these radical views on nomenclature. Asa Gray did not adopt them and Sereno Watson, on his death-bed, took occasion to dictate an article giving the views held by both Professor Gray and himself on this subject. (See the Botanical Gazette, June, 1892, p. 169.)

The views held by these American authors were substantially those adopted at Kew. Professor Jackson, of that institution, writes (Britten's Journal of Botany, 1887, p. 69): "Our practice is to take the name under which any given plant is placed in its true genus as the name to be kept up, even though the author of it may have ignored the proper rule of retaining the specific name when transferring it from its old genus to the new; when, at least, such name is not already in the genus receiving the accession. To wantonly set aside the joint name thus given and to publish a new name by joining the oldest specific name to the true generic is a mischievous practice, which should never be condoned; it is adding to the already vast mass of useless synonyms, and is more likely to be the offspring of vanity than a sincere desire to promote science."

Sassafras aptly illustrates the two methods of naming. In 1836, Nees rightly named the plant Sassafras officinale, and this name has been generally adopted since and recognized in the past editions of the Pharmacopœia, and in Gray's Manual and other American botanical works. Previous to this Nuttall had applied Evosmos albida and Linnæus Laurus sassafras, and Salisbury, in 1796, Laurus variifolia. Otto Kuntze now proposes as the correct binomial (according to priority only), Sassafras variifolium, and the Pharmacopœia of 1890 states Sassafras variifolium (Salisbury), O. Kuntze, as the source of sassafras.

It is now a matter of record, that the very meeting that adopted the rules in the Rochester Convention of 1892, appointed a delegate to attend the International Botanical Congress held in Genoa, in

[1] The date 1753 will most likely be adopted as the beginning for both generic and specific names by an international agreement.

September, 1892, at which this subject was a prominent topic of discussion, and an international committee was appointed to consider the same. The decisions of the Genoa congress have not been unanimously adopted and at the International Congress, called for August, 1893, at Madison, Wis., another attempt was to have been made toward an universal agreement. Dr. Otto Kuntze, the foremost nomenclaturist, accepts no authority, and on priority alone would set aside, as he says, hundreds of Bentham and Hooker's names for genera, and in his Revisio Generum Plantarum (1891) proposes changes affecting the names of many thousands of plants. By a single sentence, the generic name Astragalus is replaced by Tragacantha, changing thus the names of 1,500 species (*ibid.*, pp. 210 and 940). Strangely this change has not been adopted by the Pharmacopœia. It is known that the *botanical authorities* at Berlin, astounded by the confusion likely to result from this publication of Kuntze, proposed, in the latter part of 1892, amending the code of 1867, and have suggested a revision of the same and significant omen, exceptions to this law of priority in a number of genera covering about 5,000 species. It is a query if the nomenclaturists practically adopt their own suggestions and reclassify and label their herbarium specimens with each change proposed, or whether their theories remain on paper? It will also be interesting to note how many of these names will survive till the pharmacopœial revision of 1900.

This argument has been extended very much beyond what was originally intended. But the anomalous position of the committee is such as to cause comment. To cast aside well-recognized names and authorities, and to accept rules which were presented by a committee of the Botanical Section of the A. A. A. S. within 24 hours of the time of their appointment, and which had not withstood the test of application, and to reject rules adopted by the Chemical Section of the same Association when presented by a committee whose labors lasted for more than 4 years, seems inexplicable, particularly so, when the committee appointed by the International Congress of Botanists at Genoa, to consider this subject, had not completed their work.

There will always be a number of changes in the botanical names of plants, necessarily caused by mistakes in classification or other errors of botanists, for even they do err, as, for example, it is known

that in the Linnæan herbarium the names of Cerastium viscosum and C. vulgatum were transposed, and that Linnæus filius mixed the plants yielding Balsam of Peru and Balsam of Tolu. By thorough study of genera or orders by monographers, changes in accepted names became necessary. An instance is found in Aloes, where the studies of J. G. Baker, on Aloinæ, have made him an authority, whose determinations are to be accepted. Changes are likewise necessitated by newly-discovered materials and information regarding the true source of drugs, especially if these are obtained from countries whose flora has been but imperfectly studied. Examples of this are found in Illicium, which E. M. Holmes proved to be derived from Illicium verum, Hook. fil. (see Pharm. Journal and Transactions, August 11, 1888) and in Pernambuco Jaborandi, which the same author decides is from a previously unnamed species of Pilocarpus. These names are rightly adopted in the Pharmacopœia, and it is a matter for congratulation that Mr. Holmes had published this paper on Jaborandi before the appearance of the Pharmacopœia (Pharm. Journal and Transactions, June 10, 1893, p. 1005; see also Amer. Jour. Pharm., July, 1893, p. 351) so that the "ined" after Pilocarpus Jaborandi, Holmes, on p. 301, can be eradicated, as unpublished matter is *not accepted* as authority.

The citation of authors might be likewise simplified. If the authority of the maker of the new binomial (or as he has been called the synonym manufacturer) is to be accepted, let us be content, *for the Pharmacopœia*, with the statement of such author's name, which is sufficient to designate the plant intended. For the student of pharmacy, Hedeoma pulegioides, Persoon, is as good as Hedeoma pulegioides (Linné), Persoon; if Persoon and not Aiton (U. S. P., 1880) is author of Gelsemium sempervirens, then it is sufficient to write Gelsemium sempervirens, Persoon, not Gelsemium sempervirens (Linné), Persoon. If O. Kuntze's name is correct for Sassafras, why not write Sassafras variifolium, O. Kuntze, and not Sassafras variifolium (Salisbury), O. Kuntze? It is to be observed, that the latter form continually implies the authority of earlier botanists to names which they would never have accepted. The true aim of science is to simplify not to involve.

The changes in the titles of official preparations are not very numerous. In a number of extracts and tinctures it has been deemed advisable to designate, in the title, the part of the plant used

as Extractum Belladonnæ Foliorum Alcoholicum, Extractum Belladonnæ Radicis Fluidum, Tinctura Colchici Seminis, etc. Opium is again said to be deodorized not denarcotized. It is a query, which is the most important, the odor or the narcotine extracted by the use of ether? If the latter, then denarcotized, or if that is not correct, then as suggested denarcotinated would be correct. Sapo Mollis is the new name for Sapo Viridis of the Pharmacopœia of 1880, and a formula is given for preparing it from linseed oil and potassa. The commercial article was only very rarely found to be green, and that only when it was made from hemp seed oil. The Tincture of Green Soap, 1880, is now Liniment of Soft Soap.

The term Mistura is now officially restricted to those preparations in which insoluble material not of an oily character is suspended in aqueous solution by the use of gum or other viscid material. As a result, ammoniac, almond, asafœtida and chloroform mixtures of 1880 are now classed as Emulsions, under the Latin title "Emulsum." But the remedies which physicians *now prescribe* under the name of "*Emulsions*" are not represented. It would have been a *practical experiment* and a taking one to have introduced a "standard" formula for (say) Emulsion of Cod Liver Oil with Hypophosphites. It is not too late to teach our medical brethren to write Emulsum Olei Morrhuæ cum Hypophosphitum, *U. S. P.*, instead of Scotts, Phillips, etc. I know someone says, "We have a National Formulary," but the doctors don't know that book. It is a book of druggists' formulas in the preparation of which they have not taken any part or interest. This would in a very large measure stop the present system of fighting patent medicines by increasing the number, wherein each druggist feels compelled to make a preparation after his own formula, *just as good* as the other proprietary. We want something that is not "as good," but the best, because it has the stamp of official authority.

The Pharmacopœia, to remain the authority, must be *abreast* of the times. It must neither theorize in advance nor retain obsolete ideas. *Standard* formulas must be introduced for remedies prescribed daily with success, and those whose use has become only occasional, can safely be relegated to the formularies. The "*ideal*" Pharmacopœia of some is a book of simples. Such it never has been and never can be made.

Liquor Ferri et Ammonii Acetatis is the new name for Basham's

Mixture. While "mistura" is hardly an appropriate name for a clear liquid preparation, the term liquor strikes us very strangely for a preparation containing over twenty per cent. of flavoring and sweetening material. Would not "Elixir" have been a more appropriate name?

It is to be observed that Acetum Opii and Acetum Scillæ are now made by maceration instead of percolation, the strength remaining about the same as in 1880.

There are some changes in the acids of the Pharmacopœia, requiring notice. Volumetric solution of potassic hydrate with phenolphthalein as an indicator, is generally adopted for determining strength. Acid Acetic, still remains the 36 per cent. acid and the glacial acid 99 per cent. It would have been well to have changed the former to the 60 per cent. acid now being manufactured extensively.

It is to be regretted that under the title of Benzoic Acid both the natural and the synthetic acids are recognized and that in the tests for identification the latter seems to be given the preference. In the past, we have been taught to discriminate against the artificial acids and tests were proposed to detect such substitutes or adulterants of the natural. Those who have administered both, and benzoates made from both, distinguish a practical difference. The administering of the synthetic is generally followed by a disagreeable taste, very persistent and frequently producing nausea. This effect is most likely due to toluol derivatives remaining as impurities, but is nevertheless recognized and physicians are careful, in many instances, to specify "natural." Tinctura Opii Camphorata, should be stated as a benzoic acid preparation.

Phenol, should be the title, with carbolic acid as a synonym. A volumetric method for determining the amount of absolute phenol present, and depending on the tribrom-phenol reaction, has been adopted. Likewise Chromic Trioxide and Chromic Anhydride are given as synonyms for Acidum Chromicum; the former would be the correct title.

Diluted Hydrocyanic Acid is again a two per cent. solution in *water only*. The acid as distilled being condensed in a receiver containing distilled water, not diluted alcohol, as in the pharmacopœial process of 1880; and the distillation is stopped when the volume of liquid in the retort is reduced to one-half. The retention of the formula for making this acid extemporaneously, is surely unnecessary.

Diluted Hypophosphorous Acid is a new addition and is directed to be about 10 per cent. of the absolute acid. An acid of fifty per cent. strength has been supplied by the manufacturers for some years and, according to F. X. Moerk, is more stable than the weaker acid and should have been recognized in place of the dilute.

Nitric Acid is now 68 per cent. of HNO_3 instead of 69·4 per cent. as formerly, and Sulphuric Acid is 92·5 per cent. of H_2SO_4, with sp. gr. 1·835 instead of 96 per cent. On the other hand, Phosphoric Acid is now 85 per cent. instead of 50 per cent. The so-called syrupy phosphoric acid (85 per cent.) was in extensive use in 1880, and it is to be regretted, that it was not then made official, as prior to that date only the diluted acid had been recognized. There is, in the future, the likelihood of considerable confusion arising from this change of standard. The process of manufacture of phosphoric acid is rightly omitted, as it is such as to be hardly practical for the pharmacist to attempt. Sulphurous Acid should hereafter contain 6·4 per cent. of sulphur dioxide instead of 3·5 per cent. as heretofore.

Benzoinated Lard is again directed to be prepared by tying the benzoin in muslin and suspending in the melted lard for 2 hours. A superior product would be obtained by mixing the benzoin in a coarse powder with the lard and allowing to stand for six hours, then melt and strain. By the official process but a small portion of the benzoin becomes thoroughly exposed to the action of the lard.

Wool-fat, an ancient medicament, forgotten until recently introduced in the purified state by Liebrich, is recognized under the same name as that adopted in the "Additions to the British Pharmacopœia" in 1890, and the degree of allowable hydration (30 per cent.), is likewise the same in both standards. The statement that it is "miscible with twice its weight of water without losing its ointment-like character," requires some little modification. At the normal temperature only about an equal weight can be incorporated. "Unna says 105 per cent. at 15° C." (see Amer. Journal of Pharmacy, 1886, p. 101); but, by warming the mortar, two hundred parts can be incorporated with 100 parts of the lanolin.

The ether of the Pharmacopœia of 1880, containing but 74 per cent. of ethyl oxide, has been discarded and only the stronger ether containing 96 per cent. of ethyl oxide is now official under the title Æther. The potassium iodide test, given on p. 28, we are

told, indicates by the absence of color produced "absence of aldehyde, etc." What is meant by "etc.;" we presume ozone and hydrogen peroxide?

We now have Alcohol, Absolute Alcohol, Deodorized Alcohol and Diluted Alcohol, all official. Absolute alcohol should be placed with the reagents and test solutions. The official alcohol should, likewise, be required to conform to the percentage and tests for deodorized alcohol and the latter title dropped. The difference in commercial value between the two grades during the past year has only been from 5 to 10 cents per gallon. The U. S. P., 1880, required alcohol to stand the sulphuric acid test which is now given as the distinguishing test between these grades.

Diluted Alcohol is again made from *equal volumes* of alcohol and water, and is 41 per cent. by weight or 48·6 per cent. by volume, instead of being 53 per cent. by volume, as in 1880.

The rules for making a lower percentage of alcohol from a higher percentage should be attached to the alcohol table in the appendix and not incorporated in the body of the book.

Purified Aloes remains. There may be some reason for directing its use in the pills containing that article and in compound extract of colocynth, but in the various tinctures which are necessarily filtered, the Socotrine aloes might have been directed. The use of aloes and not purified aloes in these tinctures appears to be universal.

Aloin is a newly admitted remedy. It is to be remarked that as one of the principal uses of a Pharmacopœia is to prevent uncertainty, to fix definite standards, it would have been well to have recognized only barbaloin under that title, especially as it constitutes almost entirely the aloin of commerce.

Dried Alum is now manufactured in such quantities and at such reasonable price that its preparation is seldom, if ever, attempted by the pharmacist and so the process of manufacture might have been omitted. Aluminum Hydrate should have been omitted; use would not necessitate its retention.

Ammonium Carbonate is tested for empyreumatic substances by supersaturating with nitric acid and evaporating to dryness when a colorless and odorless residue should be obtained; the permanganate test of the Pharmacopœia, 1880, being discarded. It is titrated with normal sulphuric acid solution, using rosolic acid as an indicator. But why not direct that 2·613 grm. of the salt be dissolved

and titrated instead of taking 7 84 grm. and dissolving and using only one-third for the test?

Ammonium Nitrate might have been dropped, as its use is almost entirely restricted to dental practice for preparing nitrogen monoxide and even here the purchase of the compressed gas in cylinders is generally deemed preferable to preparing the same.

In assaying Amyl Nitrite, a control experiment should be directed, using the same quantities of reagents and alcohol and under the same conditions without the amyl nitrite and the volume of any gas generated deducted from that found in the assay.

The method of making aromatic waters is again changed. The cotton method of 1880 is discarded, and in place of magnesium carbonate as a distributing material for the essential oil, as in 1870, calcium phosphate is now directed. This is not a new idea, but is one which I have frequently employed since 1878. It is to be remarked that as magnesium carbonate is very much more bulky or specifically lighter than precipitated calcium phosphate that an increased weight of the latter should be directed. The amount now directed is nearly the same weight as that of magnesium carbonate formerly ordered, and in most cases it will be found advantageous to increase this to 8 grm. instead of 4 grm. in the official formula. The process is otherwise unobjectionable, provided proper care is exercised in selecting precipitated calcium phosphate answering the official tests for purity. Several samples examined by the writer have contained notable quantities of carbonate, alkali and metallic impurities.

Bitter Almond Water, Chloroform Water and Creosote Water are direct solutions in water without the aid of any distributing material or chemical means.

Aqua Hydrogenii Dioxidi is the official name for *solution* of hydrogen peroxide, and an extensive formula for its preparation from barium dioxide and phosphoric acid is given, the strength adopted being 10 volumes of available oxygen when estimated by the process of assay given. This preparation and likewise chlorine water, and the ammonia waters should be classified with liquors or a new class of solutions.

In addition to the other stringent requirements for Distilled Water it must now be free from carbonic acid. This is a degree of purity we fear not often attained, and where necessary it is easy to direct boiling to dispel the *carbon dioxide*.

On p. 48 we are told that triple orange flower water, the Stronger Orange Flower Water of the Pharmacopœia of 1890, is the *same* as the "Aqua Aurantii Florum, Pharm., 1880," and a formula is given for making "orange flower water" by dilution, and from this latter syrup of orange flower water is directed to be made. On p. 54 the same information is given regarding rose water, and it is to be observed, that the rose water and not the stronger rose water, is stated to be used in cold cream, whereas in the formula p. 440 the stronger is specified. The truth is that the terms "*triple*" and "*quadruple*" were applied by the manufacturers to indicate that their products were three and four times the strength of the official, and it has become the trade custom to make the pharmacopœial products from these by the necessary dilution. As orange flower water is only used for making the syrup and for flavoring the stronger only should be official. The stronger rose water, however, is too strong to be used undiluted in eye waters, injections, etc., and so rose water should be retained, but the stronger rose water should be directed for the pharmacopœial preparations. Confection of Rose should be given as a preparation containing stronger rose water, likewise, as mentioned, Ointment of Rose Water.

Silver Cyanide should be omitted; provided, the formula for the extemporaneous preparation of diluted hydrocyanic acid be likewise dropped.

The Subcarbonate and Subnitrate of Bismuth are now recognized as of varying composition and consequently chemical formulas are omitted. Bettendorff's arsenic test is directed in place of the Fleitmann's test of 1880, to prove the absence or limit allowable of that element.

Calamus is, as in 1880, *unpeeled*. How many druggists have the official?

Calx Chlorata is required to contain not less than 35 per cent. of available chlorine instead of 25 per cent. as heretofore, and this is in accordance with what can now be obtained in the best commercial article. Calx Sulphurata is now made by calcining a mixture of dried calcium sulphate, charcoal and starch, and the resulting product is required to contain at least 60 per cent. of calcium monosulphide, whereas the Pharmacopœia of 1880 specified "not less than 36 per cent."

To the list of preparations containing camphor must be added Linimentum Belladonnæ, Linimentum Sinapis Compositum and Pulvis Morphinæ Compositus and to those of Cardamom, Extractum Colocynthidis Compositum, Tinctura Gentianæ Composita, Tinctura Rhei and Tinctura Rhei Dulcis. These are but samples of the "sins of omission," which appear all through the book.

In the preparation of Cerate and Ointment, benzoinated lard should have been directed in place of "lard," and the same should have been adopted even in the compound cerates and ointments where lard is directed. Camphor Cerate now contains 10 per cent., instead of 3 per cent., 1880, of camphor liniment, a commendable change.

Codeine Sulphate is used extensively where it is desired to give that remedy in liquid form as in bronchial affections and we are surprised not to find it introduced.

The directions for making Collodion are again changed. In the Pharmacopœia of 1880, the pyroxylin was directed to be macerated in the alcohol for 15 minutes and then the ether added. The directions of 1890 are to macerate for 15 minutes in the ether and then add the alcohol. Why not mix the ether and alcohol and then add the pyroxylin in portions, shaking after each addition? This, the method of 1870, has always yielded me the best results.

In the formula for Confection of Senna, on p. 99, it is to be noted that oil of coriander and not fruit is directed, yet, on p. 100, we are told that coriander is used.

Creosote is now correctly described as a mixture of phenols chiefly guaiacol and cresol, and that from beech-wood tar is preferred. The specific gravity and tests for other phenols and pyrogallic ethers are the same as adopted by the German Pharmacopœia.

Crocus should be accompanied by a test for the detection of soluble ammonium salts which have been used as adulterants. The amount of ash stated, 7·5 per cent., is too high. Examinations of a number of samples have yielded the writer 4·5 to 6 per cent. and in all pure saffrons was *non-fusible*, which should be stated in the official test.

Cubeb is notoriously adulterated and the description might have been accompanied by some description of the most common of these adulterants or some of the color reactions proposed.

What has been before said regarding the necessity of the Phar-

macopœia recognizing remedies frequently prescribed and furnishing standard formulas for the same, applies forcibly to the class of elixirs. The course of the Pharmacopœia, on this subject, has been erratic. In frequency of use, elixirs rank with tinctures, fluid extracts, syrups and aromatic waters and attention has been repeatedly directed to the necessity for official formulas for the most popular. Statistics compiled in 1888, show that Elixir of Calisaya was prescribed in about 3 per cent. of the prescriptions written in the United States and that the class was represented in from 54 to 108 out of every 1,000 prescriptions in various localities (see Amer. Journal of Pharmacy, 1888, p. 283), and their popularity seems still to be on the increase. The Pharmacopœia of 1880 *recognized* this demand by introducing Elixir Aurantii as a simple elixir or basic elixir, and this, using a vulgarity, "took well." In the Pharmacopœia of 1890, this is dismissed and two formulas are introduced, one for Aromatic Elixir and another for Elixir of Phosphorus. The former of these, *we presume*, is intended as a substitute for the simple elixir of the previous edition. If this was intended, it should have been given the synonym of basic elixir. The latter is, in this section of country, but very little used and, surely, no one can contend that a solution of phosphorus, even, when in 55 per cent. glycerin, will be a permanent preparation. We cannot explain what influence it has exercised in the minds of the committee, to be thus recognized and the frequently used Elixirs of Cinchona, Iron Quinine and Strychnine, Potassium Bromide, etc., remain forgotten. The practical pharmacist, in answer to his appeal for bread, has received not a stone but a couple of small and dry bones.

The change in the formula for Belladonna Plaster, is to be noted. In the previous Pharmacopœias, it was directed to be made from a specially prepared extract of the root, made by extracting this with alcohol. It is now directed to be prepared from the extract of the leaf and one-half of the resin plaster is substituted by soap plaster. In Mercury Plaster and likewise in the Mercury Ointment, the mercury is disseminated by trituration with oleate of mercury. Lead Plaster is directed to be boiled in a "bright *copper* boiler." Why not use an enamelled or porcelain or other boiler?

In the *official emulsions*, the formula for Emulsion of Chloroform is very different from that previously adopted for Mistura Chloroformi. The quantity of chloroform is somewhat reduced and the

camphor is omitted and as an emulsionizing agent tragacanth with oil of almonds to furnish blandness displaces the yolk of egg. This change is not approved.

There are thirty-three extracts official. The Pharmacopœia of 1880, added in the directions accompanying the formulas, permission to incorporate 5 per cent. of the weight of the extract, of glycerin to maintain its proper consistence. The Pharmacopœia of 1890, in a preliminary note (p. XLII), recommends 10 per cent. It is obvious, that in many cases this will be entirely too large a proportion.

The Pharmacopœia of 1880 directed the use of tartaric acid in the menstruum of all aconite preparations, because Duquesnel had proposed its use in the extraction of the root for alkaloid. It is noticeable that tartaric acid is now omitted in all the official formulas for aconite preparations.

The formula for Compound Extract of Colocynth directs that the purified aloes should be melted, then the alcohol, soap, extract of colocynth and resin of scammony added and the heat continued until a homogeneous mass yielding a brittle thread be obtained; the cardamom is then added and the product powdered. Starting with purified aloes and powdered resin of scammony and extract of colocynth and cardamom, why not direct the soap in *fine* powder and reduce the mixed products to a powder by triturating. The heating on the water-bath with alcohol to produce a mass to be then reduced to a powder seems wasteful of both time and material. In both the Extract and Fluid Extract of Conium acetic acid is directed in place of the hydrochloric of the Pharmacopœia of 1880. Extract of Ergot is directed to be made by evaporating the fluid extract to a pilular consistence and not to a definite weight as in 1880. The extract of ergot should be an aqueous extract, yielding a product entirely soluble in water and made by extraction with water containing only sufficient alcohol to prevent fermentation of the ergot. I would suggest the following process as yielding an excellent product suitable alike for internal administration or hypodermatic injection. The ergot in moderately fine powder is extracted by percolation with purified benzin, then dried and then percolated with a menstruum of 1 part by volume of alcohol and 9 of water. The alcohol is recovered by distillation and the product evaporated to the proper consistence.

We should have an official Fluid Extract of Wahoo as well as a solid extract; the former appears to be more used than the latter.

Extract of Jalap is reintroduced. Although dismissed in the Pharmacopœia of 1880, its use was never discontinued and, even in the compound cathartic pill, commercially it was not displaced. Extract of Juglans is now directed to be prepared with diluted alcohol and not alcohol as heretofore. It should have been dismissed for want of use.

Extract of Nux Vomica is directed to be made by extracting 1,000 grms. of the powdered drug with a mixture of alcohol 750 cc., water 250 cc., acetic acid 50 cc., continuing the extraction with a menstruum of alcohol 3 to water 1 by volume, until the nux vomica is extracted. The alcohol is recovered by distillation, and the product evaporated to 150 grms., transferred to a bottle, washing out the evaporating dish with 50 cc. warm water and adding to the extract. This is now treated repeatedly with ether until it yields no more oil to the solvent. The oil recovered by the evaporation of the ether is treated with acidulated (acetic acid) water to recover any alkaloid extracted by the ether. This aqueous solution is mixed with the extract, and this is evaporated to 200 grms., the moisture and percentage of alkaloid determined and the extract dried and powdered, adding sufficient milk sugar to make the finished product contain 15 per cent. of alkaloids. The process would be simplified and most likely cheapened if the oil were first extracted from the nux vomica by the use of benzin before extraction with alcohol. Benzin is such a poor solvent for alkaloids that the loss would hardly be appreciable, but if desirable to recover any alkaloids extracted, the benzin residue could be treated with acidulated water, and this evaporated and incorporated with the extract.

Extract of Opium is likewise made in the most extravagant way. With the morphine strength of opium fixed at not below 9 per cent., and that in commerce frequently 10·5 to 13 per cent., it is very easy to prepare from the gum opium a dry and powdered extract standardized to 18 per cent. morphine. Yet the Pharmacopœia directs powdered opium. I doubt if any practical pharmacist or manufacturer will dry his opium and reduce it to number 80 powder before treating same for extract.

Extract of Uva Ursi is a new addition, and we presume that it must be used. We had expected to find both a solid and a Fluid

Extract of Sumbul; both of these appear to be growing in favor, but neither was introduced.

Eighty-eight fluid extracts are official, and there are but two or three that should be dismissed, namely, those of kousso, menispermum and savine. Of the latter, we are told on p. 165, that an official preparation is Ceratum Sabinæ, yet this has been dismissed. There are some notable changes in the menstruums directed. Some of these changes are good, but others are questionable. The menstruum for both the Extract and the Fluid Extract of Aconite, has been alcohol. It is now directed only for the former, for the fluid extract a mixture of 3 volumes alcohol and 1 volume water is directed. For arnica root, diluted alcohol has been ordered in the past. It is now retained for the extract, but the fluid extract is directed to be made with 3 volumes alcohol, 1 volume water. Diluted alcohol has always been conceded to be the best menstruum for both arnica root and flowers, and the reason for the change is not apparent.

The menstruum for Fluid Extract of Belladonna root is changed from alcohol to alcohol 4 vols., water 1, and for Buchu alcohol is directed instead of alcohol 2 parts, water 1 part, of 1880. For Fluid Extract of Calumba, 3 vols. of alcohol and 1 vol. water displaces diluted alcohol; a commendable change. The alcoholic strength of the menstruum is increased also in Fluid Extract of Chirata, and it is to be observed that glycerin has been omitted in this and in the fluid extracts of chimaphila, leptandra, matico and sarsaparilla, but has been added in fluid extracts of chestnut leaves, hamamelis and hydrastis.

In the Pharmacopœia of 1880, Fluid Extract of Cypripedium was directed to be prepared with alcohol; that of 1890, directs diluted alcohol, a menstruum the same as used for fluid extract of valerian, 3 vols. alcohol, 1 vol. water, would have been better. In Extract of Conium, and in Fluid Extracts of Conium and Ergot, acetic acid is directed in place of the hydrochloric acid, 1880.

The U. S. P., 1880, unsatisfactory formula for Fluid Extract of Ipecac, is dismissed and a menstruum of 3 vols. alcohol to 1 vol. water directed, this being one of the suggestions of Mr. A. Robbins that has been adopted.

Fluid Extract of Malt disappears entirely from the Pharmacopœia, but not from use. An official fluid extract with fixed diastasic

value should have been introduced. Then, perhaps, we would have gradually stopped handling brown stout, porter and beer under the labels of Tom, Dick and Harry's extract of malt. It should be a medicinal product, not a beverage.

Fluid Extract of Nux Vomica, 1890, is essentially the saturated tincture suggested by Lyons in 1885. The suggestion of Maisch to reduce the alcohol to 70 per cent. by volume, as extracting less oil, is practically adopted in the menstruum of 3 vols. of alcohol and one volume water directed. The process of the Pharmacopœia is wasteful of alcohol, as it directs the extraction of the drug and subsequently by distillation to recover the alcohol and evaporate the residue to a definite weight, of which 4 grms. are assayed. From the alkaloids calculated in the entire extract; a fluid extract is made, by dilution with alcohol and water, of such strength that 100 cc. contains 1·5 per cent. of total alkaloids. Distillation, necessarily, causes some loss of alcohol. It is to be observed that the fluid extract is of such a strength that if 10 grms. of the solid extract be dissolved in a sufficient quantity of the menstruum to yield 100 cc. the product is identical in strength with the official process fluid extract. As the solution of the extract has been adopted for tincture, why not adopt same for fluid extract also? or still better, as the fluid extract is only a multiple of the solid, why not omit the former?

The official Fluid Extract of Phytolacca is made from the poke root and not from phytolacca fruit, as we are informed on p. 299.

The formula for Fluid Extract of Wild Cherry shows a decided change both in method of manipulation and in alcoholic strength of the menstruum.

In Fluid Extract of Sanguinaria the use of acetic acid is a decided improvement which should have been extended also to the Fluid Extract of Squill.

On page 167, we are told that syrupus sarsaparilla compositus is made from the compound fluid extract of sarsaparilla. It is the fluid extract of sarsaparilla that is directed in the formula for syrup and not the compound fluid extract.

The formula and process for the manufacture of Ferric Chloride should be omitted. It is now supplied in a pure condition, and at such price by manufacturers that the pharmacist will not attempt its preparation.

As the *soluble* Citrate of Iron and Quinine has been introduced,

in which the percentage of Iron and Quinine is practically the same as in the Iron and Quinine Citrate, the latter might now be omitted.

In the preparation of Saccharated Ferrous Iodide, one per cent. of reduced iron is added to preserve the ferrous iodide from change to ferric salt. The term "soluble" has been attached to the official title for Ferric Phosphate and Ferric Pyrophosphate, and serves well to indicate that these are not the pure chemical salts that the names previously adopted seemed to indicate.

Granulated Ferrous Sulphate is no longer directed to be granulated by the addition of alcohol to the concentrated aqueous solution. Alcohol is only directed to be used to wash the product granulated by constant stirring while the saturated solution is cooling.

Ferric Valerianate is admitted to be of varying composition, and the chemical formula is omitted.

Glycerites of Carbolic Acid and of TannicAcid are two old friends of 1870, restored to their rightful position. In the latter, the directions should require that the tannic acid and glycerin be rubbed in a mortar to a smooth mixture, and then transferred to a capsule and heated on a water bath until dissolved.

In Glycerite of Starch, 10 per cent. of water is introduced in place of that amount of glycerin. Glycerite of Boroglycerin and Glycerite of Hydrastis are two new additions. The former is a deserved recognition of a frequently used and good remedy, the latter we are doubtful about.

The official Mercurous Iodide is *yellow*, and this is indicated in the title by changing "viride" to *flavum*, and it is now directed to be made by precipitating mercurous nitrate with potassium iodide. Manufacturers have for years listed both yellow and green mercurous iodide, the color being dependent on the amount of mercury present. The Mercuric Iodide is made as heretofore from mercuric chloride and potassium iodide, but the solutions of the salts are directed to be simultaneously poured into a quantity of distilled water.

That the formula of the Pharmacopœia of 1880, for Mercury with Chalk was very unsatisfactory is admitted, and we are not sorry to see it abandoned. In the Pharmacopœia of 1890, clarified honey is used to disseminate the mercury. It is to be observed, that the formula prescribes 105 gm. of material to yield 100 gm. finished product, which would require a loss of 5 gm. (50 per cent.) of moisture by the honey.

We are somewhat surprised to find the hydrochloride of the artificial alkaloid *hydrastinine* introduced, and not the alkaloid *hydrastine* from which it is derived. While the reports of the hæmostatic value of the former are favorable, we were not aware that its use had extended beyond the experimental stage, but the latter has been extensively used for some years, especially as an application to mucous membranes, and the alkaloid hydrastine or its hydrochloride should have been introduced.

Hyoscine Hydrobromide and Hyoscyamine Hydrobromide are deserved admissions. Aconitine and Homatropine Hydrobromide should also have been admitted as their use would necessitate recognition.

Infusions and decoctions have both been reduced to five per cent. unless otherwise directed, and maceration in the former is directed for an half hour only. The formula for Infusion of Digitalis is changed again. In 1870, tincture of cinnamon was directed ; in 1880, cinnamon and now cinnamon water. The digitalis is now rightly directed to be bruised not powdered. Maceration is only until the mixture is cold, not for two hours as heretofore.

Iodoform is official only in crystals, but it is now generally seen in powder only.

Jalap is still required to yield " not less than 12 per cent. of resin." Shortly after the revision of 1880, Dr. Squibb, Turner and Drescher, all reported examinations showing that the jalap in the market yielded less than 10 per cent. resin. While recently, some lots have appeared in the market yielding 12 per cent. that requirement would exclude most in the market. It would have been as well to have fixed the limit at not less than 10 per cent.

Lemon Peel is official for the sole purpose of using it in spirit of lemon, yet the lemon peel described under the official title of " Limonis Cortex " is not that directed in spirit of lemon. The description should be " *the outer or yellow epidermal surface grated from the ripe fruit.*"

Linimentum Calcis is again *linseed oil* and lime water, old "carron oil." The substitution of cotton-seed oil in this and in Linimentum Ammoniæ by the Pharmacopœia of 1880, was an inexcusable blunder and the retention of this oil in the volatile liniment of 1890, is a persistent continuation in a palpable error which is beyond explanation. Olive oil is admittedly the best for this purpose, producing

the smoothest and thickest liniment. The very consistence of the liniment produced, giving it the property of retaining the ammonia for a time, assuring the action desired and rendering it more valuable than the other oils which saponify less perfectly with ammonia. It is amusing to note the substitutes that have been proposed, *rancid* cotton-seed oil, paraffin oil, lard oil, linseed oil and the new Pharmacopœia proposes cotton-seed oil with the addition of some alcohol. The change to cotton-seed oil has been excused by the statement that pure olive oil was not obtainable. This argument, if valid, would require the substitution of cotton-seed oil soap for the official soap and the use of cotton-seed oil in lead plaster and other official preparations. At no time within the last 15 years has it been difficult to obtain either in Philadelphia or New York olive oil of such purity and at moderate prices yielding satisfactory pharmaceutical preparations. The formula of the Pharmacopœia of 1870 for volatile liniment has not been improved upon, and should have been reinstated in the revision of 1890.

In Soap Liniment, the soap is directed to be in fine powder; as the official soap is in lump and containing considerable water (not over 36 per cent. U. S. P.) I presume this is soap which has been dried. If so, the formula should read "Soap previously dried at a temperature not exceeding (100° C.?), and reduced to a fine powder 70 gm."

Ground Flaxseed, if pure and recently prepared, will yield 32 to 35 per cent. of fixed oil, yet the official requirements are only 25 per cent., which would admit of considerable adulteration.

In the formula now adopted for Basham's mixture, glycerin is used in place of the syrup. The iron strength still remains at 2 per cent. of tincture by volume—too weak. The original formula for this preparation contained a little over 6 per cent. by volume.

In the Solution of Magnesium Citrate, the water should be directed to be boiled and used, while hot; this renders the solution more permanent, probably by destroying fungus spores. The amount of syrup directed in this preparation, 120 cc., is entirely too much, 60 cc. would be sufficient.

In Solution of Chlorinated Soda a decided excess of sodium carbonate is directed rendering the finished product distinctly alkaline, as it should be.

In Liquor Ammonii Acetatis the second process of the previous

Pharmacopœias, in which the ammonium carbonate and acetic acid were prepared in separate solutions and these mixed at the time needed, has been discarded. By many *practical pharmacists* this is deemed the better of the two processes. The term "spirit of mindererus," has become obsolete and is so inaccurate a name, according to our present idea of a spirit, that it should be omitted as an official synonym.

Effervescent Lithium Citrate should have been directed to be granulated. Using the salt and not the lithium carbonate and citric acid, to prepare same when dissolved, tartaric acid could have been substituted for the citric acid to produce effervescence.

While native Manganese Dioxide, containing 66 per cent. of the dioxide, is pure enough for preparing chlorine water it is not sufficiently pure for internal administration. Manganese dioxide is now largely administered as an emmenagogue and alterative and a pure oxide should have been introduced for this purpose and a note of caution under the present official oxide, explaining that it was not intended for internal use.

Very little of the *natural* copaiba will yield Mass of Copaiba by the official process until a portion of the essential oil is distilled off. The addition of one per cent. sodic hydrate dissolved in a little water improves the solidification of the mass.

The introduction of Methyl Salicylate into the Pharmacopœia is unwarranted by either use or character of the product. Its principal use has been as an adulterant of the natural oil of wintergreen and a test that would readily detect its presence in this oil has been a desideratum. As a product, it is itself liable to contamination with other synthetic products from impurities present in the salicylic acid used in its manufacture, and it is, in addition, notoriously adulterated.

Its introduction into the Pharmacopœia, is accompanied with tests for the detection of some of these adulterants. The official tests for methyl benzoate would fail to detect the presence of a small amount of that product. It lays claim to no superiority and possesses no advantages over the natural oil of wintergreen. The latter is extensively used both internally and externally, and I have yet to see or hear of the physician who knowingly ordered or accepted the synthetic oil. On the other hand, the statement is made by some that the salicylic acid made from the natural oil of wintergreen has

a better remedial effect than that made synthetically. The only claim that methyl salicylate appears to advance is that it is a cheap substitute. While this might appeal to the soap manufacturer it is beneath the self-respect of the honest pharmacist and the dignity of the Pharmacopœia to recognize such reason. This introduction of synthetic oil of wintergreen becomes a dangerous precedent. If synthetic oil of wintergreen is to be officially recognized, why not introduce also the synthetic essential oils of almond and of mustard?

The theoretical necessity for a more accurate classification of the pharmacopœial preparations, alone, seems to have decided the Committee in dividing the old class of mixtures. In the past, pharmacists have felt the need of at least one class of liquid preparations, wherein might be grouped such preparations as could not be properly classed under the more rigid titles, as tinctures, syrups, liquors, etc. The title "mistura" was deemed sufficiently elastic, and it has always conveyed the idea of a heterogeneous group of remedies. This want has been universal and in the British Pharmacopœia and in other national pharmacopœias, we have similar groups under this title. Under the new classification mixtures are more nearly related to the emulsions than heretofore. It remains to be seen if the new class "Emulsa" will be more graciously received than were the abstracts of the Pharmacopœia of 1880.

Some peculiar changes have necessarily resulted in the formulas for these preparations. In Brown Mixture, syrup and mucilage of acacia are now directed in place of sugar and powdered acacia. We can see no advantage from the change.

The marked changes made in the formula for Mistura Rhei et Sodæ are such that we cannot approve. To make this formula conform strictly to the newly adopted idea of a mixture, 35 per cent. by volume of glycerin is introduced. But why has ipecac been added to the formula? It is to be observed, that the amount of ipecac is one-fifth that of the rhubarb; now one grain of ipecac is quite as active comparatively as the five grains of rhubarb, and this if desirable to be introduced should be indicated in the title.

Oleate of Mercury now is made by dissolving 20 parts of yellow oxide of mercury in 80 parts oleic acid. The 20 per cent. oleate will be found more permanent than the 10 per cent. of 1880. The red mercuric oxide finely powdered and dried answers as well as the yellow oxide. This formula, however, still leaves a decided excess

of oleic acid not in combination. The true oleate prepared by double decomposition (and containing but a very small amount of free oleic acid due to acidity of the metallic nitrate solution used) should have been introduced. Oleate of Zinc of the Pharmacopœia is likewise a solution of 5 per cent. of zinc oxide in oleic acid. It ofrms a hard, unctuous mass. This should have been the impalpable powder obtained by precipitation from solutions of alkaline oleate and zinc sulphate. Almost all the zinc oleate of commerce is the latter.

The entire class of oleoresins is directed to be prepared by exhausting the powdered drug with ether (stronger ether of U. S. P. 1880). The complete exhaustion of the drug directed is wasteful of the ether, as experiments have shown that it is not advantageous to continue the percolation beyond that point necessary to obtain 150 to 200 cc. of percolate for every 100 gm. of the drug. The small amount of oleoresin yielded by continuing the percolation till the drug is completely exhausted will not pay for the ether lost. For some of these oleoresins a cheaper solvent would have been acetone. (See Amer. Journal of Pharmacy, 1892, 145.)

In the statements regarding the characters and properties of both the fixed and volatile oils we notice a decided improvement. Many of the errors in the Pharmacopœia of 1880, in stating the physical properties of the essential oils are corrected.

It is to be noted that in the Expressed Oil of Almond the solubility of the separated fat acids in alcohol is adopted to detect the admixture of other fixed oils, and in lard oil and olive oil the reduction of silver nitrate in acidified alcoholic solution is applied for the detection of cotton-seed oil. The iodine absorption test of Hübl is generally accepted by chemists as a valuable test for adulterants in these oils. It has nowhere, in the volume, been directed, probably because it was thought too difficult for the average pharmacist. Yet the only apparatus it requires, a burette and a bottle or a beaker should be in every pharmacy. In marked contrast to this, we note that in a number of the essential oils the optical rotary values are given and on p. 512, we find instructions for determining the same. The polariscopic apparatus needed is not in the possession of the pharmacist. In many cases, the natural variations of the oils in their optical behavior and the causes affecting the same are still to be further investigated.

The Oil of Bitter Almond should have been "sine prussic acid" or if that was deemed unnecessary, at least the percentage of hydrocyanic acid allowable should have been stated. The test for synthetic oil, by detecting chlorinated compounds has proven very satisfactory in the writer's experience.

Volatile Oil of Betula is introduced to distinguish between the true oil of wintergreen and what is generally sold as such. The statement unnecessarily introduced in the official definition that "it is identical with methyl salicylate" is seriously disputed. We are aware that the manufacturers of methyl salicylate make this claim which has been questioned by disinterested chemists who proposed a distinguishing test. It is to be hoped that some unprejudiced chemist will reinvestigate the subject thoroughly so as to settle the mooted question.

Oil of Ceylon Cinnamon is no longer official. The Pharmacopœia now describes Oil of Cinnamon as "a volatile oil from Cassia cinnamon" which implies that it is distilled from the bark. According to Messrs. Schimmel & Co. the bark yields but 1·5 per cent. of oil, having a sp. gr. 1·035, this as well as price precludes its use for this purpose. From their investigations they state, "It can, therefore, be assumed with safety, that the cassia oil of commerce is distilled in China out of the leaves, leafstalks and young twigs of the cassia plant, probably together with various refuse products worthless for other purpose."—(Semi-Annual Report Schimmel & Co., Oct., 1892, p. 14.)

Hirschsohn's alcoholic lead acetate test is adopted for detecting colophony. The character of the residue left on evaporation is a simple test that should have been given, as it yields valuable information as to the character of adulterants. The quantitative estimation of cinnamic aldehyde is likewise one of the surest tests of quality and is not very difficult to apply.

Oil of Copaiba is stated to be soluble in about 10 times its volume of alcohol and not an equal weight, as erroneously stated in 1880. My own notes show that freshly distilled oil is soluble in from 6 to 8 volumes of alcohol, but solubility varies with age, as oils a year or so old require from 10 to 15 volumes.

Oil of Pennyroyal, it should be remembered, is only the American oil distilled from hedeoma. The closely allied Austrian and Spanish oils obtained from Mentha pulegium, L., are frequently seen in commerce under this title.

The sp. gr. of Oil of Peppermint is stated at ·900 to ·920. Pure oil generally averages ·910 and the range ·908 to ·917 has been found as fixing the limits. The statement that "the oil does not fulminate with iodine," would be correct if changed to "*should not* fulminate with iodine," as old oil or one exposed to oxidation will fume with iodine more or less.

The nitric acid test, proposed by A. B. Stevens, is adopted to detect the adulteration of this and other oils with oil of camphor. A test that will readily detect oil of copaiba in this and other oils is needed.

The sp. gr. of Oil of Sandal Wood is stated at 0·970 to 0·978. This is too limited. Peter MacEwen reports for an Indian oil 0·989 and recommended that the official British Pharmacopœia figures be changed to 0·970 to 0·990. Mr. Holmes had previously reported for museum specimens 0·9901 (Amer. Journal of Pharmacy, 1886, p. 254.) Dodge and Olcott report (Druggists' Circular, 1889, p. 84): "We find the bulked result of a distillation to be 0·970 at 60° F. The first of the run is of a light color and weighs 0·960 at 60° F., and on account of its flowery odor is especially adapted for perfumery use. The last of the run is dark and weighs ·980 at 60°." I have examined American distilled oil, showing a gravity of 0·9809. The East Indian oil distilled in crude apparatus would of course show a higher gravity and the figures proposed by MacEwen would include this native oil.

The official test solubility in mixture of alcohol and water (3–1) is not always reliable for detecting the common adulterant, oil of cedar. E. M. Holmes (loc. cit., p. 262) concludes that the admixture of cedar oil with sandal oil to the extent of 10 per cent. is not easily detected by the reduced solubility in alcohol. My own experiments in this direction were likewise unsatisfactory. I have found the ammonio-copper solution test, proposed by M. Durand (see Brannt, "Fats and Oils," pp. 540–541), to give satisfactory results in detecting easily 3 to 5 per cent. of cedar oil. This test appears to have been overlooked by all the recent investigators, although claimed by the author to detect $\frac{1}{10}$ of one per cent. of the adulterant. Almost all of the so-called West Indian sandal wood oil in the American market is not the oil described by Holmes as obtained from an undetermined species of Rutaceæ, but is really a mixture of East Indian sandal wood oil and oils of cedar and copaiba.

In the preparation of Phosphorated Oil, I would suggest the use of chloroform in place of ether as being a much better solvent of phosphorus.

Oil of Turpentine should be accompanied by specific tests for benzin.

While the morphine strength of Opium remains at not less than 9 per cent., that of powdered opium is rightly limited to not less than 13 nor more than 15 per cent. The Pharmacopœia of 1880, admitted powdered opium of from 12 to 16 per cent. morphine, which permitted too great a variation in the strength of the pharmaceutical preparations. Neither the percentage of water allowable in opium nor the yield of extract is given.

The introduction of Pepsin is accompanied by an official description sufficiently elastic to admit all the varieties of pepsin in the market, providing that they possess the required digestive value. There is a lack of definiteness in a product that may be either "white, yellowish-white, pale yellow, or yellowish;" may be either "an amorphous powder, grains or scales;" may be either "soluble or only partly soluble," and may be "opaque or translucent." Would it not have been more in accordance with pharmacopœial exactness to have introduced two pepsins, one in powder, the so-called insoluble, and the other in grains or scales, the so-called soluble? The properties of each could have been definitely fixed and the former directed for preparing the saccharated pepsin and dispensing in powders, the latter for solutions. The statement in the assay process that "100 cc. of the liquid will contain 0·2 cc. of absolute hydrochloric acid and 0·00335 gm. of the pepsin to be tested and 98 cc. of water" is a self-apparent error, as necessarily there must be somewhat more than 98 cc. of water.

The use of the various purified liquid petroleum products so largely introduced as proprietary articles has necessitated the official recognition of a Liquid Petrolatum. There is too much variation allowable in the official description of color and gravity of this product. The requirements of the Pharmacopœia Germanica for paraffinum liquidum ("without color, clear, non-fluorescent, * * * about ·880 sp. gr.") should have been adopted. The statement that it is "readily soluble in fixed oils" must be questioned as it is nearly insoluble in castor oil.

The two terms Soft Petrolatum and Hard Petrolatum replace the

Petrolatum of 1880. This change, I presume, has been made to define the products suitable for different climates and uses. Fluorescence in these products is due to impurities remaining and is an indication of the degree of purification the product has been subjected to. I would suggest that in the official description "more or less fluorescent" should be changed to "nearly or quite free from fluorescence." The melting point is given for the soft at 40° to 45° C. and for the hard 45° to 51°, so that there is an intermediate melting point, 45°, where the petrolatum may be either hard or soft. The melting point for the hard petrolatum should be 48° to 52° C. (118·4° F. to 125·6° F.)

The official description of Jaborandi intended to cover both Rio Janeiro and Pernambuco Jaborandi does not agree with E. M. Holmes' description of the latter variety. The official description reads "*4 to 6 cm. broad, oval* or ovate oblong; Holmes (loc. cit.) writes *2½ to 5 cm. broad, narrowly elliptical.* The description should also describe the prominent veinlets on the upper surface.

Two pills, namely, Pilulæ Galbani Compositæ and Pilulæ Ferri Compositæ have been dismissed, and two, namely, Pilulæ Cathartic Vegetabilis and Pilulæ Ferri Carbonatis (Blaud's pills) have been added to the official list.

Castor oil is directed as the excipient for Compound Pills of Antimony. In Compound Cathartic Pills, extract of jalap is again directed, but it is to be noted that the proportion of the ingredients has been changed so that now the official pills weigh each ·185 gm. In 1880, the weight was ·230 gm., and in 1870 ·231 gm.

In the formula for Pills of Ferrous Carbonate, the quantity of potassium carbonate directed is insufficient to decompose the quantity of ferrous sulphate directed even if an anhydrous pure carbonate of potassium is used. These pills should have been directed to be coated with an ethereal solution of tolu, as a protection against oxidation, and then the requirement that they should be freshly prepared when wanted could have been omitted.

In the formula for Pills of Phosphorus the althea and acacia have been increased so that each pill, when finished, will weigh ·120 gm. (nearly 2 grains), unnecessarily large for a pill containing only ·0006 gm. ($\frac{1}{100}$ grain) phosphorus. The manufacturers will hardly dare to adopt this formula.

Lead Nitrate is so little used that it might have been dropped.

Potassium Carbonate is now directed to be anhydrous, and to contain not less than 95 per cent. of the pure salt. This excludes the commercial purified carbonate or salt of tartar, which generally contains 18 per cent. of water, about 3 molecules. Prune should be the *dried* fruit of Prunus domestica, L.

In Pulvis Glycyrrhizæ Compositum, the substitution of oil of fennel for the pulverized fruit is to be noted. We see no reason for changing this formula from that original in the German Pharmacopœia.

In the description of Pyrethrum it should have been noted that the crown of the root usually contains tufts of hair from the base of the pubescent stem.

The solubility of Resin of Podophyllum is erroneously stated on p. 338.[1] On p. 340, Pale Rose is stated to be an ingredient in Syrupus Sarsaparillæ Compositus, but it is not mentioned in the formula given for this preparation; as it has no other use it might have been omitted.

Sugar of Milk should be accompanied by tests for such adulterants as starch and glucose, and should be required to be free from fat and casein. The tests should likewise state the percentage of ash allowable, and supply other tests for inorganic salts apt to be present from the water used in its preparation.

In order to insure uniformity of product, the formula for Sapo Mollis should require a definite yield of product.

Scutellaria is stated to be 50 cm. long; most of that in the market will be 20 to 25 cm. and broken. We are again told on p. 349 that argel leaves "are frequently present" in Alexandria Senna, and a description is attached to detect this adulterant. For ten years past the writer has been examining commercial senna for this adulterant, but has not yet been successful in finding it.

Tests are wanted for detecting chloride and bromide in Sodium Iodide. Sodium Nitrate is not sufficiently used to be retained.

Sodium Nitrite is a new addition, introduced as the source of nitrogen dioxide in the new official process for spirit of nitrous ether. It is required to contain not less than 97·6 per cent. of the pure salt a degree of purity hard to obtain in the commercial salt. The price at which the chemically pure salt is now sold, $2.50 to $3 per

[1] Experiments by the writer to decide this point were not completed, but were reported later. (See Amer. Journal of Pharmacy, 1894, 9.)

kilo, precludes its use for this purpose. The commercial article prepared for the use of the dyer while not attaining the official purity will probably be found to answer. It is likely, however, to be contaminated with both lead and arsenic.

To the official Spirits there are four additions, Spirit of Bitter Almond, Compound Spirit of Orange, Spirit of Glonoin and Spirit of Phosphorus, and one dismissal, Perfumed Spirit or Cologne Water of 1880. Spirit of Nitrous Ether is required to yield when assayed by the nitrometer method 4 per cent. of pure ethyl nitrite. The process for the manufacture of this spirit is again changed; sodium nitrite, alcohol and sulphuric acid being distilled to yield the ether; which after washing and dehydrating is dissolved in 22 times its weight of alcohol. In the formula 770 gm. sodium nitrite is directed to be dissolved in 1,000 cc. water, heat not being directed. This salt is stated to require 1·5 parts of water for solution and this would necessitate increasing the amount of water directed.

The ammoniacal strength of Aromatic Spirit of Ammonia is reduced and oil of nutmeg is again directed replacing the oil of pimenta of 1880. The solution of the ammonium carbonate in the ammonia water and water should be directed to remain in the closed flask for 24 hours to insure the conversion of the acid carbonate into the normal carbonate and leaving less free alkali to react on the essential oils and darken the solution.

In Spirit of Orange the synonym, "essence of orange" should be given; oil of *sweet* orange peel should be specified and 50 gm. orange peel grated from the fresh ripe fruit should be added. In Compound Spirit of Orange, oil of *bitter* orange peel should be specified. In Spirit of Camphor, water is omitted, alcohol alone being the solvent. At least 10 per cent. of water should have been directed. The addition of a small amount of water seems to bring out the pungency of the camphor. Spirits of Gaultheria, Juniper, Juniper Compound, Lavender and Nutmeg have all been increased in strength.

Strophanthus is stated to be nearly inodorous, this is hardly accurate as a very disagreeable odor is obtained on crushing the seed.

Strychnine Sulphate is stated to contain 5 molecules of water, whereas in 1880 it was recognized as containing 7 molecules. As this would materially affect the strength of such a potent remedy as

well as its physical properties, solubility, etc., it is interesting to know which formula corresponds with the present commercial article.

The Pharmacopœia is careful to specify both the shape and weight of the various suppositories. The rectal suppository is directed to be 1 gm. as in 1880. In many cases this has proven too small except for infants. The 2 gm. size is preferable. The vaginal suppository is directed to be *globular*, and about 3 gm. in weight. Six gm. is preferable, especially where large quantities of such articles as boric acid and iodoform are directed as has become customary. I see no reason why the official directions should not order that the medicinal ingredients be incorporated with all the cacao butter, it being grated and added in portions, and the resulting mass melted on a water-bath, and poured into moulds as melted.

It is to be observed that in Suppositories of Glycerin the formula directs 68 gm. "to make ten rectal suppositories." There will be some loss of water, of course, in the preparation. A trial of this formula yielded 65 gm.; but this would yield suppositories of 6·5 gm. each, if made into *ten suppositories*, as directed. On the other hand, one gramme rectal suppositories of glycerin are too small except for infants. These, as generally supplied, are from 2 gm. to 2·5 gm. each. The direction that they should be freshly prepared when required is unnecessary and impractical. The permanence of glycerin suppositories is a practical test of their quality.

The process of cold percolation is for the first time officially applied to the preparation of syrups.

The exact instructions for carrying out this process, given under Syrupus, on p. 387, should be sufficient for all intelligent pharmacists, and there should be no necessity for a repetition of the instruction in each of the other ten syrups in which this process is officially permitted. The statement that the solution of the sugar may also be effected by the process of percolation as described on p. 387 would be sufficient.

The formula of 1880 for Syrup of Acacia is maintained, with the exception that the mucilage of acacia is directed to be recently prepared. The mucilage itself is very prone to decomposition. It is regretted that the formula of the 1870 Pharmacopœia, which yielded an excellent preparation, that properly kept remained unaltered for some time, was not again introduced.

In Syrup of Citric Acid the amount of spirit of lemon is greatly increased, making the preparation correspond more nearly to the lemon syrup, dismissed.

The formula for Syrup of Hydriodic Acid of the Pharmacopœia of 1880 is discarded, and the process of the National Formulary is introduced. In the official formula the quantity of tartaric acid directed, 12 gm., is insufficient to decompose both the potassium iodide and potassium hypophosphite directed and necessarily a portion must remain undecomposed in the product. To ensure entire decomposition 13·19 gm. would be required. The tartaric acid should be directed to be *crystals* as the experience of the writer is that the *commercial* powdered acid when used in this preparation causes liberation of iodine. The use of hypophosphite of potassium as a preservative is unnecessary, provided a small amount of sugar is added to the acid solution before filtering. The official directions to evaporate the solution on a water-bath, and when cold to mix with syrup is likely to result in decomposition of the hydriodic acid; why not direct the acid solution to be filtered into sugar and a sufficient quantity of distilled water added and the sugar dissolved by agitation? In the report of the Pharmacopœia Committee of the Philadelphia College of Pharmacy, submitted to the National Convention, will be found a formula containing these suggestions. To test this formula samples have been preserved for over a year, and in one instance for over three years, with satisfactory results. The addition of a small amount of spirit of orange would improve this syrup and give it distinguishing character.

The addition of both alcohol and glycerin in the formula for Syrup of Althæa is endorsed and will render this a more stable preparation than it has been in the past.

The directions for preparing Syrup of Almond are sadly erroneous, and we can only conjecture what the intention was. In the formula, 200 cc. of water is directed and quantity sufficient of syrup to make 1,000 cc.; but in the instructions 330 cc. of water is used, and then in addition *water* to make the product measure 1,000 cc. For the latter, syrup evidently was intended.

In Syrup of Orange, the orange peel cut into shreds is boiled with alcohol for 5 minutes and after cooling the tincture expressed. Macerating the orange peel, *grated* from the fruit, with the alcohol for 2 or 3 days without heat, and then expressing and washing the residue with sufficient alcohol would be preferable.

In Syrup of Calcium Lactophosphate the salt is directed to be prepared by dissolving the calcium carbonate in lactic acid and adding phosphoric acid. There is a decided excess of acid directed. Stronger orange flower water should be directed and was most likely intended as the quantity directed to be used is much less than that ordered in 1880.

The saccharine strength of Syrup of Ferrous Iodide is now less than 50 per cent. instead of 60 per cent. in 1880, and syrup is used instead of sugar, the boiling ferrous iodide solution is filtered into the syrup which is not directed to be warmed previously, otherwise the process is identical with that of the Pharmacopœia of 1870.

Syrup of Hypophosphites now contains a small amount of hypophosphorous acid in place of the citric acid of the 1880 edition. The quantity of sugar directed should be increased to 600 gm. In Syrup of Hypophosphites with Iron, ferrous lactate is retained, but is directed to be dissolved by aid of potassium citrate; ferric hypophosphite should have been directed, making all the metallic salts used hypophosphites.

The addition of acetic acid and glycerin to Syrup of Ipecac is a decided improvement.

It is a question if in the new official formula for Syrup of Lactucarium the valuable portion is not precipitated by the water, and allowed to remain with the calcium phosphate on the filter? With the present official tincture of lactucarium a syrup, yielding but a small amount of precipitate on standing, can be made by the following formula: tincture of lactucarium 100 cc., glycerin 100 cc., syrup 800 cc., mix the tincture with the glycerin and add the syrup to the mixture.

In Syrup of Wild Cherry the glycerin is excessively increased, and is now part of the menstruum and not added to the percolate. We cannot approve this formula, as the resulting syrup is more remarkable for increased astringency than for improved flavor.

Syrup of Rhubarb is a decided improvement over the formula of 1880, and yields a more stable preparation.

In Compound Syrup of Sarsaparilla the suggestion of Oldberg to omit both the guaiac wood and pale rose has been adopted, and oils of sassafras and gaultheria have again taken the place of their respective drugs directed in the Pharmacopœia of 1880. The use of fluid

extracts of sarsaparilla, glycyrrhiza and senna in the preparation of this syrup is another innovation.

For preparing Syrup of Senna, Alexandria senna only is rightly directed to be used. In the direction for this preparation we are instructed to prepare 600 cc. of infusion. "Strain this, and, when it is cold, mix it with the alcohol (150 cc.) in which the oil of coriander (5 cc.) has previously been dissolved. Set it aside until the precipitate has subsided, then pour off the clear liquid, filter the remainder, and pass enough water through the filter to obtain 550 cc." It is to be noted that *755 cc.* of liquid is to be filtered, and the filtrate to be *made up to 550 cc.* by washing the precipitate. The precipitate cannot occupy the space of 205 cc. of the liquid. The 600 cc. of infusion should be directed to be evaporated to 400 cc., and then the alcohol and oil of coriander added and the process continued as in the official direction.

The tinctures as a class show a decided improvement. With but one exception, and that, most likely unintentional, the formulas are given for the uniform quantity of 1 liter of product. In Tincture of Aconite the suggestion of Tscheppe to reduce the alcoholic strength of the menstruum has been accepted and 7 vols. alcohol, 3 vols. water now are directed in place of alcohol of the previous edition.

In Tincture of Aloes, liquorice root is now directed in place of the extract and percolation is ordered instead of maceration. Liquorice root is likewise added to the Tincture of Aloes and Myrrh, an unnecessary addition. I would prefer maceration to percolation in both of these tinctures.

In Tincture of Arnica the arnica flowers in No. 20 powder are to be packed into a cylindrical percolator, *without* previous *moistening*. We cannot see why this exception should be made to the generally adopted rule of moistening the powder before packing.

The adoption of alcohol in place of diluted alcohol for Tincture of Calendula is a change that cannot be approved. Diluted alcohol even of the strength of the Pharmacopœia of 1880 extracted this drug and yielded a permanent tincture. The use to which this preparation is generally applied, namely, external application to wounds, bruises, etc., makes strong alcohol undesirable as the menstruum.

The Pharmacopœia of 1880 reduced the strength of Tincture of Indian Cannabis and it now suffers another reduction of nearly 5 per cent. in the amount of the drug used, equivalent to a reduction of nearly 25 per cent. in strength.

Tincture of Cinnamon is now to be made from the Ceylon cinnamon and contains 5 per cent. by volume of glycerin.

In Tincture of Cubebs the menstruum becomes alcohol in place of diluted alcohol and the drug strength is doubled. Both of these are good changes.

In the formula given for Tinctures of Fresh Herbs, the amount of product to be obtained is not stated. This would vary with the amount of moisture present in the various herbs. It evidently was the intention to direct that the so-called 50 per cent. tincture should be obtained, that is 50 gm. of the fresh drug to be represented by 100 cc. of the finished tincture. In order to attain this object but 900 cc. of alcohol should be directed to be used in the maceration and then the residue after expression and the filter washed with sufficient alcohol to obtain 1,000 cc. of tincture.

The increase in alcoholic strength of the menstruum used for Tincture of Galls and the reduction in that directed for Tincture of Gelsemium are both good changes.

In the Compound Tincture of Gentian, it is to be noted that the amount of Cardamom has been reduced one-half. We doubt if too much aromatic material could be introduced in this preparation.

Tincture of Lactucarium is introduced solely for the purpose of making therefrom the syrup. As a substitute for the unsatisfactory and difficult to prepare fluid extract of 1880, it is a welcome addition.

Elsewhere, the writer has called attention to the impossibility of preparing Tincture of Musk, containing 10 per cent. of musk, as directed by the Pharmacopœia of 1880, and attempted to prove that even in a tincture containing 2 per cent. of pure musk it was not completely extracted. In the new edition, the first proposition appears to be recognized, and now the tincture is directed to be made 50 gm. in 1,000 cc., about 5 per cent. To have made it 2 per cent. would have brought it in harmony with the German Pharmacopœia and as strong as a tincture of *pure musk* can be made.

If the official directions for preparing Tincture of Nux Vomica are followed, using only extract of nux vomica corresponding to the official requirements, an active remedy must result. In future, tincture of nux vomica from all sources should be uniform.

The formula for Tincture of Opium is likewise excellent, and with the morphine strength of powdered opium, as limited by

the Pharmacopœia, there remains no excuse for the want of uniformity in this preparation as supplied by different pharmacists.

Tinctures of Physostigma and Stramonium Seed have been increased nearly 50 per cent. in strength, there now being 150 gm. of the drug in 1,000 cc., instead of 10 per cent. This strength has been adopted for many of the tinctures of poisonous drugs.

Tincture of Quillaia is a new addition, being a concentrated decoction, with the addition of 35 per cent. by volume of alcohol as a preservative.

For Tincture of Rhubarb, a menstruum containing 60 per cent. of alcohol by volume and 10 per cent. of glycerin, has been adopted, and percolation completed with alcohol 60 volumes, water 30 volumes. For Aromatic Tincture of Rhubarb and for Sweet Tincture of Rhubarb the menstruum contains 50 per cent. by volume of alcohol and 10 per cent. of glycerin, and percolation is continued with diluted alcohol. The amount of glycerin is excessive, and we see no reason why the same menstruum should not have been adopted for all three, especially as the former contains less aromatic material.

The introduction of acetic acid in preparing Tincture of Sanguinaria is good. Acetic acid appears to be peculiarly adapted for extracting this drug.

The menstruum for Tincture of Squill now becomes the same as that for the fluid extract, being 3 vols. alcohol, 1 vol. water.

Tincture of Strophanthus is one of the newer remedies that has merited recognition by the Pharmacopœia. It is regretted that in the official formula no instructions are given for removing the oil from the powdered seed before percolation. This oil of an exceedingly disagreeable character, will average 30 per cent. of the weight of the seed and is easily removed by ether or purified benzin or even largely removed as directed in the German Pharmacopœia by expression. By the use of a weaker alcoholic menstruum than that originally proposed for this preparation, the Pharmacopœia evidently aims to diminish the amount of oil extracted. The alcoholic strength of the menstruum adopted, 65 per cent. of alcohol, U. S. P., by volume corresponds closely to the diluted alcohol adopted in the German Pharmacopœia (68 per cent. by vol. Ph. G.)

Tincture of Sumbul remains 10 per cent. of sumbul, while the alcoholic strength of the menstruum is reduced. This tincture is too

weak to be very active. It should contain at least 25 per cent. of the drug or be entirely dismissed and a fluid extract of sumbul introduced.

The formula for Trituration of Elaterin should have been omitted as the general formula for triturations is sufficient and more exact in the directions.

The *official* troches as a class are sadly neglected by the medical profession, and from a pharmaceutical standpoint they are badly in need of a more thorough revision than they have obtained in this edition. But one actual dismissal has been made, that of Troches of Magnesia. The substitution of Troches of Santonin for Troches of Santoninate of Sodium was but a correction of this at once acknowledged error of the Pharmacopœia of 1880. We are of the opinion that Troches of Chalk and Troches of Ipecac have become obsolete and should be omitted, and as the preparation of peppermint and ginger lozenges appears to be left to the confectioner, these likewise could be spared from the official list. We are disappointed in not finding, as additions to the class, some of the frequently used troches, such as those of benzoic acid, cocaine, guaiac and its compounds and kino.

The *compressed* lozenge, although almost universally used, is not officially recognized. It could have been adopted in place of the *mass* lozenge for most of those in the official list. As a class the official troches are not in harmony with that marked spirit of progress that characterizes the volume generally. The most displeasing feature is the absence of any uniformity in the size of the finished products. They vary from ·42 Gm. in Troches of Cubeb to 1·56 Gm. in Troches of Potassium Chlorate. The latter are unnecessarily large, the former too small. Between these extremes we find all sizes. They could readily have been classed under not more than two sizes: 1· Gm. and ·7 Gm. or ·75 Gm.

With the exception of Troches of Santonin, Troches of Ammonium Chloride is the only one exhibiting any improvement. The popular muriate of ammonium and licorice lozenge has been introduced, but the quantity of ammonium chloride has been reduced to ·1 Gm. in each instead of about ·15 Gm., as generally made.

The official ointments exhibit but few changes of note. Ointment would have been improved by substituting *benzoinated* lard. Ointment of Carbolic Acid and Chrysarobin Ointment are both

reduced to five per cent. instead of ten per cent. Of the three astringent ointments formerly official, the Ointment of Gallic Acid has been dismissed and the Ointment of Tannic Acid and the Nut-gall Ointment have been both increased to 20 per cent., just double the strength of those official in the Pharmacopœia of 1880.

The formula for Ointment of Rose Water now given yields a rather odd amount of product 985 to 990 Gm. With the substitution of stronger rose water for rose water in this preparation, it has been deemed advisable to reduce the amount. If 200 cc. had been directed in place of 190 cc., the product would have been about one kilogramme. The addition of borax materially improves the appearance of this ointment. The directions for the addition of the rose water are that the entire amount is to be added to the waxes and oil previously melted and poured into a mortar, "*without stirring* and then to stir rapidly and continuously until the mixture becomes uniformly soft and creamy." The addition of 20 per cent. of water to the melted fats must necessarily cause congealing of the wax and separation in masses, which it would be nigh impossible to beat to a smooth mass. The rose water should be directed to be *warmed* to the temperature of the fusing of the waxes before being added.

The directions given under Iodine Ointment and Iodoform Ointment that they should be freshly made when required might likewise have been applied to such ointments as those of tannic acid, potassium iodide and the mercuric oxides.

The addition of castor oil in Ointment of Red Mercuric Oxide serves well both as an aid in triturating the oxide and in preserving the ointment from oxidation.

A mixture of yellow wax and lard replaces suet in Tar Ointment. A mixture of wax and lard is less easily absorbed than suet and as the stimulating effect resulting from this absorption is desired we would prefer the old formula.

Sulphur Ointment is now directed to be prepared with washed sulphur instead of sublimed sulphur. The small amount of acid present in the latter from oxidation has heretofore been looked upon rather as desirable in this ointment.

The Pharmacopœia of 1880 directed, that in Veratrine Ointment the veratrine should be rubbed up with alcohol before incorporating with the benzoinated lard. It was found that this always resulted

in the production of a resinous mass which it was almost impossible to evenly disseminate. The Pharmacopœia of 1890 directs six per cent. of olive oil in place of the alcohol. Both of these are unnecessary additions and in summer time the latter especially would render the ointment too soft. The veratrine should be directed to be rubbed up with about one-tenth of the lard to a smooth paste and this then incorporated with the balance.

The directions for Ointment of Zinc Oxide are to sift the zinc oxide through a No. 20 sieve upon melted benzoinated lard; a number 40 sieve would be better.

The required alcoholic strength of both white wine and red wine is changed to from 10 to 14 per cent. in place of 10 to 12 per cent. and the method of determining the percentage of alcohol present incorrectly stated in 1880 is now correctly given. Stronger White Wine is dismissed and where it was formerly directed in preparing the official wines, white wine, with the addition of 15 per cent. by volume of alcohol, is now ordered. In addition to this the number of the official wines has been decreased by three other dismissals, namely, Aromatic Wine, Wine of Aloes and Wine of Rhubarb.

In the formula for Wine of Antimony 1015 cc. of liquids is directed to yield 1,000 cc. of product. The quantity of white wine directed is 800 cc. instead of a sufficient quantity to make 1,000 cc.

Wine of Ipecac has been increased in strength to 10 per cent. by volume of the fluid extract instead of 7 per cent. The formula, however, fails to direct that the filter should be washed with sufficient white wine to make the product measure 1,000 cc.

Nineteen pages are required for the very complete list of reagents and instructions for preparing the same.

Twenty-seven pages are devoted to volumetric solutions and methods of analysis. We regret that this feature of the book has been marred by a statement made exactly 12 times in the 27 pages "that the figures given may be rounded off when a delicate balance and exact weights are not at hand." This is the more remarkable, as in the introductory note to this subject it is insisted that all volumetric solutions should be made and used at temperatures not deviating materially from the normal temperature, 15° C., and that all measuring vessels employed should agree among themselves in accuracy of graduation, thus avoiding the introduction of errors.

What chemist can, with any satisfaction, make volumetric estimations, using an inaccurate balance and weights?

In a volume whose chemical requirements are so exacting, such slovenly methods should not be condoned. Especially is this to be condemned in the preparation of such volumetric solutions as those of oxalic acid and iodine used to standardize other solutions.

Two pages are devoted to each of the following subjects, gasometric estimations, alkaloidal assay by immiscible solvents and determination of optical rotation of organic substances.

Eight pages are required for a list of chemicals and formulas.

It will be thus seen that 60 pages, one-tenth of the entire volume, are devoted to purely chemical instruction in addition to the many pages already occupied in the tests appended to the official products in the preceding pages. The increase of 115 pages in the present edition, amounting to more than 20 per cent. in the size of the volume, is largely due to this source. This may well serve to illustrate the present tendency of pharmaceutical training toward a more thorough education in chemistry. But it must not be forgotten that if the same privilege be extended to pharmacognosy, pharmacology, botany in its various relations to organic materia medica and other allied sciences that has been assumed by chemistry, the Pharmacopœia would soon become a commentary upon itself. A volume so cumbersome as to be unsuited to its purpose and use.

The Pharmacopœia should not be converted into a text-book on any science. It is with regret that we observe that the present tendency is to forget entirely its legitimate character. The Pharmacopœia is essentially a law book, a volume of statutes. As such, it should content itself with stating accurately the characters and requirements of the official products. Any deviation from this rule is a digression from its true scope. The official volume of the statutes enacted by a legislative body is unaccompanied by explanations and judicial opinions on the application of the laws.

It is hoped that, in future revisions, that the plan adopted will be to leave the methods of testing and of proving the purity of the official chemicals to a special volume compiled if necessary by authorities recognized by the pharmacopœial committee. A volume which shall be to the United States Pharmacopœia what Pribram

and Welden "Prüfung Artzneistoffe" is to the new German Pharmacopœia.

Thirty-seven pages are utilized for the various tables. Those for alcohol, the acids and alkalies and for equivalents of weights and measures being especially noticeable for completeness. Forty-two pages are devoted to the very thorough index, which is one of the most commendable features of the book.

Viewed as a complete work the volume is remarkable for its advanced position; for the great progress which it indicates in the coming pharmacist. Its progressiveness and superiority from a purely scientific standpoint is admitted. The committee evidently had in mind a lofty ideal for their Pharmacopœia. The book is at least a decade in advance of the scientific attainments of the average American pharmacist and is likely to give the impression to our foreign professional brethren that he is the possessor of knowledge and standing, alas, too often lacking. We imagine that we hear many of the class who are more concerned over the commercial aspect than the professional side of their calling, repeat the words of the horse to his groom in Æsop's fable: "Groom me less and feed me more."

I firmly believe that this is a grand step and that it will mark a distinct epoch in American pharmacy; that it will stimulate hosts of pharmacists to renewed efforts to maintain their educational and professional standing, and that it will compel many to obtain a more thorough education in order to stand on the same plane to which this volume will elevate the progressive pharmacist. It is a matter of profound regret that in a volume of such magnificent intent there should be so much to criticise adversely.

In concluding this review the writer wishes to explain that it was undertaken in response to the request of the late editor of the American Journal of Pharmacy, Professor John M. Maisch, for a criticism to be published in parts commencing with the October number of the journal.

In discharging this task, I have conceived it to be my duty as well as to the best interests of pharmacy to unhesitatingly express my views. It has been the aim to avoid all personalities, and if any one has been offended it has been unintentional. The writer has no axe to grind and is personally acquainted with but few of the com-

mittee, nor has he any knowledge as to which members of the committee the various parts of the volume can be attributed. I have naturally assumed the position expressed by Mr. Hosea Biglow's candidate:

"There's nothin' thet my natur so shuns
Ez bein' mum or underhand;
I'm a straight-spoken kind o' creetur
Thet blurts right out wut's in his head,
An ef I've one pecooler feetur,
It is a nose thet wunt be led."

Hardly had the introductory lines of this review appeared before the writer was criticised as a pessimist, and his review as being hastily written. In opposition to some of the views expressed very flattering reviews were quoted. I have no intention of replying to my critical friend who so evidently has misconstrued my position, nor is any defence needed. But I would assure him that it is much easier to flatter than to conscientiously criticise; to swim with the current than to stem the tide. But the latter may be the position of duty, and a review to be of any value must be the expression of independent thought, and devoid of flattery.

I am aware that it has become fashionable for reviewers not to look much beyond the preface, and this is so well known that shrewd authors now so word their prefaces as to purposely give the flattering critic material for his adulation. The true friend is not the flatterer.

I would also assure him that whatever progress is made by pharmacy, and introduced in the next Pharmacopœial revision will be the result of criticism and not flattery.

I would finally assure him that the writer would assume a position not second to any one in desiring a true advance and a scientific elevation of pharmacy.