THE NORWEGIAN PHARMACOPŒIA.

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The fourth edition of the Norwegian Pharmacopœia, or as it is officially known "Pharmacopœa Norvegica, 1913," became official on January 1, 1914, replacing the former third edition of the book which was published in 1895.

The new pharmacopœia consists of a total of XIII and 467 printed octavo pages, 362 of which are given over to the description of official drugs and preparations. The official monographs include 543 titles, of which number 17 are general headings, 149 are drugs, including 15 of animal origin, 169 are chemical substances and 208 pharmaceutical preparations.

The prefatory pages include the royal proclamation of February 7, 1913, announcing the publication of the book and the date on which it is to become official, a review of the contents, a short prefatory note by the members of the commission in charge of the revision and the outline of general methods for determining physical and chemical constants. These general methods include directions for the determination of temperature, specific gravity, solubility, melting point, boiling point, polarization, iodine number, acid number, ester number and other constants. This portion of the book also briefly outlines the methods to be followed in collecting and preserving plant drugs.

The text of the pharmacopœia is printed in Norwegian and only the titles of the several articles are in Latin. In compliance with an existing agreement these Latin titles are similar to those in the other Scandinavian countries, Sweden and Denmark, and are generally quite distinct from the titles appearing in the pharmacopœias of other European countries; the older Berzelian method of giving preference to the acid radical in connection with chemical substances being generally followed.

The monographs for drugs, particularly drugs of vegetable origin, are concise and clear and the same can be said of the monographs for chemical substances. In connection with the latter class of articles the chemical formula and also the atomic weight where reasonably available is usually given. This is modified somewhat in the case of acids and other solutions to indicate that those substances are more or less variable. Hydrochloric acid, for instance, is given HCl.Aq. with the requirement; 100 parts contain 25 parts of hydrogen chloride (HCl=36.47).

In common with the pharmacopœias of the two other Scandinavian countries this book includes what may be characterized as a pharmacopœial joke. Under the heading "Glacies" and the Scandinavian "Is," the equivalent of the English "Ice," is a blank space evidently intimating that any attempt to describe the substance would be useless.

As an illustration of the recognition that has been accorded to newer researches, more particularly the possible influence of enzymes on the activity of plant drugs, it will suffice to call attention to the requirements for digitalis leaf. This drug is to be collected from the indigenous, wild growing plant at the time of flowering, is to be dried for at least five hours at about 80° and preserved in small, well-closed containers holding about 50 gms. of the drug.

The Norwegian Pharmacopœia has, of course, been liberally discussed in European countries and differences of opinion have been evidenced particularly in regard to the scientific character of the book. A writer in the Chemist and Druggist, London, for instance, expresses the opinion that "The book is not a particularly up to date publication," while the reviewer in the Lancet opines that "The new work embodies many features of modern research in pharmacy and testifies to the high scientific attainment of Norwegian pharmacists." The German reviewers generally find much to commend in the book, largely perhaps, because it is considered to be distinctly in keeping with the German pharmacopœia. The descriptions of crude drugs and of chemicals are generally commended, and Schimmel & Co., in their Semi-Annual Report for October, 1913, express the opinion that the requirements included in the monographs for essential oils are generally reasonable and in keeping with our present-day knowledge regarding this class of products.

The galenical pharmacy is perhaps not as thoroughly up to date as one might have expected, a considerable number of complex pharmaceuticals have been retained from former editions of the pharmacopœia and several equally objectionable preparations were included as new remedies. Among the latter is the compound syrup of hypophosphites, a complex preparation that has been the cause of considerable dispute in our own country.

General articles descriptive of the several classes of galenicals have been included and these usually describe the methods to be employed in making and preserving the various preparations. In connection with fluid extracts and tinctures, the color, specific gravity and extract content of the several preparations is given.

A liberal number of assay requirements have been introduced in connection with the preparations of alkaloidal drugs, but the requirements are not stated at all uniformity and in connection therewith some rather liberal variations are permitted. Thus extract of nux vomica may vary from 15 to 17 *per cent.* of total alkaloids and extract of opium from 18 to 20 *per cent.* of morphine. The tincture of nux vomica may vary from 0.25 to 0.30 *per cent.* of total alkaloids but the tincture of opium is to contain *about* 1 *per cent.* of morphine and fluid extract of hydrastis is to contain *not less than* 2 *per cent.* of hydrastine.

Among the newer remedies that have been added we find acetylsalicylic acid, diethylbarbituric acid, camphoric acid, bromoform, ethylbromide, creosote carbonate, eucalyptol, eugenol, hexamethylentetramine, cresol, novocaine, amyl nitrite, silver proteinate, antipyrine salicylate, mercury salicylate, solution of formaldehyde, and the several hypophosphites used in the making of compound syrup of hypophosphites. It will be noted that at least several of these articles are no longer considered new remedies with us in this country, while others have never secured sufficient recognition on the part of the medical profession to warrant their being included in our own pharmacopœia.

The requirements of the Brussels Conference Protocol have been generally followed rather closely. The protocol itself is reproduced in tabulated form and the articles that have been included in the pharmacopœia itself are designated by the addition of the letters P. I. to the sub-titles which are those included in the international treaty.

Table showing the international standard titles included in the Norwegian Pharmacopœia, 1913:—

Acidum Hydrocyanicum dilutum P. I.
Amygdalæ amaræ aqua s. Aqua amygdalæ amaræ P. I.
Belladonnæ extractum s. Extractum Belladonnæ P. I.
Belladonnæ folium s. Folium Belladonnæ P. I.
Cocainum hydrochloricum P. I.
Colchici semen s. Semen Colchici P. I.
Colchici tinctura s. Tinctura Colchici P. I.
Digitalis folium s. Folium Digitalis P. I.
Digitalis tinctura s. Tinctura Digitalis P. I.
Ferri jodidi sirupus s. Sirupus jodeti ferrosi s. Sirupus ferri jodati P. I.
Hydrargyri unguentum s. Unguentum Hydrargyri P. I.
Hyoscyami extractum s. Extractum Hyoscyami P. I.
Hyoscyami folium s. Folium Hyoscyami P. I.
Ipecacuanhæ radis s. Radix Ipecacuanhæ P. I.
Jodi tinctura s. Tinctura Jodi P. I.
Kalii arsenicosi liquor s. Arsenicalis liquor Fowleri s. Liquor arsenicalis Fowleri.
Opii et Ipecacuanhæ pulvis compositus s. Pulvis Doveri P. I.
Opii extractum s. Extractum Opii P. I.
Opii Tinctura s. Tinctura Opii P. I.
Phenoli solutio s. Aqua phenolata P. I.
Secalis cornuti extractum s. Extractum Secalis cornuti; Ergoti extractum s. Extractum Ergoti P. I.
Secalis cornuti extractum fluidum s. Extractum fluidum Secalis cornuti; Ergoti extractum fluidum s. Extractum fluidum Ergoti P. I.
Secale Cornutum s. Ergotum Secale P. I.
Strophanthi tinctura s. Tinctura Strophanthi P. I.
Strychni extractum s. Extractum Strychni; Nucis vomicæ extractum s. Extractum Nucis vomicæ P. I.
Strychni semen s. Semen Strychni s. Nux vomica P. I.
Strychni tinctura s. tinctura Strychni s. Nucix vomicæ tinctura s. tinctura Nucis vomicæ P. I.

The appendix includes a number of tables, among others: An atomic weight table of the elements referred to in the pharmacopœia based on the international atomic weight table for 1910; a list of the reagents used in testing drugs and medicines, also a list of reagents for tests and stains used in the clinical laboratory; a table showing the specific gravity of solutions of acids and alkalies at 15°, a table showing the number of drops in a gramme of several frequently used official preparations when dropped from the official normal drop counter at 15°, a table of the maximum doses of active medicaments, a list of poisonous articles that should be kept in the poison closet apart from other medicines, and a list of potent medicines specially designated in the body of the book that are to be kept separated from other articles; a list of the articles added to the fourth edition of the pharmacopœia and a list of the articles in the third edition, but not continued in the fourth edition. These several tables are followed by a reprint of the Brussels Conference Protocol and by two indices, one an index of the Latin titles with the sub-titles from the International Protocol and the other an index of the Norwegian names. The index of the Latin titles also includes under the several official names of the drugs and chemicals a list of the preparations in which the substances are directed to be used.

Altogether the book impresses one as being an earnest attempt to solve pharmacopœial problems in an up-to-date manner. The directions and requirements appear to be reasonable, and the general concensus of opinion of writers and reviewers is to the effect that the book furnishes satisfactory standards for the articles enumerated in it.

In the limited time that can be devoted to a review of this kind no elaborate critical review of the book can be presented, but enough has been said to justify the statement made by the reviewer in the London Lancet that the work embodies many features of modern research in pharmacy and testifies to the high scientific attainment of Norwegian pharmacists.

DISCUSSION.

MR. RAUBENHEIMER:—"It is certainly gratifying to become acquainted with some of these foreign pharmacopœias, even if we are unable to read them. I would like to ask Mr. Wilbert what edition this pharmacopœia is, in the first place, because that is quite important. I also want to point out that the nomenclature of the Scandinavian pharmacopœia is also used by the Netherlands pharmacopœia. Of course, this nomenclature is entirely different and confusing with the tables of the U. S. P., and you will have to get used to it in filling foreign prescriptions.

"There is one important item I also want to call attention to. I had a call for this from one of the professors in Highland College. It was a Norwegian prescription and it was rather a peculiar preparation. I looked it up for him and it happened to be spiritus ammonii carbonici pyro-oleosi. That was the old spirit of hartshorn. Instead of being distilled from the horns of deer, as done by our forefathers, and which process, I suppose, was official, it is now made by taking ammonium carbonate, and in order to give it this pungent, disagreeable, empyreumatic odor, adding a small amount of ethereal animal oil, the ill-smelling empyreumatic oil distilled from bones, etc., discovered by the Berlin alchemist Dippel. That makes practically the same thing as the old spirit of hartshorn, which is still used in medicine to-day in some countries.

"Regarding the nomenclature, I have no doubt Mr. Wilbert has in his paper the odd titles ætheroleum and pyroleum. The former applied to 'essential oils,' and the latter to 'empyreumatic oils,' and they are very wisely intended to separate these oils into classes by themselves.

"From the review of foreign pharmacopœias the pharmacist can always learn something, and even the members of the Revision Committee of the U. S. P. can receive and conceive valuable suggestions, which may be applied to our own pharmacopœia."

Dr. Wulling stated the matter referred to by Mr. Raubenheimer was one of the subjects the International Pharmaceutical Congress has before it and he thought a proper solution of the subject could be brought about in time.

President Beringer stated he believed the American Pharmaceutical Association had a committee that was giving attention to this matter. The question of titles was one that was prevalent, but there was, nevertheless a practical side of that question. He stated that every pharmacopœia has been made to suit the medical practice and customs of its own country. Now, to change the title under which mixed drugs are to be prescribed in a country, is likely to cause confusion, and he believed the U. S. P. has as pure a system of nomenclature as any of the foreign pharmacopœias; that on the whole he believed our titles to be as pure in following a distinct system of nomenclature as any of the pharmacopœias, and to change the title would really be of no benefit but only lead to confusion.

Chairman Cook stated it was interesting to say, in connection with the subject of international agreements, that the present pharmacopœia revision committee has coöperated with the British Pharmacopœial Committee on uniform abbreviations, and that with very few exceptions abbreviations will be uniform in Great Britain and in the United States.

Dr. Wilbert, in answer to a question propounded by Mr. Raubenheimer, stated the present Norwegian pharmacopœia is the fourth revision, published in 1914. The Scandinavian system of nomenclature, which is the earliest, is adopted also in good part at least in the Belgium pharmacopœia, and as Mr. Raubenheimer said, it occurs also in the Dutch. The matter of foreign titles, he thought, was an important one. Personally, he thought it would have been an advantage as an educational factor to include in our own pharmacopœia the synonyms of the most widely used titles.

President Beringer read a paper entitled. "The Review of the New Homeopathic Pharmacopœia." [Printed in February issue.]

CHAIRMAN COOK:—"If there is no objection, I am going to ask that the exhibition of crude drugs be presented next, and following that, the exhibition of preparations. The crude drugs are supplied from the University of Minnesota, and Prof. Newcomb not being able to remain, we will listen to a statement with regard to them by Prof. Wulling."

PROF. F. J. WULLING:—"Mr. Chairman and Gentlemen: The exhibit before you consists of drug specimens grown and produced in the Medicinal Plant Garden and the Medicinal Plant Laboratory of the College of Pharmacy of the University of Minnesota. The time is limited and instead of giving you a formal address on the subject of medicinal plant cultivation, I will speak only a few minutes on the subject.

"The crude drugs exhibited before you are the bases of many of the preparations which will be the subject of discussion immediately following. The exhibit before you is not as creditable a one as we could have prepared had time permitted. The more important of the drugs included in the exhibit are as follows:

Digitalis, U. S. P.
Digitalis lutea
Digitalis ferruginea
Digitalis lanata
Digitalis grandiflora
Datura Stramonium
Datura tatula
Datura Stramonium, stems, powdered
Datura tatula, stems, powdered
Datura metelloides
Datura metelloides, stems, powd.
Datura fastuosa, cœrulea
Datura metelloides, seed, whole
Datura Stramonium, seed, whole
Datura lævis, seed, whole
Datura fastuosa, alba
Valeriana, U. S. P.
Salvia, U. S. P.
Marrubium, U. S. P.
Chenopodium
Levisticum
Belladonnæ Folia
Symphytum Leaves (Adulterant of Digitalis)
Verbascum Leaves (Adulterant of Digitalis)
Althæa Leaves
Taraxacum, U. S. P.
Coix Lacryma, fruits
Humulus, U. S. P.
Cannabis sativa
Capsicum
Inula, root
Coriandrum, U. S. P.
Conium, U. S. P.

"It occurs to me that the exhibit explains itself in a way and that it might be more interesting to you to learn something of the introduction of this kind of educational work into the curriculum of a pharmaceutical educational institution. Those of you who are sufficiently interested to desire information about the drugs exhibited are asked to read the labels on the respective containers. Much information will be found there.

"I have been asked here, whether I think it is proper for a college of pharmacy to undertake the production of crude drugs. I reply that it is perfectly consistent, indeed, I believe essential, for the best and fullest kind of pharmaceutical instruction for colleges of pharmacy to add medicinal plant gardens to their equipment to strengthen the curriculum. We are very careful to emphasize that we do not cultivate medicinal plants in a commercial way, but we do stimulate especially the coming pharmacists to endeavor to prepare for themselves some of the crude drugs which it has been found upon research and experiment to be possible for them to cultivate satisfactorily.

"Our present medicinal plant garden occupies an area of a little over two acres and was begun about five years ago. Our first garden was begun in 1893, but on account of lack of time and money we did not go on with it. A few years later I used a good part of the plot of ground adjoining my residence in the rear, for drug plant cultivation but this did not prove satisfactory. Somewhat later, the University authorities became more disposed to consider a plant-garden and finally were prevailed upon to allow a sum of money for a garden and to designate a site. Indeed, so interested did the authorities become in the project that they insisted that I visit the more important botanical and medicinal plant-gardens of Europe and this country. I gathered much information from the gardens at Paris, Berlin, Marburg, Munich, London and elsewhere. Much of the information thus gained has been used in a practical way at our College. Dr. E. L. Newcomb, who had had some experience in horticulture and greenhouse work, was secured to carry on the work in pharmacognosy and to carry out the plans for the garden. His services have been very helpful along these lines.

"In order to employ the fullest facilities of the garden, a medicinal plant greenhouse and laboratory was erected immediately adjoining the Pharmacy Building and connected with it by a passageway. This laboratory is unique and is the only one of the kind I know of. It is 32 x 61 feet in dimensions, has a full cemented basement, in which are contained a complete milling-plant, consisting of fanning-mills, disintegrators, limited powdering-mill, thresher and sifters, all operated by individual electric motors. Five spacious drug-drying ovens are used in this basement, together with a series of portable steel drug containers. A separate drying room and a root-cellar adjoin the main basement room. The superstructure is the greenhouse proper, the central portion of which is devoted to a pyramid on which are placed the perennial and some potted annual plants. The lantern is high enough to admit of the cultivation of trees, such as a small sized eucalyptus, tall shrubs, etc. Surrounding this pyramid are cement work-tables for sixty students. An aquarium is also provided. The department of pharmacognosy is located in the Pharmacy Building on the side nearest the plant-house so that communication between the two floors of the pharmacognosy department and the plant-house and the garden is most convenient.

"Some of the plant seeds are sown early in March or late in February in the plant-house. At the proper time the young plants are taken from the pots in which the seed was sown broadcast and placed into flats where they are allowed to develop until they are large enough to be transplanted into individual pots in some cases, or until they may be planted in the open in the garden. In the garden the necessary care is given to the needs of the individual

plants to the end that the best possible crop of each is secured. Most of the crop is not ready for gathering until the students return in September. The students do most of the harvesting, drying, assaying, powdering and preserving of the drugs, of course under proper direction and supervision. The work is not done in any haphazard way. In drying the harvest, for example, some drugs are dried by gas heat, others by steam heat. Full data are kept of the moisture before, and at stated times during the drying. The temperature is always under proper regulation. Certain of the drugs are subjected to assay and to other pharmacopœial tests, before they are finally declared ready for conversion into preparations in the pharmaceutical laboratories. We have found that most of the drugs we have undertaken to cultivate, meet the pharmacopœial requirements, and in some cases exceed them. Our digitalis, for example, so far has met, at the end of the first year, all the requirements exacted of the official drug. In this connection, it should be remembered that we begin cultivation in the plant-house early in March. No doubt other regions could demonstrate equally, that with proper care and conditions digitalis could be grown elsewhere in one season that would meet the two-year's requirement of the Pharmacopœia and thus much could be gained.

"This kind of work is, of course, still in its initial stage. So far we have not published any bulletins covering our research work along these lines, but we expect to be able to issue such bulletins soon. The interest in this kind of work is very pronounced. Within a period of about a year following the beginning of our work, we had several thousand letters inquiring how to grow some of the medicinal plants commercially. Some of the correspondents inquired for full information as to how to make a profit of from three to four thousand dollars per acre. We replied to all letters emphasizing the need of more than a mere agricultural training in the cultivation of medicinal plants, and we discouraged them, as we do now, this kind of cultivation by all who have not had some special pharmaceutical or medical training. However, we are advising pharmacists to look into the matter and cultivate some plant drugs We have advised some to cultivate such drugs as peppermint, spearmint, horehound, ginger, etc., even if they have not the courage to cultivate the more potent medicinal plants. There is no doubt in our minds that more money could be made by the cultivation of some of the commoner medicinal herbs, than could be made from the cultivation of potatoes or wheat. The point we emphasize is, that the cultivation of toxic medicinal plants ought not to be carried on by others than pharmacists or by those similarly qualified. We tell the farmers it is necessary for the successful cultivation of such drugs as digitalis, belladonna and stramonium, to have some pharmacologic training. The average farmer has not sufficient qualification without further preparation to cultivate drugs.

"It is not necessary for colleges of pharmacy to have an expensive plant in all cases for the cultivation of the more representative drugs. While we have expended something over $25,000.00 on our department of pharmacognosy, including the plant garden and plant laboratory, some institutions are doing creditable work with a much smaller and less representative equipment. Our beginning was a very modest one, but by perseverance we have finally been able to develop it to a certain degree. We found the greatest difficulty in creating a favorable sentiment for this kind of work among the authorities. When that was overcome, the rest followed naturally. Possibly others would succeed similarly if they made the beginning."

MR. MAYO:—"In view of the very great shortage in our supply of the drugs grown in Europe, it seems to me we ought to pay some attention to the immediate future supply, especially to such as are available in our own fields. I know we have a good many drugs that are indigenous growing in various sections, which we have not cultivated for various reasons. I am under the impression that, at the very high prices which now prevail, we won't have to convince the farmers of the advantage in cultivating some of these drugs. It might be well for this Association to see whether it is not feasible to make good at least a part of this shortage by a collection of indigenous drugs. I therefore move you, as carrying out this idea, that this section recommend to the general session that a committee of five be appointed to investigate the feasibility of a collection of this year's indigenous drugs to supplement the foreign supply, and to take such steps as may seem to them to be proper without incurring any expense to the association. The department of agriculture have issued bulletins on this subject and they might be very glad indeed to coöperate with us.

"I believe this Association should take the initiative and I therefore move you that the section recommend to the general session that a committee of five be appointed to investigate the matter, and if feasible, agitate for the collection of botanical drugs."

CHAIRMAN COOK:—"You have heard this motion, which is a very excellent one at this time because of the very peculiar condition of the market."

DR. SCHNEIDER:—"I second the motion. In addition to this idea advanced by Mr. Mayo in his motion, I would like also to call more specific attention to the advisability of entering into the growing of medicinal plants right here in the United States as a commercial proposition. I have worked out in every detail the growing of belladonna as it should be grown, along the Pacific coast. To this end we have devoted I should say, roughly, about five or six thousand dollars, and I have put into it perhaps some five or six years of my time. So far we have sold perhaps, estimating it roughly, some fifteen tons of belladonna. I think I could get as much as five dollars a pound for belladonna if I had it, but I have not got it. The price of

belladonna in the past has been so low we could not compete successfully. I think the motion should include also an instruction that the committee should look into the cultivation of the plants."

MR. MAYO:—"I will gladly accept that as an amendment."

CHAIRMAN COOK:—"You all understand the motion, I think, that a committee of five be appointed to look into the question of collecting and cultivating indigenous medicinal drugs and other drugs than those indigenous to assist, if possible, in relieving the drug market."

The motion was adopted.

CHAIRMAN COOK:—"The time has come now for the consideration of the exhibit which is before you. I would like to say a word or two about this exhibit, its purpose, the manner of collection of the samples, and the way in which I hope we can gain some benefit from its consideration.

"As you all know, the United States Pharmacopœia, 9th revision, and the National Formulary, 4th edition, are practically completed in their revision. The formulas which are proposed for inclusion, are available, and many of them have been published. The books are practically ready to print to-day. It was suggested that, at this section, we could be of great help to the committee of revision and the members of the association who were present would be very much interested no doubt in seeing an exhibit of the new preparations proposed, and those older preparations which have been modified. With that in view, a number of pharmacists, fifty or more, were asked each to prepare six preparations. We had excellent responses from these requests; I think all but about four, who had legitimate excuses, complied. The preparations on this row represent those made by the pharmacists very recently. The preparations on the three lower shelves are those which have been contributed from time to time by the sub-committees of the Revision Committee to substantiate their reports. Some of them are two, three and four years old. This exhibit was undertaken with a view then of giving the pharmacists here an opportunity to see what these preparations were, for the purpose of trying to clarify a few points which have been severely criticized and also for subsequent exhibition in association work. Anyone who is interested in having this exhibit for one of their meetings this winter, can arrange for it.

"It is the intention here this morning to select from this set of specimens a small group, ten or possibly fifteen, depending upon the time which we have, of these preparations which have been especially discussed, and about which there is some question as to the formula. Reports have been sent in,—quite a voluminous series of reports from all the pharmacists who have made these preparations. I have selected a group of about ten which we will take up first. When these have been given adequate consideration, and it must be limited to ten minutes or we will not be able to get through, we will then take up others if there is any time remaining. If you have any suggestions, may I ask you to write them out now and hand them to me? All of these recommendations will be transferred immediately to the revision committee.

"The first preparation I wish you to consider is the preparation of Syrupus Ferri Iodidi, which has been modified to the extent of omitting the dilute hypophosphorous acid as a preservative. Two samples have been submitted, one from Philadelphia, and one from Massachusetts. I have also a sample by Mr. Beringer. The results are before you. Apparently the new modification is a very great advantage.

"The next preparation I wish to have you consider is Magnesiæ Magma. This preparation was formerly in the National Formulary. It has been introduced now into the United States Pharmacopœia. The formula that has been approved is one that was adopted by the National Formulary Revision Committee before it was known the United States Pharmacopœia would adopt the preparation. I have here five samples made up by this new formula. Has anyone anything to say of this preparation? The new formula has been published in the Journals in the last few years. This is a modification of the present National Formulary formula, and I should be glad to hear anyone discuss this in assisting the Revision Committee to a final conclusion."

MR. HOSTMANN:—"The main objection I have to Mr. Beringer's formula was the long time of washing and the quantity of water required. I do not believe it is necessary to wash with distilled water. If you want a white preparation, it is necessary to have water that is absolutely free from iron. When we were working on it, we took a large quantity of hydrant water, boiled it first and then shook it up with magnesia oxide and magnesia carbonate and let it settle and decant and used it for washing purposes. I have not had any experience with the formula that is proposed for adoption, but I do know that you get a very nice preparation, a very smooth preparation, one that pours easily and stands up very well. You do have to wash a very long while and must be very, very careful that your magma never dries on cheese cloth."

S. L. HILTON:—"The preparation itself is a mechanical one pure and simple, and one that cannot be hurried in its manufacture; the best results I have been able to obtain is by sedimentation and not by straining; straining is liable to make the finished product more or less lumpy so that it will be impossible to obtain a smooth product. Further, the straining process may be satisfactory for a litre or two, but if you make a quantity of the preparation, for instance, forty gallons, how are you going to strain that amount of magma? It is impossible

to handle it in that way. Consequently, for large quantities, sedimentation is far better and I have also found that for small quantities it is equally satisfactory, more cleanly, and gives a better finished product. I use a much stronger solution of Magnesium Sulphate and solution of Sodium Hydroxide. I do not use hot solutions, as I have found by experiment they are not necessary. The condition of the magma formed, is in my judgment governed entirely by the way the solution of Sodium Hydroxide is added and the rapidity of agitation of the solutions at the time of mixing. The strength of the magma as obtained by the formula suggested, that is the amount of Magnesium Hydroxide in suspension, is insufficient, it is far less than the proprietary preparations for the reason that the solutions you start with are not strong enough. The Magma Magnesia obtained by this formula will assay only about five and a fraction *per cent.*, the proprietary will assay six *per cent.* The product I have been making will assay from six and one-half to six and three-quarters *per cent.* and after assay I adjust same to six and one-half *per cent.*

"Unless water free from iron and organic matter, can be obtained it is necessary to use distilled water or the product will not be perfectly white, and some attention should be paid as to the amount of sulphate remaining in the finished product. It is not necessary to carry the washing to the point where all or practically all of the sulphate is removed; a certain definite amount of sulphate remaining in the finished magma has a decided advantage; it assists the laxative action of the preparation and, unless this be excessive, it does not have any unpleasant taste in the finished preparation. I have adopted a standard of my own on this point and every lot made is adjusted to contain a definite amount. I think this should be taken into consideration and provided for."

CHAIRMAN COOK:—"The next preparation is the magma bismuthi. The formula has not been an official formula in any of the standard books. This is now proposed for inclusion in the pharmacopœia. We have a number of criticisms of the formula.

"Dr. Francis can probably tell us something about this phase of the formula."

DR. J. M. FRANCIS:—"Because of limited time I did not intend to offer any suggestions, but as it has been requested by the chairman, I would say that my extensive experience in the manufacture of Milk of Magnesia and Milk of Bismuth warrants the statement that there are several details of the process which demand more careful consideration.

"In the case of Milk of Bismuth, containing the quantities of ingredients specified in the proposed formula, it is a fact beyond dispute that by varying the temperature and the several manipulative details, one can produce a Milk of Bismuth so dense, or in other words, so thick that it cannot be poured out of a bottle having an ordinary mouth, or, on the other hand, a magma can be produced consisting of such a coarse powder that an excessive proportion of water will separate on standing and the product will be wholly unfit for use. The same statement as to the possibility of varying the density of the magma is equally true in the production of Milk of Magnesia.

"I have taken occasion to criticise the formulas for both the Milk of Bismuth and the Milk of Magnesia, to the effect that the maximum quantity of water-soluble salts allowed to be present, is entirely too small. The chief item of expense in the preparation of both of these preparations, is the large volume of distilled or filtered water required for washing, or for the removal of the soluble salts produced by the chemical reaction. If this washing is extended, so as to greatly increase the volume of water necessary, the cost of the water will actually exceed the cost of the medicament employed. Certainly, the washing of the magma should be continued until only traces of the soluble salts remain, but a considerably greater quantity of the soluble sulphates or chlorides should be admitted than is proposed by the formulas which have been offered for adoption. What harm could possibly result either to the stability of the preparation or to the patient using the Milk of Magnesia or the Milk of Bismuth, by the presence of traces of soluble chlorides or sulphates?

"In this connection, it is also well to consider the great variation in the content of hydrated oxide of magnesia on the one hand and hydrated oxide of bismuth on the other, in the several preparations now very widely marketed by different firms. There should be some uniformity, and while the degree of concentration should be placed reasonably high, it should also be kept within the limits of economical production.

"Another fact brought out by Prof. Cook, in the previous discussion, is the question of indicating the value of these two preparations in terms which are comprehensible to the average physicians. While a statement to the effect that each ounce of Milk of Bismuth contains a given number of grains of hydrated oxide of Bismuth is scientifically correct, it means little to the average doctor. Physicians seldom or never prescribe the oxide of bismuth; this is not a commercial article. They are, however, entirely familiar with the dose of subnitrate of bismuth, and if we state that each dram or each ounce of milk of bismuth is equivalent to ——— grains of bismuth subnitrate, they can easily determine dosage.

"It should also not he forgotten that in the process of manufacturing, milk of bismuth should always be left distinctly acid in reaction, as otherwise it will shortly revert to the alkaline or neutral state, and in this condition will rapidly discolor on exposure to light. Sometimes even a dark mirror of reduced bismuth will cover the entire inner surface of the bottle."

CHAIRMAN COOK:—"The next preparation is the solution of iron albuminate of the National Formulary. I will ask Prof. LaPierre his difficulty."

PROF. LAPIERRE:—"My difficulty was in reference to the addition of sodium citrate. I had no difficulty at all in the solution of albumen or in the addition of iron to the albumen. But at the time of the addition of the sodium citrate the precipitation of the iron occurred and it would not go again in solution notwithstanding all sorts of arrangements to coax it back into solution again. I tried it with a smaller quantity of sodium citrate with no better results. I am open to instruction along that line. I believe that is going to be the trouble with that preparation."

CHAIRMAN COOK:—"Anyone else have a suggestion to make in regard to this difficulty? I might say that the National Formulary Committee in preparing this formula have found it necessary to advise that the iron oxychloride be freshly made and used immediately."

PROF. LAPIERRE:—"I made the oxychloride fresh and we had no difficulties with that same iron in the preparation of peptonates."

CHAIRMAN COOK:—"The next preparation is one which has been causing discussion back and forth during the entire revision work of the pharmacopœia. There is the much mooted question of soft soap, one made from cotton-seed oil, the other from linseed oil. The subcommittees that have had this preparation in charge have unanimously agreed—probably I should not say unanimously—but the committees have all agreed to introduce the cotton seed oil soap. I personally believe it to be a great improvement over the other formula. We have here samples of the U. S. P. linseed oil soap and the proposed cotton seed oil soap.

"The chief objection to this formula is that the claim is made that it is not as detergent. Is there any discussion on this subject. I know that the cotton seed oil soap particularly has been used very extensively for a number of years by some larger users, and it has proven very satisfactory.

"If there is no discussion, the next preparation is compound solution of cresol, which has caused very much criticism. The present formula as now proposed for the pharmacopœia, calls for the saponification of linseed oil, making linseed oil soap, and the subsequent solution of that in cresol."

PROF. SCOVILLE:—"In other words, you will find that cresol is as good a solvent for soap as alcohol, if you dissolve your oil directly in the cresol and then add the alkali solution; saponification takes place in the cold, and that quickly. But you cannot use the preparation at once because you find that it clouds when diluted. It does not mix immediately. The difficulty there is that the saponification is not complete, although your solution looks perfectly clear. You can remedy that, if you choose, by heating it, but if you do that you darken your preparation. In order to get a light colored preparation it is necessary that you should let it stand."

CHAIRMAN COOK:—"The main argument in the committee against the use of directly dissolved soap, was that large variation was found in the soft soaps in the market and it was feared they would not be official soft soap. That led the committee to recommend the making of the soap. Again, I believe an inference would be permitted here, by the clause in the pharmacopœia to use a soft soap as a starting point, if we know the end point is all right."

MR. I. A. BECKER:—"I have had no complaint from the doctors, or in making a perfect preparation so far as its pharmaceutical preparation is concerned, by simply taking the cresol in equal weight to the soft soap and stirring it up and letting it stand twenty-four hours to thirty-six hours, when it readily dissolves. I might add that that thick solution readily goes through filter paper."

CHAIRMAN COOK:—"If there is no further discussion we will go to the next preparation, Glycerite of Bismuth.

"I have understood that Prof. Scoville has made a special study of this preparation, and we will be glad to hear what he has to say."

MR. W. L. SCOVILLE:—"The suggestion I made on the preparation, is that according to the present formula there is a loss of ten to twenty *per cent.* of your bismuth. Still, of course, it is an official preparation. The loss comes from the fact that in the very acid mixture that is first obtained,—not solution but mixture—after the bismuth is dissolved in nitric acid, we add tartaric acid, and then bicarbonate of soda, and we get a heavy precipitate of bismuth tartrate. That is supposed to carry down all the bismuth, but it does not. The solution is entirely too acid, and my modification simply calls for the addition of some bicarbonate of soda so as to throw down as much as possible of the bismuth. I have never been able to get it all down. The formula makes that loss within five *per cent.*, that was as close as I was able to make it. The formula, as submitted, would probably make nearer to 950 cc. instead of 1000."

CHAIRMAN COOK:—"Anyone else have anything to say with regard to this preparation of Glycerite of Bismuth? (No response.)

"The next preparation is the elixir of the phosphates of iron, quinine and strychnia. This preparation has received merited discussion *pro* and *con*. The formula which is proposed is one submitted by Mr. Beringer at the meeting of the New Jersey Pharmaceutical Association some time ago. There has been another formula proposed by Prof. Caspari, which is a modification of the one now official, which requires no neutralization. It is allowed to re-

main acid. But the chief objection to the formula of Mr. Beringer is the tendency to darken slightly. At temperatures such as we have here this morning, the preparation is a very beautiful one. It is made quickly. It does not vary quickly in color; it is recommended to be kept in amber colored bottles, but as soon as the temperature reaches that of ordinary fall weather, precipitation occurs in some instances.

"I have put it directly on the ice and you see the precipitation.

"The Caspari formula has the same precipitation. I have had them both on the ice. So we have the peculiar situation of having two formulas each having the same objection.

"Here is another of the Beringer formulas proposed, showing the precipitation. I will be glad to have some discussion on this point."

MR. W. L. SCOVILLE:—"There is no more delicate or troublesome formula in pharmacy today than that of the elixir of phosphates of iron, quinine and strychnia. It is a very easy thing to make a preparation that will look good for a week or two, or a month or two; it is another proposition to make one that will stand for a year or two, and stand changes of temperature and exposure.

"There are two or three things about that formula that I do not think are very much understood. One is the action of light on the ferric salt, particularly in the presence of citrates. So I ask, is it understood that light causes the decomposition of citrates by ferric salts? A normal citrate will entirely be decomposed by the ferric salt if it is exposed to the light. That is one reason why that elixir should never be put up in a white bottle, no matter what your formula is.

"Another difficulty is, that if you get in an organic acid in the presence of quinine, you have some of your quinine changed to a poisonous form, quinotoxin. It is the explanation of some disintegrations of quinine, perhaps,—troublesome reactions; illness after taking quinine. It occurs in the presence of quinine with organic acids. With mineral acids you are not likely to have any difficulty.

"One of the difficulties in the past, of course, has been the presence of sugar. You cannot put sugar in a preparation of that kind without it darkening. The new formula uses glycerin, which is a decided advantage.

"The action of light, the influence of quinine and the acidity, all have an important bearing on that preparation. I think I have made, without any exaggeration whatever, 200 tests of formulas for elixir of phosphates of iron, quinine and strychnia. The more I make the more I respect that preparation. It has got me guessing. I do not feel discouraged over it, however. I expect some day to have something that is really worth while. I do not know whether I have it now or not. It takes time to find out. The difficulty is, I cannot find out for a year and a half whether I have what I expect or not. I thought I had it six months ago, but some difficulties came up. I have some more standing. I have some standing in a wooden box outside my window. It is going to stand there all the time, through summer and winter. The only thing I exclude is the light. Any formula that would stand the light would not be a ferric solution; you might make a ferrous solution."

DR. WILBERT:—"I believe an immense amount of time and money has been wasted on this preparation, and for no real good reason.

"A number of years ago Prof. Diehl introduced in the National Formulary his well known formula for elixir of pyrophosphate of iron, quinine and strychnia. This preparation is easily made, can in fact be thrown together, and will keep almost indefinitely without much change. I think we have devoted altogether too much time to the fetish that the ingredients must be present in the form of phosphates. The elixir of pyrophosphate is readily made and will stand fairly well."

MR. W. L. SCOVILLE:—"I would like to call Mr. Wilbert's attention to the sample of elixir of pyrophosphate of iron, quinine and strychnia on the case there."

CHAIRMAN COOK:—"Any further suggestions about this preparation? I would be very glad to have the help of the members."

"All these criticisms, I hope you understand will be very carefully noted and referred immediately to the committee on revision.

"The next preparation is the new aromatic fluid glycerate of cascara sagrada. I have three samples here. This is a new preparation and is here for your observation.

"The next preparation is the tincture of ferri citro-chloridi of the National Formulary, the basis of the making of elixir iron, quinine and strychnia without the phosphate. There was considerable criticism of this formula. It will be referred to the committee on revision."

MR. WM. A. HALL:—"Having had this work in hand I did not expect any particular trouble, but I was particular in getting a solution of chloride of iron for my base that was strictly U. S. P. and with a gravity of 1.310. Using that as the basis, taking the requisite quantity of sodium citrate called for, 425 grammes, I found I did not have a green but a brown solution. Of course, I knew I did not have enough sodium citrate. I kept on adding until I had added 100 grammes, making 525 grammes, to make the reaction complete as shown by the emerald green color. Then I took another sample of solution of iron, which had a gravity of the 1890 U. S. P., namely, 1,290, and found 425 grammes sodium citrate was practically enough. I added 20 grammes more, but the little difference might be simply the little variation in reading the gravity. I would not criticize it on that score. But with the

specific gravity of 1.310 it certainly required more sodium citrate. Then I began looking it up and sent the memoranda of the details to our Chairman for action before the National Formulary Committee.

"With the gravity of a solution of iron of the last pharmacopœia, the trouble is that we have increased the gravity or the strength of the solution of iron in the present pharmacopœia beyond that of the last and we have not changed the quantity of sodium citrate. That is the whole substance of it. So that it would seem as though it will have to be threshed out a little more; that the sodium citrate will have to be increased."

MR. F. M. APPLE:—"That was my experience in making up the preparation."

CHAIRMAN COOK:—"The next preparation is a new preparation for the National Formulary, a compound solution of phosphates. This preparation was made with the intention that it would form a stable concentrated solution for the making of a number of other preparations which call for phosphates; notably the syrup of phosphates.

"I have samples here made over a year, and one made more recently, and quite extensive criticism of this formula by Mr. Hensel of Denver, together with criticism from Dr. Englehardt of Baltimore. The criticisms will be referred to the National Formulary Committee. Has anyone anything to say about it?

"If not, the next preparation is the syrup made from this solution, which is also here for you to see, showing quite a striking difference in the two preparations made by the two men.

"The next preparation is the tincture of cudbear of the National Formulary. This preparation has been the cause of probably more discussion in the National Formulary Committee than any other one preparation. The preparations are here before you with some notes with regard to difficulty in percolation, which has been the old story in regard to this preparation.

"The next preparation is an antiseptic solution of pepsin. This preparation received considerable comment when it was published in the Journal a number of years ago. It is a stimulating antiseptic wash for wounds, I believe."

DR. WILBERT:—"There is nothing to say except that it is a wash used for cleaning and flushing wounds. It has been used extensively in surgical practice and with satisfaction. We have made it at the hospital for a number of years and it has been used there and in other places. It is not intended at all for internal use."

MR. EDSEL A. RUDDIMAN:—"What effect has the antiseptics on the action of pepsin? Do they interfere there with the digestive action of pepsin?"

DR. WILBERT:—"Possibly they do, but we make the preparation up fresh. It is never kept more than a couple of months. The loss in activity is not material and we have never had any complaint from it, at least not in my time."

CHAIRMAN COOK:—"The next preparation is the syrup of hydriodic acid. The formula is here rather for you to see than to comment upon specially. I might say that glycerin has been omitted in the preparation of syrup of hydriodic acid. This was originally proposed but found to be objectionable. The formula is modified to this extent. This is practically the same as the present U. S. P. excepting that the amount of hydriodic acid is slightly increased so that instead of one *per cent.* I think we will have about 1.25 *per cent.* present. It is also made up instead of by weight, by mixing volumes.

"The next preparation that I have on my list is solution of magnesia citrate. Unfortunately, the sample was broken in transportation. I have had a number of criticisms. Anyone who would like to say anything about the newly proposed formula for solution of magnesium citrate?

"If there is no discussion, the next preparation will be elixir of phosphorus. The preparations you have before you. The old criticism that has come in, is that they prefer the old method. The formula itself is probably satisfactory.

"That concludes the preparations that I had specifically selected in filling out the program as I had planned it.

"I would now ask for the reading of the paper on zinc oxide ointment by Mr. Ernest R. Jones."

A NEEDED CHANGE IN OINTMENT ZINC OXIDE, U. S. P.

ERNEST R. JONES, PH. C.

It is a well-known fact that this ointment, after standing for a little while, becomes very granular and is anything but a sample of pharmaceutical elegance.

Most of the previous papers on this subject have ascribed the cause as due to the zinc oxide or to faulty compounding of the formula, and have suggested changes in the manipulation of the present formula which were expected to produce a permanently smooth ointment.