

## Contributed and Selected

### STATE BOARD OF PHARMACY EXAMINATIONS.\*

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At the meeting in Denver a year ago a resolution was passed authorizing the appointment of an Advisory Committee of three to investigate the status of examinations among the various State Boards of Pharmacy, with the end in view of determining the conditions under which reciprocal registration among them could be furthered.

Mr. Charles Geitner, of the Missouri Board of Pharmacy, Mr. E. L. Brandis, of the Virginia Board, and myself, representing the Illinois Board, were honored by appointment upon this committee. I was doubly honored and greatly obligated by being chosen its chairman. Representing my fellow members, it now becomes my duty, as well as my pleasure, to report to you the results of our work.

At the risk of provoking your impatience at delay, we are moved to observe here that, in our opinion, the action of this body in adopting the Dodds resolution, looking to the establishing of general reciprocity, will mark an epoch in pharmaceutical progress in this country for the present century, not alone as a piece of legislation national in its scope, but as a basis upon which the entire profession will be elevated. For just as soon as you bring men together from different sections of a great commonwealth to discuss a common subject, to exchange ideas, to promote a common cause, just so soon will the cause in which they are interested be raised above the common level. The art of printing, ready and rapid means of travel, the telegraph and telephone—all hailed as the great promoters of civilization—were and are such only because they make the easy exchange of ideas among men possible. The struggle for a standard of qualification upon which general reciprocity may be based will serve to crystalize our ideas of what our profession should be, will modernize methods and standards long since antiquated, and will aid in putting the ancient and honorable profession of pharmacy in the front rank of the scientific professions, where it rightfully belongs. It is needless to add that the great public, by whose grace we exist, and for whose benefits our efforts should be maintained, will profit thereby.

It will do no harm to note, in passing, that this is the first of the scientific professions to take such a tangible step to abolish state lines in the legal recognition of its qualified membership.

Since its appointment, your Committee visited several of the state boards during their examination periods to observe the work of each board, study its questions, note the method of conducting its examinations and to determine as

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far as possible how much of the work of any given board might be suitable for all boards, or rather to determine what changes, if any, might be necessary to make the work of any board acceptable to the other boards on a reciprocal basis. Your Committee also studied the published questions of boards not visited. It is to be regretted that, for lack of time as well as lack of funds, only the following could be visited: Illinois, Missouri, Nebraska, North Dakota, Ohio, Virginia, West Virginia, Kansas, and Arkansas. It is to be hoped and expected, of course, that in the future work of this Committee all the states may be visited.

Now, it needs no argument to convince you that before reciprocity can be permanently or satisfactorily established, the qualifications upon which registration is based must be fairly uniform and acceptable to all the states. As in practically all the states registration is based upon examination, the attention of your Committee was directed to the subjects embraced in the examination, the character of the questions, etc. It is not the purpose of this report to either criticise or praise any state board. Each one has many commendable points and all have something to condemn.

Whatever may be the criticism or suggestions here presented, let it be understood at the very outset that no exemption is claimed by the boards represented by members of this Committee. Speaking personally for the State of Illinois, I found as a result of my visits to other boards that there were several things in our examinations that we could change to advantage.

In general, we found as regards examinations a marked lack of uniformity—a lack of uniformity that must be corrected before satisfactory reciprocity can be established. This condition we expected to find. It would be strange were it not so; hedged in as we are by state boundaries, inheriting as we do the precedents and practices of departed boards, proud and jealous as we are of our state rights, ignoring if not resenting outside suggestions, it would indeed be remarkable if uniformity were the rule. Even in the individual boards we did not always find uniformity in the character of preparing questions. Some may even have hobbies—it may be stereoisomerism in chemistry, the cultivation of leeches in pharmacy, the antidotal treatment of yohimbine in toxicology, or the treatment of “sleeping sickness” in therapeutics. But whatever it may be, the composite questions do not always make a harmonious examination. In some boards, we found an overlapping of subjects—each member apparently ignoring what the others were giving. In other boards the examinations were long and exhausting—the examiner trying, it would seem, to go over the entire subject with a fine-tooth comb, while in still others, the questions were so brief as not to admit of thoroughness.

One general criticism that can be made of nearly all examinations is an absence of proportion among the various subjects and a lack of proper distribution of the questions of each subject over that subject. To illustrate, I have seen examinations where toxicology and posology seemed to be the dominant subjects, and where the questions in chemistry would be concentrated on physiological chemistry. Toxicology, it is admitted, is an important subject, but not more so than pharmacy, and urinary analysis should not crowd out either general or organic chemistry.

Now, these criticisms are not made carpingly. We simply want to show the conditions that exist and to point out that they are incompatible with the object at which we aim. The case must be diagnosed before it can be treated. Before suggestions are permissible, it must be shown that they are necessary.

You might be led to believe from the tone of this paper that the examinations are all wrong. Not at all. We do not need to discuss the things that are right. Our laws, our religion, our entire civilization, in fact, are fabricated to correct what is wrong.

The points upon which your Committee wishes to report may be fittingly discussed under three heads. Criticisms and recommendations will be made under the appropriate head, except such general recommendations as may appear in the summary. These topics are:

- (1) Subjects embraced in the examinations.
- (2) Character and scope of the questions on each subject.
- (3) Weight, significance or emphasis attached to each subject in its relation to the other subjects.

First, we found the following subjects covered:

Chemistry, including General, Qualitative, Quantitative, Organic, Inorganic, Physiological, and various combinations of the foregoing, under the head of Pharmaceutical Chemistry.

Materia Medica, embracing Pharmacognosy, Therapeutics, Botany, Posology and Toxicology. Sometimes the last two subjects were presented in separate papers.

Pharmacy, including both theoretical and practical.

Pharmaceutical and Chemical Problems, given in Illinois as a separate paper, but in the other States scattered throughout the other subjects.

Dispensing, both Theoretical and Practical, including Incompatibilities.

Identification and Oral:

In some States, but in none of those visited, Bacteriology and Physiology are also given.

Your Committee recommends the following as the subjects upon which examinations should be based for reciprocal registration:

(a) Chemistry, including General, Qualitative, Quantitative, Organic and Inorganic, or any combination of the foregoing, known as Pharmaceutical Chemistry, as one paper.

(b) Pharmacy, including theoretical and practical, as one paper.

(c) Materia Medica, embracing Pharmacognosy, Botany, Therapeutics, Toxicology and Posology, as one paper.

(d) Pharmaceutical and Chemical Problems, or Arithmetic, to be given as one paper or distributed throughout the various subjects. We consider this a very important subject. Whether because of a decline in the teaching of arithmetic in our public schools or whether the colleges do not or cannot teach arithmetic, we cannot say, but we know from our experience as examiners that there is a woeful lack of knowledge in this subject on the part of candidates for registration. When you consider the daily use of this subject in the drug store in calculating parts to be used in manufacturing or dispensing, in calculating doses and in the ordinary commercial transactions, you will agree that it is the duty of examining boards to see that their licentiates are properly qualified.

(e) Dispensing, both practical and theoretical. We regard this subject worthy of a separate branch. If there is any particular thing in pharmacy for which a druggist needs training it is dispensing. In fact, it is in some places the last remaining shred of professional pharmacy. If we are to license clerks to serve both employer and public as they should, how very important that we *know* from personal observation of their work that they can actually dispense as they should! Written work is not sufficient. Many a "quiz-compend" graduate can put a "crimp" in any reasonable set of written questions in dispensing, and yet that same candidate, in many instances, cannot dispense quinine capsules with as much quinine inside the capsule as he puts on the outside.

(f) Co-equal with Dispensing, we look upon the Oral Examination as the means of testing a candidate's absolute fitness for registration. Get him in front of you, run over the same range of questions as is given in the written work and see how he handles himself. Here is one place where he can't run in a "pony" on you or translate the shorthand on his cuffs. We maintain that the competent examiners can tell more from an oral quiz than from all the written work. It furnishes the greatest safeguard against the registration of incompetents.

*Character and Scope of Questions.* This is one of the most difficult subjects to handle, as well as the most important, for upon your questions hinges the success or failure of your examination.

What is the purpose of an examination? Obviously, to test the examinee's knowledge of any given subject or his fitness to do a given thing and an examination must do that very thing absolutely or fail in its mission. An examination should not be to shut out as many men as possible, though there are examiners, we think, who hold that view. The attitude of a board member toward the candidate should be that of a friend who desires his success, but who, as a just friend, insists on his measuring up to a certain standard, and who is happy when the candidate succeeds. The questions should not be obscure or obsolete. They should be fair, honorable questions, touching upon the most important parts of the work. Neither "snap" questions or "catch" questions should be tolerated. Questions should be written so that there will be no doubt as to their meaning and susceptible of only one interpretation. Not easy to write, you say? True, but more of that later.

We have agreed, let us assume, upon the subjects enumerated above. Your Committee, therefore, suggests the following number and distribution of obligatory questions:

(1) **PHARMACY.** Twenty questions. Much care must be used to properly distribute the questions. Assuming twenty questions, about ten should be allotted to the Galenical Groups, such as Waters, Solutions, Fluidextracts, Tinctures, Pills, Powders, Plasters, Suppositories, etc. Some of these questions should be allotted to the N. F. preparations—preferably to those N. F. preparations that do not find a counterpart in the official groups.

(2) Questions to non-metallic mineral preparations, such as the mineral acids, sulphur, Halogens, etc.

- 2 questions to the metallic salts and compounds.
- 2 to the Oils, both fixed and volatile, fats soaps, etc.
- 1 to the Animal drugs. 1 to Alcohols, aldehydes, etc.
- 1 to Coal Tar and synthetic preparations.
- 1 to the organic acids, sugars, etc.

This is of course purely suggestive, the object being to obtain an equitable distribution of the questions according to the number or importance of the compounds represented by the different groups.

It will be noted that no mention is made of the definitions that ordinarily pertain to pharmacy and pharmaceutical operations. These are omitted because they are ordinarily covered in the assistant's examinations that are given in many of the States.

The subdivision of the questions will permit, of course, a wider range than this outline indicates.

(2) **CHEMISTRY.** Ten questions which should be distributed about as follows: Four in general Inorganic. Two in Qualitative, two in Quantitative and two in General Organic.

(3) **MATERIA MEDICA.** Twenty questions, distributed as follows: Toxicology 5, Posology 5, Botany and Pharmacognosy 5 and remainder 5. These questions may be subdivided or compounded, i. e., several topics covered in one question. For instance, in asking about Belladonna, it would be quite logical to ask for the botanical characteristics, use, dose, antidote, part used, etc., in one question, it being necessary to maintain only the right proportion.

(4) **PHARMACEUTICAL AND CHEMICAL PROBLEMS.** Ten questions, with subdivisions, distributed as follows: Weights and Measures 1, Thermometry 1, Alligation 1, Percentage 1, Specific Gravity or Specific Volume 1, Dosage 1, Chemical Problems 2, Commercial Problems 2. It is easy, of course, to combine two or more of these in any one problem, which will then permit of a greater range and variety of questions. If these problems are not given in a separate paper they can be distributed throughout Chemistry, Pharmacy, Materia Medica and Prescriptions.

(5) **PRESCRIPTIONS.** Four, which should cover the usual range, such as Emulsions, Pills, Suppositories, Ointments, Solutions, Washes, Mixtures, Official Preparations, etc.

In preparing a set of prescriptions care should be exercised in the selection of ingredients which will test the ability of a candidate to properly compound. For instance, in compounding a prescription calling for capsules to be made from a mixture of sodium bicarbonate and powdered aloes, a skillful candidate will have no trouble in producing a capsule without a particle of the mixture adhering to the outside.

Furthermore, if a pill was to be made from a potent drug such as mercuric chloride, along with, we will say ammonium chloride, neither of which contain any of the properties needed to make a good pill mass, a candidate would show his ability as a good pill-maker by his choice of excipients in order to get the proper size and consistency.

Another illustration would be a prescription calling for an ointment to be made of opium, lead acetate, tannic acid, extract of belladonna and wool fat. A prescription of this kind requires more or less knowledge of the general properties of drugs as well as manipulation to compound satisfactorily. The extract of belladonna should be made into a paste with dilute alcohol, and the paste mixed with some of the wool fat. The tannic acid should be dissolved in a small amount of water and likewise mixed with another portion of the wool fat. The lead acetate should be dissolved in a few drops of water, or reduced to the finest powder, and it and the opium each separately mixed with portions of the wool fat. The four separate ointments should then be combined to form one smooth homogenous ointment containing all the ingredients. The finished product should be a perfectly smooth, greenish-brown ointment, free from lumps or grit.

(6) ORAL. No number of questions can be assigned here, because cases will vary. The examiner should have a good range of questions (they may be conveniently written out on cards), or otherwise he will soon find himself running in a "rut."

Relative to the subdivision of questions, care should be taken lest so many divisions be made that the candidate will be burdened beyond reason. Your committee has seen questions where there were ten subdivisions, making a total of one hundred distinct answers necessary on a paper of ten questions. By carefully wording the questions the same information of the candidate's knowledge could be elicited by having not more than two subdivisions. In general, we think, two subdivisions of any question is ample.

We do not require the marathon runner to cover his twenty-five mile course twice to prove he is a qualified sprinter. Then why give a candidate "writer's cramp" by making him tell us that Couch Grass, Dog Grass, Goose Grass, Knot Grass, Quick Grass and Quitch Grass are all our old friend *Triticum Repens*?

As to the character of the individual questions, that will depend wholly upon the examiner coining them. And right here is the meat in the nut. Upon the character of the individual questions rests, mainly, the quality of your examination. Any scheme or recommendation of your committee is of no avail so far as the *quality* of the question is concerned. Any distribution of questions will avail but little unless the questions are right. To use an old phrase, more expressive than elegant, perhaps, "You cannot make a whistle out of a pig's tail." An examiner can or cannot write proper questions. Much like the ability to write poetry, we believe, proper question writing is more inherited than acquired. No rule will help much.

*Relative Weight or Significance of Various Subjects.* We have already referred to the lack of proportion among the various subjects found in different examinations. It is unfair, of course, to give a relative minor subject dominant importance in an examination, but such sometimes proves to be the case. It comes about in this way: One examiner on the board may be given a minor subject, but consider it of major importance. The man having the major subject may be indifferent as to the importance of his subject, or may be incapable of preparing a superior set of questions. He may be weak in that subject. The result will be an examination without proportion, strong where it should be weak and weak where it should be strong.

Your committee recommends the following as the order of importance of the subjects of examination: Pharmacy; *Materia Medica*, embracing Toxicology, Posology and Botany; Chemistry; Dispensing; oral Pharmaceutical and

Chemical Problems. Cognizance is given to the relative importance of subjects in an examination by nearly all civil service bodies, where different subjects are given different weights to total a hundred. In the Federal Civil Service examinations in Pharmacy, for instance, the order runs about as follows: Pharmacy 40 units; Chemistry 20 units, Materia Medica 15 units; making a total of 75 units. The remaining 25 units being composed of Spelling, Arithmetic, Penmanship, Letterwriting and Bookkeeping, each 5 points.

We do not know that it is either practicable or advisable at this time to attempt a numerical proportioning of the various subjects. We are inclined to think not. In a state board examination, it is not always satisfactory to have one examiner giving a paper carrying a much greater numerical weight than another examiner. It might lead to internal complications. Precisely the same results can be obtained by proportioning the hardness or difficulty of the questions. If Pharmacy is the most important, make the questions in this branch the hardest. If Arithmetic is the least important, let the question on this subject be relatively easy. In the State of Illinois (which, by the way, I am not putting forth as a paragon of perfection), we have made it a practice to exchange our tentative questions. Each member goes over the questions of the other members, pointing out possible errors, improvements, and changes. In this way, each member of the board can see where his questions duplicate or encroach upon the questions of another member. When the author of any particular set of questions has his set returned to him, with the criticisms and comments of all the other members of the board, he is then in a position to prepare a much better set. These criticisms are not always favorable, but each member understands the spirit in which they are made and the results have been very satisfactory.

*General Character of Questions.* There is another point that has not been referred to, which may be pertinently considered at this place. It is the relation between the board of pharmacy questions and the accepted courses in pharmacy covered by the standard schools or colleges of pharmacy. We realize that we are treading on thin ice when we open this subject, but we think it our duty to consider it. A student of board questions and college curricula is not very greatly impressed by any intimate relations between the two. He is still less convinced of an intimate relation if he gets outspoken board members and college professors to express their opinions of each other's work. We are not here to argue either side of this question. Both are partly right and both partly wrong. One thing we are convinced of, however, and we think you will agree with us, is that there is not the intimate relation between the board questions and the college courses there should be. The record of college graduates before the various boards of pharmacy proves this conclusively. We are not blaming either side. We only say that it is bad for both. We consider it a very bad thing for the colleges to have their graduates fail in board of pharmacy examinations. It is likewise a bad thing for boards of pharmacy, representing the public and protecting its welfare, to have what should be the cream of the profession, the college graduates, fail in examinations.

In but few states is graduation from a recognized college or school of pharmacy a prerequisite for registration. A bill to this effect recently failed in the State of Illinois. It will be a long time before all the states have such a law.

Certainly it will not be in our generation. Yet all the states have examining boards that attempt to sort out the fit from the unfit. Whether you believe in compulsory graduation is not the question. You will admit, we believe, that the same man with a college education will make a better public servant than without it. But what inducement is there, we ask, for a young man to take a college course of pharmacy if failure before his state board is as probable as improbable? We hold that this condition is unfair to the young man or woman who aspires to enter our profession. We want to go on record here as being on the side of the clerk of today and the proprietor of tomorrow. Is it fair to a young man to compel him, as is done in some states, to get his degree and then require him to pass an examination for which his course has not fitted him? Is it any inducement to a young man to fit himself with a college course when he knows that he has no more chance of passing a board of pharmacy examination than the "quiz-compend alumnus?" We submit that this is a condition that requires remedying.

*Suggestions.* Your committee believes that such changes as are necessary to bring about a more uniform standard of examinations can be made without any radical departure on the part of any state board. There may be some instances in which the laws of a state prohibit such changes or render them difficult, but we are firmly of the opinion that once it be shown to any legislature that the status of pharmacy in its state will be raised by such change, prohibitory laws will be repealed or laws permitting reciprocity be enacted. Your committee is thoroughly convinced that once reciprocity becomes established that the standard of the profession will be automatically elevated.

As a means of bringing about uniformity in examinations, we suggest that it might be well for the members of this Advisory Committee, whomever they may be, to be clothed with authority to prepare one hundred examination questions in each of the branches herein recommended. These questions could be printed, with proper keys, and furnished to any board of pharmacy desiring them. From these one hundred questions board members could select the requisite number in each branch. Your committee does not want to interfere with the examinations of any board of pharmacy, and hopes you will not construe this suggestion as meddling in any way, shape or form. Such action would be purely advisory and no board of pharmacy would be obliged to select its examination questions from these printed lists. We venture the statement that there is not a member of any board of pharmacy at this meeting who, when pressed for time, would not welcome an entire set of questions, with key, that he knew were academically sound.

Again, it may not be out of place, or assuming to dictate, to suggest that examining boards desiring to do so might send contemplated questions to the Advisory Committee for criticism in the proper spirit and helpful suggestions.

We are taking the liberty of referring to a few examination questions, selected at random, and which were apparently not properly censored.

In a set of Chemistry questions we find the formula for Magnesium Hydrate given as  $Mg(OH)$ ; Strontium Bromide spelled *Strontum*, and Glucoside spelled *Glucocide*. The same paper asks for the reaction between two molecules of Sulphuric Acid and an Atom of Metallic Calcium. Since when did the

action of acids on the metal calcium become of pharmaceutical importance? At the top of the same paper, the candidate was cautioned that correct spelling would be considered in the rating.

In another set, the examinees were asked in one question to tell from what and *how* the following were obtained: Acetone, Cellulose, Amylum, Glucose, Eucalyptol, Terpin Hydrate (spelled Terpen), Benzoic Acid, Pyrogallic Acid, Cacao Butter and Milk Sugar. I wonder if the examiner realized just how much writing it would entail to tell *how* these were obtained—granting that the candidate knew. Truly, a Marathon answer. In that same paper Iodum was spelled Iodium—a curious combination of the Latin and English spelling; Creosote was spelled Creasote, and Hydrocyanic was spelled Hydriocyanic, while at the top of the page the candidate was instructed to “writ” on one side of the leaf.

These mistakes are not as serious, perhaps, as asking for the “alkaloids” of digitalis, or from what plant the “alkaloid” salacin was obtained, but many a bright student must have had a quiet laugh after the examination over these typographical errors. If we demand accuracy in the answers of our candidates we should at least set the example in our questions. Such mistakes, if excusable, are hardly necessary. If these questions had been revised by other board members or by an Advisory Committee, the errors would have been detected before the papers were printed and the board member who prepared them would have been spared humiliation.

*Conclusion.*—In concluding our report, perhaps we should apologize for the small amount really accomplished. However, you cannot change in one day or one year what has been established for a quarter or half a century. It would not be advisable to do so even if you could. We feel that a start has been made and made in the right direction. Interfering laws, customs, precedents and prejudices will give way when the truth is pointed out. We are standing on the threshold of an epoch-making period. We are living in an age of rapid progress. Social, business and political evolution, if not revolution, is going on about us. The forces of man are being wielded as never before to help his fellow man. Never in the world's history have the resources of medical science been used as they are today to prevent disease and remove its causes. Yellow fever has been stamped out, smallpox no longer terrorizes, and the great white plague must soon yield its intrenched ground. To further this great liberation of the human race from disease and suffering, new men as well as new means are being created. Shall we stand idly by and let others shoulder the burden? Or shall we take our place on the firing line—where we rightfully belong—with those who are fighting the great battle of the race and aid in the cause by producing better pharmacists by means already pointed out as feasible?

We ask you to join us in giving better examinations which will produce us better men. As an inducement and a reward to pharmacists—be they clerks or proprietors—who attain the new standard, let us wipe out the artificial barriers that prevent the free flow of qualified men from one state to another. Surely the day of provincial prejudice has passed. We meet here as a national body having common aims, ambitions and aspirations. Let us express our confidence in each other by our willingness to recognize those whom the others have licensed.



Assuredly, the man who can serve as a pharmacist the people of Missouri, can equally well serve those of Indiana, Colorado or Illinois.

We, as individuals, are transient, but the cause and the public we represent are permanent. We are here today and replaced tomorrow. But let us, in our allotted time, at least, keep the cause moving. In order that there may be no mistakes and no regrets, let us adopt a uniform standard of examinations. Make it as high as the majority wills. Let it be such that it *can* and *will* be recognized from Arizona to Alabama, from Minnesota to Maine. Leave it not to those who follow us to say, "They halted when they should have marched. They saw their duty and they heeded not."

H. C. CHRISTENSEN, Chairman,  
E. L. BRANDIS,  
CHARLES GIETNER,  
Committee.

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### THE MICROSCOPIC EXAMINATION OF OINTMENTS.\*

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FRITZ HEIDELBERG AND CHAS. E. VANDERKLEED.

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The value of an ointment depends upon many factors, including such things as amount of active ingredient present, absorbability of the vehicle, etc., but not the least important of these factors is the degree or fineness of subdivision of the active ingredient in the vehicle, generally, though erroneously, called the base. No doubt, the finer this subdivision, the better the ointment will be, the more quickly will it be absorbed, and we have as the ultimate limit of fineness of subdivision those preparations in which the active principle is in actual molecular solution, when on the one hand it is soluble in the vehicle, and those in which the active principle is in colloidal solution or suspension, when on the other hand it is insoluble in the vehicle. Only a small proportion of the ointments, official and unofficial in present day use, however, approach these ideal conditions.

Every maker of an ointment, therefore, should endeavor to subdivide his active ingredients as finely and as evenly as possible throughout the mass, and he should therefore have a means of determining when he has reached the desired limit, or when he can conscientiously consider his ointment fine and even enough to insure satisfactory results. Chemical analysis will of course not suffice, for the active ingredient may be present in ample and correct proportion and yet be present in such a rough suspension, as to be useless or even dangerous, as for example, in the case of an improperly prepared yellow oxide of mercury ointment for eye medication.

The only satisfactory method for determining whether or not the proper degree of subdivision has been secured is by means of the microscope. The U. S. P. requires that mercurial ointment shall be rubbed until the individual globules of mercury are no longer visible under a lens magnifying ten diameters. But if still better and more nearly uniform results are desired, and who shall

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\*Read before the Pennsylvania Pharmaceutical Association, June, 1913.