

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

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DEPARTMENT.

Editor's Note: Some of us may think that the old days when we were compelled to teach incompatibilities for hours on end have gone and we need to give little or no attention to the subject to-day. With better basic training being given our students, we would not have to give as much time to this subject as we used to give in the past. However, we must not lose sight of the fact that new incompatibilities are arising every day because new drugs, especially new synthetics, are being introduced. Prof. Mantz sets forth these problems in a clear and lucid way and offers a good suggestion on when and how the subject should be taught.—C. B. JORDAN, *Editor*.

WHEN SHOULD THE COURSE IN INCOMPATIBILITIES BEGIN AND HOW SHOULD IT BE TAUGHT?

BY HARRY W. MANTZ.*

The methods used in teaching incompatibilities are, no doubt, similar in all schools of pharmacy. Assuming this to be true, any useful methods carried out in one school can be applied advantageously by the others, and I present this paper with the hope that it will give rise to discussions from which we may all profit. No matter how efficiently this subject may be taught, there will always be room for improvement.

Incompatibility is one of the most difficult and most inadequately taught subjects in a pharmacy school curriculum and it is my thought that if a teacher is honest with himself, he cannot have a feeling of complete satisfaction after he has finished his discussions of the subject. I am not criticizing the ability and knowledge of the teacher but refer to the difficulties inherent in the subject itself.

Scientific, as well as commercial progress, leads to discoveries and the production of new compounds to be used for the cure of disease, which causes a continual increase in the scope of the subject. This is further complicated by the fact that little is known about the composition of many of the so-called proprietary preparations, so frequently prescribed and this makes it difficult to explain many incompatibilities which may arise in combinations containing such products.

In order to get a picture of the magnitude of the problem facing us, let us consider the number of prescriptions which could be written, by using one hundred drugs with "four to a prescription." The number of different combinations obtainable amount only to a little less than four millions. Now, if we were to include all the medicinal substances known, the total would probably make the war debt figures, which we see in the daily newspapers, look like pin money. This gives us an idea of the potential difficulties which may be dormant, but which may suddenly come into existence and face the man in the prescription laboratory. Therefore, as teachers, we feel it our duty to train the students so that they will be able to cope with these problems when they arise.

Referring more specifically to the subject of this paper, "When Should the Course in Incompatibilities Begin and How Should It Be Taught?" the syllabus allots 64 didactic hours and 128 laboratory hours to Dispensing Pharmacy and

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suggests the teaching of incompatibilities as a part of the course. While we understand the subject had to be put under some heading, we feel that this particular branch in the training of a pharmacist is of such vital importance that it cannot be adequately taught as a subdivision of Dispensing Pharmacy during the number of hours suggested. Pharmacy as an art comes into being in the dispensing laboratory where the final technique is affected. At this stage the student is on the verge of putting into practice, in his chosen profession, the knowledge which he has accumulated. When this part of his training has been reached, he should have a knowledge of incompatibilities and be able to apply it.

Instead of being incorporated as a part of a single subject, incompatibilities can be taught more effectively by dividing them into the three classifications and enlisting the coöperation of the chairs of Chemistry, Pharmacy and Pharmacology. The teachers should have two objectives in view: *first*, to teach so that the students will gain a fundamental knowledge of their subjects, and *second*, with the idea of training them to use such knowledge as it applies to incompatibilities. We all realize that students generally lack the ability to apply what they have learned. This teaching should begin as soon as the students have an understanding of the various subjects sufficient to enable them to comprehend the meaning and importance of incompatibilities as they pertain to medicinal substances.

The teaching of chemical incompatibilities can have its origin in General Chemistry under the discussions of ionization, and be continued throughout the various succeeding courses in Chemistry. In the laboratories prescriptions can be used to illustrate the reactions. For example, in giving the test for chlorides, a prescription containing silver nitrate and physiological salt solution could be used to make the student aware of the incompatibility which exists in such a combination.

Discussions on pharmaceutical or physical incompatibilities can be included with those of the simplest preparations such as the aromatic waters. In the laboratory the student can compound a prescription calling for a bromide to be dissolved in an aromatic water and note what occurs, and then be instructed how to remedy this difficulty. In like manner, the student could be gradually trained to handle the more difficult combinations.

The pharmacist is not greatly concerned with therapeutic incompatibilities, but the departments of Pharmacology and Toxicology could do their share of the work by referring to the poisonous combinations which may result from chemical changes or unforeseen physical incompatibilities.

By following these plans the teachers in the laboratories have the opportunity of applying one of the basic principles of learning, "Learn by Doing," and we all agree with the old saying, "Experience is the best teacher." This is really how our veteran forefathers in pharmacy learned their profession; they learned by doing. Due to the change of conditions in the profession of pharmacy and to the gradual decrease of practical experience required by the State Boards, the burden now rests upon the shoulders of the institutions and their faculties. They are expected to supply ways and means for this training.

These are the methods the School of Pharmacy of Temple University uses to teach incompatibilities before the student enters the course in Dispensing Pharmacy.

Allow me to explain briefly how we teach that part of Dispensing Pharmacy which applies to incompatibilities and the compounding of prescriptions. At this point we know that the student has had instruction pertaining to incompatibilities both in lectures and in laboratories. The Dispensing Pharmacy Laboratory, as has been stated, is the finishing department and the work outlined here for the students, as far as this subject is concerned, consists chiefly of an application of the knowledge already gained.

We have on file the names of approximately one hundred practicing physicians from whom we solicit prescriptions which they use frequently and we request them to mark those which they have found by experience to have been the most difficult to have compounded satisfactorily. This list not only includes physicians in the vicinity of Philadelphia, but those located in different sections of Pennsylvania and a few other states. Many names and addresses of physicians are obtained from the students themselves.

The prescriptions are placed on cardboards which are inserted into a folder with a leather back and transparent front, and each student is required to copy the prescriptions in a note-book. A certain amount of time is set aside during each laboratory period for this work. After each student has copied about two hundred prescriptions, he is assigned four on which he writes a detailed description as to the methods of preparation of the ingredients, the methods of compounding and a discussion of any difficulties which might possibly arise. This procedure makes it necessary in many cases for the student to refer to the library. At the end of the time allotted, each student reads his assignment in class. The instructor then answers questions, makes corrections or further discusses the prescriptions, as necessary. In this manner each student contributes to and benefits by the research work of the others. Many of these prescriptions are compounded during the laboratory hours. It is interesting to know that in many cases those students who are working in drug stores compound the prescriptions assigned to them for their own benefit, if they have not been already compounded in the dispensing laboratory. In other cases exceptional prescriptions are compounded by the instructor to demonstrate the reactions.

Our curriculum contains special hours assigned to the general discussion of difficult prescriptions received in drug stores where our students are employed. The students also are urged to make memoranda of any interesting problems which only present themselves in a drug store. During this period a representative from each of the departments of Chemistry, Pharmacy and Pharmacology is present to discuss questions which are pertinent to his teaching.

By using this system we feel that the student is getting experience which is analogous to that obtained in a drug store. He comes in contact with prescriptions which are being used rather frequently; and due to the number of physicians who submit them, he gains valuable experience in reading a variety of handwritings.

With the trend of modern medicine toward the use of specifics in the treatment of disease, these problems may not confront the pharmacist in the future as frequently as they have in the past. For the present, however, as teachers, we should feel it our responsibility to give the student training which is as practical and comprehensive as possible.

To summarize, my thought is that

1. Teaching incompatibilities should begin soon after the student enters the school.
2. All teachers should have this subject constantly in mind and select illustrations for their statements from the incompatible group whenever possible.
3. This accumulation of theory under the various chairs should then be applied in the course of dispensing pharmacy.
4. Better results will be obtained from the use of original prescriptions than from the use of printed formulas.
5. The conference on prescription difficulties occurring in the stores from day to day, keeps the instruction up to the minute.

THE TEACHING OF INCOMPATIBILITIES.

BY W. G. CROCKETT.*

Editor's Note: The preceding paper by Professor Mantz, together with the four papers following, comprise a good symposium on Incompatibilities. It is noticeable that the authors are not in entire agreement on when and how this subject should be taught and this, to me, is a good sign. When we all agree on a time or a method of teaching a subject, we should ask ourselves whether we have not eliminated originality, the teacher's best qualification. Two teachers may present a subject in quite a different way and yet secure equally good results. I do not agree with some of the authors on when and how incompatibilities should be taught and more than likely the reader would not agree with me should I set forth my opinions. What are we to do in this dilemma? Read all the papers, those of Mantz, Crockett, Johnson, Mitchell and Terry, and cull the best from each of them.—C. B. JORDAN, *Editor*.

The subject of incompatibilities in prescriptions is an important one, and one which should not be treated superficially by educators merely because physicians in recent years have become more and more inclined toward prescribing simple-named, manufactured products. Evidences of closer coöperation between medical and pharmaceutical groups throughout the country, along with increasing costs of medical care, lead me to believe that as the years go by physicians will return to writing original prescriptions in order to reduce the costs of medical care and at the same time forestall self-medication on the part of the laity. If this be true the subject of incompatibilities in prescriptions will be of more concern in years to come than it is at the present time. We must teach for future needs as well as for present ones.

A complete discussion of the teaching of incompatibilities should embrace both what to teach and how to teach it. This subject is so broad and so debatable that I shall not attempt to treat either of these phases in detail, but instead will confine myself to a few thoughts or principles with the expectation that the discussion which follows will bring us many different points of view and thereby be more helpful than my own personal views. Any scheme I might present would prove inadequate even to myself. I say this because I find myself altering my own approach to the subject from year to year.

At the outset I wish to state that I think it a mistake to isolate the subject of incompatibilities and attempt to teach it as a separate course. Curricular

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