

sufficiently emphasize the subject of synthetics and proprietaries, and students fail to get an appreciation of its value and are unable to remember the desirable things because they are subordinated to the general topic of organic chemistry.

The second, and by far the most satisfactory method, is to present the subject in a special course, and here two lines of action are open. In either case the subject should be presented after the regular courses in organic chemistry are finished. One method is to group these medicaments according to their therapeutic action. The writer has tried this and while it is very acceptable to medical students it lacks many of the advantages of the method followed for many years which is given below.

These medicaments are classified according to their constitution, and arranged in groups, according to the system of grouping used by most organic texts. Since a student has a knowledge of the entire field of organic chemistry, both aliphatic and aromatic substances may be grouped together, for example *all* the aldehydes, acids, alcohols, etc., may be studied at once and their properties compared. If a medicament is heterogeneous in character, it may be placed in any one of several groups according to the teacher's best judgment. If it is a pharmaceutical mixture it may be treated under the group to which its most important constituent belongs. A great deal of latitude is allowed in this classification, as for example, chloral may be treated among the aldehydes, or the halogen derivatives, as may seem desirable. Barbiturates may be discussed under urea derivatives, or given a special class. Arsenicals may all be treated in one group, or the various types under their particular class. Very frequently a combination of chemical and therapeutic character is desirable as in the case of local anesthetics.

The writer has found the greatest advantage of this mode of treatment, regardless of the finer details upon which there is much room for differences of opinion, to lie in the fact that when it is given to senior students, it affords a most excellent method for review of the entire field of organic chemistry. By emphasizing the relationships of these medicaments to the various classes of organic substances, and the fact that their properties are usually due to the characteristic class structures present, the student must refresh his mind about these properties in order to see the connection. Finally, as time permits, there is no limit to the interesting discussions of the relationship between therapeutic activity and chemical constitution that may be introduced in a course arranged in this way, and there is no branch of chemistry that lends itself to the seminar system of instruction so well as this does, providing the class is not too large. There is no limit to the interesting discussions, investigations, reports, outside assignments of work, library reading, etc., that a small group can indulge in, if wisely directed by the instructor in charge of such a seminar.

METHOD OF APPROACH IN TEACHING THE PHARMACY OF NEW AND NON-OFFICIAL REMEDIES.

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For the past several decades, it seems that the chemical and pharmaceutical manufacturers have been trying to surpass one another in the production of new

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remedies for nearly every disease from which mankind and other animals have been known to suffer. For want of a better term, we usually refer to these products as "new and non-official remedies." Some of these so-called remedies have but little merit and physicians soon cease to prescribe them. Others, which do have some real value as therapeutic agents, or are made to appear so through clever advertising, come into more or less general use. Whether these products belong to the first or second group, the dispenser must know something about their pharmacy if he is to intelligently fill the prescriptions calling for them. The method of approach to teaching this information to pharmacy students is the subject of this paper.

At the University of Maryland School of Pharmacy instruction to this end is given in three different departments, namely, the departments of Chemistry, Pharmacology and Pharmacy. This instruction is given primarily in the third year after the student has had the basic courses in chemistry, pharmacy and the biological sciences which are necessary for a proper understanding of the subject.

In the department of Chemistry, new and non-official remedies are considered along with the official products in a course entitled "Chemistry of Medicinal Products." This course is divided into two parts. One part deals with natural products, such as fatty oils, resins, carbohydrates, volatile oils, alkaloids, glycosides, enzymes, glandular products and vitamins; and the other part deals primarily with synthetics, such as the hypnotics, anesthetics, antipyretics, analgesics, pressor drugs, etc.

The department of Pharmacology limits the instruction which it gives covering these drugs and preparations to a consideration of their physiologic, pharmacologic, toxicologic and therapeutic properties. For purposes of study the drugs are grouped according to the physiological action which is of greatest therapeutic importance; methods of administration and dosage are emphasized.

In so far as the instruction in the pharmacy of these remedies is concerned, the approach is the same as that followed in giving instruction covering the official drugs and preparations. In our courses in pharmacy and dispensing, the more important of these remedies are covered in those cases where these products can be conveniently grouped with the official products. In attempting to do this, however, two main difficulties have been encountered. In the first place, these remedies are so numerous that it is difficult to determine their relative importance and to make a representative selection. In the second place it is often difficult, if not impossible, to obtain reliable information on the pharmacy of these remedies. We have attempted to overcome these difficulties by using some one of the various textbooks on new remedies, such as, "The Chemistry of Synthetic Drugs" by Percy May, or "New and Nonofficial Remedies" issued by the American Medical Association as a basis for the selection of the remedies to be covered. The time which can be devoted to instruction along these lines will not permit us to give consideration to more than a comparatively small number of these remedies. A few of the most widely used of these preparations are selected from each group as represented by similarity in chemical composition or in physiological action. Where information on the pharmacy of these products is not available in textbooks, we have searched through the journals for it and, in a few instances, we have conducted laboratory experiments to secure the desired information.

As previously stated, our method of approach to instruction to the students in

the pharmacy of these remedies does not differ from the method employed in teaching the official drugs and preparations. Our method of instructing students in dispensing may, however, have some points of interest for you.

The prescriptions containing the drugs and preparations to be studied are first classified into groups according to "New and Non-official Remedies," such as anesthetics, barbitol compounds, silver preparations, etc., after which the students are assigned this chapter or group for study prior to the lecture and recitation. Whenever possible original packages of the material under discussion are shown the students during the lecture. An attempt is made to select preparations that have been previously studied in chemistry and pharmacology.

The prescriptions are placed in a baloptican projector and flashed on a silver screen in the front of the room in full view of the entire class. They are then read and discussed by the professor in charge during the first few lecture periods, or until the students become accustomed to the procedure, after which the students are called upon to read and discuss them.

In conclusion, the general procedure followed in the discussion of individual products may be summed up briefly by the use of the following example:

Name of Article.....	Luminal Sodium.
The Manufacturer.....	
Composition or Formula....	The monosodium salt of phenylethylbarbituric acid. (All other information of this character is taken up in the department of chemistry.)
Description and Physical Properties.....	A white hygroscopic powder; very soluble in water; soluble in alcohol; practically insoluble in ether and chloroform. An aqueous solution of luminal-sodium has an alkaline reaction to litmus.
Actions and Uses.....	The same as those of phenolbarbital; sedative or hypnotic. (All other information of this character is taken up in the department of pharmacology.)
Dosage.....	$\frac{1}{2}$ to 5 grains.
Forms on the Market.....	Powder in $\frac{1}{2}$ - and 1-oz. bottles. Ampuls (powder) 2 and 5 grains. Capsules—5 grains. Tablets— $\frac{1}{4}$, $\frac{1}{2}$ and $1\frac{1}{2}$ grains.
Incompatibilities.....	Is neutralized with free acid or acid solutions and the normal salt is precipitated in aqueous or low alcoholic solutions. (For example, Compound Elixir of Pepsin and Rennin, N. F., which contains free lactic acid.)

RESEARCH IN PHARMACEUTICAL EDUCATION.*

BY WILLIAM J. HUSA.¹

The interest which pharmacists have in educational matters was evidenced many years ago by the establishment of this Section. Through the subsequent organization of the American Association of Colleges of Pharmacy and through the activities of the Committee on Educational Methods established by the National

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