

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

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DEPARTMENT.

Below are presented two papers of widely differing content and interest to our readers.

The first by Dr. Harris deals with a new course in "Plant Extractives" which has been introduced in the School of Pharmacy at the University of Oklahoma. It will be read with special interest by teachers of pharmacy and chemistry in our colleges of pharmacy. The chemistry of plant products is correlated with the student's study of plant extractives in a manner calculated to increase the student's interest and appreciation of such preparations.

In his paper "What Is a Shelf-Warmer?" Dr. Olsen has discussed a topic which is not new, but which is of fundamental interest to every retail pharmacist who is responsible for the management of a modern drug store. Dr. Olsen's conclusion is that in general "Shelf-Warmers" are found on the shelves of our drug stores not so much because the pharmacist purchases too great a variety of articles, but rather too many of one kind of any article. Customer demand will determine what should be found on the shelves of the drug store. Shrewd buying ability must see to it that these articles are not purchased in such quantities as to become "Shelf-Warmers."—
ERNEST LITTLE.

THE USE OF CHEMISTRY IN TEACHING PLANT EXTRACTIVES.*¹

BY LOYD E. HARRIS.

The students in pharmacy at the University of Oklahoma were being taught about fluidextracts, tinctures and extracts in a very perfunctory sort of way. That is, they started in with a definition of fluidextracts and then studied each of the preparations under this heading just as they were listed alphabetically. Naturally they forgot many of the facts that were presented in this manner. When they were called upon to fill prescriptions involving the use of this information, in the laboratory, they were frequently at a loss as to how to proceed.

As a result of the above conditions, a new course was introduced into the curriculum. These three classes of preparations, namely, tinctures, fluidextracts and extracts were separated from the other classes of galenicals that are usually taught in Operative Pharmacy courses. The name of the new course was "Plant Extractives." The prerequisites for the course were Pharmacognosy (Plant Drugs) and Organic Chemistry, in addition to the beginning courses in pharmacy. A knowledge of chemistry was believed to be essential for the proper approach of the subject matter to be presented. If you have not already done so, it is suggested that you read the article "Is Galenical Pharmacy a Science?" by Professor A. Tschirch. It appeared in volume 105 (1933) on page 441 of the *American Journal of Pharmacy*.

The first thing that is discussed in this course is the more common solvents that are used in pharmacy. The miscibility of each solvent with the others and mixtures of the others, together with their specific gravities, boiling points and viscosities are studied. This is followed by a discussion of solutions and the student is required to list in a note-book, the various classes of plant constituents that are

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¹ From the Pharmacy Laboratories, University of Oklahoma, School of Pharmacy.

soluble in each solvent. It is pointed out, under this heading, that each solution becomes a potential or possible new solvent.

In pharmacognosy, the student had learned about the distribution of the various classes of constituents in the plant and then in chemistry they had learned something about their properties. All of this is correlated and reviewed.

The students are next assigned some drug and they study its inorganic constituents. Moisture determinations are made in both the green and the cured drug. The importance of water in the growing plant, in the curing, storing and final extraction of the drug is emphasized. Enzymes, fermentation, etc., are especially emphasized. Ash determinations, including water-soluble, acid-soluble and insoluble ash, frequently give the student a new viewpoint as to the importance of inorganic salts in galenicals. Hydrogen-ion concentrations are also mentioned here.

The extraction of a drug, usually the same as used for moisture and ash determinations, by selective solvents is the next step. The modified Dragendorff method is employed. Using a continuous extractor or percolator, a convenient quantity of the sample is extracted with petroleum benzine and the amount of the extract or residue determined semi-quantitatively. At this time the student is given a series of experiments dealing with the physical and chemical properties of fats, volatile oils and mixtures of the two. As a library assignment, the definitions of the words and terms relating to them, such as soaps, saponification, spirit, etc., are required to be put into their note-books. The student also makes a list of all tinctures, fluidextracts and extracts that are made, using petroleum benzine, giving the reasons for its use.

The above extraction is continued, using the drug just extracted by the petroleum benzine and not a fresh sample, using ether as the next solvent. The same procedure is repeated that was used in the case of petroleum benzine. Thus they continue with alcohol, water, dilute acids and finally dilute alkalies. After water, the preparations made with alcohol-water menstrua are listed.

In the above classifications, that is according to the menstruum used, the student is asked to list the constituents that he believes to have been extracted by the specified solvents. This is done for all of the official preparations. Of course, he will not remember all of this data or information, but it does impress him with the general information.

The making of small quantities (two to four fluidounces of each) is then given some time and study. Finally the miscibilities or incompatibilities of a number of the preparations of these classes are tested. Their own preparations are used as far as is possible.

Thus the student has had a chance to learn something about the chemistry of plant products and to correlate this information with his study of plant extractives. This information gives him the ability to properly mix, if it is possible, two or more of such preparations if the need arises in prescription work. It also gives the student an appreciation of this class of preparations. A fluidextract or a tincture is no longer just another liquid to be poured from one bottle to another.
