

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

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DEPARTMENT.

TEACHING LABORATORY WORK IN PHARMACY.*

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"The following paper by our Canadian confrère, Jessie I. MacKnight, clearly sets forth the fact that teaching problems know no country and that the difficulties met by the American teachers are almost identical with those met by teachers in other nations. The American Association of Colleges of Pharmacy welcomes the following contribution by Miss MacKnight. The sane treatment of the subject of "Teaching Laboratory Work in Pharmacy" will appeal to all."—C. B. JORDAN, *Editor*.

Pharmaceutical laboratory work appears to fall into two sections, practical pharmacy and practical dispensing. The former includes the compounding of all B. P., U. S. P., N. F. or other formulas and work along such lines as suitability of coloring or flavoring agents, tests for purity or solubility of drugs and in compatibility in all its phases. In such a class the work is outlined for the student and he is expected to look up his data, work out his formulas, check up his results and write out a systematic report of all work done. The instructor is at all times available for direction or for consultation and from time to time lectures are given on the more important phases of the work. The class, as time goes on, evolves itself into one of research. The student learns where to look for data, how to apply it when found and gradually develops his ability to think, to reason and to be self reliant and efficient.

A druggist sends in the request—"Can you give me any information on the following difficulty? An emulsion of cod liver oil containing syrup of ferrous iodide turns brown on standing a short time. With some grades of oil this appears to be more pronounced than with others. Is this color change due to the oil or how may it be accounted for or prevented?"

Another friend of the college sends a sample of a powder with the statement that several barrels were bought at a sale of ship's cargo—what is it? Still another makes a request for a suitable coloring agent for a polish—sample submitted. Such requests together with problems that arise in class are turned over to the senior students of the practical pharmacy class and though their findings may not be conclusive they derive much benefit from attempting to solve the difficulties, the fact that the problems are not theoretical adding incentive to accuracy of detail.

A practical dispensing class is conducted along very different lines.

Elementary classes especially are under the close supervision of the instructor. At this stage neatness, quietness, accuracy and ordinary technique are stressed, the main object being to inculcate correct habits in manipulation and procedure rather than to develop initiative. Only simple prescriptions are dispensed and the student is required to follow a given procedure. In senior classes manipulation is

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further developed and the student not only carries on more advanced prescription work but adds to this the solution of problems which arise. He is now encouraged to use his initiative. He deals with prescriptions in all their varied forms from the simplest mixture or powder down through the whole line of emulsions, ointments, suppositories, pills, troches, tablet triturates, konseals, ampuls and all types of sterile solutions and has many opportunities to put into practice the fund of knowledge he has acquired or is acquiring in his *Materia Medica*, Chemistry, Practical Pharmacy or other classes.

He has by this time sufficient knowledge of chemistry to enable him to discuss intelligently the subject of incompatibility; he has also done a considerable amount of investigative work in his practical pharmacy classes and is in a position to apply this knowledge to his prescription work; methods of overcoming or of preventing incompatibility have been devised, unusual prescriptions have been discussed and dispensed. All of this rounds out his course and forms the background for future work in experimental dispensing.

In the modern dispensing class there are at least three types of students to be considered—those who are preparing to enter retail pharmacy, those who intend to practice as hospital pharmacists and to whom dispensing is a main issue, those who will proceed to Degree work and thence to other professional branches such as teaching or research. A course must be outlined which will meet the requirements of all and should be systematically built up.

When the student has learned how to prepare drugs to be used as ingredients in powders, he is then able to apply this knowledge to the preparation of ingredients for ointments. This normally carries him to mixtures, where solubility is added to his knowledge, also types and choice of vehicles and compatibility.

In emulsions he is taught the preferable method to use in the case of fixed and volatile oils. Here also he gains a knowledge of saponification and its application to external and internal preparations.

In pill making he studies types of pill masses whether organic or inorganic, and the excipient or coating best adapted to each case.

He makes konseals by machine and by hand, tablet triturates with their minuteness and potency of dosage, also lozenges in diversity of type and of basis.

Suppository making is a good test of technique. The student is taught to make hand-made molds from wax paper, parchment or plaster of Paris, for use when the heat process is involved. Thus, though he occasionally employs them, he is never dependent on metal molds which are often not suitable in size or in kind. The several types of suppository machines are demonstrated and used. Hand manipulation is perfected so that he may not think the making of a batch of suppositories an irksome task.

The preparation of ampuls and many types of solutions for sterile injection such as intravenous and intramuscular solutions, also sterile saline and sterile oils, is gone into very thoroughly. This may be made one of the most interesting and fascinating parts of the course. Ample practice is allowed in several methods of sterilization such as by the Arnold sterilizer, by autoclaving and by simple boiling. The making of ampuls extemporaneously from test-tubes, specially prepared, is another interesting phase of this work. The lecture periods preceding such laboratory classes would include discussion of glass, its general suitability for ampuls and

tests for its neutrality and solubility, also methods of filling, sealing and sterilizing the ampuls.

What is the relation of lecture work to such laboratory classes?

In the practical pharmacy class, lectures are largely displaced by the student's own research. The instructor uses the time assigned to discuss the work in progress and to compare results so that the lecture period follows the laboratory period. On the other hand the lectures of the dispensing class deal in advance with the work of the day or of the week.

When the student of the latter class fully understands his subject and the principles he is about to apply, he then only requires sufficient repetition, under supervision, to become skilful in turning out his products with speed and dexterity. If pill making is to be taken up in the laboratory, the preceding lectures will not only include discussion of the characteristics of drugs commonly administered in this form but will also include the necessary information regarding excipients and preservatives. Pill coating will include instruction in gelatin coating with or without coloring, silver coating, and pearl coating, also shellac, salol, formalin and other enteric coatings. Pill making and coating is practiced until the student becomes proficient in recognizing types and in turning out creditable products.

A dispensing class at its best correlates the lecture work with the practical. A course which stresses memory work and in which the student follows set rules, depending largely on memory for his technique, does not produce the results for which our colleges of Pharmacy aim. If he has only assembled a mass of facts and rules our graduate falls far short of the ideal. If on the other hand he has acquired the ability to use his knowledge, has learned how to locate and to use additional data, how to reason through rather than to follow blindly or to lean upon his text-books; if he has developed the ability to coördinate head and hand he has had a training which should enable him to go far in the practice of his chosen profession.

MICHIGAN'S PHARMACEUTICAL ACHIEVEMENT.*

BY C. H. STOCKING.¹

"The following radio address by Professor C. H. Stocking, president of the American Association of Colleges of Pharmacy, will be of interest to all teachers of pharmacy. It gives a brief outline of pharmaceutical activity in the State of Michigan. I sincerely hope that Professor Stocking will, at a later time, write a complete history of this activity, and that the same will be done by leaders in other states of the Union. Such histories would be very valuable contributions to the Historical Section of the AMERICAN PHARMACEUTICAL ASSOCIATION."—C. B. JORDAN, *Editor*.

When James I of England in the 17th Century signed the corporate papers of the Apothecaries' Guild he said, "The business of the apothecary is a mystery: wherefore, I think it fitting that they should be a corporation of themselves." Pharmacists the world over may well look with pride and satisfaction to that early English monarch and his famous declaration. The impetus that was thus given to

* Radio address given over Station WJR, Saturday, January 28, 1933.

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