

universities in establishing instruction in pharmacy. Due to the thoroughness of this instruction and to the fact that the minimum four-year curriculum has been in vogue here since the early nineties, it is well-known that more deans of colleges of pharmacy and more faculty members holding positions throughout the nation have received their education at the University of Michigan than at any other institution of learning. In pharmaceutical organization work, Michigan men by the score have been highly honored. Of the thirty-two presidents of the American Association of Colleges of Pharmacy five have been members of the faculty and six others have received degrees from this University. Michigan men in large numbers are listed in the annals of United States Pharmacopoeial and National Formulary revision work. If the "leaves of the trees are for the healing of the nation," Michigan men, Prescott, Stevens, Schlotterbeck, A. B. Lyons and others, have picked those leaves, have analyzed them for their medicinal virtues and have extracted their active principles for you and for me.

MODERN TRENDS IN EDUCATIONAL METHODS.*

BY A. B. LEMON.

More experiments and changes have been introduced in higher education in the last five years than in the previous twenty. The committee on educational methods of our National Conference on Pharmaceutical Research has been making a study of the major experiments in the field of higher education toward the end of selecting those the results of which might properly be used in pharmaceutical education. This paper is intended briefly to present some observations on a few of the educational problems receiving most wide-spread attention and showing most promising results. This may be considered a supplement to the less detailed report read before the conference last Saturday.

Experimentation has been very active in all four branches of education, *viz.*, care and direction of students, curriculum construction, teaching methods and administration. The National Society of College Teachers of Education has just published a wealth of material on changes and experiments in liberal arts education collected and organized by the American Association of University Women under the able direction of Kathryn McHale. This report gives, in addition to other valuable information, a summary of one hundred twenty-eight outstanding changes and experiments in higher education as selected by C. S. Boucher of the University of Chicago. From this elaborate list six topics have been chosen for discussion in this paper. These have been selected first because of the interest they should demand in pharmaceutical education and second on the basis of the number of colleges experimenting with them. The six selected are as follows:

- (1) Comprehensive examinations [115].
- (2) Admission of freshmen including tests [104].
- (3) Honors courses [100].
- (4) Personnel work including counseling of students [83].
- (5) Improvement in curricula [63].
- (6) Improvement in teaching methods [45].

* Section on Education and Legislation, A. P. H. A., Toronto meeting, 1932.

The number in brackets indicates the number of liberal arts colleges experimenting with the project as reported by the A. A. U. W. survey.

Comprehensive Examinations.—It is not surprizing to find the subject of examinations leading the list of experiments. The old *essay type* of examination as a single measurement of learning has been subject to sharp attack for some years. Its extreme subjectivity both in construction and reading, its narrowness of sampling and its demoralizing influence on both teacher and student stand out most prominently among its negative values. Of course the essay type is not without some positive values but they are largely confined to a measurement of composition and English which may or may not be found among the objectives of the particular test involved. Certainly testing for breadth and readiness of information should be left largely to other types of examination. In so far as *oral examinations* are concerned Ben Wood states that they are for the most part “highly ambiguous in purpose, methods and results.” The *objective or new type examination* is being used very extensively as a supplement to the essay type. The new type examinations have their critics, too, but most of the valid criticism is leveled at their composition and administration rather than at the principle involved. And now comes the *comprehensive examination* which is not a type of examination but rather a different application of the types already available and mentioned above. Comprehensive examinations are, as the title suggests, tests that cover large fields of thought rather than small course units. They are now being used in more than one hundred American colleges and according to reports the results are highly gratifying. While there has been a marked trend toward a mixture of types of tests followed at the end of the course by a comprehensive examination the most important move, in so far as the usual examination is concerned, has been toward the development of objectivity. Never before has there been such profound recognition of the fact that the fundamental task in the construction of an achievement test is to make certain that it is an adequate measure of the important objectives of the course. “What do we want to measure” should be the question constantly before us. For instance, in Botany the following course objectives might be set up toward which the student would progress:

- (1) A fund of information regarding plant structure.
- (2) An understanding of technical terminology.
- (3) An ability to draw inferences from facts.
- (4) An ability to apply principles to new situations.
- (5) Accuracy of observation.
- (6) Skill in the use of the microscope and other essential tools.
- (7) An ability to express effectively ideas relating to Botany.

The nature of these objectives determines the variety of the test to be constructed. The individual being tested should, at the end of the test, see as clearly as does the examiner what the results mean. Examinations should be made to benefit the examined as well as the examiner, and every test to have a constructive influence upon the student should yield an accurate measurement which can be arrived at only by objective means. Many of the examinations now given in American Schools lay too much stress on the learner's memory for facts and his ability to define technical terms. In so far as such tests serve as the means of selecting those who

should be advanced they emphasize or select memory as the most desirable or at least the most tangible trait to be cultivated through the educational process. It is a grave question as to whether the ability to draw inferences is equally if not more important than the ability to remember. The application of comprehensive examinations in colleges of pharmacy might well be undertaken. Indeed, at least two schools are now using them in a limited way. The author has used a comprehensive test in Bacteriology on a selected group of seniors during the past three years with gratifying results to both student and examiner. We know of no instance, however, in which a comprehensive examination covering the entire course is given to pharmacy students at the end of their course. That is the way it is applied in liberal arts colleges and usually is a complement of some sort of honors course or tutorial system. Professor E. S. Jones of the University of Buffalo has just completed an intensive study of the merits of comprehensive examinations for the American Association of Colleges. His report published by the A. A. C. is heartily commended to those interested in this project.

Admission of Freshmen Including Tests.—Shall we admit all candidates to our courses who meet the minimum requirements, *viz.*, high school graduation, or shall we refuse admission to those who do not look promising? If so what will be the basis for our eliminations? Unfortunately we are not yet in possession of any single safe device or formula that can be relied upon to sift the chaff from the wheat. From an academic standpoint the candidate who comes from the lowest two-fifths in his high school and who receives a low score in any of the standard intelligence tests is a "poor risk." In the liberal arts college of the University of Buffalo *all* applicants from the lowest two-fifths in high school and those of the middle fifth who do not have a good score on an intelligence test are required to take a three-week preliminary study course known as a "How to Study Course." This course is designed *first* to test thoroughly the ability of these so-called "poor risks" to undertake college work and *second*, to train them in the techniques of study. This course has been required since 1926, and the results have been very gratifying. The percentage of these "poor risks" in the entering class has dropped from 20% to 12%, the percentage of individuals surviving the freshman year with an average of "C" or better has been doubled and the total of failures has been reduced from 40% to 15%. This program appears to be the most elaborate used by any college for the admission of "poor risks." Of course, each of the 144 colleges reporting in the A. A. U. W. report has a testing system. Indeed the results of two or three aptitude tests plus the high school record are almost indispensable, not so much for determining eligibility for admission as for dealing with the student after he is in college. This subject was covered in detail in a paper entitled "Five Years of Intelligence Testing" read at Miami last summer. Most of the older colleges such as Harvard require their freshmen to pass a college entrance examination. Personal interview of entering students is practiced at a number of institutions. Colgate and Rollins report enthusiastically on the benefits of a personal interview. The Rollins interview is supplemented by elaborate questionnaires filled out by teachers, employers, parents and the applicant.

The trend in this field is distinctly toward a more careful selection of candidates for higher education and improved means for making the selection. It is considered eminently unfair to accept a candidate whose failure in a particular field is a

foregone conclusion. It is equally unfair to society and the profession to accept a thoroughly unfit candidate and then push him through just for the sake of the tuition he pays.

HONORS COURSES.

During the last ten years there has been a tendency on the part of a number of American colleges, at first limited to Harvard, Princeton, Smith and Swarthmore, to utilize modifications of the honors system and tutorial methods long used by Oxford and Cambridge. The basic principles of the American adaptations seem to be

- (1) The college student should learn to educate himself.
- (2) The student should receive more individual contact, guidance and stimulus from his teachers.
- (3) Superior students should receive some marked recognition of their superiority other than that usually conferred at graduation.
- (4) The student should be tested at the end of his college course with examinations covering the whole field of his concentration.

While there are more than one hundred colleges now using some modification of the honors system, Swarthmore has been the pioneer in this field and has perhaps received more attention than any other American college. Honors work was begun there in 1922. The story of its progress is splendidly recorded in a book by Robert C. Brooks entitled "Reading for Honors at Swarthmore." Honors students are selected from the upper classmen after showing a marked superiority in their freshman and sophomore years. As a merit for their excellency they are permitted more or less latitude in their class attendance and study hours. There are set hours for group conferences with the professors. These conferences may be held two or three times weekly. The professor acts as one of the students rather than as a schoolmaster. The questioning and debate and the personal contact between professor and student are said to be very stimulating to both. There is no reason why some modification of the honors system should not be used in pharmacy schools. Experience has shown that it is not only beneficial to the upper classmen participating but it also stimulates more underclassmen to a greater effort in their desire to qualify for the benefits and privileges of the "honors group." It has also proved a valuable means for stimulating desire to do graduate work—a stimulus badly needed in pharmacy schools. At the University of Buffalo School of Pharmacy we have been able to show repeatedly that superior students are not motivated to their best efforts when given no more work than can be accomplished by the average or inferior group. The result is that they either do more outside work or waste the time that might be spent in advanced work if opportunity were presented. Undoubtedly the best method for stimulating the average boy to additional effort is to reward him for work well done. The "honors work" has proved to be a highly satisfactory reward.

Personnel Work Including Consulting Students.—With the advent of the wide elective system in our arts colleges it became necessary to have some office responsible for the guidance of students in the selection of proper courses. The duties of this office have been broadened out to include vocational guidance, the analysis and remedying of student difficulties, the administration and analysis of various

tests and the correlation of test results with college grades. Some personnel offices serve as placement bureaus. Heretofore the bulk of the duties enumerated above have been the responsibility of the college Dean. The trend, however, is toward placing these details in the hands of one or more members of the faculty who by training and temperament are especially fitted to deal with students in a personal and friendly way. It is obvious that up to the present time pharmacy students have not needed guidance in the selection of electives because there have been none. Nor has he had any vocational guidance, since by entering a professional school he has thereby selected his vocation whether qualified for it or not. With the advent of the four-year curriculum and its proposed electives there will now be a demand for assistance in selecting the proper courses. The personnel record of each pharmacy student should include

- (1) Results of aptitude and placement tests.
- (2) High school record.
- (3) College record to date.
- (4) Health record.
- (5) Amount of outside work.
- (6) Extra curriculum activities.
- (7) An analysis of personal traits.
- (8) Such other available information as will assist in giving the student as well as the faculty the most useful information when needed.

The personnel office is now recognized by most colleges as an indispensable part of their equipment.

Improvement in Curricula.—The most recent trend in curriculum construction is the development of a course of study based upon the exact needs of the student. Curriculum builders are constantly asking themselves this question—what does this student need to know intelligently to pursue his chosen calling—and then building his course to suit his needs. The recent work of Charters and his associates has given us the basic material for a pharmaceutical curriculum. Since we are all familiar with that work and since it represents the most modern methods of curriculum construction, it will be unnecessary further to discuss it in this paper.

Improvement in Teaching Methods.—The Boucher survey, mentioned earlier, reports forty-five colleges experimenting with improvements in instruction. The most outstanding work has been done at Yale, Rollins, Illinois, Oberlin, Purdue and Chicago. Reports of success have been widely disseminated through educational publications and college reports. The American Association of University Professors under the direction of Professor H. L. Dodge of the University of Oklahoma is just now completing a survey of the teaching practices in vogue at our leading colleges. When this survey is complete a group of experts will evaluate the various teaching methods and report thereon. This report should be one of profound interest to pharmaceutical educators.

Obviously it will be impossible to even enumerate in this paper the vast number of methods being employed to improve teaching. The application of much already discussed in this paper has in a general way improved our teaching. Much remains to be done. A number of colleges have thrown the spot light on their teaching defects through self surveys. If discreetly conducted, a faculty can critically examine its own teaching procedure without creating any internal ill will. A real teacher

does not object to being shown a better way to teach. The opinions of students and alumni should be solicited but carefully evaluated before being accepted. In the author's school the faculty annually elects a committee on teaching methods. The members of this committee are expected to be familiar with advocated improvements in teaching. A portion of each faculty meeting is devoted to a discussion of some phase of teaching such as "Methods for Securing Student Interest," "Modern Methods for Testing Achievement," "The Values of Personal Interviews," etc. One school of pharmacy maintains a library of the most recent books and articles dealing with teaching methods for the use of its faculty. One of the most significant trends in the improvement of teaching in pharmacy schools is the marked improvement in the quality of our younger teachers. Pharmacy schools are now beginning to demand the same degree of excellency in their teachers as is required in other branches of higher learning.

SUMMARY.

Hundreds of experiments are being conducted in an effort to improve our educational methods. The last decade has seen the application of the results of such experiments with exceedingly gratifying results. Some of these modern methods in education should be introduced in pharmaceutical training. This paper suggests six projects for consideration by pharmaceutical educators. They have produced outstanding results in liberal arts colleges and should at least be tried by us. It is recommended that in those schools where the Dean does not have the time to review the literature on educational methods an individual or committee be charged with that responsibility in order that our faculties may know what is going on even though they may not agree with or be in position to apply advocated changes.

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PHARMACY AS A CAREER.

Herbert Skinner, chairman of the British Pharmaceutical Conference, who was a welcome visitor at the Toronto A. Ph. A. meeting is reporting on his visit in *The Chemist and Druggist*. Referring to the *Guidance Leaflet* of the United States—he states "it presents an idea for pharmacy well worth while and quotes: 'Collegiate education and training is designed to prepare the pharmacists to conduct a pharmacy, to prepare, compound, distribute and dispense drugs and medicines, including narcotics, poisons and alcoholic liquors; to furnish sick room supplies; to distribute insecticides and fungicides; to make analytical and microscopic examinations and service; and to do these on sound economic principles.'"