

chologist and help the doctor in convincing the patient that the medicine prescribed is beneficial to him, though it may contain but a small amount of bromide or aspirin, or even no active ingredients. At such times the demeanor of the druggist, and a sufficiently high price will create a confidence in both doctor and pharmacist which cannot be otherwise obtained. The doctor wants and expects this confidence. The amount to add as a psychic charge depends entirely upon the particular case and the judgment of the druggist.

To complete this pricing system a few supplementary rules are necessary or advisable. They follow.

1. When two or more prescriptions are dispensed to the same person at the same time, they should be differently priced.
2. Prescription prices should end in five or zero.
3. Charity and other discounts upon prescriptions should be fixed.
4. Ready-made prescriptions should be priced by the same method used in pricing all other prescriptions.

If the druggist has any doubts about the wisdom of the last rule, let him ask himself the following questions before he fills a ready-made prescription at retail price or retail price plus fifteen cents:

- Am I giving him the materials below cost? (material-cost charge)
- Am I forgoing my profit? (profit charge)
- Am I omitting the overhead charge? (overhead charge)
- Am I working for nothing? (labor charge)
- Am I assuming the legal risks and duties for nothing? (insurer's charge) (Remember, *you* are liable for any errors caused by a ready-made preparation. The law recognizes *only you*, the druggist, as the maker of the prescription. Has it *your* label upon it?)

In conclusion, the system outlined seems to possess the following advantages:

1. It provides a uniform pricing procedure for all prescriptions.
2. It includes in the price all expenses without duplication.
3. It explains each charge with reference to legal or economic principles.
4. It is subject to revision to meet changing economic conditions.
5. An approximation of one or more of the charges does not affect the accuracy of the other charges.
6. It prevents price variations due to personal variations of clerks.

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## AN ADVENTURE IN PHARMACEUTICAL CURRICULUM CONSTRUCTION.\*

BY HOWARD C. NEWTON.<sup>1</sup>

If you should have an opportunity to construct a pharmaceutical curriculum just as you want it, one which would represent your very best thought on the subject, how would you go about it?

Deans and others have had such an opportunity during the past five years and the results have been interesting and diversified. Doubtless it will be a long time before the full effect of their work is known because we are still feeling the effects of

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\* Section on Education and Legislation, A. P. H. A., Dallas meeting, 1936.

<sup>1</sup> Dean, Massachusetts College of Pharmacy.

the early curricula of the colleges and even of the apprenticeship curricula, if these can be given that title.

It is a real responsibility to prepare a curriculum which may influence greatly the lives of hundreds of young men and women or perhaps an entire profession. Yet the usual method of constructing curricula has been aptly described by Robert L. Kelly, Executive Secretary of the Association of American Colleges, as follows:

"It is unnecessary to attempt to account for the confusion which has arisen through the former method of curriculum-building, a method, as our investigation shows, which is still the dominant one. A careful scrutiny of the program of study of most of the colleges indicates that they were constructed very much as a tariff bill is constructed in the Congress of the United States. The final result is the outcome of strains and tensions, of concessions and exchanges as between departmental representatives. The evidences that unifying principles are actually functioning in the development of the college curriculum are difficult to discover" (1).

When it became evident some seven or eight years ago that within a few years the curricula of colleges of pharmacy would need to be reconstructed to conform to the four-year plan then proposed, the writer determined to proceed in a manner different from the usual, as described, and to make an extensive study of the preparation of a curriculum for the Creighton University College of Pharmacy. More than three years were devoted to this study and now that all four years of the resulting curriculum have been in effect, it seems that it might be interesting to outline the procedure adopted and the resulting product, the curriculum.

There seemed to be no reason to believe that pharmaceutical education is based on principles different from those of other types of education and therefore it could be expected that the principles formulated by curriculum experts in the general field of education should prove a valuable aid in solving the problem of this study. With this in mind, the writer enlisted the assistance of Dr. William A. Kelly, Head of the Department of Education, Creighton University, who became greatly interested in the project. During the following two years, under his supervision, many formal courses in general curriculum construction and allied educational subjects as well as seminars in the field of education were completed by the writer to furnish a modern background for the work to be done. The following plan of procedure was then adopted:

1. A DETAILED REVIEW OF THE HISTORY OF PHARMACEUTICAL CURRICULUM CONSTRUCTION IN THE UNITED STATES.

This step was taken under the logical assumption that in order to profit by any mistakes which may have been made in the past and to improve upon the current curricula it is necessary to understand how these curricula were evolved. Furthermore, considered in connection with the knowledge of the present, it serves to indicate the trend of progress in this field and to assist in estimating the direction of future developments.

2. THE INVESTIGATION OF THE WORKS OF MODERN EXPERTS IN CURRICULUM-MAKING IN ORDER TO DISCOVER THE GENERAL PRINCIPLES WHICH MAY HAVE BEEN DEVELOPED IN THIS PHASE OF EDUCATION.

In support of this step, the following statement by the Committee on Curriculum-Making of the Society for the Study of Education is quoted:

"It is the judgment of the Committee that the principles laid down in this general statement on curriculum-making apply equally well to all periods of the American school system. Specifically, we believe the principles are equally applicable, with appropriate adaptations, to the construction of the curriculum of the elementary, the secondary and the college levels. It is only as those who are responsible for the construction of the college curricula come to employ such principles as are herein set forth that we shall have a truly continuous scheme of education" (2).

These first two steps constitute a preliminary survey of the field.

3. A REVIEW OF THE WORK OF CHARTERS, LEMON AND MONELL (3) IN APPLYING THE METHOD OF ACTIVITY ANALYSIS TO THE FIELD OF THE PHARMACEUTICAL CURRICULUM.

This work was done under the personal supervision of W. W. Charters and had for its purpose the securing of completely logical derivation of the content of the curriculum from the determined functions of the materials. The results of such an authoritative and recent investigation appear to form an excellent basis on which to build a pharmaceutical curriculum and they were used for this purpose in this study. The status of such investigations in curriculum planning is termed indispensable by Franklin Bobbitt (4).

4. A QUESTIONNAIRE SENT TO SOME THREE HUNDRED GRADUATES OF THE COLLEGE FOR THE PURPOSE OF OBTAINING DEFINITE INFORMATION AS TO THE PRESENT POSITIONS HELD BY THESE GRADUATES AND ALSO TO SECURE THEIR OPINIONS ON CERTAIN FEATURES OF THE CURRICULUM.

By learning the present occupations of the graduates, it was expected to ascertain the number who were practicing the phases of pharmacy included in Charters' activity analysis or, in other words, to discover whether this activity analysis fits the field occupied by the graduates of this college for which this curriculum was to be made. Furthermore, if any considerable group were found practicing other phases, the curriculum could be prepared to include training for such positions. These graduates whose opinions were sought may be considered to be experts in their own limited field and their opinions should have some weight in constructing a curriculum intended to train students for their positions or similar ones.

5. A SURVEY OF THE CATALOGS OF THE COLLEGES OF PHARMACY OF THE UNITED STATES IN ORDER TO DISCOVER THE SCOPE OF THEIR CURRICULA.

The curricula of these colleges presumably represents the best thought on the subject in the respective colleges and therefore should not be ignored.

6. A REVIEW OF THE REPORTS OF THE NATIONAL DRUG STORE SURVEY.

It was expected that this would yield information of value in outlining the commercial courses of the curriculum.

7. A STUDY OF CHARACTER EDUCATION FROM THE POINT OF VIEW OF THE CURRICULUM.

The importance of character development in education should insure it a place in all considerations such as this. Perhaps it may be considered the outstanding problem in the making of general curricula.

8. THE CONSTRUCTING OF THE CURRICULUM TO CONFORM WITH THE ARBITRARY LIMITATIONS PLACED UPON IT.

Perhaps the most interesting of these steps and the only one which seems to require further explanation for the purpose of this paper is No. 4, the questionnaire. The value of such a questionnaire is recognized by Frederick J. Kelly in his report on a limited survey of the American Arts Colleges (5). This questionnaire, in addition to asking for identification of the graduate as to his present position, asked the following two questions:

1. If you were to attend the College of Pharmacy over again, what subjects would you want in the curriculum, in addition to those which you studied?
2. What subjects did you study which you think should not be included in the curriculum?

It was sent to 302 graduates and the first 250 replies received were tabulated. It is not the purpose of this paper to present the numerous tabulations and charts obtained from the study of this and other steps in the procedure. However, it is of interest to note that in the opinion of these graduates English and Public Speaking courses were very desirable among the non-vocational subjects and that the medical subjects, Biochemistry, Pharmacology and Public Health, deserved additional consideration. Salesmanship and Advertising were favored among the commercial subjects. The one subject which generally did not seem desirable to them was Pharmacognosy.

Turning now to the actual construction of the curriculum from the information available, the following set of objectives was formulated to govern the work:

1. To furnish the student with that basic training which will enable him to render intelligent and constructive pharmaceutical service in the community in which he practices his profession.
2. To prepare the student so that he can grow in information and skill after he graduates and thereby meet satisfactorily the changing demands that occur throughout his service.
3. To offer the student an opportunity to elect certain courses in addition to the prescribed fundamental courses of the curriculum in order that he may better prepare himself for the particular phase of the practice of pharmacy which he may wish to pursue.
4. To develop within the student a professional morale.
5. To exemplify the utilization of the modern methods of curriculum construction and of sound principles of education, general as well as professional.
6. To provide, if possible, for the character education and cultural development of the student.

The arbitrary limitations placed on the work by the by-laws of the American Association of Colleges of Pharmacy and by the University were as follows:

1. The curriculum shall include a period of instruction of four college years.
2. It shall require the completion of not less than 3000 hours (now 3200 hours) of instruction of which at least 1000 hours (now 1300 hours) shall consist of lectures and recitations and at least 1500 hours (now 1300 hours) shall consist of laboratory work.
3. It presupposes the satisfactory completion of four years of high school work or its equivalent.
4. The degree given upon completion of the curriculum shall be Bachelor of Science in Pharmacy, and it is understood that the degree shall be for work which will admit to full standing in the graduate school of any recognized university.
5. It shall include courses in Philosophy.

With these objectives and limitations, this curriculum was constructed as outlined here. The names of the courses indicate their general content in most cases and brief descriptive terms have been included where it seemed necessary. Of course it is not feasible to try to include a complete syllabus with this paper.

In order to show the general plan of the courses, the following diagrams of the major divisions were prepared. These have been found very useful in explaining the divisions of the curriculum to pharmacists and to prospective students and their parents.

CURRICULUM.

BACHELOR OF SCIENCE IN PHARMACY.

First Year.

First Semester.	Sem. Hrs.	Second Semester.	Sem. Hrs.
Chemistry 1A (Gen. Inorg.).....	4	Chemistry 1B (Gen. Inorg.).....	4
Pharmacy 1 (Theoretical).....	3	Pharmacy 2 (General).....	3
Biology 1 (Botany).....	3	Biology 2 (Zoölogy).....	3
English 1.....	3	English 2.....	3
Pharmacy 8A (Arithmetic).....	2	Pharmacy 8B (Arithmetic).....	2
Philosophy 1 (Ethics).....	2	Pharmacy 7 (Latin).....	2
	—		—
	17		17

Second Year.

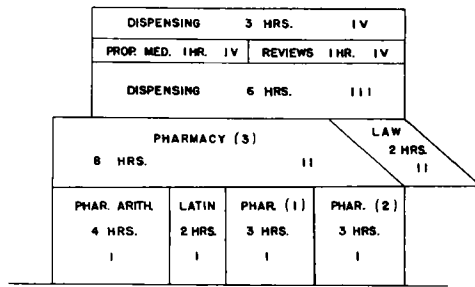
First Semester.	Sem. Hrs.	Second Semester.	Sem. Hrs.
Chemistry 2 (Qual. Analysis).....	4	Chemistry 3 (Quant. Analysis).....	3
Pharmacy 3A (Manufacturing).....	4	Pharmacy 3B (Manufacturing).....	4
Biology 3 (Physiology).....	3	Pharmacology 1B.....	2
Pharmacology 1A (Mat. Med.).....	2	Pharmacy 9 (Law).....	2
Chemistry 4A (Organic).....	4	Chemistry 4B (Organic).....	4
	—	Pharmacognosy 1.....	2
	17		—
			17

Third Year.

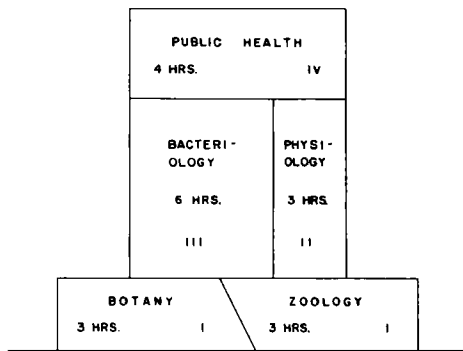
First Semester.	Sem. Hrs.	Second Semester.	Sem. Hrs.
Chemistry 5A (Food and Drug).....	2	Chemistry 5B (Food and Drug).....	2
Pharmacy 4A (Dispensing).....	3	Pharmacy 4B (Dispensing).....	3
Biology 4A (Bacteriology).....	3	Biology 4B (Bacteriology).....	3
Pharmacognosy 2.....	2	Philosophy 2 (Psychology).....	2
Pharmacology 2 (Mat. Med.).....	2	Pharmacology 3 (Mat. Med.).....	3
Approved Electives.....	4	Approved Electives.....	4
	—		—
	16		17

Fourth Year.

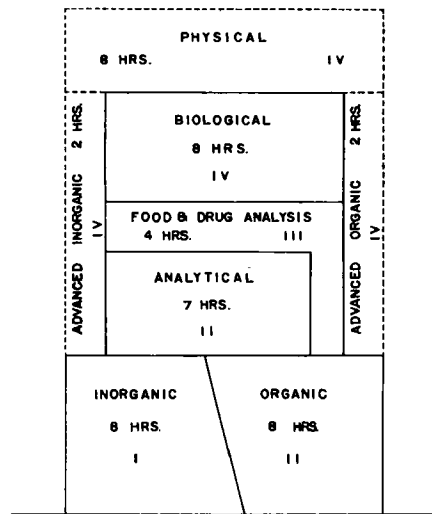
First Semester.	Sem. Hrs.	Second Semester.	Sem. Hrs.
Pharmacy 5 (Dispensing).....	2	Pharmacy 5 (Dispensing).....	1
Chemistry 7A (Biochemistry).....	4	Chemistry 7B (Biochemistry).....	4
Public Health 1A.....	2	Public Health 1B.....	2
Pharmacy 10 (Proprietaries).....	1	Pharmacy 12 (Reviews).....	1
Philosophy 3 (Applied Ethics).....	2	Pharmacology 4.....	1
Approved Electives.....	7	Approved Electives.....	7
	—		—
	18		16



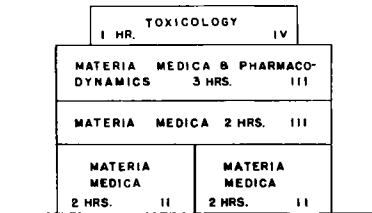
ROMAN NUMERALS INDICATE THE YEAR OF THE CURRICULUM  
GENERAL PLAN OF THE COURSES IN PHARMACY



ROMAN NUMERALS INDICATE THE YEAR OF THE CURRICULUM  
GENERAL PLAN OF THE COURSES IN BIOLOGY



ROMAN NUMERALS INDICATE THE YEAR OF THE CURRICULUM  
BROKEN OUTLINE INDICATES AN ELECTIVE COURSE  
GENERAL PLAN OF THE COURSES IN CHEMISTRY



ROMAN NUMERALS INDICATE THE YEAR OF THE CURRICULUM  
GENERAL PLAN OF THE COURSES IN PHARMACOLOGY

APPROVED ELECTIVES.

Third Year.

- Modern Language (French, German, Spanish)
- Economics 11 and 12 (Principles of Economics)
- Mathematics 2 (Trigonometry)
- Speech 51 (Public Speaking)

Fourth Year.

- Accounting 1 (Elementary Accounting)
- Advertising and Selling 1 (Advertising)
- Advertising and Selling 2 (Show Card Writing)
- Advertising and Selling 3 (Window Display)
- Advertising and Selling 4 (Salesmanship)
- Physics 21 and 22
- Pharmacognosy 3 (Advanced Pharmacognosy)
- Pharmacy 6 (Commercial Pharmacy)
- Pharmacy 11 (Druggists' Sundries)
- Pharmacy 13 (Cosmetics)
- Pharmacy 14 (Veterinary Remedies)
- Public Speaking 51 and 52
- Chemistry 6 (Advanced Organic).

Other courses given in the colleges of the University may be accepted as approved electives at the discretion of the Faculty of the College of Pharmacy.

This curriculum was not offered as something fixed and unchanging in the years to come; on the contrary, it was expected that refinements and adjustments would be made through continuous study, evaluation and testing of materials of the curriculum and that it would keep pace with the progress and practice of the craft.

It will be noticed that the first two years of the curriculum are made up entirely of required courses; the third year includes eight hours of electives and the fourth year, fourteen hours of electives. It is considered to be a fact that the courses of these first two years are necessary as a foundation for the practice of pharmacy in each of its phases. Therefore the administration of the first two years is practically automatic.

At the end of the second year it is planned that the student shall attempt to decide which phase of the practice of pharmacy he wishes to pursue after graduation. By means of conferences with the student, all available information on each phase will be brought to his attention and all possible assistance will be given him in order to attempt to insure a wise choice. It is expected that the student will have made his decision before the date of registration of his third year. Upon this decision will depend the choice of elective courses which he will be advised to select. Thus, if he decides on the commercial practice of pharmacy, his electives will include the courses of the commercial group; if he wishes to prepare to enter the field of pharmaceutical chemistry, the electives in Chemistry will be advised; if he plans to enter a school of Medicine, his electives will be taken from the group commonly known as pre-medical subjects, such as Physics, Modern Foreign Language, etc. The electives of the fourth year follow out the plan indicated for the third year or in case of a change of mind on the part of the student, will lead in the direction which seems best adapted to his individual needs.

For the proper administration of this curriculum it is deemed necessary that the administrator continue to gather all available information on the phases of the practice of pharmacy so that the advice which he may give the student will be accurate at the time given. This may cause changes in the approved electives from time to time in order to meet the conditions in the several divisions of the practice.

Four years have now passed since this curriculum became effective and we can consider as completed the most important part of our adventure.

The writer, in presenting this paper, hopes to encourage discussion of the subject and perhaps to stimulate others to describe their experiences in constructing a curriculum for use during the past four years. It is not presented with any thought of attempting to regiment college curricula but with the thought that some point mentioned might lead to an improvement of them. As an example, even if it were not to be acted on immediately in making changes, wouldn't it be interesting to have the opinions of our graduates from time to time as expressed in answer to a questionnaire like the one described here? We might gain the assurance that we are offering just what is best for our students and then again we might be given reason to doubt it. In any event, it would help in eliminating the obsolete portions of a curriculum and in curtailing a division of it which may have come to receive too great an emphasis.

In conclusion, believing that progress in the development of the pharmaceutical curriculum is a good criterion of the progress of the profession, we suggest that an increased interest in the subject on the part of those in each and every phase of the profession, instead of just the few in the field of education, will result in still greater future progress.

## REFERENCES.

- (1) *Bulletin*, Association of American Colleges, page 71 (April 1923).
- (2) The Twenty-Sixth Yearbook National Society for the Study of Education, Part II, page 12.
- (3) Charters, W. W., Lemon, A. B., and Monell, Leon M., "Basic Material for a Pharmaceutical Curriculum."
- (4) Bobbitt, Franklin, "How to Make a Curriculum," page 5.
- (5) Kelly, Frederick J., "The American Arts Colleges," page 198.

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PROGRAM OF NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH, 1937  
MEETING, NEW YORK, N. Y., AUGUST 14TH AT HOTEL PENNSYLVANIA.

## FIRST SESSION, 2:00 P.M.

1. Call to Order by the Chairman.
2. Appointment of Nominating Committee.
3. Summary of Year's Activities and Outlook of Conference for the Future, by Chairman Gathercoal.
4. Reports of Officers. *a.* Report of Secretary. *b.* Report of Treasurer. *c.* Report of Executive Committee by Secretary.
5. Reports of Standing Committees.
  - (1) Physical Chemistry, Arthur Osol, *Chairman*.
  - (2) Bacteriology and Immunology, Louis Gershenfeld, *Chairman*.
  - (3) Pharmacognosy, Heber W. Youngken, *Chairman*.
  - (4) Pharmacology and Bioassays, James C. Munch, *Chairman*.
  - (5) Medicinal Chemicals, Joseph Rosin, *Chairman*.
  - (6) Endocrinology, Arthur Grollman, *Chairman*.
  - (7) Manufacturing Pharmacy, L. Wait Rising, *Chairman*.
  - (8) Pharmaceutical Dispensing, William J. Husa, *Chairman*.
  - (9) Educational Methods, A. B. Lemon, *Chairman*.
  - (10) Pharmaceutical Economics, Harry S. Noel, *Chairman*.
  - (11) Historical Pharmacy, Charles H. LaWall, *Chairman*.
  - (12) Census of Research, James C. Munch, *Chairman*.
6. Reports of Other Special Committees. 7. Roll Call of Delegates.
8. Adjournment for Dinner. Arrangements Will Be Made for a Dinner for the Delegates Assembled.  
An address pertinent to the work of the Conference will be delivered.

## EVENING SESSION, 8:00 P.M.

9. Symposium on Deterioration.
  - a.* Digitalis Preparations, James C. Munch.
  - b.* Pepsin Preparations, E. N. Gathercoal.
  - c.* Ergot Preparations, M. J. Thompson.
  - d.* Syrup of Ferrous Iodide, William J. Husa.
10. General Discussion of the Status of Pharmaceutical Research.
11. Election and Installation of Officers. 12. Adjournment.

*Chairman*, E. N. GATHERCOAL; *Secretary*, JOHN C. KRANTZ, JR.