

# THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS  
DEPARTMENT.

"The following paper by Dean A. G. DuMez of the Maryland College of Pharmacy is very timely. Pharmaceutical education has been developing rapidly in the past ten years and a survey of its historical development in the United States is very beneficial to all pharmaceutical educators in determining whether we are on the right track or not. This very comprehensive paper by Dean DuMez gives an excellent survey. In addition, his references make it possible for us to look up the original material. I am sure that all teachers of pharmacy will find much of interest in the paper.—C. B. JORDAN, *Editor.*"

## DEVELOPMENT OF PHARMACEUTICAL EDUCATION IN THE UNITED STATES AND ITS PRESENT TREND.\*

BY A. G. DUMEZ.

The practice of pharmacy as a separate or distinct profession in the United States may be said to have had its beginning in the years immediately following the Revolutionary War. While the records show that a number of so-called apothecary shops were established by persons other than medical practitioners<sup>1</sup> in earlier years and that in some few instances apothecaries educated in Europe<sup>2</sup> compounded medicines and dispensed prescriptions prior to that time, it is a well-established fact that practically all doctors of the colonial period carried stocks of drugs and filled their own prescriptions.<sup>3</sup> It was not until after the war that pharmacy as an inde-

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<sup>1</sup> Otto Raubenheimer in an article entitled "Historical Sketches of Old Drug Stores in This Country" lists eight apothecary shops or drug stores established by non-medical practitioners in this country prior to 1780. These were located at Boston, New York, Perth Amboy, N. J., and Philadelphia. *Drug. Circ.* (October 1927), page 989.

<sup>2</sup> Mr. Leighton, an English apothecary, established himself in Philadelphia in 1765, where he advertised that he brought a large supply of medicines with him and that he was prepared to fill all prescriptions that should be presented to him. The outcome of this venture is not recorded. M. I. Wilbert, *Am. J. Pharm.*, 79 (1907), 402.

A shop was opened in Norfolk, Va., in 1772 by Robert Agnes, an apothecary from London. Blanton, "Medicine in Virginia in the Eighteenth Century," 1932, page 33.

The first appointment of an apothecary to fill prescriptions in this country other than his own was the appointment of Jonathan Roberts as apothecary to the Pennsylvania Hospital in December 1752. Benjamin Franklin, Account of the Pennsylvania Hospital from Its Rise to the Beginning of the Fifth Month, called May 1754.

<sup>3</sup> De Warville in writing of his travels in this country in 1788 says: "The greater part of these physicians are at the same time apothecaries. They continue to unite the two sciences, out of respect to the people, who wish that the man who orders the medicine should likewise prepare it." De Warville, "New Travels in the United States of America," performed in 1788, page 351.

In Baltimore, the compounding of prescriptions was mostly in the hands of physicians up to 1840. Prior to that time, the pharmacist was a mere vendor of crude drugs. "Annual Catalogue of the Maryland College of Pharmacy," 1891, page 9.

The conditions throughout Virginia were similar to those in Maryland. Such apothecary shops as were in existence before the end of the Revolution were owned and operated by physicians. Blanton, "Medicine in Virginia in the Eighteenth Century," 1932, pages 30-31.

pendent profession began to receive noteworthy support from American physicians.<sup>1</sup> The fact that the systematic education of young men to become its practitioners was not inaugurated until nearly half a century later is, therefore, not astounding. To trace for you the development of this field of education in our country from its beginning and to direct your attention to the present trend therein is the objective of this paper.

In the colonial days, the practice of pharmacy and medicine was carried on by one and the same person, usually a matron or a quack, frequently a clergyman and in the old established and more thickly populated settlements a physician.<sup>2</sup> But, as peace settled over the land following the War, agriculture, the trades and commerce grew apace and prospered and physicians educated and trained in Europe settled here in larger numbers. The more successful of these soon became so busily engaged with their medical practice that they had no time for the preparation of medicines and gradually relegated this work to those less successful or those especially interested in materia medica, to established dealers in drugs and medicines and to the apothecaries by education as they came here from Europe. In this way a differentiation between prescribers and dispensers gradually took place.

Dr. John Morgan was the first to publicly advocate the dissociation of the two professions.<sup>3</sup> On his return to Philadelphia in 1765 from Paris and Edinburg, where he had been studying medicine, he proclaimed the principle that physicians should confine themselves to prescribing, leaving to the apothecary the preparing and compounding of medicines. The first physician to have actually made a practice of writing prescriptions is said to have been Abraham Chauvet, who settled in Philadelphia in 1770. He was followed by John Jones, also of Philadelphia.<sup>4</sup>

It must not be inferred from the two cases cited that the principles enunciated by Dr. Morgan were generally accepted and that complete dissociation of the two callings took place immediately. As already stated, the process of separation was

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<sup>1</sup> Blanton attributes the change in the attitude of the physician to the influx of foreign doctors, "particularly those from Great Britain where the two branches had long been separated." "Medicine in Virginia in the Eighteenth Century," 1932, page 32.

<sup>2</sup> Of the early medical practitioners of the Massachusetts Colony, 6 or 7 (or more) were ministers as well as physicians; 1 was a doctor, schoolmaster and poet; 1 practiced medicine and kept a tavern; 1 was a butcher and 1 a female practitioner employed by her own sex. Lecture by Oliver Wendell Holmes delivered before the Lowell Institute, January 29, 1869.

The following description of the condition of medicine in the Colonies prior to the beginning of the Revolution is given in Smith's History of New York, page 326: "Few physicians amongst us are eminent for their skill. Quacks abound, and too many have recommended themselves to a full and profitable practice and subsistence. Any man at his pleasure sets up for physician, apothecary and chirurgeon."

Toner states that when the War of Independence began, and no American degrees existed, there were hardly more than 400 physicians holding European degrees in all the Colonies; and yet the medical practitioners numbered about 3500. Contributions to the Annals of Medical Progress, etc., 1874, page 106.

<sup>3</sup> Dr. Morgan in his "Discourse upon the Institution of Medical Schools in America" advocated "the regular mode of practicing physic" and recommended the complete separation of pharmacy and surgery from the practice of medicine. He wrote: "We must regret that the very different employment of physician, surgeon and apothecary should be promiscuously followed by one man; they certainly require different talents. Commencement address delivered at the College of Philadelphia, May 30, 1765. Printed by William Bradford.

<sup>4</sup> Blanton, "Medicine in Virginia in the Eighteenth Century," 1932, page 32.

a gradual one and it was many years before it was completed. The average medical practitioner was loathe to give up the additional fee he received for dispensing and the public did not take readily to the payment of two fees instead of one, one to the physician for treatment and one to the pharmacist for medicines.

This separation of the two professions, although definitely begun in the latter part of the eighteenth century, did not make much progress until the early part of the nineteenth century, when it appears to have become a part of a general forward movement which began about 1785 and which was characterized by a more marked specialization in the arts, trades and professions. Education, both elementary and higher, was improved and extended, and the standards of professional requirements and proficiency raised. Medical education advanced correspondingly and with the resulting increase in numbers and influence of a superior class of medical practitioners, a stricter discrimination in the arts of medicine and pharmacy gradually asserted itself. Some of the old-time general merchandise stores were converted into drug stores and dispensing apothecaries' shops; and these were conducted by men who grew up in the trade or men who were originally trained by physicians, and to a much smaller extent by pharmacists who immigrated from European countries.<sup>1</sup> This variety of pharmaceutical practitioners gradually amalgamated into one uniform profession with common aims and interests. One of these aims, the one with which this paper deals, was the inauguration of some system of education for their assistants commensurate with that already established for students of medicine. In the actual launching of this movement, however, the pharmacists were preceded by the medical men.

Pharmacy was already being taught in a number of the medical schools, but the courses were designed for medical students and were open to such students only. Martin I. Wilbert, in a paper on the beginnings of pharmacy in America published in 1907, wrote as follows regarding pharmaceutical education in the early medical schools: "The medical schools in different sections of the country early recognized the necessity of including instruction in pharmacy in their regular curriculum, and a number of them included pharmacy in the title of one of their professors. In 1820 no less than six of the twenty medical schools enumerated by Thacher in his 'History of Medicine in America' included more or less extensive instruction in pharmacy. The chair of pharmacy was usually combined with that of chemistry or materia medica, although in one instance it was combined with that of obstetrics."<sup>2</sup> This description of the status of pharmaceutical instruction in medical schools prior to 1820 is so comprehensive, in spite of its brevity, that the subject will not be pursued further, except in one or two instances and these will be dealt with further on.

The first recorded attempt to teach pharmacy to others than students regularly matriculated in medical schools was made in the city of Philadelphia in 1816, by Dr. James Mease, a well-known medical practitioner and author. According to Dr. Joseph Carson, the historian of the Medical Department of the University of Pennsylvania, Dr. James Mease applied for and was granted permission to hold the introductory lecture to his course in pharmacy in the buildings of the Pennsylvania

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<sup>1</sup> J. D. Schoepf, "Reise durch einige der mittleren und südlichen Vereinigten Staaten," etc., Erlangen, 1788, vol. I, page 121, through *Pharm. Review*, 16 (1898), 298.

<sup>2</sup> *Am. J. Pharm.*, 79 (1907), 406.

College.<sup>1</sup> Where, when and by whom the lectures were actually given is not known as the foregoing note made in the minute book of the Board of Trustees of the University of Pennsylvania is the only reference to the matter to be found.

The first provision for collegiate instruction in pharmacy in America was made by the first medical school to be established in this country, namely, the Medical School of the College of Philadelphia, which was opened in the City of Philadelphia in the fall of 1765, and which later became a department of the University of Pennsylvania. In the official announcement of the opening of the School it is stated: "In order to render the courses of lectures the more extensively useful, it is intended to introduce into them as much of the theory and practice of physic, of pharmacy and chemistry as can be conveniently admitted."<sup>2</sup> However, the chair of materia medica and pharmacy was not installed until 1789 and so far as I have been able to discover few if any pharmacists enrolled for the course.

The second attempt to supply the pharmacists' educational needs was also made by a Philadelphia institution, namely, the University of Pennsylvania. In 1819, the title of Professor of Materia Medica in the University was changed to that of Professor of Materia Medica and Pharmacy, and the lectures in these subjects along with those in chemistry were opened to students of pharmacy. The number of students who availed themselves of the privilege of attending these lectures appears to have been sufficiently large to have induced the officials of the University to take up the matter of making provision for a pharmacy degree. At a meeting of the trustees held on February 21, 1821, the following resolutions<sup>3</sup> were adopted on the recommendation and at the request of the Medical Faculty:

"Resolved, (1) That the degree of Master of Pharmacy be, and is hereby instituted, to be conferred hereafter by the Trustees of this University on such persons exercising or intending to exercise the profession of an apothecary as are and shall be duly qualified to receive the same.

"(2) That the faculty of medicine be requested to report to this Board at their next meeting a proper form of diploma and also a list of such apothecaries in the city and liberties of Philadelphia as are desirous and, in their opinion, deserving of the degree of Master of Pharmacy, and unless subsequent reasons to the contrary shall appear, the degree of Master of Pharmacy shall be conferred on such individuals, respectively.

"(3) That every person who shall have served a regular apprenticeship of at least three years with a respectable apothecary or a master of pharmacy, and who shall exercise or intend to exercise the profession of an apothecary, in this State or elsewhere, may, on application to the Board, obtain the degree of Master of Pharmacy. Provided he shall produce a certificate of the faculty of medicine, signed by the Dean thereof, of his being qualified to receive the same, which certificate the faculty may grant on the attestation of the Professor of Chemistry and Materia Medica and Pharmacy, who shall have examined the candidate. He must also produce a certificate of his good moral character.

"(4) That in future it shall be requisite for obtaining such a degree that the candidate shall have attended at least two courses of lectures on chemistry, materia medica and pharmacy in this University."

At the ensuing commencement, held on April 5, 1821, sixteen candidates re-

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<sup>1</sup> Carson, "History of the Medical Department of the University of Pennsylvania," 1869, page 145.

<sup>2</sup> *Ibid.*, page 56.

<sup>3</sup> *Ibid.*, page 145.

ceived the degree of Master of Pharmacy. Unfortunately, this attempt on the part of an American University to recognize pharmacy as a branch of the healing art coordinate with medicine was checked by the pharmacists of Philadelphia, who believed that the physicians were endeavoring to control pharmaceutical practice, and the benefits of such a connection were lost to pharmacy for many years to come.<sup>1</sup>

The next step in this direction was taken by the practitioners of pharmacy themselves. On February 23, 1821, two days after the University of Pennsylvania had resolved to grant the degree of Master of Pharmacy, the apothecaries and druggists of the city and liberties of Philadelphia met in Carpenter's Hall to object to the step taken by the University and to organize themselves into a society "for the twofold purpose of providing a system of instruction in pharmacy, and subjecting themselves to regulations in their business." At subsequent meetings held on March 3 and 27, 1821, they organized the College of Apothecaries; and on March 30, 1822, their school was incorporated as the Philadelphia College of Pharmacy.<sup>2</sup> This school still functions to-day as the Philadelphia College of Pharmacy and Science.

The precedent set by the apothecaries of Philadelphia was followed by the pharmaceutical practitioners in most of the large cities of the country. The more important colleges of this type were established in Boston in 1823,<sup>3</sup> in New York in 1829, in Baltimore in 1841, in Chicago in 1859, in Cincinnati in 1870, in St. Louis in 1871, in Louisville in 1871, in San Francisco in 1872 and in Washington, D. C., in 1873. And, it must be admitted that the schools established by these colleges were well founded as all of them are still functioning as teaching institutions, although a majority have formed university connections and can no longer be considered as belonging to this group.

These schools founded and managed by pharmacists actively engaged in practice had for their primary objective the supplementing of the training received by apprentices in the drug stores and were operated mostly at night to suit the convenience of the employers. The nature of the instruction given by these institutions is perhaps best described in the words of Dr. Edward Kremers, Director of the Course in Pharmacy at the University of Wisconsin. At the fourth annual meeting of the American Conference of Pharmaceutical Faculties he spoke in part as follows: "The early history of all of these institutions clearly shows that they were 'Fortbildungsanstalten' closely affiliated with the daily routine of the drug store. The idea was not so much to give a thorough training in the fundamental sciences as to supplement the unsystematic training of the stores by a course of evening lectures. This truth is particularly emphasized by the fact that the clerk who had served an apprenticeship of two or more years attended the same course of evening lectures at least twice. It was the apprenticeship system improved but still essentially the apprenticeship system. The time spent in the store was, therefore, the

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<sup>1</sup> Pharmaceutical education was not accorded equal recognition until 1876, when a school of pharmacy was established at the University of Michigan.

<sup>2</sup> "First Century of The Philadelphia College of Pharmacy," 1922, pages 65-68.

<sup>3</sup> The Boston College did not set up an organization for giving instruction in pharmacy until 1867. The school which was organized at that time is known as the Massachusetts College of Pharmacy.

prime requisite to a certificate of proficiency. The course of lectures simply served as a kind of superstructure, their prime object being to bring into some system the information and experience irregularly acquired during an apprenticeship and assistantship of four or more years."<sup>1</sup>

The first coördinate school of pharmacy operated as a university unit was established at the University of Michigan in 1876.<sup>2</sup> This event, important in itself, is of particular significance because it ushered in the application of university methods and standards to pharmaceutical education in this country and marks the beginning of the present trend in this field.

This change in the old order was vigorously opposed by the independent schools on the ground that the university teachers lacked drug store experience and that such experience was a primary requisite for the training of pharmacists. Whether it was because of this opposition or for some other reason, there were no further developments of the kind until 1883, when a school of pharmacy was established at the University of Wisconsin. From then on, the movement rapidly gathered momentum and within the following thirteen years no less than eleven such schools were established, *viz.*: at Purdue University, 1884; University of Iowa, 1885; University of Kansas, 1885; University of Ohio, 1885; Cornell University, 1887;<sup>3</sup> South Dakota Agricultural College, 1888; University of Minnesota, 1892; Alabama Polytechnic Institute, 1895; University of Washington, 1895; Washington Agricultural College, 1896; and University of North Carolina, 1896. At the present time, instruction in pharmacy is offered by most of our state universities, the notable exceptions being the universities of the New England States, New York and Pennsylvania.<sup>4</sup>

The advantages of the university school of pharmacy over the independent school were recognized immediately by those familiar with conditions. Dr. Frederick Hoffmann of Berlin, Honorary President of the AMERICAN PHARMACEUTICAL ASSOCIATION, in an address prepared for the golden jubilee meeting of that Association held in Philadelphia in 1902, in commenting on this phase of the development of pharmaceutical education in this country, made the following significant statement: "It was a great advantage and conducive to superior results of the earlier university schools of pharmacy, equipped with a full faculty and ample laboratory and museum appointments, that they at once installed the pharmaceutical students in the general classes of the respective branches and required attendance at all the lectures and laboratory work."<sup>5</sup>

Whether the advantages singled out by Doctor Hoffmann were alone responsible for the rapid advance made by the university schools we do not know, but we do know that university ideals took root almost immediately, and by 1895 they were already so firmly implanted as to draw forth the following statement which

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<sup>1</sup> "Proc. Am. Conf. Pharm. Faculties," 1903, page 5.

<sup>2</sup> The department of Pharmacy of Tulane University of Louisiana, established in 1834, is reported to be the oldest of the schools of pharmacy connected with a university, but it was not a school of pharmacy in the sense accepted at present. *Pharm. Era* (March 1912), 180.

<sup>3</sup> Discontinued in 1890.

<sup>4</sup> At present there are 67 schools and colleges of pharmacy in this country. Of this number, 33 are integral parts of state universities or municipally supported colleges, 21 are units with university applications and 13 are independent institutions of the proprietary type.

<sup>5</sup> PROC. A. PH. A., 50 (1902), 113.

appeared in the proceedings of the section on education and legislation of the AMERICAN PHARMACEUTICAL ASSOCIATION for that year: "Institutions that were founded by 'impractical' university teachers have proven their right to existence to such an extent that those who criticized them in former days, though still ostensibly maintaining their earlier ground, are in reality undermining their own foundation by silently accepting the ground of their supposed opponents."<sup>1</sup> These ideals have continued to take root and spread until to-day it may be said without fear of contradiction that the university schools now dominate in this field and that the trend in pharmaceutical education as a whole is distinctly toward the standards set by them.

The questions naturally arise: What are the standards set by these schools? What has caused the trend in pharmaceutical education to assume its present course? The statements immediately following are the answers in brief. The standards advocated by the university schools are those generally recognized in educational circles for work of collegiate grade. The placement of pharmaceutical education on an equality with that accepted as a standard by other university departments and their standardizing agencies is one of the chief aims of these schools. The reason for the drift toward the general adoption of these standards is that the body pharmaceutical of this country has finally awakened to the fact that, if the calling of pharmacy is to survive as a profession, the old idea of a course of study comprised almost wholly of subjects of strict pharmaceutical applicability and the employment of trade-school methods of instruction must be abandoned. The reorganization of the course of study to bring it into conformity with the broader curricula of other university departments and thereby give the student in pharmacy the same opportunity for independent study and research open to students of the other professions is a natural sequence. The extent to which we have progressed in this direction, as well as the nature of the progress made is depicted in a most interesting and striking way by the annual catalogues of the School of Pharmacy of the University of Maryland from which the following notes were taken.<sup>2</sup>

These catalogues, although intended primarily to convey information about the Maryland school, simulate so closely like publications of the other schools in nature and content that they serve to picture in a fairly accurate way conditions which were prevalent throughout the land. Taken as a whole, they, therefore, form a continuous record of the progress in pharmaceutical education made in this country during the last half century and leave no doubt as to its present trend. They record each step in the evolution of pharmaceutical education from the "Fortbildungsaustalten" stage to its present advanced state of development. They show that the requirements for admission were advanced about as rapidly as facilities for obtaining the required preliminary education became generally available, also the effect of the position taken by the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy on this requirement as soon

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<sup>1</sup> *Ibid.* (1895), 448.

<sup>2</sup> The annual catalogues of the School of Pharmacy of the University of Maryland, formerly the Maryland College of Pharmacy, are admirably suited to this purpose as the school began its existence in 1841 as an independent institution, became a part of the privately incorporated University of Maryland in 1904 and a department of the State University in 1920, when the old University of Maryland was merged with Maryland State College.

as these organizations became active, which was shortly after 1920; when the lectures were first graded so that second-year students did not merely repeat the work of the first year; when night courses were discontinued; when the recitation was first used as a method of instruction; the beginning and growth of laboratory instruction and how it gradually supplanted the apprenticeship requirement for graduation; each step in the broadening of the curriculum to meet new conditions or influences, and, particularly, in more recent years to bring it up to the standard set by the other professional schools; the times when the period of required attendance upon instruction was lengthened to meet the new conditions imposed by additions to the curriculum or for other reasons; the changes in scholastic standards; the evolution of the pharmaceutical degree and the changes in the requirements to be met by the candidates for degrees; and the stimulating effect of the merger of the School with the University of Maryland in 1904 and the additional impetus given to advancement received when the School was made a department of the State University in 1920.

ANNUAL CATALOGUE AND ANNOUNCEMENT.

SCHOOL OF PHARMACY, UNIVERSITY OF MARYLAND.

(Maryland College of Pharmacy 1841-1904.)

*Session of 1870-1871.*

The prescribed course of study consisted of lectures in Pharmacy, Materia Medica and Chemistry.

Attendance upon two full courses of lectures given over a period of 2 sessions of about 18 weeks each was required for graduation. The candidate was also required to furnish proof of having served an apprenticeship of 4 years in the "drug and apothecary business" and to submit an original thesis of not less than 15 pages on some subject pertaining to pharmacy.

The degree conferred at graduation was Licentiate in Pharmacy. At the expiration of 3 years, upon evidence of professional advancement, the title of Master of Pharmacy was given; and upon those who maintained the honor and dignity of the profession for 10 years, the degree of Doctor of Pharmacy was conferred.

*Session of 1871-1872.*

Optional lectures on toxicology were offered.

The degree conferred upon graduation was changed from Licentiate in Pharmacy to Graduate in Pharmacy (Ph.G.).

*Session of 1873-1874.*

Laboratory work in Analytical Chemistry was required for the first time. This is the first instance in which laboratory work in chemistry was required by any of the schools of pharmacy of this country.

*Session of 1878-1879.*

The courses of lectures were graded to provide advanced instruction for the second-year students, or seniors. Previous to this time, the lectures were the same for all students, the seniors merely repeating attendance upon the lectures given in the first year.

*Session of 1881-1882.*

Attendance upon the lectures in Toxicology was made obligatory for graduation.

*Session of 1883-1884.*

A practical course in pharmaceutical manipulations was introduced. This is the first time laboratory work in pharmacy was offered.



*Session of 1885-1886.*

"Quiz Instruction" was introduced. Evidently, this was the first use made of the recitation as a means of instruction.

*Session of 1886-1887.*

With the beginning of this session, candidates for admission were required to pass a preliminary examination in "the ordinary branches of an English education taught in grammar schools; or to furnish in its stead a certificate of having passed an examination equivalent to that required for admission into the high schools of this city" (Baltimore).

Laboratory work in microscopy and practical botany was offered for the first time, but was not required for graduation.

*Session of 1888-1889.*

The length of a session was extended to cover a period of 6 months.

Laboratory work in the various branches of general chemistry was required for the first time.

*Session of 1889-1890.*

Beginning with this session, the time actually spent in attendance upon lectures and practical instruction in the chemical and pharmaceutical laboratories of the College was accepted as fulfilling in part the four-year apprenticeship requirement for graduation.

*Session of 1891-1892.*

The curriculum was divided into compulsory and optional studies, *viz.*:

Compulsory: Pharmacy, Practical Pharmacy (Short Course), General Chemistry, Practical and Analytical Chemistry, Materia Medica, Botany and Pharmacognosy.

Optional: Practical Pharmacy (Long Course), Microscopy, Practical Botany, Quiz Instruction.

*Session of 1892-1893.*

Beginning with this session, the lectures were given in the morning instead of in the late afternoon and evening.

The credit allowed for the time actually spent in practical instruction in the chemical and pharmaceutical laboratories of the College in the fulfillment of the four-year apprenticeship requirement for graduation was fixed at 6 months.

*Session of 1894-1895.*

Vegetable Histology and Pharmaceutical Assaying were added to the group of optional studies.

The practice of conferring the degrees of Master of Pharmacy (M.P.) and Doctor of Pharmacy (Phar.D.) upon graduates of the two-year course who had "maintained the honor and dignity of the profession" for 3- and 10-year periods, respectively, was discontinued at the end of this session. The total number of such degrees conferred was 21. Of these, 6 were Master of Pharmacy degrees and 15 Doctor of Pharmacy degrees.

*Session of 1895-1896.*

The length of the course was extended to two sessions of 7½ months each.

The thesis requirement for graduation from the two-year course was discontinued.

A "postgraduate" course leading to the degree of Doctor of Pharmacy (Phar.D.) was offered for the first time. It consisted principally of advanced laboratory work in the subjects of the two-year curriculum and covered a period of 32 weeks of 5 full days each.

*Session of 1896-1897.*

The two-year course was extended in length to two sessions of 32 weeks each. The apprenticeship requirement for graduation was discontinued.

*Session of 1900-1901.*

A separate and distinct course, including laboratory work in dispensing pharmacy was added; also a course in commercial pharmacy.

Beginning with this session, the degree of Doctor of Pharmacy (Phar.D.) was conferred upon the completion of the two-year course, and the conferring of the degree of Graduate in Pharmacy (Ph.G.) was discontinued until the session of 1914-1915, when the recommendations of the American Conference of Pharmaceutical Faculties relative to standardization of degrees was adopted.

*Session of 1906-1907.*

The entrance requirements were advanced to the completion of 1 year of high-school work or its equivalent.

*Session of 1913-1914.*

Courses in Pharmaceutical Arithmetic, Pharmaceutical Latin and Pharmaceutical Jurisprudence were added to the curriculum.

*Session of 1914-1915.*

Beginning with this session, the requirements for eligibility to receive the degree of Doctor of Pharmacy (Phar.D.) were advanced to the completion of 3 years of specified work, and the degree of Graduate in Pharmacy (Ph.G.) was conferred upon the completion of the two-year course.

*Session of 1918-1919.*

A minimum of 2 years of high-school work was required for entrance.

*Session of 1919-1920.*

The conferring of the degree of Doctor of Pharmacy (Phar.D.) upon the completion of three years of work was discontinued and the degree of Pharmaceutical Chemist (Ph.C.) was given in its place.

*Session of 1920-1921.*

The entrance requirements were advanced to the completion of 4 years of standard high-school work or its equivalent, *viz.*:

"The applicant must be not less than seventeen years old and must have completed a four-year standard high-school course, or its equivalent. The course, or its equivalent, must have included one year of Latin. Two years of Latin, however, are more desirable.

Admission to the course in pharmacy is by certificate issued by the State Department of Education, 210 W. Madison St., Baltimore, Md. The certificate is issued on the basis of credentials, or by examination or both. Evaluation of credentials can be made by the Department of Education only, and all applicants, whether their entrance qualifications are clearly satisfactory as per the requirements for matriculation outlined above, or not, must secure a certificate from said Department of Education to be presented to the Dean before they can be matriculated."

*Session of 1921-1922.*

The curriculum was broadened to include the general educational subjects, English, Modern Languages, Algebra, Trigonometry and Physics.

*Session of 1923-1924.*

The regular course of study was lengthened to three years of 32 weeks each. Upon the successful completion of the course, the diploma of Graduate in Pharmacy (Ph.G.) was given. The award of the Ph.C. degree was discontinued.

Provision was made for giving a fourth year of work leading to the degree of Bachelor of Science in Pharmacy (B.S. in Phar.). The work of the fourth year consisted of courses in Advanced Pharmacy, Dispensary Practice, Pharmacognosy, Physiological Chemistry, Serology and Immunology, Civil Government, Food and Drug Analysis, Clinical Laboratory Practice and Economics.

*Session of 1931-1932.*

A complete list of the subjects comprising the course of study for this session is given because it shows the advances made up to the present and the condition of the curriculum at the end of the period of transition from a course of three years to one of four years. The attempt to build upon the old three-year course with a view to preparing the way for the final step in the change is readily discernable. The excessive amount of work now required in the first three years and the illogical sequence in which some of the subjects are scheduled are conditions brought on by this building process. The manner in which these conditions have been improved is shown in the outline for the new four-year curriculum.

OUTLINE OF PRESENT CURRICULUM.

<i>First Year.</i>		<i>Third Year.—Continued.</i>			
	First Semester.	Second Semester.	First Semester.	Second Semester.	
Botany <i>1s</i> , Structural.....	..	3	Immunology.....	..	2
*Chemistry <i>1y</i> , Inorganic and Qualitative Analysis.....	4	4	Chemistry <i>4f</i> , Medicinal Products.....	4	..
*English <i>1y</i> , Composition and Rhetoric.....	3	3	Chemistry <i>5s</i> , Pharmaceutical Assaying.....	..	4
*Modern Language <i>1y</i> , German or French.....	4	4	Pharm. Economics <i>1f</i> , Book-keeping and Business Methods.....	3	..
*Mathematics <i>1f</i> , Algebra.....	3	..	Pharmacology <i>2f</i> , Pharmacology, Toxicology and Ther.	3	..
*Mathematics <i>2s</i> , Trigonometry.....	..	3	Pharmacy <i>4y</i> , Dispensing.....	4	4
Pharmacy <i>1f</i> , History of Pharmacy.....	1	..	Pharmacy <i>5y</i> , Pharmaceutical Practice.....	1	1
Pharmacy <i>2s</i> , Pharmaceutical Mathematics.....	..	2	Pharmacognosy <i>2s</i> , Vegetable Histology.....	..	2
*Zoölogy <i>1f</i> , General.....	4	..	Pharm. Law <i>1s</i> , Pharm. Laws and Regulations.....	..	2
	19	19	*Zoölogy <i>2s</i> , (elective), Vertebrate.....	..	4
				19	19
<i>Second Year.</i>			<i>Fourth Year.</i>		
*Chemistry <i>2y</i> , Organic.....	4	4	Chemistry <i>101f</i> , Medicinal Products.....	3	..
Pharmacognosy <i>1f</i> , General....	4	..	Chemistry <i>102f</i> , Food and Drug Analysis.....	4	..
Pharmacy <i>3y</i> , Galenical.....	4	4	Chemistry <i>103y</i> , Physical.....	3	3
*Physics <i>1y</i> , General.....	4	4	Chemistry <i>104y</i> , Physiological..	4	4
Physiology <i>1f</i> , Physiology and Hygiene.....	3	..	Pharmacy <i>101y</i> , Advanced....	3	3
Chemistry <i>3s</i> , Quantitative Analysis.....	..	3	Pharmacology <i>101s</i> , Physiological Assaying and Testing....	..	4
Pharmacology <i>1s</i> , Pharmacology, Toxicology and Therapeutics.....	..	3	Elective.....	..	4
	19	18		17	18
<i>Third Year.</i>					
Bacteriology <i>1f</i> , General.....	4	..			
Bacteriology <i>2s</i> , Serology and					

*Note:* The letter following the numbers of a course indicates the semester in which it is offered: thus, course *1f* is offered in the first semester; *1s*, in the second semester. The letter "y" indicates a full-year course.

\* Instruction in these courses is given by the faculty of the College of Arts and Sciences.

## OUTLINE OF NEW FOUR-YEAR CURRICULUM.

Beginning with the session of 1932-1933, a minimum of four years of prescribed work will be required, the awarding of the diploma of Graduate in Pharmacy (Ph.G.) will be discontinued and the degree of Bachelor of Science in Pharmacy (B.S. in Pharm.) will be conferred upon candidates successfully completing the course.

<i>First Year.</i>		<i>Third Year.—Continued.</i>			
	First Se- mester.	Second Se- mester.	First Se- mester.	Second Se- mester.	
Botany 1s, Structural.....	..	3	Pharmacy 2y, Dispensing.....	4	4
*Chemistry 1y, Inorganic and Qualitative Analysis.....	4	4	Pharmacy 3y, History of Phar- macy.....	1	1
*English 1y, Composition and Rhetoric.....	3	3	Pharmacy 4f, Pharmaceutical Mathematics.....	2	..
*Modern Language 1y, French or German.....	4	4	—	—	—
*Mathematics 1f, Algebra.....	3	..	18	17	17
*Mathematics 2s, Trigonometry..	..	3	<i>Fourth Year.</i>		
*Zoölogy 1f, Invertebrate.....	4	..	(Required Subjects.)		
—	—	—	Bacteriology 3s, Hygiene and Sanitation.....	..	2
18	17	17	Chemistry 5f, Pharmaceutical Assaying and Testing.....	4	..
<i>Second Year.</i>			Economics 2f, Pharmaceutical..	3	..
Botany 2f, Pharmacognosy.....	4	..	Law 1s, Pharmacy Laws and Regulations.....	..	3
Botany 2s, Vegetable Histology ..	..	2	Pharmacy 5y, Manufacturing Pharmacy.....	3	3
Chemistry 2y, Organic.....	4	4	Pharmacy 6y, Pharmaceutical Practice.....	1	1
*English 2y, Public Speaking... 1	1	1	Electives.....	7	8
Pharmacy 1y, Galenical.....	4	4	—	—	—
*Physics 1y, General.....	4	4	18	17	17
Physiology 1s, General.....	..	3	(Electives.)		
—	—	—	Botany 3y, Advanced Vegetable Histology.....	4	4
17	18	18	Chemistry 6y, Physical.....	3	3
<i>Third Year.</i>			Chemistry 7y, Physiological... 4	4	4
Bacteriology 1f, General.....	4	..	Chemistry 8s, Food and Drug Analysis.....	..	4
Bacteriology 2s, Serology and Immunology.....	..	2	Pharmacology 2f, Bioassaying.. 4	..	..
Chemistry 3f, Medicinal Prod- ucts.....	4	..	*Zoölogy 2s, Vertebrate.....	..	4
Chemistry 4s, Quantitative An- alysis.....	..	4	Thesis.....	..	11
Economics 1s, Principles of... ..	..	3			
Pharmacology 1y, Pharmacol. Toxicol. and Therapeutics... 3	3	3			

\* Instruction in these courses is given by the faculty of the College of Arts and Sciences.

The attainment of the principal objective of the university schools is now only a short time off. With the inauguration of the minimum four-year course next fall, at all of the fifty-eight schools holding membership in the American Association of Colleges of Pharmacy, it is believed that the goal will have been reached.<sup>1</sup> And, in fairness to all, it should be stated that the independent schools have done

<sup>1</sup> A number of the schools have offered a four-year course leading to the Bachelor's degree for many years past. Some of these have also offered work leading to the advanced degrees, Master of Science and Doctor of Philosophy. At the present time 12 of the schools are requiring a minimum of four years of work for graduation.

their share of the work involved in bringing this about, and that no small amount of credit for the progress that has been made should be given to those pharmaceutical organizations not primarily concerned with educational matters but which have loyally supported this movement, namely: The AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Boards of Pharmacy.

The necessity for some organized effort to properly develop pharmaceutical education in this country was early recognized by the AMERICAN PHARMACEUTICAL ASSOCIATION<sup>1</sup> but it was not until 1870 that the then existing schools took a united interest in the matter. In that year there was held in Baltimore a conference of delegates of the more progressive colleges of pharmacy for the purpose of bringing about uniformity in the standards for graduation.<sup>2</sup> The principal outcome of this conference was the formation of an organization of the colleges which continued to function until 1886, but which left no record of its activities or of its accomplishments, except some scattered notes in the minutes of the boards and faculties of the member colleges. A second organization of the schools was effected in 1900.<sup>3</sup> The organization formed at that time is now known as the American Association of Colleges of Pharmacy.<sup>4</sup> It has been a virile organization since the date of its birth and the leader in advancing the interests of pharmaceutical education. In the furtherance of its aims, it has been ably assisted by the National Association of Boards of Pharmacy which was organized in 1904 and with which it has many interests in common. In fact, the two organizations have worked hand in hand in advancing our standards to the position which they now occupy. Both labored earnestly and consistently in the endeavor to broaden the curriculum, to lengthen the course of study and to bring it up to the desired standards in other respects, but without definite progress before the War in Europe.

It seems that no less than an ultimatum from an outside agency was required to make us realize what was really the matter with our system of education and to spur us on to remedy its defects. The ultimatum was received on September 30, 1918, from an agent of the War Department. Dr. R. C. McLaurin, chairman of the whole Government educational plan, in a conference of pharmaceutical educators and others held in Washington, D. C., on that date relative to the establishment of Students' Army Training Corps in schools of pharmacy, declared: "If the colleges of pharmacy desire the same consideration accorded the other professional schools, they must demand of their students the same conditions for entrance and the same type of professional work required by these other professional schools."<sup>5</sup> Certainly, no declaration could have been more in keeping with the aims of the

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<sup>1</sup> The AMERICAN PHARMACEUTICAL ASSOCIATION has taken an interest in pharmaceutical education from the very beginning of its existence in 1852. In 1887, it organized a section on pharmaceutical education, which is still continued as the Section on Education and Legislation.

<sup>2</sup> The call for this conference was issued by the Maryland College of Pharmacy. "Proc. Am. Conf. Pharm. Faculties," 1906, page 8.

<sup>3</sup> An unsuccessful attempt to form a new conference was made by James H. Beal and George B. Kauffman in 1893. The call for the conference of 1900 was issued by Henry P. Hynson, secretary of the Maryland College of Pharmacy. *Ibid.*, page 9.

<sup>4</sup> Previous to 1925, the title of the organization was The American Conference of Pharmaceutical Faculties.

<sup>5</sup> Rudd and Fackenthal, "Pharmaceutical Education," Bur. of Education, Dept. of the Interior, 1921, Bull. No. 11, page 12

university schools, and in my opinion it was the factor largely responsible for the progress made since the War and for the present trend in formulating our courses of study.

One of the immediate effects of the foregoing declaration was to create a more widespread interest in pharmaceutical education and to set the pharmaceutical educators, in particular, to searching for the best way of meeting the requirements laid down therein. It was soon realized that the problem was one that could not be hastily solved. There was so little upon which to build. Of course, the nature of the work done by the schools was known and likewise the nature of the requirements of the state boards of pharmacy for licensure, but there were practically no available data that could be used as a basis for defining the duties of a pharmacist and what he should know to be able to perform those duties satisfactorily. The collection and classification of data of this character was recognized as being the first step in the logical development of a new pharmaceutical curriculum. Fortunately for pharmacy, an outside agency came to its assistance, namely, the Commonwealth Fund. A subvention was granted by this fund through its Committee on Administrative Units to defray the expenses of a study of pharmacy. The study was conducted over a period of approximately three years under the direction of Doctor W. W. Charters, then of the University of Pittsburgh, and the results were made available in a comprehensive report published in 1927.<sup>1</sup> The data supplied by this report, together with the information collected by the Syllabus Committee,<sup>2</sup> a joint committee of several of the national pharmaceutical organizations which has functioned since 1906 in the preparation of the Pharmaceutical Syllabus, have been extensively drawn upon in planning the new curriculum for the School of Pharmacy of the University of Maryland as outlined on page 500 and have no doubt been utilized to a like extent by the other schools.

A new syllabus is now in the process of preparation and, if the tentative draft distributed last summer may be taken as an indication of the changes to be looked for, the pharmacy curriculum of the immediate future will show unmistakable signs of a drift to university standards. This will manifest itself mainly by the inclusion of a number of new courses. In addition to the established courses in pharmacy, there will probably be offered courses in English, public speaking, modern languages, mathematics, history, economics, psychology, zoölogy, pharmacology, hygiene and sanitation, public health, etc., and the schedule of studies will be arranged to give the student some time for specialization in at least one branch of the pharmaceutical or allied sciences.

Taken all in all, it is believed that the new curricula, in spite of the variations which will appear in them due to a difference in viewpoint or conditions of the

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<sup>1</sup> "Basic Material for a Pharmaceutical Curriculum." The McGraw-Hill Book Company, Inc., 1927.

<sup>2</sup> The Syllabus Committee is an outgrowth of a committee appointed by the Board of Regents of New York in 1905 to determine what should be the proper standards for the registration of schools of pharmacy in that state. In 1906, an invitation was extended to the National Association of Boards of Pharmacy and The American Conference of Pharmaceutical Faculties to be represented on the committee by one member from each organization. Since 1910, the committee has been composed entirely of delegates from pharmaceutical organizations, namely: The AMERICAN PHARMACEUTICAL ASSOCIATION, Association of Colleges of Pharmacy, National Association of Boards of Pharmacy. "Pharm. Syllabus," 3rd Edit., 1922, page 6.

individual schools, will be found to have been built upon good foundations and to have been developed logically. Students who complete the courses of study comprising them will have had a liberal as well as a professional education and there should be no question as to their ability to make for themselves a dignified place in our social system and to advance the prestige of pharmacy.

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### THE PRESCRIPTION DEPARTMENT.\*

BY FRANK A. DELGADO, U. S. DEPARTMENT OF COMMERCE.

The prescription phase of the National Drug Store Survey has not been approached merely from the commercial angle. At no time was sight lost of the fact that the professional side of pharmacy is just as individual as the practice of medicine, dentistry or any other profession. It is true that the first and other reports of the Prescription Department will point out the benefits to be derived through greater standardization and uniformity and the adoption of modern merchandising methods, but the necessity of pharmacy operating under certain minimum requirements and rendering special and vital service to the physician and the public was and is fully realized.

The commercially minded pharmacist should not minimize the contribution which the science of pharmacy makes to his success. At the same time merchandising, when defined broadly as the application of business principles to any activity involving buying and selling, cannot be overlooked by the most professional. Such principles apply in filling prescriptions as in other phases of the business.

This becomes apparent as soon as a summary is made of the factors and business practices to which the successful operation of professional pharmacies can be attributed. Among these factors of success are:

- (1) Knowledge, skill, experience, honesty, diligence and personality of both proprietor and staff.
- (2) Physicians' support, coöperation, confidence and friendship.
- (3) Location, accessibility to physicians.
- (4) Store arrangement, adequate equipment, appearance and cleanliness.
- (5) Buying carefully, quality, variety, purity and freshness of stock.
- (6) Selling, accuracy in filling prescriptions, reasonable prices commensurate with quality and service.
- (7) Service, every possible facility, such as private telephones, switchboards, rapid calling for and delivering of prescriptions, filling prescriptions without delay, prompt attention to mail orders, having on hand new foreign and domestic preparations.
- (8) Advertising or promotion, continually contacting the physician, meeting with and speaking before physicians and internes, furnishing prescription blanks.
- (9) Bookkeeping, adequate records, annual inventory and profit and loss statement, careful extension of credit, collect bills promptly.

Nearly all of the factors enumerated above embrace the two outstanding phases of merchandising, cost control and sales promotion. It is the latter phase only that is dealt with in the report just released by the Bureau of Foreign and Domestic Commerce and entitled "Prescription Sales Analysis in Selected Drug Stores." In addition to the sale report there will be two additional reports, one a companion to the report already referred to, but dealing with cost control, and another dealing with both cost control and sales promotion in professional pharmacies.

The material contained in the report already published is presented to the 60,000 retail druggists throughout the country in the hope that it will prove a basis of increased efficiency in the operation of the prescription departments of many of their stores.

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\* An address before the National Drug Store Survey Conference, April 26, 1932, by Frank A. Delgado, U. S. Department of Commerce.