

an admirable physical background for the work it is to accomplish. Its faculty is full of promise of the right spirit to bring to a successful accomplishment the new undertaking. Its alumni and friends, while true to the memory of the past, will, no doubt, enter into this new spirit with enthusiasm. I am convinced that this new institution, the cornerstone of which, figuratively speaking, we have laid today, will develop into an educational structure the influence of which will be felt not only in this good city of Baltimore, not only in this great commonwealth of Maryland, but throughout the length and breadth of this our native land.

THE DEVELOPMENT OF PHARMACEUTICAL EDUCATION.*

BY EDWARD H. KRAUS.¹

The dedication of a new building by an educational institution is always the occasion of great rejoicing for long cherished hopes and plans have finally been realized. Purdue University and the pharmacists and citizens of the State of Indiana are all to be congratulated upon the completion of this beautiful and unusually well-equipped structure, devoted entirely to the profession of pharmacy. Additional floor space and improved facilities generally bring, however, the responsibility of serving the state and the nation in an enlarged way. Knowing rather intimately, as I do, the important contributions of Purdue University and of the pharmacists of the state to the advancement of the profession, I am confident that this new responsibility will be fully met and that in Indiana Pharmacy will now be able to function in a much more effective way as one of the great agencies in the conservation of health.

The story of the development of pharmaceutical education in the United States is strikingly similar to that of the other disciplines concerned with the conservation of health, medicine and dentistry. In all of these fields the preceptorial or apprenticeship system first prevailed, which in each case was slowly, and only by overcoming much persistent opposition, replaced by systematic instruction.

Although the first American College of liberal arts was established in 1636, more than a century and a quarter passed before the first medical school was founded. This was in Philadelphia in 1765. During the following one hundred years there was a rapid increase in the number of medical schools for it is reported that there were fifty in 1870.

There is abundant evidence that the practice of pharmacy flourished during the colonial period but systematic training in this subject lagged behind medicine for it was not until 1821 that the Philadelphia College of Pharmacy was organized. The opening of this institution, the oldest of the colleges of pharmacy in the United States, stimulated interest in pharmaceutical education in Boston and New York and, in 1823, the Massachusetts College of Pharmacy was founded in the former place while a little later the New York College of Pharmacy opened its doors. These were the only three institutions giving instruction in pharmacy in this country in 1850.

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The first attempts to teach dentistry were made much later than was the case with medicine and pharmacy and it was not until 1837 that Hayden gave the first series of lectures on dentistry to be delivered in the United States. These were given to the students of medicine at the University of Maryland. But the importance of such systematic instruction was not appreciated by the medical faculty of that institution and the lectures were not repeated. Hayden and his associates, however, persevered, and in 1840 were able to organize the Baltimore College of Dental Surgery, the first institution of its kind to be established in this country. At first dental education made very slow progress and twenty-five years later there were but four colleges devoted to this phase of health education.

The early colleges of medicine, dentistry and pharmacy were proprietary in character. They were conducted by local groups of men with but little academic training, who attempted to teach poorly prepared students a body of knowledge, much of it unsound, that they had acquired largely through experience. In fact, many of these colleges were conducted for profit to those in charge, either in cash or in increased prestige. Furthermore, these institutions were poorly housed with no facilities for demonstration and laboratory instruction in the modern sense.

When it is remembered that the Boston English High School, which opened its doors in 1821, was the first American high school as we understand that great educational institution to-day, and that the academies of the early part of the last century were by no means numerous, it is at once obvious that the preparation of the students entering these early institutions was very scant. Moreover, the period of training at these professional colleges was extremely brief and, as already stated, the instruction very poor. In fact, even as late as 1870 the teaching of medicine in this country was considered a social disgrace, for at Harvard and other leading universities only two courses of lectures consisting of four months each were required for graduation. Degrees of Doctor of Medicine were generally granted upon the passing of a nominal examination and upon the presentation of evidence of having read medicine for three years including the time spent at college. Indeed, only sixty years ago the admission requirements were so low that at Harvard written examinations were considered impossible because most of the students of medicine could not write well enough.

It was at this period in the development of the health professions that a new day began to dawn, for about 1870 a great movement for the improvement of medical education was launched, largely under the leadership of C. W. Eliot, who had just been elected to the presidency of Harvard University. Then, too, at the same time many of the universities of the country began to realize the importance of more adequately serving the public by offering instruction in dentistry and pharmacy. To Harvard University also belongs the credit of establishing the first school of dentistry to be coordinated with a recognized institution of learning. This was done in 1867. A year later the first courses in pharmacy to be offered in an institution other than one established solely for that purpose were given at the University of Michigan under the leadership of that wise and far-sighted pharmaceutical educator, A. B. Prescott. This instruction was so successful that in 1876 the University of Michigan raised pharmacy to the level of medicine and law by establishing what was then called the School of Pharmacy. Other universities soon followed the lead taken by Michigan and began to offer instruction

in pharmacy, thus at the University of Wisconsin in 1883, at Purdue University in 1884, at the Universities of Iowa and Kansas in 1885 and at the University of Minnesota in 1892.

While sixty years ago the requirements for admission to and graduation from colleges dedicated to the promotion of the three health professions were all on a very low level, to-day the differences are quite marked. As is commonly known, medical education has advanced most and at present six or seven years beyond the high school are required for graduation from an accredited college of medicine, two or three years of collegiate study being demanded in preparation for the professional training for four years. Dental education has also made splendid strides and to-day one or two years of collegiate training are required in preparation for the professional work which extends over periods of three or four years. In general five years beyond the high school are necessary to meet the requirements of approved dental colleges.

But let me hasten to remind you that many of these advances were stimulated and materially aided by agencies outside of these professions, for we all know that the famous Flexner report, sponsored and published by the Carnegie Foundation for the Advancement of Teaching during the first decade of this century, created a great stir in medical circles and at once led to profound changes for the better. Furthermore, the critical and constructive study of dentistry conducted more recently under the same auspices by Dr. W. J. Gies has been the means of marked advances in that profession.

Unfortunately pharmacy, the mother of both medicine and dentistry, has permitted her progeny to outdistance her in educational achievement and consequently in the recognition given at present to these health professions by the public. Pharmaceutical educators have, however, been exceedingly active in recent years and have succeeded in materially advancing educational and legal requirements, thereby greatly improving the status of professional pharmacy. A brief survey of some of the splendid achievements in pharmaceutical education may not be out of order on an occasion such as this.

In the early seventies of the last century there were but eleven colleges of pharmacy in this country, but by the opening of the twentieth century the number had increased fivefold, namely, to fifty-six. During this thirty-year period various attempts were made to organize these institutions into an association for the purpose of improving the character of the instruction. These efforts did not succeed, however, until 1900 when the American Conference of Pharmaceutical Faculties was organized in Richmond, Virginia, by the representatives of twenty-one institutions. This young association immediately attempted to raise standards but there soon developed a sharp division of opinion, as well as marked differences in educational ideals, between the representatives of the proprietary or private institutions and those from the colleges that are integral parts of great universities and more especially of the state universities.

The great need for educational advancement was clearly seen by the university group but, being in the minority, their efforts in this direction were usually thwarted or retarded. It was also recognized at this time that not only must higher educational standards be adopted but that the legal requirements for licensure to practice pharmacy must also be advanced. A very important forward step in this direction

was the organization of the National Association of Boards of Pharmacy in 1904. Since that date those entrusted with the collegiate training of young pharmacists and those responsible for establishing and enforcing the legal professional requirements in the various states have met in annual meetings and in recent years in joint sessions for the discussion of problems of mutual interest and concern.

Only thirty years ago many of the colleges of pharmacy admitted students who had not progressed beyond the elementary or grammar school. While the crying need for better prepared students was clearly recognized, progress came slowly, for the advancing of educational standards is usually a long process. These young national organizations, however, immediately began to correct this deplorable condition and in 1905 one year of high school preparation was made an absolute requirement for admission to college. A movement was also started to advance the legal requirements and to New York belongs the credit for being the first state to demand graduation from a college of pharmacy as a prerequisite for admission to practice the profession. This action was also taken in 1905.

At that time the standard length of the college course in pharmacy was but two years. Then, too, the content of the course varied greatly. Hence, a concerted effort was made to evaluate the character of pharmaceutical instruction given in the various colleges. This effort soon resulted in the development of the Syllabus, the first edition of which appeared in 1910. This instructional guide was soon adopted in part, or as a whole, by a majority of the examining boards of the various states and by a large percentage of the colleges of pharmacy.

It was also during this decade that one of the illustrious members of the early faculty of Purdue University, Dr. Harvey W. Wiley, led a successful movement for better food and drug laws. With the enactment of the Food and Drugs Act in 1906 the United States Pharmacopœia and the National Formulary became standards of the federal government. These actions naturally greatly stimulated interest in scientific pharmacy and pharmaceutical education.

The second decade, 1910 to 1920, also saw much progress. Thus in 1915, the minimum admission requirements to the colleges in general were advanced to two years of high school preparation. At the same time several of the colleges affiliated with state universities voted to admit only high school graduates. It was also during this period that the university point of view began to prevail in the deliberations of the national pharmaceutical organizations and consequently further educational advances came more rapidly. Accordingly, in 1917 the American Conference of Pharmaceutical Faculties, since 1925 known as the American Association of Colleges of Pharmacy, and the National Association of Boards of Pharmacy voted that beginning with the fall of 1923 high school graduation should be required of students seeking admission to colleges of pharmacy. And only three years later, namely, in 1920, these organizations agreed that in 1925 one year should be added to the instruction, that is, the college course be increased from two to three years. Indeed, a strong feeling already prevailed that a further increase to four years of college training should be made as soon as possible after 1925.

During the early years of the third decade some opposition to these higher standards developed especially on the part of a group associated with proprietary colleges or with those only loosely affiliated with well-established educational

institutions. For a time it seemed that this opposition might lead to the rescinding of some of the actions of the national associations or at least to the postponing of the dates on which the new requirements should become effective. The representatives of a majority of the member colleges were, however, steadfast and educational progress continued.

When the minimum three-year course became effective in 1925 a very active agitation immediately began in favor of advancing the requirement for graduation from a three-year course to one four years in length. This question was discussed seriously at the annual meetings and in 1928 the long hoped-for action was taken requiring all colleges holding membership in the American Association of Colleges of Pharmacy to institute the four-year course as the minimum requirement for graduation for students entering in the fall of 1932. This was very gratifying, indeed, to the advocates of higher standards especially since the action was taken without a dissenting vote. This advanced requirement subsequently received the endorsement of the National Association of Boards of Pharmacy.

That there has been a very sincere urge for these advances is clearly indicated by the fact that many institutions desire to anticipate the date at which the requirements of the national organizations are to become effective, for in approximately one-third of the member colleges the four-year course will become obligatory for freshmen entering this fall.

Sentiment in favor of the four-year curriculum was greatly stimulated by the Charters report on *Basic Material for a Pharmaceutical Curriculum* published in 1927. This careful and discriminating study was begun in July 1923. It was conducted under the auspices of the Commonwealth Fund by Dr. W. W. Charters, now of Ohio State University, a keen, impartial observer and an experienced investigator. Although Dr. Charters confined his investigations chiefly to the functions and responsibilities of the neighborhood pharmacist, his observations on other phases of the profession and upon pharmaceutical education were most significant. Especially his pronouncements concerning pharmacy as a profession and on the length of the curriculum necessary to impart the required body of knowledge made a profound impression.

That the Charters' report materially assisted in obtaining favorable action for the longer curriculum, there can be no doubt. Moreover, in organizing the four-year course, his findings will be of great assistance to those institutions in which the longer course has not yet been offered. In fact, we are justified in saying that one of the very valuable contributions to the advancement of the profession during the last decade was this searching study carried on by Charters with the assistance of a selected group of pharmaceutical educators.

This review of the progress made during the ten-year period 1920-1930 shows that in some colleges of pharmacy the requirement for graduation has been increased four years, that is, two years have been added to the period of preparation and two more to the collegiate course. This is truly a noteworthy achievement of which those who have been interested in advancing the status of the profession of pharmacy may be justly proud.

I am sure that many in this audience will be pleased to know that the College of Pharmacy of Purdue University has always urged higher educational standards and that for two decades your able and energetic Dean has constantly advocated

educational advances. Moreover, due to his ability as a leader he has been a most important factor in securing the adoption of these progressive measures. To him great credit is due for the signal service he has rendered.

That these higher standards have had a marked effect upon the quality of the student now entering our colleges of pharmacy is clearly shown by the fact that of those admitted in the fall of 1929 sixteen per cent had had some previous college training. This tendency toward college training before entering upon the study of the more professional aspects of pharmacy has caused some of the leaders to advocate a five-year course, similar to that now obtaining in dentistry. It is suggested that the five-year period of study be conducted on either the one- and four- or two- and three-year plan, that is, that one or two years of collegiate training be demanded as a prerequisite for the professional study covering periods of either three or four years.

While it is very fitting that suggestions of this character should be made at this time, action to increase the requirements beyond those which will not become fully effective until 1932 should by all means be postponed. It is highly advisable that the general effects of the four-year curriculum should be carefully studied before another advance is made. Moreover it is by far more imperative, that the legal requirements for licensure keep pace with the educational. While material progress has been made in this regard, much remains to be done for at present there are still twelve states in which no college training is demanded as a prerequisite for admission to the examination for licensure.

Closely related to the collegiate prerequisite for licensure is that of required practical experience. In some instances, college training is deemed sufficient while in others the sentiment of practicing pharmacists seems to favor insistence upon practical experience as vitally essential. Recently the officers of the board of pharmacy of one of our eastern states suggested the requiring of one year of internship in an approved pharmacy as an efficient way of ensuring the high quality of the men and women who are to be permitted to practice the art of compounding and dispensing medicines. That questions of this character are also being considered at this time clearly indicates that all concerned with the future of pharmacy are by no means satisfied with present conditions and are eagerly striving to improve the status of the profession.

While on the one hand pharmaceutical educators have been greatly concerned with increasing the time devoted to the academic and collegiate preparation of those desiring to enter the profession, they have also, on the other hand, been striving to improve the character of the instruction given in the colleges of pharmacy by strengthening the teaching staffs and the instructional facilities.

Thus, until quite recently, it was common practice in many colleges to appoint as instructors recent graduates of the shorter two- or three-year college courses. With the raising of the standards to be met by the students, it at once became obvious that the qualifications to be demanded for appointment to teaching positions in our colleges of pharmacy must be advanced materially. Administrators were therefore urged to exercise the greatest care and to select only thoroughly trained men. As a minimum requirement it was suggested that not only should a standard four-year course of professional training have been completed, but also that several years of graduate work should be demanded when making new ap-

pointments. It was further recommended that some graduate study should be insisted upon as a prerequisite for promotion, especially in rank. Marked improvement in this regard is already to be observed for the demand at present for professionally trained men with Master's and Doctor's degrees to fill vacancies in the colleges of pharmacy of the country is very much greater than the supply.

In 1927 a very important action was taken by the American Association of Colleges of Pharmacy which at once proved very effective in raising the quality of the teaching staffs in many of our colleges. Furthermore, it has also been of great service in securing better class room, laboratory and library facilities. I refer to the triennial visitation of the member colleges by leaders in pharmaceutical education. During the three years the plan has been in operation all colleges of the Association have been visited.

In carrying out the plan a very representative group, fifteen in all, of the older and trusted leaders of the profession has been called upon to make these important visits. Obviously a group of this character was bound to make a profound impression upon the rank and file of the colleges visited. The results have been most gratifying and the plan is to be continued. I am confident that during the next triennial period even greater progress may be expected from these visitations.

Another recent development which should prove of unusual significance to pharmacy is the proposed nation-wide survey of the colleges of pharmacy and of the profession as a whole. This movement originated with the officers of the National Association of Boards of Pharmacy who had long recognized the great need of some means of better evaluating the instruction given by the various colleges. Accordingly, in 1927, that Association appropriated the sum of \$10,000 for a study of the colleges to be conducted with the coöperation of representatives of the educational institutions. When the joint committee met to discuss plans it was pointed out that the time had come when a really comprehensive survey of pharmacy in its various phases should be undertaken. Accordingly, resolutions were passed favoring a larger survey to be conducted under the auspices of the three national pharmaceutical associations interested in pharmaceutical education, in the legal requirements and in the profession as a whole.

In due time the proposed comprehensive survey was approved by the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy and the AMERICAN PHARMACEUTICAL ASSOCIATION. These three organizations also pledged themselves to support the survey financially and to contribute jointly over a period of three years sums which will total approximately \$48,000.

In order that this survey may be as authoritative as possible, and be so recognized the country over, experts in the conduct of educational surveys were called into consultation with the result that the American Council on Education voted to sponsor this investigation. A committee of representatives of the three associations and of the Pharmaceutical Syllabus Committee has had several meetings with Director C. R. Mann and his associates, of the American Council on Education, as well as with such nationally known experts on surveys as Chancellor S. L. Capen, of the University of Buffalo, President G. F. Zook, of the University of Akron, and Dr. W. W. Charters. As the preliminary plans for this survey call for a budget

somewhat larger than the total sum to be raised by the three pharmaceutical associations, efforts are now being made to interest some of the great educational foundations in this important project. There is no doubt in the minds of the members of the joint committee but that sufficient funds will be forthcoming for this undertaking.

It is greatly to the credit of the pharmacists of the country that this proposed survey originated within their group and that they are loyally and enthusiastically supporting it financially in a substantial way. When completed this survey should make as profound an impact upon pharmacy in this country as the similar surveys of medicine and dentistry made upon those professions.

A review of the development of pharmaceutical education in this country cannot be brought to a close without referring to the splendid contributions made by the great pharmaceutical manufacturing plants to scientific pharmacy and to the effective support given by many of them to the fostering of pharmaceutical investigations at our leading institutions of higher education. The establishment by them of scholarships, fellowships and special research grants has been of inestimable value in encouraging meritorious students, many of whom are pharmaceutically trained, to continue their work leading to the higher degrees. In many instances this action has also brought about a much closer relationship between the educator, the manufacturer and the special investigator than would otherwise have been possible. It is to be sincerely hoped that this interest in pharmaceutical education and the sponsoring of special investigations will be continued by our leaders in manufacturing pharmacy.

At present the future of the community pharmacist is highly problematical. Many who were well informed on the development of pharmacy and its present trends are of the opinion that we are on the eve of rather profound changes in retail pharmacy. It is not my intention this afternoon to discuss this phase of the profession. I am, however, confident that pharmaceutical educators will adequately meet the challenge of any changed conditions within the profession, whatever they may be. I am also confident that, as the result of the enormous progress that has been made during the last thirty years, and more especially during the last decade, in advancing educational and professional requirements and in improving the instructional staffs and teaching facilities, the importance of the profession of pharmacy will be more adequately recognized and that pharmacy, along with the allied health professions of medicine and dentistry, will play an ever-increasing rôle in the conservation of health.

Purdue University and the pharmacists of Indiana are to be congratulated upon the completion of their magnificent new building, which will enable them to contribute in an even larger and more effective way than in the past to the development of the profession of pharmacy.

PHARMACY AT THE 1933 WORLD'S FAIR.

The National Research Conference, at its meeting in Washington, endorsed a Pharmacy Exhibit, under the auspices of the AMERICAN PHARMACEUTICAL ASSOCIATION, at the World's Fair, to be held in Chicago, in 1933. The exhibit is to be historic, depicting the development of pharmacy.