Medical Education in Young America

The distinctive origin and revolutionary role of the pioneering institution that came to be Northwestern University Medical School cannot be properly told by itself alone. It must be placed against a background provided by earlier medical developments in America, and in the Chicago area in particular. For this reason the main historical account will be prefaced by a chapter summarizing the progress of medical education from colonial times to the middle of the nineteenth century, when academic conditions were over-ripe for basic reforms. Previously there had been some bold critics of existing conditions, and even specific recommendations for an educational overhaul, but no person or school had yet dared to make a serious start toward instituting drastic changes.

MEDICAL TRAINING IN THE COLONIES

Physicians set foot on this continent in company with the first settlers. Three are mentioned in relation to the early period of the settlement of Jamestown, Virginia, by the London Company. Yet it would appear that none made permanent residence there, because Captain John Smith returned to England in 1609 for surgical treatment since "there was neither chirurgeon or chirurgery at the fort." The only well-qualified physician mentioned among the permanent settlers at Jamestown, Plymouth and New Amsterdam (later New York) was Samuel Fuller, who accompanied the Pilgrims on their voyage to the New World and served them faithfully as a prac-
petitioner until his death, in an epidemic of infectious fever in 1632.

Within the half century following the beginnings of the Colonies, few names of even respectable professional competence are recorded. Among these are the two Governors Winthrop (of Massachusetts and Connecticut) and a few clergymen. The latter came to include priests who had read Hippocrates, Galen and other accepted writers during their formal education in Europe, and non-conformist Protestants, persecuted or silenced, who pursued regular studies in Europe and then served the colonists usefully, both as preacher and as physician. Cotton Mather spoke of this dual function — the caring for body and soul — as the “angelical conjunction.” Among these clergyman-physicians should be mentioned Thomas Thacher, whose pamphlet, *Brief Rule in Small-Pox or Measels*, in 1677, is credited with being the first medical publication in this country.

Although apprentices to medical preceptors furnished a steady grist of variably qualified practitioners, there was a great dearth of properly trained and reasonably competent physicians in the young Colonies. This was to be expected because the total lack of hospitals and formal instruction limited the supply to two possible sources. One was emigrants from the Old World, but these recruits were largely ship surgeons and apothecaries — hence not of the caliber most needed. Established practitioners were unwilling to journey to a new land and there endure the entailed poverty and hardships, in addition to the isolation from accustomed professional advantages. Hence, for the most part, early physician-emigrants were limited to some who had failed to establish a successful practice and others who, aware of their incompetence, were unwilling to make the attempt. As one writer summarized: “Thus it was, that while persecution filled the clerical ranks of the Colonies with men of the deepest piety, and the most varied learning, and the patronage of the Crown induced a full supply of legal talent, the profession of medicine sank to a comparatively low state.”

The second source of supply, theoretically, was the young colonist who might seek a medical education in the colleges and hospitals of Europe. Yet for many years a failure to realize the inadequacies of colonial medicine, and the expense of gaining foreign training, combined as a practical barrier to this remedial move. The first native-born residents to carry out such a program by study in the Mother Country were Henry Saltonstall and Samuel Bell-
ingham, who graduated at the first commencement of Harvard College (1642), obtained medical degrees in England and returned to the Massachusetts Colony to practice their profession. Even earlier, in 1634, William Bull of South Carolina had received the degree of Doctor of Medicine from the University of Leyden — the first Colonist to earn this degree. In fact, the practice of sending young men to Europe for a medical education became more common in the southern colonies, whereas the northern colonies tended toward providing training locally. The trend toward seeking a medical education in Europe continued even after medical colleges began to be established in the early Republic. Leyden was favored in the seventeenth century, but yielded to the lure of Edinburgh in the eighteenth century.

As the years went on, an increasing number of individuals availed themselves of European training and returned with a medical degree (122 from Edinburgh, by 1800). Most important for their pioneer influence on medical education were William Shippen, Jr., John Morgan and Benjamin Rush, all of whom arrived in Philadelphia between 1762 and 1769, and were leaders in instituting the first medical college in the land. As the Colonies became better settled and living conditions improved in them, some competent physicians from Great Britain also became willing to emigrate to the New World. Among these, Zabdiel Boylston of Massachusetts (1635), John Mitchell of Virginia (about 1700), Lieutenant Governor Cadwallader Colden of New York (about 1710) and John Ling of South Carolina (about 1730) earned honored recognition in the permanent history of American medicine.

During the colonial period the almost continuous hostilities (1690-1783) between the northern colonies and the French settlements in Canada brought repeated aid from the Mother Country. Each expedition was accompanied by a competent and well-outfitted medical staff. The presence of these superior practitioners and the mobile military hospitals, which they of necessity set up, afforded the first impetus to improve materially the condition of medicine in the Colonies. Young men now had the opportunity of attending the military hospitals and receiving instruction there, so that these organizations served, to a degree, as medical schools. The physicians and surgeons of the combined military forces became recognized by the public as superior in skill and deportment.

With the populace thus introduced to a new order of medical men
and medical service, its influence extended in several important directions. One was that the imaginations and ambitions of young colonists were activated to obtain superior European training and become pioneers of scientific medicine in America. The second was the making of a start (in New York, 1760) toward regulating by law the conditions to be satisfied before the practice of medicine or surgery could be undertaken. The third was the establishing of permanent hospitals, the earliest at Philadelphia in 1752. The fourth was

![Surgeons' Hall, Philadelphia, home of the earliest medical school (1765) in the Colonies.](image)

the organizing of regular medical colleges; the only ones to operate before the War for Independence were the Medical College of Philadelphia (1765; later absorbed into the School of Medicine of the University of Pennsylvania), and the medical department of King's College (1767; now Columbia University). The fifth was the organizing of medical societies; the earliest statewide meeting attaining constitutional formalization was held in New Jersey in 1766. The sixth was the founding of medical journals for the dissemination of information, the earliest (1797, New York) being *The Medical Repository*.

The need for these various advances is apparent from many considerations. As late as 1753, a New York periodical charged that the greatest part of the practitioners in that city "were mere pretenders to a profession, of which they were entirely ignorant; and convincing proofs of their incompetency were exemplified in their iniquitous practices. The advertisements they published proved
them ignorant of the very names of their drugs . . .” Moreover, the
low state of medicine at the beginning of this country as an indepen­
dent nation, in 1776, is reflected in several statistics. The thirteen
States contained about three million inhabitants, among whom
some 3,500 were engaged in the practice of medicine. Yet less than
400 (some say only 200) of these had received a degree from any
medical college. After the Province of Massachusetts had adopted a
law in 1649 to control the activities of “chirurgeons, midwives,
physitians and others” there was a long lapse, and by 1850 only two
States (New York; New Jersey) had attempted to regulate the
qualifications and the practice of physicians. There were but two
organized medical societies (New Jersey; Delaware), one perma­
nent general hospital (Philadelphia) and no medical journal. It is
doubtful that any medical library existed that could boast of 1,000
volumes.

To be sure, the first recorded autopsy occurred in 1637, in
Maryland, the first use of a cadaver for anatomical instruction in
1642 at Cambridge, Massachusetts, the first private-school instruc­
tion in anatomy in 1750 at New York, and the first institutional
anatomical course at King’s College in 1764. Nevertheless, it was
not until 1750 that the first human body was dissected for regular
instructional purposes (also in New York), and not until far into the
next century that the student himself was required to do more than
observe anatomical demonstrations. The first two colonial medical
colleges played only a minor role in supplying graduate physicians.
In their ten years of operation prior to the Revolution only 43
persons had received the bachelor’s degree in medicine, and seven
the doctorate.

During the colonial period, and even for the first decades of the
nineteenth century, it was the general custom for a young man
aspiring to become a physician to indenture himself to some prac­titioner. There was a fee (latterly about $300) and the term of inden­
ture ran from five to seven years (latterly, three years), beginning at
the age of fourteen to eighteen. The student rendered services as a
helper, and sometimes as a menial; in return he received room and
board, and instruction aimed to qualify him for independent prac­tice. At the end of the apprenticeship he was given a new set of
pocket instruments, some medical books and a certificate testifying
to years of service and proficiency acquired.

The course of instruction included several phases. At first came
“reading with the doctor,” consisting of assigned topics in textbooks, followed by recitations and quizzes. Human dissection might be done, the body being stolen from the churchyard and studied secretly in an outbuilding; in this instance, the cleaned skeleton became the first major item of professional equipment owned by the prospective physician. Practical work in pharmacy was gained by grinding crude drugs, preparing tinctures, rolling pills, spreading plasters and wrapping powders. In the office practice of the preceptor, the student-pupil could first observe and later assist in the examination of patients and the handling of surgical procedures, such as bandaging, dressing wounds, opening abscesses, extracting teeth and letting of blood. A second phase comprised “riding with the doctor”; that is, the student accompanied his preceptor on calls, observed and listened. On leaving the patient the significance of things seen and heard was explained, and the diagnosis and treatment justified. Toward the end of the pupillage more autonomy was permitted, including unaccompanied calls on convalescent or chronic patients. Nevertheless, except for negro patients, it was not considered proper for a student to enter the sickroom of an adolescent girl or woman; hence any knowledge of gynecology and obstetrics was restricted to book learning.

This preceptor-apprentice relationship was patterned after that which prevailed in Great Britain, early immigrant-physicians continuing, by sheer necessity in a sparsely populated and undeveloped land, the regimen that they themselves had experienced. For 200 years, more than ninety per cent of American physicians were educated under the preceptorial system. By the middle of the nineteenth century, more than half of the practitioners had still gained their medical training solely in this way. The value of such a system naturally depended on the competency of the preceptor, and his ability and zeal in imparting information.

The theory of the early medical schools in both Great Britain and this country was to provide a rapid review of the medical arts and sciences, and to supplement the previous, private instruction by whatever facilities a school might better afford. In the beginning there was no thought of this instruction superseding preceptorial training. Rather, it was precisely to remedy the inherent deficiencies in preceptorial instruction that the medical department of the University of Edinburgh was founded in 1726, and it was this popular school that served as the model after which the early medical
colleges of this country were patterned.

These first colonial colleges offered the degree of Bachelor of Medicine at the end of a single course of lectures. The degree of Doctor of Medicine followed one year (at King's) to seven years (at Harvard) later, when the same course had been repeated, a thesis submitted and an examination passed. On trial, however, the great majority of students did not return for the second course. Many of them lived in towns remote from the college, thus making attendance not only tedious, because of the difficulties of travel, but also expensive. Hence the Bachelor of Medicine degree was abandoned by all colleges between 1789 and 1813, whereupon the course was condensed into the shortest term possible (twelve weeks) in order to attract more students to attend, and to encourage more to repeat the course a second year in order to qualify for the superior degree. Most of the matriculants, nevertheless, began practice after the completion of one college term and without a degree, whereas many apprentices were satisfied with nothing more than the bare certificate from their preceptor.

The originally high entrance requirements of the Medical College of Philadelphia and of King's College were likewise abandoned toward the end of the eighteenth century; and in regard to a knowledge of ancient languages, these standards were scarcely again adopted — and then rarely enforced. The following statements from an early announcement were destined to sound alien to those who controlled medical pedagogy through most of the nineteenth century: “It is required that such students as have not taken a Degree in Arts, shall, before admission to a degree in Physic, satisfy the trustees and Professors of the College, concerning their knowledge of the Latin tongue, and on such branches of Mathematics, Natural and Experimental Philosophy, as shall be judged requisite to a Medical Education.” Public examinations were conducted for the Bachelor's and Doctor's degree in Physic, and for the doctorate a thesis in Latin was required. In general, no one could dispute that “the utmost care is taken to render the degrees real marks of honor.”

**MEDICAL TRAINING IN THE REPUBLIC**

During the War for Independence, the advancement of medical
education and science languished. The two recently-formed colleges were disrupted by the British occupations of Philadelphia and New York, and they suspended operation. When freedom had been gained and an independent government established, a new era began in which medical progress became reactivated; yet the results from institutional teaching were not immediately spectacular. By the end of the eighteenth century ten charters had been issued to medical colleges, but only four schools were still in operation. In this period of 35 years since the first medical faculty had been organized, only 257 individuals earned degrees (M.B. or M.D.), whereas probably five times that number had attended one course of lectures and become practitioners. The total yield of graduates from all schools averaged only about seven each year. This result indicates forcefully that institutional instruction was still far from becoming the popular route into clinical practice. To be sure, the War had disrupted a courageous start, yet far more important as an explanation was the coolness of the majority of medical practitioners toward this way of supplementing medical training.

By 1850 the number of medical colleges that had been organized totaled 43, of which 36 remained in active operation. Every large city had at least one school, as did every state in the Union. Even 100 years after the Revolution, when eighty schools had been founded, it could be said that they had all stemmed from the ambition and effort of individuals, rather than from any initiative on the part of college administrations or legislatures. Some statistics will illustrate certain conditions at several periods prior to the entry into the medical scene, in 1859, of the school that was to become associated after a time with Northwestern University:

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Schools operating</th>
<th>Students attending</th>
<th>Diplomas granted</th>
<th>Ratio of diplomates to total students</th>
<th>Ratio of diplomates to population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1810</td>
<td>7,240,000</td>
<td>5</td>
<td>650</td>
<td>100</td>
<td>1:6.5</td>
<td>1:72,400</td>
</tr>
<tr>
<td>1830</td>
<td>12,866,000</td>
<td>17</td>
<td>2,125</td>
<td>597</td>
<td>1:3.6</td>
<td>1:21,550</td>
</tr>
<tr>
<td>1850</td>
<td>23,192,000</td>
<td>36</td>
<td>4,500</td>
<td>1,300</td>
<td>1:3.5</td>
<td>1:17,840</td>
</tr>
</tbody>
</table>

The medical situation in the Fifties was still far from adequate in any respect. No standard of preliminary education, prerequisite to
entrance into a medical college, was maintained. Twenty of the 36 schools then operating were not so located that their students could profit by any bedside or hospital instruction. In fact, only nine of the 36 professed to insist on any hospital attendance as a requirement for graduation. Twenty-five schools demanded dissection, and this constituted the only laboratory work done. The sole set of didactic lectures scheduled five or six on each day, and the term ranged from less than sixteen weeks to six months in length, 26 schools adhering to the traditional term of sixteen weeks, or slightly more.

There were other fundamental shortcomings that depreciated the face value of the scholastic standards still further. Inept students could not be dropped, because information lacked as to their academic standing. The testing of competence was done only on those who wished to qualify for the doctoral diploma; such terminal examinations were only a brief quizzing on lecture material. The sixteen-week curriculum consisted largely of didactic clinical instruction, and few students gained even a superficial knowledge of anatomy, physiology or chemistry. The "second course" was an exact repetition of the first one. Matriculation books were kept open for late comers until the middle of the term, and full credit was given to those who left before three-fourths of the lectures had been delivered. Attendance after matriculation was not checked, and Nathan Smith Davis, the most respected critic of the era, wrote scathingly of those "who spend half their lecture hours in eating houses and places of amusement, or between the house of ill fame and the grog shop." The major graduation requirements consisted of time fulfillment, taken out of the apprenticeship years, and cursory oral questioning. The general degradation of standards can be attributed in part to the complete lack of national or state supervision of medical training. A contributory factor was the ease with which any group could get a proposed medical college incorporated, under state laws, without any guarantee of a suitable faculty, building or other facilities.

Originally each province in colonial America assumed the responsibility of controlling medical practice within its boundaries, but by 1815 this authority was delegated to whatever medical societies that had arisen in most of the young states. A correlated problem arose as the medical diploma gained acceptance in almost every state as sufficient evidence of qualification for practice. The
result was that the functions of teaching and licensing became automatically combined in the faculties of the medical schools. Students soon recognized the double value of a diploma, in that it saved a year over the alternative requirement of four years with a preceptor alone, followed by an examination by a board of censors of a state or county medical society. Hence the medical-college diploma straightway became the primary objective of their pursuit, and this circumstance led to the rapid multiplication of medical colleges, as already discussed. But, at best, the existing situation was open to severe criticism, since medical faculties were not disinterested parties. This was because of the graduation-fee that was collected, and because of their financial stake in maintaining and increasing the popularity of a school through its reputation for yielding a successful graduate-grist, automatically licensed. Additionally, the brief oral examination was criticized as being superficial, based on memory recall, and not designed to test the clinical competence of a prospective practitioner.

The system of medical colleges, originating as a spontaneous outgrowth of the profession itself in an attempt to supply the needs of a rapidly expanding populace, found its constituent schools engaged in an unrestricted competition that turned their activities into two paths, divergent and conflicting. One trend was to increase the size of the faculty to keep pace with advancing medical sciences, to strengthen the teaching personnel and to improve instructional aids and facilities. These praiseworthy efforts were offset by a shortening of the original annual term from 24 to 16 and finally to 12 weeks (partly through pressure from physicians who favored "practical" apprenticeships), the abandoning of prerequisites for admission, the failure to arrange the increasing branches of medical science into a logical sequence, and the limitation of the terminal examination to a few questions.

Not only did the sharp competition between schools tend to degrade standards as an inducement to attract students, but also it encouraged prospective students, many with limited financial resources or totally dependent on earning their way, to go where a degree (and its automatic licensing power) could be gained quickest and cheapest. And this, unfortunately, was without regard to the quality of the facilities offered for scientific and practical instruction. As the eminent Nathan S. Davis remarked bitterly: "The medical college in a country village, remote from all facilities..."
can issue its graduates just as large a diploma, couched in just as unintelligible Latin and having much the same influence with the people. . . .” So it was that matriculants of twenty of the 36 schools operating midway in the nineteenth century found themselves in communities that were remote from hospital or dispensary and handicapped with other inadequacies, including subjects for anatomical dissection.

A further result of the rise of medical schools with cheapened standards was reflected in a complete change in the relations of the private preceptor and his pupil. The system of indenture to a master, with long and serious training, all but ceased as the colleges grew in number and improved communications made travel to them relatively easy. The relationship became a nominal one of sponsorship, access to books and certification of fulfillment of the time requirement. Thus it came about that the medical course at a school, instead of being a review and supplement to a protracted period of private study, became the main source of training at the very time it had lessened its values. Yet in spite of all changes that might be thought to make the medical degree the widely accepted path to medical practice, Davis concluded (on the basis of observation and inquiry) that in the western states at about 1850 “scarcely one-half of the whole number of practitioners have ever been examined or licensed, either by colleges or societies, and very many of them have never attended a lecture in any medical institution.” By the beginning of the Civil War only half of the practitioners in the nation had ever attended a medical college; and only one out of five held a medical degree, either earned or honorary.

From preceding paragraphs it is clear that serious deficiencies existed in the system of education offered by all medical colleges in the years prior to 1859, presently being reviewed. Wholly disregarded was the blueprint for a rational curriculum, as set forth by John Morgan before the American Revolution. The multiple defects and incongruities were recognized by perceptive individuals (notably Daniel Drake and Nathan S. Davis) and by at least one state society (Ohio; 1838). Their persistence had led to definite recommendations for reform by the American Medical Association in the years beginning with its founding in 1847. Indeed, the superficiality and degradation of medical practice in this country were attributed to the imperfect and restricted courses of the medical colleges and to their low standards of graduation. It would
seem, however, that an indictment of the better medical schools should not be aimed at their actual deterioration (other than that contingent on the shortened curriculum) so much as at their failure to adapt to changing conditions and advancing knowledge.

The medical course at first was an innovation, designed as a brief review or adjunct to matters learned in the period of indenture under a preceptor. Later, two factors came in that altered the initial reasonableness of this arrangement. For one thing, the role of the preceptor steadily declined as the medical colleges gained in popularity as the shorter and surer path to licensure. Hence the college became increasingly the source of primary instruction, and its three-to four-month term, which had been made as brief as possible in order not to discourage students from taking the review, became plainly inadequate for the real needs. In the second place, the field of medical science had expanded markedly, with new departments demanding attention that exceeded in extent and equaled in importance the branches constituting the original rudiments of medical education. Obstetrics was emerging from the hands of unlettered midwives; surgery was freeing itself from being an appendage to anatomy; histology, physiology and organic chemistry were advancing far beyond their original scope. To attempt to cover adequately by concurrent lectures the entire field of medicine, in both basic sciences and clinical application, in three to four months became pedagogically absurd. Actually, it was impossible in execution, and in most instances lecture courses were left unfinished wherever they might be when the time ran out.

Among other necessary comments on the period under consideration it should be said that by 1850 medical societies had increased sufficiently so that at the organizing session of the American Medical Association, in 1847, the delegates included representatives from more than forty medical societies, both state and county. Yet doubt was expressed that any state offered reasonably adequate opportunities for social and scientific contacts among its physicians. The American Medical Association owes its origin to widespread concern over the existing shortcomings in medical education, and a primary consideration of its early conventions was the improvement of premedical preparation and the medical curriculum. To this end the Association repeatedly passed resolutions strongly recommending the following reforms: a standard of preparatory education; more teachers and longer annual terms in medical colleges;
a division of the subjects taught into separate courses to be taken in successive years; an extension of the curriculum to include applied clinical instruction in hospitals; and higher requirements for gaining the degree of doctor of medicine.

These several recommendations were not adopted by medical colleges because, as Davis caustically wrote, "while the faculty of each school frankly acknowledges the defects in adaptation to the present enlarged field of medical science and art, and the urgent needs of the profession, each waits for the other to move first, lest by placing higher requirements upon the time and resources of the student it should cause its own halls to be deserted for those of its less exacting neighbor." Finally it should be recorded that the dissemination of medical information advanced considerably in the half century since the first journal began publication in 1797. Periodicals, from weeklies to quarterlies, totaled eighteen in 1850, but they were mostly controlled by the faculties of medical colleges, and naturally expressed the views of local groups rather than speaking for the profession at large.

From the preceding expositions it can be seen that medical education in America underwent three phases of development. The first, confined solely to preceptorial training, lasted 145 years; that is, until the first medical college was founded. The second period was institutional instruction, as a supplement to apprenticeship with a preceptor. For 42 years (1765-1807) such medical education was in every instance connected with a college of liberal arts. Directly afterward, a few medical colleges arose under the auspices of state or district medical societies, but not until 1818 did the first wholly independent medical college appear. During this entire second phase, lasting 100 years or more, the role of the medical college strengthened progressively, while that of the preceptor weakened until it became a nominal sponsorship, in which the student might register with a physician whom he never saw again. Meanwhile progress in biology, chemistry and physics had begun to endow the former empirical practice of medicine with a somewhat scientific basis, both diagnostic and remedial. Although the medical schools now took over all of the widened responsibilities, they did not recognize this progress and adjust to it for a half century.

The third period of development began in the late decades of the nineteenth century, when even the token role of the preceptor was abandoned as a recognized feature in medical education, and the
medical college became the sole source of instruction. One important factor, responsible for the early, limited appeal of an unshared course of institutional instruction, was a lack of agreement on the relative value of preceptorial training as opposed to institutional teaching. Educators connected with colleges of liberal arts considered scientific medicine, as presented in formal lectures, to be primary in importance and believed that a half of each year spent with the preceptor was more than adequate for what he could supply. Contrary in opinion were the practitioners in general, who maintained that the art or practical side of medicine, as inculcated by the preceptor, was paramount, whereas the college lectures were only theoretical and supplemental.

When physicians first came into control of medical schools, separate from arts colleges, state educational organizations or medical societies, they got rid of three features of which they disapproved; first, a prolonged premedical education; second, the long term of lectures; and third, the offering of two medical degrees (baccalaureate and doctoral). Hence, in independent colleges under the guidance of physicians, no standard of preliminary education was stipulated, the college term was shortened first to four and then to three months, and the total time-requirement at college was reduced from three terms to two, provided a preliminary year had been spent with a preceptor. These measures served to attract more students, and competition compelled the schools connected with colleges of arts to lower their standards accordingly. For these reasons the year 1807, when the Medical Society of the County of New York obtained the first charter for a “separate” medical college, marks the beginning of a decline in the quality of medical education that was destined to continue for decades. As will be seen in subsequent chapters, an independent college, which secondarily associated itself with Northwestern University, was destined to have the honor of instituting important reforms that went far toward exemplifying how medical education could be rescued from its low estate. The assumption of this role as innovator and leader in sorely needed reforms was a bold move, without parallel in the history of American medical education.
EARLY MEDICAL COLLEGES

The essential framework of all medical colleges and their pattern of operation changed but little in the century from their inception until the time of the Civil War, and even after. These colleges were basically private enterprises, run by a small group of physicians, and were virtually autonomous even when operating nominally as the medical department of a liberal arts college. The chartered corporation commonly acted as a joint stock company, in which shares of ownership might be assigned to the several professorial chairs, and had to be purchased by the occupant; on the other hand, the title to the school might be held by one or two resident "proprietors," whereas the rest of the faculty was seasonal, being assembled only for the actual session. After paying running expenses including, perhaps, amortization of a building debt, dividends to the eligible, participating faculty were declared on the basis of lecture hours delivered. The converse picture, however, was assessments in the case of an operating deficit.

The physical plant

The medical quarters might be an adapted college hall, a private residence or rooms in a business building. Later, if the venture prospered, a medical "edifice" would be erected, designed better to meet its purposes. Since instruction was almost wholly didactic, the physical requirements were modest: one or two lecture halls (preferably of the amphitheater type), a dissecting room and a museum were primary; other variable features were a library, chemical laboratory and dispensary.

Dissection was the only form of individual laboratory work done by students; it was, however, designated as "practical anatomy," whereas the term "laboratory" until far into the nineteenth century referred to the chemical laboratory alone. Luxurious accessories to dissection, serving as safeguards against raids by constables or aroused townsfolk, were secret concealment places for cadavers and escape stairs for the ambushed living; even the domed cupola, reached only by a ladder, might receive bodies hastily hoisted
through an inconspicuous trap door. The museum contained the "means of illustration," which included: preserved specimens, both human and botanical; charts; colored plates; surgical instruments; and drug samples. The various exhibits were, at least initially, the property of individual professors, and those who taught in more than one college would transport their teaching equipment from place to place. Instead of a chemical laboratory, there often was a mere cabinet for apparatus used in demonstration at lectures in chemistry and elementary physics. The so-called library was apt to be a miscellaneous assortment for textbooks located in the faculty room, since the books belonged to the several professors. A dispensary might be included, especially in urban colleges where outpatients were available.

The faculty

The roster comprised physicians, many of whom would adapt themselves to whatever vacancy or reorganization of personnel might occur. A common exception was a lawyer who taught medical jurisprudence, and sometimes chemistry was in nonmedical hands as well. Over a long period the total field of medicine was considered to consist of seven parts, so that this number of professors made a "complete" faculty. Of these professorships, the Principles and Practice of Medicine, which contained many subjects now considered as independent fields, was held to be the most important, and the possessor of this chair was regarded, in public esteem, as the leader of the group.

Notwithstanding this "ideal" organization, by force of necessity the early medical schools began with extremely limited faculties; Dartmouth had only one teacher, the College of Philadelphia had two, and Harvard three. The combining of separate disciplines in one chair was common, as the first four schools to be founded will illustrate. On the union of the College of Philadelphia with the post-war school of the University of Pennsylvania, the faculty still contained but five professorships, Dr. Shippen serving in a composite chair of anatomy, surgery and midwifery. At King's College (later Columbia University) Dr. Middleton had five colleagues, yet held the chair of physiology and pathology. Harvard, beginning with a
faculty of three, combined anatomy with surgery, and chemistry with materia medica. For the first decade of its existence the medical faculty of Dartmouth College consisted of one professor, the illustrious Nathan Smith, who taught all subjects with distinction. Even as late as 1832 there were schools with three, four and five professors, while in 1850 the spread ranged from three to nine.

As more medical schools arose with the years, the weaker ones (and especially those known as "country colleges") found that by offering their lecture sessions at seasons of the year other than the regular winter term they could operate advantageously. Usually one professor, or at most two, then constituted the resident staff, whereas the others were recruited from urban medical colleges or from peripatetic professors who shifted seasonally from school to school. One such teacher is known to have given seventy courses of instruction in 38 years at nine different medical colleges; during his busiest period he taught 49 courses in seventeen years. These conditions encouraged the migration of some medical students, since they could attend the required two sessions, necessary for a degree, in one year's time or even less. Moreover, the repetitive plan of teaching, whereby students listened to the same lectures on all subjects each year, naturally encouraged some student-migration for the purpose of obtaining instruction from another group of teachers, with some change of content.

In early medical colleges, and even far into the nineteenth century, teachers often shifted from one course to another to suit their own convenience and the exigencies of the moment. This versatility apparently meant that the professors leaned heavily on the cherished lecture notes of their own student days. At the medical college that subsequently became a part of Northwestern University, Dr. Nathan Smith Davis prided himself on being able to lecture from any chair. Also Dr. John H. Hollister, during his tenure on the faculty, held seven different titles: he taught, among other things, all of the basic sciences except chemistry.

The curriculum

For a century or more after the War for Independence, institutional medical education in America differed in important respects
from that in all other fields of learning. From the common schools, through colleges of liberal arts, and into seminaries of theology and law, all studies were traditionally graded into progressive series that occupied successive terms and years. Correspondingly, students were assigned to appropriate classes; proficiency was tested by examinations, grades were recorded and promotions to higher classes were awarded. On the other hand, medical colleges midway in the nineteenth century still had no educational requirement for entrance; students were not segregated into separate classes for instruction, since the subjects were not graded. Hence teachers spoke of the class (in the singular), because all enrolled students attended the single set of lectures regardless of their status as beginners or previous matriculants; college catalogues listed all students alphabetically without regard to seniority; schedules listed lectures by the speaker's name, not by subject, and students spoke of taking or passing Dr. X, rather than his subject; attendance was not checked; examinations in course were not given; and students were not dismissed for scholastic reasons, since there were no evaluations of performance and, of course, no recorded grades.

The subject matter of the curriculum was divided in accordance with tradition, which considered the field of medicine as consisting of seven parts, although some variation existed in itemizing the actual subdivisions. An average handling would apportion the several subjects as follows: anatomy; chemistry; physiology; materia medica; physic (medicine); surgery; and midwifery. Pathology and therapeutics were often regarded as belonging to physic, as were regularly physical diagnosis, pediatrics, medical gynecology, dermatology, neurology and psychiatry. The diseases of women and children were commonly combined with midwifery; surgery, prior to the discovery of ether-anesthesia (1846), was a limited field of practice. Except for gross anatomy, the basic preclinical sciences bore but slight resemblance to their modern counterparts; bacteriology was wholly unknown. Adjunct and minor in nature was medical jurisprudence which might, however, be joined along with therapeutics to materia medica. Pathology was commonly linked with physiology. The teacher of each subject-field was given the title of Professor. Subordinate titles were not used except for the person in charge of dissection and securing cadavers, who was designated as Demonstrator.
Teaching methods

Subjects were taught by formal lectures, and students wearied of the constant routine of five or six each day; in fact, the class might become quite thin by defections before the end of the term. Eloquence and oratorical style seem to have been esteemed by many students equally with clarity, and professors with such attainments were held in high regard. Limited dissection constituted the only opportunity for laboratory work, but it was not required by any college until well into the nineteenth century. When done, it was completed often in a few days, both because embalming was not employed and because the cadaver had been obtained illegally and detection was feared. Legislative action, legalizing the procural of material for human dissection did not originate until 1831 (Massachusetts) and had made little further progress outside of New England by midcentury. Elementary physics (often termed natural philosophy) was taught as a part of the chemistry course. Toxicology was given considerable attention, as was pharmacy; students were particularly eager to acquire the favorite prescriptions given in clinical lectures. A few schools, or teachers, possessed a microscope, but it was put to little or no use in the teaching of either histology or pathology.

Patients were not used to any degree in clinical teaching through the early part of the nineteenth century; this, as a phase of practical instruction, was left to the preceptor. Colleges that boasted of their clinical advantages often refrained from requiring attendance on them through fear of losing prospective students to other schools. A few urban colleges offered a private clinical course in hospitals as a supplement to the regular session, and for an additional fee.

The weak points in a short repetitive program, under which a student listened to the same set of lectures at two sessions, are obvious. Until far into the nineteenth century the student heard much, saw little and did nothing. Arguments in favor of such a system were that by repetition the subjects became fixed in mind better, and that many things became clearer at a second hearing because in the interval the student had seen with his preceptor some of the ailments being described.
In 1825 the shortened annual session still remained fixed at twelve weeks, and until the time of the Civil War it was most commonly only sixteen weeks. The term of the twelve-week courses in urban medical colleges began in November and ran without vacation until February. This calendar, avoiding seed time and harvest, was arranged for a period when farm work was least exacting. For this reason such schools were called "winter colleges." Most of the rural medical colleges, dependent on visiting or migratory professors to round out a faculty, had to adapt to other seasons; spring, summer or autumn sessions were all utilized as they best fitted local conditions. The scholastic term started with a "public introductory," or opening address on historical, advisory, inspirational or technical matters, and ended with a "valedictory" of felicitations to those about to graduate. Florid oratory was apparently expected and appreciated; the occasions gave opportunity to a professional weakness among pedagogues toward offering sage advice.

Informational matter concerning a college was issued in an Annual Announcement which might be widely distributed. The competition for students became so acute that many schools, engaged in a veritable struggle for existence, made unblushing claims of allegedly superior advantages and described modest equipment in grandiose terms. The rivalry often led to active recruiting by the faculty and their agents; faculty members living in a region other than the college location were obligated to seek out and deliver a quota of matriculants, while their agents commonly were students earning a remission of fees by soliciting and delivering these new recruits. Sharp criticism was directed against colleges that, because of small enrollments, either failed to include in their announcement a registry of students or printed names without addresses. All announcements were deficient through failing to describe the subject-content of the various lecture courses listed. The graduation exercises were public events, often attended by a surprising turnout of townsfolk. Even in large cities they served to satisfy a craving for entertainment that not even the reading of sample student-theses could dull.
Fees and credentials

The payment of tuition was managed differently than in other educational institutions. For over fifty years, students enrolled in each professor's course by paying him a fee (commonly $15) and receiving a printed and signed annual card. Some forgeries had brought on a trend toward the use of ornamental type and other embellishments, or even of engraved plates. Because these cards were examined by an "usher" stationed at the entrance of the lecture room at the early part of a session, they came to be called "tickets." About the year 1825, but much later in some localities, a change took place, for several reasons, whereby all fees were paid to a faculty treasurer who issued a matriculation or "general ticket" which admitted to all lectures. At the end of the session this ticket was exchanged for a set of individual tickets covering all of the teachers (cf. pp. 58, 59). These tickets then constituted evidence of attendance throughout the session and could be used like a modern transcript. This newer handling prevented the earlier abuse of students withdrawing with acceptable credentials before the end of a session. The individual tickets were highly prized, especially by those who did not remain to secure a diploma, since they comprised evidence to be shown censors when applying for a license to practice.

A matriculation fee of $5 and a graduation fee of $20 were customary. The latter was returnable if the candidate failed to pass his oral examination, but this was not a common occurrence since these two fees were designed to carry the running expenses of the college, whereas lecture fees were perquisites of the eligible, individual professors. A dissection fee of $5-$10 went to the demonstrator. In early times the student was expected to procure his own dissection material, perhaps aided by the demonstrator. Later, with much more demand, there arose a trade of "resurrectionists," whose price for an illicit body ranged from $10-$25. Some or all fees were commonly met by offering the college an endorsed note, bearing interest, collectible later and even after the student engaged in practice. These were assigned equably to individual professors, and the collection of payment was then their private concern. The term "tuition" was not used until late in the nineteenth century; instead, the phrase employed was "the cost of tickets" or "fees."
The student body was a motley group, representing a fair cross-section of the populace. Anyone interested could have a try at medicine, and could become a practitioner without encountering more than some regional hindrance. The medical school presented no barrier to matriculation or continuing in course. A medical diploma or a license from a state or local medical society was not overly difficult of attainment; in default of these, practice could be entered upon in many localities, anyway. Hence students ranged from those with excellent preparation and scholarly ideals down to near illiterates whose chief ambition was to acquire a choice lot of prescriptions. Although it is said that, by the middle of the nineteenth century, more than half of the students had helped earn their way by teaching school, this qualification did not guarantee more than moderate literacy.

In fact, at this very time the American Medical Association concluded that both Law and Theology were acquiring better-educated students than was Medicine. Also Daniel Drake, the leading contemporary proponent of better medical education, was highly critical of the quality of medical students in general. He wrote: “Medical students were being recruited from those who were too weak to labor on a farm or in a workshop; or addicted to study, but too stupid for the Bar; or too immoral for the pulpit.”

Since the majority of medical students had not received higher schooling, the set of formal lectures was their first contact with this method of instruction. These, which were the totality of instruction, seemingly impressed the students greatly and, to a degree, unduly. Possibly the final ratings of the individual professors as good or poor lecturers were really sound after a tyro had listened to the same discourses in successive years!

Educational requirements

Except for the early years, minimal standards for preliminary education were scarcely ever published in Annual Announcements, and still more rarely were they enforced until after the Civil War. In
general, any applicant could gain ready admission to the medical college of his choice. Even a common school education had been deemed too much to stipulate. Once matriculated, a fitness for medical studies was not tested at any time during the course.

If the student chose to seek a degree, then certain requirements for graduation were imposed, but these were not fearsome. The terms were essentially uniform throughout the country: 21 years of age; a certificate of good moral character; evidence of having studied medicine with some general practitioner for three years; attendance during that period on two full courses of lectures in a regularly incorporated medical school; the presentation of a thesis on some medical subject (and the possibility of having to defend its content); and a satisfactory oral examination, at the completion of these requirements. In schools with large enrollments, the examination must have been given to groups of candidates. Actually few failed, since this would have been unsound business both by the guaranteed return of deposited fees and as a deterrent to future matriculations through getting a “hard” reputation.

The requirement of a thesis prevailed in all colleges, and did not begin to disappear until about 1880. Until after the Civil War the thesis, which the rules commonly specified to be presented in the candidate’s own handwriting, might constitute the only presumptive evidence of literacy that the faculty ever had the opportunity to review. Usually the ability to read and write was not verified either before matriculation or afterwards, except that matriculants ordinarily were required to sign their names in an official register. Davis, in exasperation, wrote: “In the almost universal neglect of a proper preliminary education we find hundreds who, while they carry a Latin diploma in their pockets, cannot write six lines in accordance with the rules of English grammar.”

**Theses, examinations and diplomas**

The thesis varied in length from some 3,000 words upward. Faulty English frequently betrayed a deficiency in preliminary general education. Most of the theses were perfunctory compilations from textbooks that could have been assembled in a short time, like an undergraduate term paper. A few were meritorious, either showing
evidence of more extensive reading and thought, or incorporating original observations dealing with a series of clinical cases. The range of subjects was narrow and largely on clinical matters; such topics as malaria, diphtheria and pulmonary tuberculosis were favorites, often recurring. Theses dealing with any of the basic sciences, even pathology, were rare. It is revealing that the “writing of a composition” was the most dreaded task in the life of a medical student, and the final abolition of this prerequisite to a diploma was hailed with joy by every student body.

In all early medical colleges the oral examination at the end of the second, repeated year was, like the thesis, a requirement for graduation. This was the only test of proficiency during the total period of enrollment, but it could not have been thorough when the annual candidates of a popular college might number up to 200, or even more. The “green room” was a name commonly associated with the examination site. This term was borrowed from the off-stage waiting room for actors readying for entry; it was traditionally painted a subdued green color. As applied to the medical examination, the candidate might be placed in an adjoining room, or at least be screened from the faculty. The rationale of this arrangement was that the candidate then would not be seen, thereby lessening the chance of favoritism or prejudice on the part of examiners.

The regular diploma, earned in course, was one of three kinds issued. Reputable physicians who held a medical degree from another institution (often an inferior, distant or defunct school) could apply for an ad eundum degree. Beyond the payment of the diploma fee and passing an examination, it would seem that applicants prior to the Civil War, at least, did nothing else to gain this type of M.D. degree. Honorary medical degrees were also granted. Even by the end of the eighteenth century, the eight medical colleges had conferred 321 medical degrees, of which 46 were honorary. Only later than the period presently under review, were the medical colleges admonished by the American Medical College Association to make these diplomas show clearly that they were other than those earned in the ordinary way. Colleges of Arts did not customarily charge for any honorary degrees they conferred, although a donation was commonly expected. On the contrary, medical colleges usually charged the regular diploma fee for an honorary medical degree, but in some it was set as high as $100 and this practice then clearly qualified as a commercial enterprise.
Inadequacies recognized

The American Medical Association established a Committee on Medical Education in 1847, charging it to report on the condition of medical instruction and graduation requirements in the United States, on licensure standards, and on allied pertinent matters. The Committee rendered an unfavorable comparison with the standards and procedures in European medical colleges, and with similar practices within other learned professions in America. It recommended fewer and better medical schools, strictly chartered. It advocated higher standards of admission, curriculum, examination and licensure. It deplored purely descriptive pedagogy in the absence of affiliated hospital instruction. The outbreak of the Civil War delayed any immediate, widespread reform, but one school (soon Northwestern) was destined to appear, just before that holocaust, that would lead the way toward multiple better standards and practices. Unfortunately other medical colleges were slow in adopting similar reforms, and decades passed before these innovations became standard.

Later Medical Colleges

Earlier medical schools in the United States were largely independent enterprises, even though some had the nominal sponsorship of a college or university. Even as late as 1885 only one in four schools had ever been a part of a liberal arts institution of any kind. It was not until the beginning of the present century that firm ownership and control by universities began to be accepted as the ideal arrangement. The British and French system of medical education came to be dominated by hospital-managed schools; the German system centered in the universities. Medical development in the United States chose to fuse the two methods, combining the resources and responsibilities of both university and hospital. This ideal solution is still imperfectly met since it requires a university-owned hospital with a full-time, salaried medical staff.
EARLY CHICAGO AND ITS SCHOOLS

The Chicago region was not surely known to white men until Joliet and Marquette traversed the Chicago Portage, between the "Checaugou and Des Plaines Rivers" in 1673. The first habitation was a trader's cabin, built on the north side of the Chicago River and near its mouth, about 1777; it later became famous as the "John Kinzie cabin." In 1803, Fort Dearborn was built on the south side of the river, and garrisoned; at this time the civil community consisted of four cabins. By 1812 there were some ten or more cabins and about forty white civilian inhabitants. This population did not increase appreciably in the next two decades, until shortly before 1833, when the community acquired 350 inhabitants and so was able to qualify as a town by having "150 or more persons inhabiting an area one mile square." The next three years witnessed an unprecedented growth, the numbers doubling each eight months. The wave of immigration, largely from the northeastern states, began in 1833 and the boom continued until the panic of 1837, when the population neared 4000. At this time, less than four years after becoming a town, an application for a city charter was approved by the legislature. Slowly recovering from the depression, the new city could boast of only 4,417 souls in 1840; but the census gave 29,963 in 1850, and 109,280 in 1860 (when the new medical school that was to become a part of Northwestern University was finishing its first term).

For more than ten years after Chicago became a city, the sanitary conditions of Chicago were primitive to the extreme. There was
neither a civic water supply nor a serviceable sewerage system. Even the streets and alleys were poorly drained, both drainage and sewage collecting in gutters and under the board sidewalks. Streets were unpaved and, according to the season, became beds of dust or canals of deep mud; for weeks, in the spring, portions of streets were impassable, and wagons could be seen stuck in every block. Manure, slops, garbage and other filth were dumped in the public alleys. Domestic animals roamed at large. A reputation for unhealthfulness gained acceptance and persisted. In common with other pioneer communities the prevalent diseases were pneumonia, malaria, typhoid fever, dysentery and other digestive ailments. Even an epidemic of cholera had struck in 1832, and this plague was destined to recur for several decades. Smallpox was first experienced in 1848 and thereafter continued constantly, with periodic flare-ups, for fifty years.

*Chicago, already a city of 12,000 in 1845 (Norris).*

It was not until 1849-50 that plank roads were laid in the central region surrounding Madison and Clark Streets. By contrast, already in 1848 the Illinois and Michigan Canal had connected the Great Lakes with the Mississippi, the first train had run into the city, and a telegraph line made possible communication with the outside world. By 1850 the daily press boasted that “The amount of matter handled in the Chicago Post Office very considerably exceeds a ton's weight each day, and hence some idea may be formed of our greatness as a people.” So it was that the pioneer citizenry presently found itself immersed in an expanding population whose growth was truly phenomenal. The business of the city likewise followed a geometric rate of increase; exports in the 1840-50 decade augmented 2,000 times.

Under such yeasty conditions it is not particularly astonishing that public education was supported in a laggard manner, because
this was also general in frontier towns. Nevertheless, it was a somewhat curious display of apathy, since the settlers in the early years were from the northern seaboard states, and the New England penchant for schools and schooling had become a traditionally dominant urge, unique in the country. Midway between town- and city status, the Chicago community created its first public school (1835), whereas a public high school had to wait until after the mid-century. On the other hand, a private school had existed since 1830, and in 1844 there was opened an “English and Classical School” offering courses in art, French, Latin, Greek, higher English and mathematics. Despite parental indifference to enforcing regular school attendance, or even to electing trustees so that the schools might run (as in 1837), in 1840 nine per cent of the population was in schools (compared to Indianapolis, three per cent; Detroit, less than one per cent). Moreover, the 1840 census found no white person over twenty years who could not read or write. Libraries, however, were still private or open to the general public by fee. In 1839 began the first newspaper, the *Chicago Democrat*.

Apart from military surgeons at the Fort, the first civilian physician of the community is recorded in 1832, whereas a town census of 1835 estimated 25 (in a town of 3,265 inhabitants), a number that reflects the appeal of the then prevailing boom and the fact that the primary intent of most of the physicians was to improve personal fortune through agriculture and land speculation. Some did not practice medicine at all, and those who did set up a practice usually carried on some supplementary occupation. This number of physicians failed to increase during the depression following the panic of 1837; in fact, the 1846 directory listed but 24 at a time when the population had resumed its upward trend and had reached more than 14,000. As men of relatively superior education, they were held in social esteem, and some entered into the civic life of the community.

The years 1835-44 marked a second period of medical progress, highlighted by attempts to reduce existing factions and promote cooperative interchange by the organization of medical societies. Yet both on a local and regional level the societies, beginning in 1836, were for a time abortive or short-lived. It would seem that they exhausted their energy in preparing an imposing constitution and set of by-laws. A third period dates from 1843, when the opening of a medical college made Chicago a recognized center for medical
training. In the same year the first medical journal (the *Illinois Medical and Surgical Journal*) came into being, and the medical upsurge is reflected in the inauguration, in 1850, of the earliest medical societies to achieve vitality and to persist; they were the Chicago Medical Society and the Illinois State Medical Society. Also, in 1850, the first significant hospital (Mercy) was making a start.

It is an interesting commentary on early Chicago that both a private school beyond the secondary level and a medical college were launched before there was a municipal high school. The ambitious Dr. Daniel Brainard was the chief promoter in obtaining a charter for a medical college which was named for the deceased Dr. Benjamin Rush of Philadelphia, the most influential clinician of his time, and a signer of the Declaration of Independence. Apparently Dr. Brainard was not overly enthusiastic about this name, given in too sanguine hopes of financial assistance from heirs; at least, he twice invented another name for the college when he appeared on foreign scientific programs.

The charter of Rush Medical College (1837) was the first one granted by Illinois to any educational institution, and it antedated by a few days the obtaining of a city charter by Chicago. A contemporary newspaper reported that this college was to be “the first institution of its kind in Illinois, or indeed west of Cincinnati and Lexington, Kentucky.” But this was true in corporate existence only. Owing to the financial crises brought on by the panic of 1837, the new institution was not destined to receive students for nearly seven years. Meanwhile other medical schools had sprung up at La Porte, Indiana, and at St. Charles and Jacksonville, Illinois; in fact, it was the establishment of these colleges that forced Rush Medical College to open sooner than was planned. Four professors began the first course of lectures on December 4, 1843. Twenty-two students were in attendance, and one qualified for the Doctor of Medicine degree at the end of the term. Thirteen years later, shortly before the foundation of the future Northwestern Medical School, there were 100 matriculants and 36 who earned the medical degree. A free dispensary, or college clinic, was early available, and in 1846 a library of about 600 volumes had been assembled. In 1850 two small hospitals came to be used for clinical teaching.

It is not necessary, for present purposes, to trace further the history of this college. Strong in teaching personnel, Rush was
laggard in pedagogical advances; its contribution to the modernizing of medical education was negative in nature. That is, three of the active faculty, and two others recently resigned, having become thoroughly dissatisfied with the antagonism and obstructionism of President Brainard to admittedly needed reforms, constituted the nucleus of the faculty of a new school that would revise the medical curriculum and presently associate with Northwestern University. In his opening address Dr. Brainard prophesied: "We believe the school we this day open is destined to rank among the permanent institutions of the State. It will pass in time into other and better hands; it will live on, identified with the interests of a great and prosperous city." To the regret of many, this high hope seemed shattered when an unhappy affiliation with the University of Chicago ended in abandonment after nearly 100 years of operation. But, subsequent to three decades of dormancy, a new medical school has arisen and reclaimed the historic name.