VII

A Period of Transition
(1891-1906)

The Nineties can be taken as a transitional period between a pioneering type of medicine and what may be considered as the forerunner of the modern era. It was at this time that a rising wave of medical progress became apparent inside the schools and out. Laboratories of physiology, pathology and bacteriology were being established, and part-time clinicians in the basic sciences were being replaced by full-time teachers with special training and investigative interests in their chosen fields. Hospitals were taking on increasing importance as working laboratories for clinical instruction and research. These several factors naturally were conducive to efforts being directed concertedly toward the pursuit of systematic research. All such progressive activities brought to the minds of medical educators the necessity of adapting their colleges to the rapidly changing advances, and of aligning them with the widening vision of things still needed. Only by so doing could they make the medical colleges worthy members of the University family.

Dr. James B. Herrick, in *Memories of Eighty Years*, concluded that those whose medical birth occurred about 1885 were fortunate above others because the next few decades were so packed with epoch-making events. These he enumerated as follows: “development of bacteriology; discovery of X rays; invention of instruments of precision; birth of allergy; growing importance of biological chemistry and physiology; more scientific views of public health; clearer recognition of the inter-relation between medicine and its cognate sciences, like physics and zoology; new standards for medical schools and hospitals; evolution of specialism and group practice; endowments of institutes for research; rapid growth in size and power of the American Medical Association.” Those who graduated in the third decade of the twentieth century might make a counter-claim for the privilege granted them of standing at the threshold of a door that opened onto miracles hitherto unvisioned, but there is no denying the revolutionary aspect of the period that Dr. Herrick favored.
A unifying influence in the University was introduced in 1891, when the several professional schools were accepted as organizational units, through the creation of a University Council. This representative body was empowered at the outset to consider matters of interest to the University as a whole, and to make recommendations for honorary degrees. Its views and recommendations were to be transmitted through the President to the Board of Trustees. Later, its membership and powers broadened, and its name changed to "University Senate" in 1928.

The turn of the century made the University realize that this event brought close the observance of the semicentennial of its charter. For a decade its total enrollment had run third to that of Harvard and Michigan; graduates numbered 15,000. The initial endowment of $5,000 had been converted into property worth $2,000,000 in 1890, and $5,000,000 in 1900; the total endowment received amounted to $900,000 (and two-thirds of this in the last decade), yet 86 per cent of this sum had been contributed by six persons. Hence, through contemplative retrospection, the University gained the conviction that it did, indeed, have a meritorious past even though the achievements were not outstanding.

More important still, at the threshold of a new century vision was brought to focus on present conditions within the University, and on prospects for the future. It was sobering to remember that the total annual income was only one-tenth that of Harvard. Also, current debts gave some pause for thought. They amounted to $1,700,000, demanding annual interest of $73,000; this indebtedness was twice as much as the total endowment received in the whole fifty years of existence. Most of the debt had been incurred by improving the Chicago educational properties. The Dearborn Street project still was only partially paid for, but the Medical School had already reimbursed the University for much of its share, and would presently assume and pay off the total loan on the properties. A far greater incubus was the Chicago home for the Schools of Law, Dentistry and Pharmacy on Lake Street in the business section. This Northwestern University Building, occupied in 1902, had cost $500,000 to purchase and, astoundingly, $287,000 more to renovate (instead of an estimated $70,000). The University Trustees, taking a deep breath, undertook to liquidate the debts and to enlarge the endowments as well.

As the new century began, the University consisted of the College
and Schools of Medicine, Law, Dentistry, Pharmacy and Music. It still needed graduate and technological schools to round out the standard essentials of a University of the first rank. Actually a theological school was also lacking, although Garrett Biblical Institute had been interlocked with the University ever since it started, at the same time and on campus land. Other schools eventually to come, such as Engineering, Speech, Commerce, Education, and Journalism, were as yet largely undreamed. When in 1904-05, at the end of the period currently under consideration, the University was celebrating the semicentennial of its actual opening to students, the Medical School, had it been ceremony-minded, would have been looking forward to one of the same kind only a few years away.

Amphitheater in the Laboratory Building; Dr. Mix lecturing.

ADVANCES AND ADAPTATIONS

The three-year graded course, which had once seemed an ample expansion of the customary single-year (though repeated) condensation of studies, was no longer adequate to cope with the newer
needs. To meet the demands for additional time, an optional four-year course was first set up by the Medical School in 1889 and students were urged to take it. Three years later it became compulsory. The sharp decrease in first-year enrollment, following the announcement of a required additional year, was quite temporary. At the time when Northwestern extended the period of instruction through four years, it was one of six schools to have taken this step. Rush Medical College, less laggard than before, waited only until 1895 to adopt this advance.

Only a slow, national conformity had followed in the wake of the radical move made by the Chicago Medical College when, in 1868, it lengthened the graded course to three years and strictly enforced it from 1875 onward. Even in 1885 there were still 103 medical schools giving two years of instruction, while only five required three years. But, in 1899, only two schools required two years, ten required three years, whereas 141 demanded four years. There had been more progress nationally in medical education in the fourteen-year span (1885-99) than in the previous 150 years. Also an indication toward a better control of medical practice was clear as early as 1890, when the number of states requiring examinations for licensure reached 26. The seven-month session, also instituted by the College in 1889, was lengthened to eight months in 1894 and to eight and one-half months, or a full academic year, in the following year. In part, these advances seem to have been an adjustment to the University calendar and to administrative pressure.

Midway (1897-98) of the period presently being considered the enrollment totalled 356, and 22 per cent of these matriculants held college degrees on entering. This was not much less than the figure of 27 per cent 25 years later (1922-23), but small in comparison to 95 per cent of today. It is not complimentary to medicine to learn that a national survey in 1890 had shown that a medical career was unpopular with those who had gone on to complete a college course. Law and theology, each, attracted forty per cent of those about to graduate, whereas medicine claimed only five per cent. Among those presenting secondary-school credentials for entrance to our Medical School in 1897, there were deficiencies in eighteen required subjects, of which nine had been removed by examination within a month after classes began. It had already been ruled in the previous year that all such deficiencies in entrance requirements must be cleared before admission to the sophomore class would be per-
mitted. The loss in enrollment, incurred in 1897 by withdrawal before the final examinations, was twenty per cent of the freshman class and ten per cent for the school as a whole. The Spanish-American War caused no decrease in patronage, and apparently had no direct impress on the operation of the School. Records are silent on any relations of the Faculty or students to this national episode.

In 1895-96 the matriculants in all classes numbered 321; they came from 21 states and foreign countries, and 31 different colleges and universities were represented; 185 of the 321 students were from Illinois. The Seniors of that year were highly regarded, and the Executive Committee recommended that “the Secretary send notices to prominent medical journals of the country announcing the high literary grade of the class of 1896, and also making prominent the fact that about thirty members of a class of 74 had taken hospital positions by competitive examinations.” By comparison, in 1957-58, the same number (321) of Freshmen, Sophomores and Juniors came from 33 states and foreign countries; they had attended 132 different colleges and universities, and 122 of the 321 students were from Illinois. Thus eighty years ago, as now, the diverse origins and collegiate backgrounds of the students of this School were a matter of justifiable pride. In 1902-03 the enrollment had reached 608, surpassed only by Columbia and Illinois, and it remained at about this level through the succeeding years of the current period.

The entrance requirements, which had advanced to the high-school level in 1889, and had stipulated courses in English, mathematics, physics and Latin, soon looked elementary in comparison to the complete college course and baccalaureate degree demanded by the new medical school of the Johns Hopkins University (1893). In truth, only minor changes occurred at Northwestern Medical School in nearly two decades. For instance, in 1897 the entrance requirements were specified as then conforming in detail to those of the College of Liberal Arts. Yet even beginning with 1896, prospective students were “strongly advised to pursue a course [in college] which shall include the following branches: physics; general biology; zoology; chemistry; botany; German.” Soon, however, at least two years of college, with specific, recommended courses were advised, and this counsel continued beyond the period under present consideration. Although the limitation of the requirement to a high-school education seems meager today, this was the recommenda-
tion of the Association of American Medical Colleges in 1890, and in 1904 only three of the 166 medical colleges in the United States demanded more.

It seems that two incompatible forces came into play in the Medical Faculty: one was a desire to raise requirements consonant with University dignity; the other was the fear, in some quarters, that such was unnecessary and undesirable because it might reverse the advancing tide of matriculation, which in 1902-03 exceeded 600. Bayard Holmes, reviewing losses from the faculty of the College of Physicians and Surgeons, wrote: "Van Hook went to Northwestern [in 1896] where his enthusiasm was slowly drowned out by the economic and pedantic exploitation of the splendid foundation laid so patiently and devotedly by N. S. Davis, H. A. Johnson, Edmund Andrews and J. S. Jewell." It would be another decade or more before a discordant faction would fulminate real trouble. (p. 293).

There is also a suspicion that by the turn of the century the aggressive daring of the Founders had dwindled, and that the new policy-makers were unequal to the task of picking up the pioneering torch and carrying it forward. To be sure, the pressing need for expenditures on the laboratory sciences demanded fresh money, but so had the building ventures of the Founders. The advancing of entrance standards was no more risky now than previously. In fairness to the progressive wing of the Faculty, it should be said that the University was not at all helpful throughout the 1870-1906 period whenever educational progress entailed a threat of reduced tuition receipts, or required the expenditure of fresh money. For the University, medical prestige was desirable as a gift, but not as a commodity to be purchased at standard rates.

The Founders had been progressive innovators when they instituted final examinations for the subjects of each year, at the end of that year. With the lengthening of the annual session from five months to nearly nine months, it became apparent that a break midway in the single long term was desirable. Division of the year into semesters was done in 1896-97, but the introduction of more frequent examinations was not authorized until 1899, when it was agreed that "hereafter examinations shall be held at the end of each semester, and that students be given credit for each semester’s work." Just the year before, a long-standing refusal to release grades to students was reversed, and in 1899 letter grades (A, B, C,
D, F) replaced the former numerical scale (0-10).

The requirements for graduation underwent changes chiefly related, directly or indirectly, to the total length of the course of studies. In 1875 the required curriculum had lengthened from two years to three, and in 1892 it was extended to four years. Earlier, at the beginning of the period under current consideration, the 1891-92 session had seen the last of the unpopular thesis requirement. Four years later the name of his preceptor ceased to be listed after each student's name in the college register. This was logical because such historic sponsorship had been wholly nominal since the introduction of a three-year course. Dissection had been specified as a graduation requirement from the beginning. For twenty years no precise statement was made; then, for 23 years, "at least three parts”; thereafter, from 1893 onward, "a median half of the body.” Not until recent years, since 1945, when scarcity of material compelled two students to share each half, has all reference to dissection been omitted. Apart from quantitative changes, the only significant alterations in the list of graduation requirements at Northwestern in 100 years were discarding of the thesis and the adding of a stipulation that the candidates "must have discharged all financial obligations to the University.” For a time an internship became an additional requisite (p. 186). Since 1962 the stated requirements have been simplified to a bare "12 quarters of the medical curriculum.”

In the spring of 1892, President Rogers transferred the commencement exercises to the Auditorium Theater in Chicago because the First Methodist Church of Evanston no longer was large enough. He expressed the wish that the Medical School either lengthen or arrange its courses so that its commencement exercises would occur in June, coincident with those to be combined that year by the College of Liberal Arts and the Law School. At first such a calendar was considered impractical, because of the then shorter (seven-month) medical session. Hence the Medical School continued by itself, as also in 1893 when the School of Pharmacy and the Woman's Medical School became additional participants in a gala commencement convocation, at which President Theodore Roosevelt was the speaker. But in 1895, when the adoption of an eight-month calendar had advanced the end of the annual session to May 28, the Senior medical students voted unanimously to postpone their graduation until the time of the University Commencement on June 13. This conformity differed diametrically from the
much later longing of Seniors to get free of the University convection and have a more intimate graduation of their own.

Earlier in the same year (1895) President Rogers had prevailed upon the University Trustees to decree that students and faculties of the University must wear academic costume on all ceremonial occasions. In preparation for the imminent pomp, the Medical School ordered 3,500 engraved invitations, for the use of the Faculty and to send to alumni, and rented caps and gowns for the Faculty and graduating class. The ceremonial took place at the Auditorium “in the presence of the President, the several Faculties of the University, guests and a very large [overflow] audience.” A feature to become permanent was the commencement address by a speaker of national reputation; this innovation abolished the previous custom of filling the program with numerous student speakers. On this occasion, recognition was given for the first time to outstanding scholastic achievement in medical studies, and three diplomas were awarded *cum laude*. During the next year a system of general and special honors was set up for medical students that could yield at graduation the citation of *cum laude, magna cum laude* or *summa cum laude*. The bases of qualification were simplified after three years, and in 1929 were changed to *cum laude* alone. Later, the designations “with distinction” and “with highest distinction” were adopted and are still used.

It was not until 1908, however, that the University, now led by President Harris, succeeded in combining in one commencement ceremony all of its component schools. And it was another year until the erection of the original Patten Gymnasium provided an auditorium of sufficient size to permit the united graduation exercises to be brought back to the Evanston Campus. The symbolic merit of a single university convocation is obvious, and it has persisted. But the medical students yearned perennially for a private ceremony, and this they finally obtained as an additional feature (p. 255).

With the physical and educational expansion came increasing costs of operation. The original tuition fee of $50 became $75 in 1879, $100 in 1890, $125 in 1896, $135 in 1900, $165 in 1903, and $175 in 1906. The latter three amounts were reduced by $10 to $15 when paid in advance. Although these increases in tuition were steady, when once the advance was begun, the amount ($165) in 1903 just equalled that charged by eastern, large-city schools nearly
forty years before; by 1903 a few of the eastern schools were charging from $200 to $300. The Executive Committee of the School pointed out in 1896 that slowly increasing the price of tuition would obviously augment income, but that this measure was not a satisfactory or competent solution of the total problem. To be sure, the School had been making money and paying off indebtedness on its new building at a commendable rate, but the Committee warned that only a greatly increased endowment would permit improvements that could match the achievements of the leading medical colleges of the nation. It cited, as an example, that Harvard paid in salaries for instruction $146 for each student enrolled, whereas Northwestern spent only $43 per student.

The administrative officers and some of the Faculty grew with the times. In his annual report of 1890 President Cummings wrote: “The truly scientific professional schools of a great community are its protection against charlatans and incompetency; hence the University conducts them . . .” How different was the outlook, a dozen years later, of President James, who drew attention to the great change that had taken place from the old-fashioned, didactic school that could be run at little or no expense for salaries, and the

Amphitheater in surgical pavilion of Mercy Hospital, erected by the Medical School, 1901; Dr Murphy's clinic in progress.
A Period of Transition

later school needing large budgets and endowments to provide salaried teachers, student laboratories, clinical facilities in a university hospital, and the means and equipment for research. And he concluded: "We must look forward to the liberal endowment of our own Medical School if we expect it to hold its relative place among American medical schools . . . We have certainly reached a point in the development of medical education when we can no longer expect fees of the students to provide the necessary facilities for research [and] for teaching, which are a necessary part of a modern school." In the first years of the new century Dean N. S. Davis, Jr. also repeatedly urged the need of generous endowments and held that entrance requirements could not be raised further without them. The amount necessary, he thought, must yield an annual income of $40,000. At this period no one could envision that by midcentury the maintenance of a dispensary alone would cost ten times that sum.

Early in the present period the Medical Faculty, after mature consideration, resolved to make an effort to secure $150,000 for permanent endowments for the professorships of chemistry, physiology and pathology (including bacteriology). Within a few years a one-third share, benefiting physiology, was obtained. Also an unexpected donation made a start on the endowment of the anatomical chair, which had been omitted from the recommendation presumably because no one imagined its imminent release from the custody of volunteer surgeons. But the full and adequate endowment of departmental professorships would have to wait many long years for fulfillment. When, in 1898, the Medical Faculty recommended "that the professors of anatomy and pathology be employed to give full time to teaching and research, and that they be paid salaries," the cautious President thought "the request entirely reasonable, and salaries can be paid in the cases mentioned and still leave sufficient income to meet the interest on the building and something beside." For their part, the University Trustees refused to make any monetary contribution toward modernizing the preclinical departments (p. 506).

Discussions arose from time to time concerning the remission of fees in special situations. The curious arrangement whereby persons who had attended the College of Liberal Arts for two years or more would be charged only incidental and laboratory fees, was terminated in 1896. If its intent, to encourage better premedical
preparation, was not realized to any degree, then many students missed a bargain. Remission of fees had been approved “to students recommended by some recognized Missionary Board, the same being pledged to missionary work and conditional on their completing a thorough medical course.” This privilege was abolished when it was amply proved over a dozen or more years that many of the numerous beneficiaries never entered a foreign field of service. Remission of fees had also been granted to an Apache Indian, to Filipinos and, as late as 1918, a rebate of forty per cent was approved “to sons of ministers if their scholarship averages B.”

The general question “of the propriety of reducing the annual fees to worthy and poor men” was discussed in 1894, but no steps were taken at that time. Five years later, when the tuition was being increased to $135, the Faculty authorized four scholarships to be “awarded annually to those students who can demonstrate that they have the best preparation for the study of medicine.” In 1902 the number of such scholarships was increased to ten, but after the 1903-04 session they were withdrawn. A similar fate ended a genuine bargain sale that had been conducted at the founding of the University when needed funds were raised by peddling perpetual scholarships, at $100 each. These entitled the purchaser to educate his children, one at a time, and a bequeathed line of descendants, tuition-free, for all time. The Medical Faculty, in answer to a prospective beneficiary of this valuable possession, ruled that such an exemption did not apply to that School which was not in existence at the time of the sale. This is in accord with the general policy of the University which still restricts their validity to the undergraduate “literary and scientific departments.”

NEW CURRICULA

The advances begun by the Medical Department of Lind University, and especially those related to course-grading, session-lengthening and an increase in the total time of instruction, were accepted slowly by others in succeeding decades, yet the adoption had become general (though not complete) in the decade of 1890-1900. Much credit is due the Illinois State Board of Health, whose reports contained the only reliable information on medical schools
and medical education in the period between 1880 and 1900, and whose supervisory influence was a potent factor toward improvement throughout the country.

In these two decades came also an amplification of the program of instruction, and of its method of presentation, that made a good start toward what was becoming an educational revolution. The old method of teaching large groups by exposition, at long range about things not seen, was giving way to individual participation and first-hand knowledge by the student. He now became a tyro investigator, learning by personal experience, weighing the evidence and arriving at reasoned conclusions. Still these steps were but a beginning in a reformation, long overdue. Although, in 1896, the United States harbored half of all the medical colleges in the world, in general they were inferior to those of other progressive countries.

Even though the climax of this revolution belongs to the next period to be considered, young Americans in increasing numbers were already returning from Europe with a new knowledge of physiology, pathology and bacteriology that had to find a place in the curriculum. Equally important, they were returning with a clearer understanding of the need for sound preparatory education. In 1896 the Executive Committee of the Medical Faculty made a forceful report in which it declared that compulsory work in anatomy, physiological chemistry, pathology, and materia medica (meaning, actually, pharmacology) should be increased, and more laboratory work required. In spite of recent improvements in the preclinical and clinical offerings, the Committee warned that the policy of the School in respect to bettering the curriculum should be settled at once, since the eastern colleges, in particular, would be advancing rapidly and the leadership of Northwestern was in danger of being lost. The failure of the Committee to emphasize what the Johns Hopkins had already accomplished as a new pace-setter is astonishing. In terms of any attempt to retain leadership, the response to the challenge of the Committee was as inadequate as it was laggard. But this is a story that belongs better in the chapter to follow.

In the Nineties the Faculty was repeatedly pleased with the relatively large number of its graduates who elected to serve internships. These averaged more than one-third of each class, and had even exceeded one-half; in comparison to other schools, this record was said to be outstanding. Feeling that ultimately every stu-
dent should have a year of hospital work, the Faculty decided to provide a course that would afford many of the advantages of residence in a hospital to those who failed to obtain such an appointment. This opportunity to gain more experience took the form of a fifth, optional year, during which the students were assigned to tasks in the hospitals under the direct supervision of the professors of medicine, surgery and pathology.

The specific duties of these quasi-interns were to examine for themselves incoming patients; to serve as externs in the hospitals; to study the literature pertinent to the cases assigned; to learn the methods and imbibe the spirit of research in clinical diagnosis, in medical and surgical pathology, and in bacteriology. The several specialties also came in for attention, as did original experimentation under the departmental heads. It was hoped also that such a year would appeal to graduates already out of school, and to practitioners of still longer standing; through it, graduates of other schools would be able to qualify for an ad eundum degree from Northwestern. In order to encourage students to take the course, twelve fellowships were to be awarded; the tuition was $200. The announcement of this course appeared in 1901-02, but not thereafter. Presumably it did not attract sufficient patronage to warrant continuance.

From the first year of its operation the School had conducted a summer course, but this feature was abandoned after 27 successive sessions. In 1902 a half-semester summer course was revived, with offerings in both the laboratory and clinical fields. These opportunities, it was hoped, would attract: students from other institutions whose clinical advantages were inferior; Northwestern students preparing for competitive hospital examinations; and transfer students with work to make up. Presumably students with failures to work off must have been tolerated as well. Practitioners wishing newer and more scientific methods of clinical diagnosis and pathology, or experimental work in physiology, therapeutics and surgery, were eyed hopefully. The attendance grew steadily from 28 taking three courses in 1898, to 128 taking 21 courses in 1901. The last attendance record extant shows an enrollment of 164 in 1902. The scheduling of this annual summer course came to an end in 1910, when it was decided that the session had become a haven for conditioned students and the quality of work was inferior.
Earlier advice in the Announcements, urging prospective medical students to enroll in colleges of arts and science before attempting medical studies, led to specific recommendations concerning the best preparation to be gained. Moreover, in 1892 the Medical School began admitting to the second year, with a deficiency in gross anatomy only, those who had completed the medical preparatory course of two years in the College of Liberal Arts (or its equivalent in other institutions). Again, in 1898 it was explained how a combined course, with gross anatomy to be worked off, could yield both the Bachelor and medical degrees in as little as six years.

Additional interlocking with the College of Liberal Arts existed from the time of the first union in 1870, since that College controlled and, for 47 years, continued to administer the master's degree. At first it was conferred for five dollars on bachelors who had "sustained a good character, and pursued professional or other advanced studies." After 1890 a thesis and examination were required, and the degree "was not to be conferred on those who receive a professional degree with distinction, without additional work." By 1894 a half year of advanced work, beyond the full professional course, was stipulated for students of law and medicine. Essentially the same arrangement continues in force today, since preclinical courses (not used for the baccalaureate) can substitute for the remaining half of the required year in residence. Dr. F. S. Johnson (1881), later professor of Medicine and Dean of the Medical School, was the first medical student to gain the masters award at graduation solely by sustaining a good character and completing professional studies.

Beginning in 1893-94 advanced work, beyond the prescribed medical curriculum, was offered in a terse statement, and all Junior and Senior students were advised to pursue some line of research. Eight years later the potentiality of these opportunities was made clear: "A few optional courses are offered to small classes of students, to whom special laboratory and clinical instruction will be given. Many students who have taken the B.S. or B.A. degree before entering upon their medical studies improve this opportunity for doing the work required for the M.S. and M.A. degree, which may be granted with the medical degree at the end of the course."

The next year the offerings were elected by 258 students, which represented 72 per cent of the enrollment. Today this seems an amazing response. These electives became listed in the Annual An-
nouncements, and similar offerings toward advanced degrees have continued, without interruption, to the present day.

A start had been made in 1882 toward reforming teaching in the School by appointing a full-time, highly trained Professor of Chemistry. During the current period, other important changes were introduced into the Faculty and curriculum. These involved the basic sciences, which not only were advancing in breadth and depth but also were developing new aspects that had to be accepted as entities worthy of separate recognition. Most spectacular was medical bacteriology which, after a stormy birth, could no longer be denied its rightful place. It was only in the previous decade (1880-90) that some of the organisms responsible for common diseases had been isolated. The readiness of the Medical School to introduce such matters, some of which were still controversial, into its curriculum placed it in the forefront of progressive action. This was all the more commendable since Dean Davis had been a stalwart opponent of the germ-origin of disease, asserting that it was a passing fad and warning against its too wide applications. Dr. Samuel C. Plummer, of the class of 1886, and a member of the Faculty in the present period, wrote later that in his textbook (Lectures on the Principles and Practice of Medicine) Davis made practically no mention of germs as the cause of disease, but did occasionally speak of germs to make fun of them, once making the prediction that some of his hearers would “ride into fame on the tail of some newly-discovered microbe.”

Beyond doubt the School was progressive in this newest field. Professor Curtis, as early as 1882, reported on micro-organisms found in a victim of tetanus. And the next year Dr. Henry Gradle, Professor of Physiology, presented a series of lectures on Bacteria and the Germ Theory of Disease, the earliest in Chicago. He was among the first in America to study systematically the whole range of bacteriological investigations, and his book on the subject became famous enough to gain translation into several languages. Dr. Bayard Holmes, who had set up a laboratory while an intern at Cook County Hospital in the early Eighties and had become a self-taught bacteriologist, was appointed to give a lecture and demonstration course on this subject in the year 1889-90; he was given the grandiose title of Director of the Bacteriological Laboratory. Dr. Isaac A. Abt wrote in Baby Doctor of how he collaborated with
BACTERIA

AND

THE GERM THEORY OF DISEASE.

EIGHT LECTURES DELIVERED AT THE

CHICAGO MEDICAL COLLEGE,

BY

Dr. H. GRADLE,

PROF. OF PHYSIOLOGY, CHICAGO MEDICAL COLLEGE; OCULIST TO THE
MICHAEL REESE HOSPITAL.

CHICAGO:
W. T. KEENER, 96 WASHINGTON STREET.
1883.

Title page of Professor Gradle's pioneer book on bacteriology, which was translated into several languages.
Holmes, together with fellow-students Daniel Eisendrath and Adolph Gehrman (all later becoming notables), in prosecuting laboratory experiments:

During our second year [we] began the study of bacteriology in a closet under the amphitheater. This was about seven years after Koch had published his investigations on the tubercle bacillus and bacteriology had begun to receive a place in some medical school curricula. Dr. Davis did not believe in bacteriology ... Since we were determined to find out something about it, however, the college gave us its blessing and the only available space. We bought some simple sterilizers, stoves, test tubes, and all the other equipment within our means, and spent our spare time making culture media and studying bacterial growths under the microscope.

Laboratory work in Bacteriology was scheduled in the “time-table” of 1891-92. But the first description of a formal course came in the following year; laboratory work was required in the staining of pathogenic bacteria, while instruction in the making of pure cultures was optional. Bacteriology continued as a separate discipline (except for one year) until 1902, when it was combined with pathology under the full-time supervision of Dr. F. R. Zeit. The joint department continued in operation until 1912, when Bacteriology assumed a separate status with a greatly expanded program.

An older field, in which the Medical School was less alert, although well in advance of the other Chicago colleges, was physiology. This had been a rapidly expanding science whose method of attack, through the invention of recording devices, was making the living organism supply much desired information. Even though Americans, trained in the newer experimental techniques, had been returning from Europe for a considerable number of years, the course at Northwestern remained one of lectures expounded by a general practitioner, without special training or an equipped laboratory. The first attempt to introduce laboratory work was assigned in 1894 to Dr. Isaac A. Abt, a recent graduate already committed to pediatrics as a specialty. This task of organization, he later recorded, was a doubtful privilege in view of the lack of available laboratory equipment.

The outlook for physiology, however, changed in 1894 when William Deering gave $50,000 to endow what was to be known as
the Nathan Smith Davis Professorship in this subject. This title was appropriate since Davis had taught physiology at Rush for ten years, had published 31 papers in this field and retained a life-long interest in the subject. Dr. W. S. Hall, who was then finishing his physiological training at Leipzig under Professor Ludwig, was appointed to this chair, and under his direction a laboratory was equipped and a modern course instituted in 1895. The endowment for the chair was subsequently increased to $100,000 by various alumni and friends, and the title has continued almost uninterruptedly.

Another sign of the times was the changing of materia medica and therapeutics into an experimental course under a new name, pharmacology. The first break from tradition came in 1896, when laboratory work was introduced not by the then professor, but under the direction of Drs. W. S. Hall and H. M. Richter, long to be identified with the School as highly trained physiologist and surgeon, respectively. Three years later the name of this discipline became changed to the Department of Pharmacology. It gained a new head, who announced that students would participate in laboratory experiments “to demonstrate on animals the physiologic action of the more important drugs”; in this practical work, up to 150 dogs were said to be used each year. In addition there was classical instruction in materia medica and pharmacy, supported by “a collection of 3,000 crude drugs and pharmaceutical preparations, properly classified and labeled to correspond with the text book used.”

Dissection, although the oldest form of laboratory work, strangely was not thought of as such in this country until about the current period. The “laboratory” in all earlier years referred to the chemical laboratory alone, and the concept of any other kind of laboratory work, qualifying as such, was not even entertained. The chair of anatomy and the sub-office of “Demonstrator” at Northwestern were long held by a succession of clinicians who also became renowned as Chicago practitioners. For many years the work of dissection went on at night, usually from 7 to 10 o’clock, under dim gas jets. Not until after the new laboratory, at the Dearborn Street site, had been occupied for a year did this routine change to daylight hours.

By student acclaim one of the most inspiring teachers in the history of the School was Dr. Robert L. Rea, a part-time anatomist.
It is said that he was the first to point out that Rembrandt’s famous “Anatomy Lesson” at the Hague shows the superficial flexor of the digits originating from the wrong side of the ulnar bone. On his death the University received, in 1902, a bequest of $10,000 for the beginning of an endowment of the chair of anatomy, which became named after him. In 1904 Dr. E. C. Gregory, of the University of Minnesota, was brought in as the first incumbent of this chair and as the first full-time Professor of Anatomy. Subsequent to his resignation, three years later because of a family emergency, the title was not used again until 1925, after the chair was more adequately endowed by the widow of Professor Rea.

Among minor adjustments in this period, surgical anatomy, historically coupled with descriptive anatomy, split away in 1892 to become a separate course in surgical anatomy and operative surgery. This alliance, under the aegis of the Department of Surgery, continued as long as instruction was given in either practical discipline. Embryology first was mentioned by name in 1892, linked with similar demonstrations in histology; the earliest description of it as a course came four years later. Histology had already been emancipated from physiology in the previous period (1879). Of peculiar interest is a course in the history of medicine given by the aging N. S. Davis after he resigned from the chair of medicine in 1892. These lectures were delivered to the Senior class annually from 1892-97, inclusive, and spanned from the earliest times to the end of the nineteenth century. Shortly before his death, in 1904, they appeared in revised form as a book (*History of Medicine*), which was one of the first comprehensive treatises to be published in this country on that subject. More than thirty years were to elapse before another attempt was made to revive formal instruction on the cultural heritage from the medical past.

As the nineteenth century drew to a close, biomedical advances were beginning to have a strong impact on medicine in Western European countries. Developing rapidly were all of the ‘academic disciplines’ then becoming recognized as the sciences basic to the future progress of clinical medicine. America soon began to realize the importance of this relationship and, accordingly, directed its attention toward improving the status of these several basic sciences.

The steps that placed all of the basic sciences in the hands of full-time teachers, especially trained in those subjects, reflected a major
change of policy that was crystallizing not only here but elsewhere about the country. It infused a different spirit and substance into teaching that presaged a new day for scientific medicine. Dr. Franklin H. Martin, of the class of 1880, wrote in *The Joy of Living*: "We were in medical school during the days when the 'art of medicine' was practised to the exclusion of the 'science of medicine.' We were approaching the development of the 'science,' which was more and more to share with the art; and then the time came when we began to speak of the 'science and art of practice,' rather than the 'art' or the 'art and science of practice.'" This shift was the fruit that was to come from the laboratory approach to those sciences that had to be basic to any marked advances in the practice of truly scientific medicine.

**ADMINISTRATIVE CHANGES**

The final integration of the Chicago Medical School into Northwestern University occurred on June 16, 1906. In order to complete the sequence of the contractual union in 1891 with the final absorption and surrender of financial and some other powers in 1906, this historical account was included in a previous chapter (pp. 136-141).

Of the principal Founders, Johnson and Byford died as the present period began. In 1894-95 Davis, Andrews, Isham, and Hollister were finishing their thirty-seventh year with the School. Davis, aged 78, had already been relieved of his professorship three years previously, but remained as Dean. Andrews and Hollister were 71; Isham, 60. In that year (1895) Hollister was teaching for the last time; and Isham, the youngest of all the Founders, continued only three years more. At the end of the 1898-99 session Davis resigned his deanship, and two years later Andrews became the last of the Founders to retire. The leadership by an inspired group of innovators then, of necessity, passed into other hands.

Nathan S. Davis had been the driving force behind the new school from its inception, and had been its chief executive for most of those years. At the end of the 1891-92 session he tendered his resignation as Professor of the Principles and Practice of Medicine,
and of Clinical Medicine, feeling no longer capable of meeting the strenuous demands of that chair. Four years later he offered his resignation from the deanship, which the Board of Trustees was advised by the Medical Faculty not to accept. At the end of the 1897-98 session, this request was renewed in the following remarkable letter to the President and Trustees of Northwestern University:

Honored Friends and co-workers—

I am fast approaching the completion of 82 years of life, 62 years of which have been devoted faithfully to the general practice of medicine, which means daily efforts to alleviate human suffering and prolong human life. During the whole of those 62 years I have labored diligently, by investigation, by writing and by teaching to promote general education, both intellectual and moral; and especially to elevate and systematize the standard of medical education in this country. To the Northwestern University and to its Medical School I have given freely all of both time and money that I could spare from the time of their organization to the present time, with the addition of twenty years service as Lecturer on Medical Jurisprudence in your Law School. All the great leading objects for which I commenced to labor sixty years since, have been substantially accomplished. During that time I have been abundantly honored both by the professors at large and the University, and until the present year I have been able to give some important instruction in the Medical School and serve as its Dean. But the ordinary infirmities of age render me incompetent to give active instruction longer, and consequently I have not attempted to give any the present College term.

The University Statutes make it the duty of the Dean of the Medical School to preside at the meetings of the Faculty in the absence of the President of the University, and to report annually on the work of the School with such recommendations as he may deem proper. To discharge these duties properly, the Dean should be an active member of the teaching faculty, and so frequently in the college as to be personally acquainted with the work and needs of both faculty and students. For reasons already given I can no longer fill these requirements properly, and therefore, hereby most respectfully tender to you my resignation of the office of Dean of the Northwestern University Medical School to take effect with the close of the present College year. Your acceptance of the same will relieve me from a feeling of responsibility that I should no longer bear, but will never relieve me from a lively interest in the University and all its legitimate departments.
This communication was referred to a special committee that returned the following report and tribute:

A careful review of Dr. Davis’ statements and a full consideration of the circumstances, including his known preferences, induce us unwillingly and with sincere regret, to recommend that the resignation be accepted as hereinafter stated.

Dr. Davis’ professional requirements and services are known to his profession in our own Country and in every civilized land. Of his nearly eighty-two years of life, he has given sixty-two years to the practice of Medicine, and thousands of American homes have had abundant reason to thank God for his skill and scholarship. While the homes of the wealthy have been beneficiaries of his rare medical insight, we happen to know that other thousands of the poor, who often may have been unable to pay him in gold, surely have recompensed him in the gratitude and love which are “coin of the realm” in the Kingdom of God in Heaven and on earth.

Dr. Davis has been an apostle of the higher medical education. While we are proud that our medical department has led the way in demanding higher and severer tests from its matriculants, and has exacted both an increase of years for its curriculum, and more thorough scholarship from its graduates, we do not forget that these exactions for the good of the medical profession, are fruits in greater part of Dr. Davis’ insistence and untiring advocacy. Through him, and at the hands of his devoted and accomplished co-workers in the Medical College, great honor to the University and great good to the world have come. The retiring Dean leaves his honored Chair an authoritative author in medical literature, a reverenced chairman and leader in many State, National and inter-National Medical Conventions and Congresses, a beloved teacher, a trusted Christian gentleman, and as a practitioner who has earned, as he deserves, the benedictions of the rich and the prayers of the poor. Your Committee recommends that Dr. N. S. Davis be constituted Dean Emeritus of the Medical School of Northwestern University, and that his resignation of the active Deanship be accepted, to take effect when his successor in the latter relation has been elected.

The recommendation of the Committee was adopted by a rising vote of the Trustees.

On the recommendation of the Faculty, Dr. Frank S. Johnson, Professor of Pathology and son of the revered first President of the Faculty, assumed office as Dean before the 1898-99 session and served until 1901, when he was compelled to resign because of ill
health. He, in turn, was succeeded by Dr. N. S. Davis, Jr., Professor of Medicine, and for the previous five years the Secretary of the Faculty. His term of office (1901-07), although somewhat longer than Johnson’s, was brief in comparison to that of his distinguished and durable father. It continued into the next period to be described.

SUCCESS AND CHALLENGE

The question arises as to the kind of product that the School was turning out in the general period being considered. Available statistics indicate that it was good. One test was the competitive examinations for internship at Cook County Hospital and elsewhere. In the eight years comprising 1886 to 1893 Northwestern had 404 graduates, of whom 67 took the County examination and 31 (or 48 per cent) were successful. In the same period Rush had 1,184 graduates, of whom 96 took the examination and 18 (or 28 per cent) placed. The College of Physicians and Surgeons had 446 graduates, of whom 57 took the examination and 9 (or 14 per cent) placed. Of other hospital appointments statistics are complete in six of the eight years. These show that Northwestern placed 83 contestants, Rush 37, and Physicians and Surgeons 16. Especially in consideration of having the fewest graduates as potential competitors this record by Northwestern is remarkable. Computing to the same basis in the number of graduates, indicates that the relative success of Northwestern was seven times that of Rush and six times that of Physicians and Surgeons.

Figures are available for the class of 1899, which placed 25 of its 65 members in hospital appointments. This led The Bulletin (forerunner of the Quarterly Bulletin) to conclude: “Such a record is gratifying proof of the growing appreciation of higher education. There need be no anxiety for the future of American Medicine, when over one-third of a graduating class is willing and anxious to extend its four years of required work by one or two years of voluntary work in a hospital.” This sentiment sounds archaic today, yet years later an arbitrary edict, effective in 1919, was necessary to force participation in hospital training onto every member of a class. Additional details on the results of competitive examinations to Cook County Hospital are on record for the class of 1900, which
obtained six of the twelve appointments and also took the two alternate positions.

The results of all state-board examinations gave a national rating to schools. In 1903 Northwestern stood sixth, and Rush tenth. In 1904 Northwestern stood second (two failures out of 159 board examinations taken); Rush, twelfth; and Physicians and Surgeons, fifteenth. In 1900 four schools had no failures in state examinations throughout the country: of these, Northwestern had 57 examined; Syracuse, 28; Woman's, 31; and Yale, 1. In the five years between 1903 and 1907, the licensing records show that 39 schools presented more than 250 candidates. The percentage of failures for the leaders were: Cornell, 1.2; Johns Hopkins, 1.4; Harvard, 2.1; Northwestern, 3.5. Such results may be compared with, for example, Maryland, 49.3 per cent. Both Cornell and Johns Hopkins were schools too young to have rusty graduates attempting the examinations and downgrading their scores.
The quality of the medical graduate did make a wide and favorable impression in medical circles. It was generally conceded that Northwestern turned out unusually competent practitioners. Accordingly, from small groups of students who dared embrace an adventurous and more expensive type of training in the early years, the enrollment expanded until latterly it included nearly 600. The roster of alumni in 1906 numbered nearly 2,500, of whom one in eight was either teaching or in attendance at hospitals in Chicago. Keeping pace, the Medical Faculty nearly tripled its personnel in the thirty-odd years between the founding (nine professors and two others) and the second contractual union in 1891 (22 professors and nine others). The next fifteen years saw the total Faculty increase further to 115, of whom only 29 were professors. The large numbers of "others" reflected the growing importance of individual work, done by students in laboratories, clinics and lecture rooms.

In 1890 the medical-college property, including cash and equipment, amounted to not more than $40,000; sixteen years later, acquisitions had increased these assets by $343,000. In the same span of years, the annual income grew from $30,000 to $83,000. Although in this period there had been paid out from the earnings of the college (and some gifts) approximately $230,000, the amount still owed on the building account was $90,000. It was to be only a few years, however, until this debt would be liquidated. Also from earnings, $30,000 had been given to Wesley Memorial Hospital and $22,360 had gone into building the surgical pavilion for Mercy Hospital. In all, the College had invested, from earnings, approximately $170,000 in permanent property, and in existing equipment for it. During the years 1890-1906, benefactions had amounted to $102,000. Recently the School had gained control of all of the space in the two college buildings, and had finally conveyed all powers and properties to the University, which thereby assumed complete ownership of the School and full responsibility for it.

The early leadership of the School in bettering medical education had succeeded in pointing the way to educational reform. The various steps, once looked upon with suspicion and even hostility, had slowly gained recognition and general adoption, so that Northwestern (in thus being overtaken) had lost its role as a continually path-breaking pioneer. This situation presented the challenge that the Executive Committee analyzed so clearly: the
School must step boldly forward or relinquish its former position to others. As a matter of fact, by the end of the century the main, opportune moment had already passed. Good fortune had made it possible for another university to plunge boldly into experiments, all of which would shake the complacency of other schools, and some of which were destined to be adopted as standard procedures. Many years were to pass before Northwestern again showed innovative leadership in advancing medical education (p. 279).