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Biog

a history of medicine in pictures

by George A. Bender

painting by Robert A. Thom

The Hopkins: A Revolution in Medical Education

ON CHRISTMAS EVE, 1873, the city of Baltimore, Maryland, lost its richest man: Johns Hopkins. The bachelor merchant and financier, aged 78, had willed his substantial fortune to found a hospital and a university within which a medical school was to be organized. Each of these institutions, he decreed, was to bear his name. The shrewd and far-sighted Quaker regarded his fortune as a trust, and had spent considerable time planning its use for the good of humanity. As early as 1867, bills had been passed in the Maryland General Assembly authorizing formation of two corporations, The Johns Hopkins Hospital, and The Johns Hopkins University; carefully selected boards of trustees had been established to carry out the donor's wishes; and various plots of real estate, trust funds, and stocks had been earmarked to endow the institutions.

Altruistic as had been Johns Hopkins' motives and plans, neither he nor his trustees could have envisioned the tremendous impact that the forces thus set in motion would have on the social and cultural life of the nation; or the revolution that would be brought about in methods of medical education and in standards prerequisite to qualification for medical practice. Abraham Flexner, writing in 1940, said of The Johns Hopkins University Medical School: "It possessed ideals and men who embodied them, and from it have emanated the influences that in a half century have lifted American medical education from the lowest status to the highest in the civilized world."

In the North American colonies, medical education in the seventeenth and eighteenth centuries had largely followed the apprenticeship system. First attempt to establish a medical school came at the College of Philadelphia in 1765. Medical students who could afford it finished their training in Germany, France, Holland, Great Britain, or Denmark. In the early years of the 1800's, less than ten per cent of physicians in the United States were graduates of medical schools, and more than eighty per cent had never attended a lecture in a school of medicine.

Early in the nineteenth century, some 460 proprietary schools came into being. The primary aim of many of them was to collect tuition fees from students for the privilege of attending lecture courses running ten to twenty weeks. There were virtually no entrance requirements beyond ability to sign a promissory note or to pay for the course; and, in absence of any state regulation, a diploma from such a school was accepted as a license to practice medicine.

The aim to improve this deplorable state of medical education was one of

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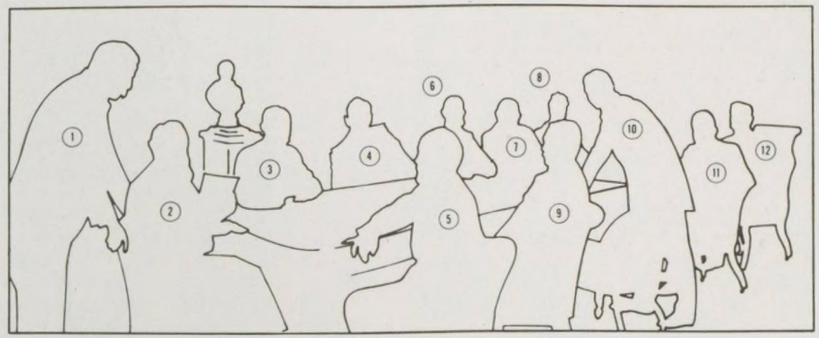
The picture Success of The Johns Hopkins University School of Medicine, opened in Baltimore, Maryland, in 1893, stemmed from policies developed at meetings of the Faculty of Medicine and its advisors during formative years. The School, with cooperation of The Johns Hopkins Hospital, was to become world renowned for emphasis on research, for high admission standards, and for innovations in medical training. These advanced teaching methods influenced a revolution in medical education, led to higher requirements for medical licensure, and helped raise the status of medicine in the United States to a position of world leadership.



Identity of Persons in the Picture

The Hopkins: A Revolution in Medical Education

1. John Shaw Billings, member, U.S. Army Surgeon General's staff, who served as advisor concerning construction of the Hospital and establishment of the Medical School.
2. Daniel Coit Gilman, President of the University.
3. Howard A. Kelly, Professor of Gynecology and Obstetrics.
4. William Osler, Professor of the Principles and Practice of Medicine.
5. William H. Welch, Dean, and Professor of Pathology.
6. Henry M. Hurd, Professor of Psychiatry, and Superintendent of the Hospital.
7. Ira Remsen, Professor of Chemistry.
8. J. Whitridge Williams, Associate in Obstetrics.
9. William S. Halsted, Professor of Surgery.
10. Franklin P. Mall, Professor of Anatomy.
11. John J. Abel, Professor of Pharmacology.
12. William H. Howell, Professor of Physiology.

The bust of Johns Hopkins, founder of the institutions, holds a place of honor in the Hospital Board Room.

the pillars upon which The American Medical Association was founded in 1847; but without vested authority, the Association could do little but point the way toward reform. Though Nathan Smith Davis, "father" of the AMA, introduced a graded curriculum in the Northwestern University School of Medicine in 1859, the Association itself has published the statement: "True university orientation of medical education really began with the Johns Hopkins University Medical School in 1893."

The philosophical (arts and sciences) faculty and the graduate school of The Johns Hopkins University opened their doors three years after the death of the man who made them possible. Significantly, this year, 1876, marked the centennial of the declaration of political independence by the United States of America. Shryock has observed that opening of The Hopkins "in effect announced American independence in scholarship and science."

The trustees selected by Johns Hopkins took their responsibilities seriously and did their work well. They persuaded Daniel Coit Gilman to leave the presidency of the University of California to organize the new university in Baltimore and to become its president. Gilman believed in the value of advanced training and of encouragement of research; as Shryock stated, "The Hopkins had neither antiquated notions nor obsolescent staff to handicap it at the start...The results: Hopkins products were soon in demand all over the country. Within twenty years (1896) over sixty American colleges or universities had three or more professors holding Hopkins degrees on their staffs."

While the University was getting under way, the trustees of The Johns Hopkins Hospital sought to carry out their first assignment: to build the hospital. Members of this board depended greatly on John Shaw Billings, whom they had chosen as their official advisor. Dr. Billings was a military physician and librarian attached to the Army Surgeon General's office, who had acquired wide hospital experience during the Civil War. Dr. Billings designed The Johns Hopkins Hospital buildings, and assisted President Gilman in preparing plans both for hospital management and for integration of the hospital with the proposed medical school. Billings included plans for a school of nursing, and for various supporting services, among them pharmacies. It was he who recommended small classes, actual clinical teaching, laboratory facilities, and that professors heading departments in the school should also head the appropriate services in the hospital. He also envisaged creation of departments of public hygiene, psychiatry, pediatrics, and medical history.

Funds for construction of the Hospital came largely from income from real estate, bank stock, and the Johns Hopkins town house. The aggregate from these income sources did not permit rapid fulfillment of the donor's plans. Building only as they had accrued income to do so, the hospital trustees resisted pressures of persons who wished them to operate an incomplete hospital; it was not until May 7, 1889, that the doors of The Johns Hopkins Hospital were formally opened. In absence of a suitable professional administrator, the hospital trustees asked President Gilman of the University to direct the Hospital. This he did during the first four months following its opening. Then the trustees secured the services of Henry M. Hurd, M.D., to superintend the Hospital, and Dr. Gilman returned to his University duties.

The University trustees had hoped to open the Medical School at the same time as the Hospital was opened. Several years previously, President Gilman had surveyed British medical opinion regarding educational standards that should be required of applicants prior to admitting them to study of medicine. He actually established, as early as 1878, a so-called "Preliminary Medical Course" in the University.

In 1883, the trustees of the University created a Faculty of Medicine, which in addition to President Gilman, consisted of Ira Remsen, Professor of Chemistry; H. N. Martin, Professor of Physiology; and J. S. Billings, Professor of Hygiene. Though none of these men actively taught in the Medical School after it was officially opened, they were influential in establishment of certain general policies of the school, notably in recommendation of high admission requirements.

It is significant that all members chosen for the faculty of The Johns Hopkins University Medical School were comparatively young. First to be chosen was William H. Welch, M.D. (1850-1934), as pathologist, in 1884. Then 34 years of age, Dr. Welch was to serve the University in various capacities for fifty years, and was the most influential of the faculty members. Dr. Welch was a graduate of Yale and of the College of Physicians and Surgeons of New York, and had studied for some time in Germany. Dr. Welch at once began to organize postgraduate courses in bacteriology and pathology for practicing physicians, using hospital facilities for teaching, since there was as yet no medical school. The greater part of responsibility for selection of his associates on the Medical School faculty fell upon Dr. Welch's shoulders.

Next to come, in 1888, was Canadian-born William Osler (1849-1919), called from a post at the University of Pennsylvania to become Physician-in-Chief at the Hospital and Professor of the Theory and Practice of Medicine at the University. Dr. Osler's services continued until 1905, when he was called to England to become Regius Professor of Medicine at Oxford University. Prior to opening of the Hospital in 1889, a New York surgeon, William S. Halsted (1852-1922), temporarily working in Dr. Welch's laboratory, was made Acting Surgeon to the Hospital; and Howard A. Kelly (1858-1943) was called from the University of Pennsylvania to become Gynecologist and Obstetrician to the Hospital.

The best of plans go awry, however. A substantial proportion of The Johns Hopkins University's endowment consisted of shares in the Baltimore and Ohio Railroad. These shares, which paid as high as ten per cent dividends when first received by the University trustees, dwindled in value within a decade to provide virtually no income at all. In 1889, President Gilman faced a seemingly insurmountable problem: there were not sufficient funds available to permit opening of the Medical School. The trustees had agreed that a minimum endowment of $500,000 should be accumulated to guarantee successful operation of the school – and when the Hospital opened, in 1889, the Medical School goal seemed far away, due to shrinkage in revenues from the original University endowment.

Fortunately, a group of young women in Baltimore, interested in a country-wide movement to provide higher education for women, and particularly desirous of assuring opportunities for women in medical education, formed a committee to raise funds. Among the leaders in this movement were the Misses M. Cary Thomas, Mary E. Garrett, Mary Gwinn, and Elizabeth T. King – all daughters of trustees or former trustees of the University. This women's committee succeeded in raising more than $100,000 in 1890, which was made available to the trustees of the University for the Medical School, on stipulation that women be admitted to the study of medicine on the same terms as men. Efforts to raise further funds languished during the next two years; but in December, 1892, Miss Garrett offered the trustees the balance required to make up the $500,000 needed to open the Medical School, subject to two conditions: admission of women on the same terms as men, and maintenance of admission qualifications for all students of a Bachelor's degree or equivalent work in chemistry, in physics, in biology, and in modern languages. Though some faculty members had misgivings about this admission standard, the trustees accepted Miss Garrett's gift and terms.

When the Johns Hopkins University School of Medicine opened, October 2, 1893, its catalogue listed the faculty as follows: Daniel C. Gilman, LL.D., President; William H. Welch, M.D., Professor of Pathology and Dean; Ira Remsen, M.D., Ph.D., Professor of Chemistry; William Osler, M.D., F.R.C.P., Professor of the Principles and Practice of Medicine; Henry M. Hurd, M.D., Professor of Psychiatry; William S. Halsted, M.D., Professor of Surgery; Howard A. Kelly, M.D., Professor of Gynecology and Obstetrics; Franklin P. Mall, M.D., Professor of Anatomy; John J. Abel, M.D., Professor of Pharmacology; William H. Howell, Ph.D., M.D., Professor of Physiology; George H. F. Nuttall, M.D., Ph.D., Associate in Bacteriology and Hygiene; Simon Flexner, M.D., Associate in Pathology; John M. T. Finney, M.D., Associate in Surgery; Hunter Robb, M.D., Associate in Gynecology; J. Whitridge Williams, M.D., Associate in Obstetrics; and B. Meade Bolton, M.D., Acting Associate in Bacteriology and Hygiene.

This fifteen-member opening faculty was in charge of seven active departments (Dr. Abel also directed physiological chemistry; Dr. Welch taught bacteriology; and as yet there was no department of psychiatry). Students beginning first-year medicine included fifteen men and three women. The Medical School had no buildings exclusively its own. The 225-bed Hospital afforded clinical facilities. Of this first class, fourteen men and one woman graduated and received degrees of Doctor of Medicine in June 1897. Four members of this first graduating class eventually became heads of departments in four of the nation's leading medical schools.

In 1962, sixty-nine years after its opening, The Johns Hopkins University School of Medicine had 282 full-time salaried members on its faculty; a student body of 344; and The Johns Hopkins Hospital had a capacity of 1,100 beds. The School of Medicine graduated 4,673 students with the degree of Doctor of Medicine during

the sixty-four years from 1897 through 1961.

When it opened in 1893, The Hopkins was a school of medicine unlike any that had previously existed in the United States. It was the first medical school in the country which was constituted as a graduate school.

Conservatives had doubted that the new Hopkins program would succeed; but its success was phenomenal. It immediately attracted patients in great numbers, as well as the best of students, of residents, and of teachers. Its example stimulated other schools and acted as a catalyzer in the great reaction of reform in medical education that was beginning to shape up in the United States as the twentieth century began.

The Johns Hopkins University School of Medicine was to make six significant contributions to the field of medical education, each of which was to have a profound influence on practices in other medical schools, and, eventually, on elevation of the quality of medical practice in the United States. Three of these were evident when the School opened in 1893:

1. Elevation of standards of admission, requiring college graduation or its equivalent, with predominance of credits in premedical subjects.
2. Acceptance of both men and women students.
3. Provision for full-time instructors, selected from among the best men available, nationally and internationally (rather than, as was the custom, local practitioners employed on a part-time basis), for the preclinical disciplines, such as anatomy, physiology, physiological chemistry, pharmacology, pathology, and bacteriology.

(Credit for establishment of these high beginning standards is due primarily to the foresight of President Gilman and Dr. Billings, with the cooperation of the medical faculty as it was assembled.)

The next innovation of nationwide importance, initiated primarily by Dr. Osler as the first classes got under way, was:

4. Introduction of medical students to an active part in the clinical care of patients in the hospital wards as a regular feature of ward operation.

(Thus students gained actual experience in patient care, rather than merely "walking the wards" at the heels of instructors.)

Two further contributions were to follow. These were:

5. Introduction (by Osler, in 1889) of the residency system in postgraduate clinical teaching.

(This was the foundation upon which competent specialization was built.)

6. Introduction (in 1913) of full-time faculty members responsible for teaching in, and conduct of, three main clinical departments—medicine, surgery, and pediatrics.

(Until then, clinical instruction traditionally had been carried on by physicians who also maintained active private practices.)

The influence exerted upon medical educational practices by The Johns Hopkins School of Medicine and by the Hospital, as Shryock has pointed out, "resulted, first, from the setting of an example." Welch and his associates "insisted that the School become...a center of basic as well as of applied science...Not only did able men accept the chairs, but their work promptly set such standards that no good school was content thereafter with part-time lecturers...Whatever their effect on average students, Hopkins methods certainly stimulated the more original men."

Despite the beneficial influences of The Hopkins and of its graduates on better schools of medicine, proprietary medical schools continued to flourish and through release of inadequately trained physicians to endanger the health of patients. By 1900, only twenty-six states required state examinations for licensure of medical school graduates. The American Medical Association, reorganized in 1901, solidified state and county medical societies into a unified organization; and in 1904, it established a Council on Medical Education. This body, in 1906, undertook the first classification of medical schools as A (acceptable), B (doubtful), and C (unacceptable).

To avoid charges of prejudicial reporting, the AMA in 1908 set in motion what proved to be the most stimulating, as well as most shocking, action in the educational reform program: the AMA Council invited the Carnegie Foundation for the Advancement of Teaching—a privately endowed foundation—to make a survey of the status of medical education. Abraham Flexner, a young educator and a brother of Simon Flexner, was commissioned by the Foundation to make a study of medical schools in the United States and in Canada.

Flexner personally visited 155 medical schools in eighteen months. He talked at length at The Hopkins with Drs. Welch, Halsted, Mall, Abel, and Howell, and "with a few others who knew what a medical school ought to be, for they had created one." Flexner's survey was published in 1910. It was scathingly critical of many schools, suggested major improvements in others, and commended only a few. The shock of his forthright and honest report mobilized both the medical profession and the public in an assault on inferior medical schools. The Flexner report was directly responsible for closing down twenty-nine medical schools within the next four years. Still more schools were to close when state licensing boards agreed to accept for examination only students from the list of 66 medical schools then approved by the AMA Council on Medical Education. As a means of meeting the demand for higher standards, most medical schools have become a part of, or associated with, universities. In 1962, all of the eighty-one schools of medicine in the United States were fully accredited, and four more were schools limited to premedical basic sciences. In the course of fifty years, progress in medical education has moved westward, and medical teaching centers in the United States now are attracting many students from abroad.

The Hopkins School of Medicine and the Hospital continued to inspire, to experiment, to innovate. Osler, Kelly, and Howell wrote famous medical textbooks, founded new journals, formed new medical associations, and rejuvenated old ones. Osler and Welch inspired founding of the Rockefeller Institute for Medical Research, in 1901, of which Welch later became President of the Board of Scientific Directors, and of which his one-time pupil and faculty member, Simon Flexner, became Director in 1903. Dr. Welch took over direction of The Johns Hopkins School of Hygiene and Public Health when it opened, in 1916; and he became The Hopkins' first Professor of Medical History in 1929, at the age of 79. Dr. Halsted became a surgeon of international fame, and is credited with introduction of rubber gloves in surgical operating rooms. New faculty members were added, and new chairs and institutes were created: J. W. Williams, in obstetrics, 1899; Walter Jones, in physiological chemistry, 1908; Adolph Meyer, in psychiatry, 1908; John Howland, in pediatrics, 1912; Hugh H. Young, in urology, 1915; and William H. Wilmer, in ophthalmology, 1927. In 1904, Harvey Cushing created the Hunterian Laboratory of Experimental Surgery. Clinical social services were introduced in 1907. Another "first" for Hopkins was the Department of Art as Applied to Medicine, inaugurated by Max Broedel.

Perhaps the truest measure of the influence of The Johns Hopkins University School of Medicine and of the strong faculty men who created it is to be found in the fact that its methods of medical and clinical teaching are no longer regarded as unique, but have become standard for medical schools throughout the United States. To Welch, Osler, Halsted, Kelly, Mall, Abel, Howell, and Williams, and others who were associated with them, and to those who have followed them, must go credit for having envisioned new goals for medical education: they trained men who achieved world-wide recognition for research, for teaching, and for practice of medicine in the United States; and they created an atmosphere of competence and of cooperation in which such training could take place.

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