Original Articles.

MEDICAL EDUCATION AND THE HARVARD MEDICAL SCHOOL.*

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FOR centuries there has been teaching in the study of medicine in one of two ways: following methods which may be defined as direct teaching, and the academic method.

By the first of these the master of his art trains his pupil as in the apprentice system. This method is necessarily employed in a new country, sparsely settled and remote from established educational centers. The practice of medicine was taught in this way in the American colonies, and produced in this country many physicians of high character, whom we justly regard as the Fathers of American Medicine. A few of them enjoyed educational advantages in courses taken in Edinburgh, but they were in reality home products, nursing perhaps in their minds ideals of what the Science of Medicine should be, but acquiring knowledge in the rude school of experience, guided at first in the office of the busy practitioners of their neighborhood.

The passer today on the busiest of Boston streets, where formerly stood the famous Old Corner Book Store, can exercise his imagination in picturing to his mind the young medical assistants of the great Dr. Warren of the early days, compounding medicines, bandaging wounds, setting bones and following the good doctor with whom they "read medicine" in his daily busy rounds.

The custom of medical students entering the office of leading practitioners prevailed in some parts of this country well into the latter part of the past century. Physicians today are in active practice whose first step in the study of medicine was to register with a prominent physician, their "preceptor," paying in some instances a fee for the privilege.

The advantage of the method of direct teaching lies in the fact that it is direct, and that it attempts to meet existing medical needs. Fanciful theories and fine spun speculations had little chance of development among doctors whose work consisted in relieving the suffering of a hard working people. Human nature was observed at close range by men who were trained to the accurate observation of symptoms in their relation to the development of disorders and the natural course of diseases.

The value of the method of direct teaching is seen today in many places. At Rochester, Minnesota, Dr. Mayo and his brother are showing to the world an admirable example of direct teaching. Those trained by them can begin their work as masters of their art. Young physicians

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who were fortunate enough to have assisted the late Dr. Maurice Richardson in the many years of his surgical activity throughout New England, were trained in the best of schools of direct teaching in surgery; this added to their medical school studies and hospital work made them proficient in their calling.

The apprentice system still survives in a most valuable form in hospital training of assistants, and this should be utilized as a definite part of the educational plan of every properly organized medical school.

In England, early the land of individual effort, medical education began with direct teaching. The universities, until comparatively recently, treated the art of medicine as affording few subjects worthy of the study of a cultivated mind. The Royal College of Surgeons was an off-shoot of the Guild of Barber Surgeons. Although the university later claimed the right to grant medical degrees, the English medical schools were to a greater or lesser degree proprietary schools, outgrowths of the hospital.

The apprentice system in medicine, however, fails from the very complexity of its undertakings. No one would think of attempting to teach all of medicine today; no man can even know one branch of medical science exhaustively. The great practitioners, as their fields of usefulness enlarged, gave up undertaking to teach medical truths to individual students; group teaching followed, often conducted by the less busy men, would-be masters for personal advertisement or gain, and the proprietary school developed with its commercialism and superficiality. A condition of affairs grew up manifestly injurious, and the medical world finally turned to the universities in the hope that they might establish higher ideals, more thorough and broader methods. The multiplication of cheap medical schools became a national disgrace and the horde of untrained medical doctors a calamity.

In the dawn of civilization the development of the science and art of healing can be traced as coming from the Chaldean, Egyptian and Greek temples and shrines, to which sufferers were brought in the hope of divine aid. The priests, and attendants who accepted the offerings performed the rites, watched the sick and the dying, and those who were most observant and humane among them studied the effect of such measures of relief as were attempted. The code of Hammurabi, the Egyptian papyri, the Book of Leviticus show in many instances the accuracy of observation and the soundness of reasoning of these primitive teachers. But the legacy from the Greek temples and the philosophy of Aristotle, who is supposed to have had some knowledge of medicine, with the writings of Galen and Hippocrates, are of a much more lasting value. For centuries all medical teaching had for its foundation principles, not direct observation, but instead a knowledge of the recorded theories and opinions of the ancients and

the later teachers in the few great schools of medicine. Without the sanction of such authorities no changes in medicine and practice could be permitted. Even when Harvey ventured to publish his great discovery, the result of careful observation, he prefaced his statement with a disclaimer of any attempt on his part to subvert the doctrines of the early great teachers of medicine.

It is perhaps difficult for us today to realize the benefit which in the middle ages must have come to the world from the great schools of medicine in Greece, Alexandria, Italy, and France. Our knowledge and experience today enable us to comprehend that, like the dogmatism and bigotry of theology, crushing out the development of true religious thought, the medical dogmatic delayed progress in medical studies for centuries. But we forget that it was in these schools that true zeal in the study of medicine was promoted, and the foundation of a science laid which has become so important in human affairs today. Even a superficial acquaintance with the medicine of China, Thibet and Japan of forty years ago, countries uninfluenced by the teaching of the great European schools of medicine, is sufficient to suggest to us the enormous debt we owe to the academic tradition in the study of medicine.

But the academic tradition may degenerate into bigotry and pedantry; the zeal of the scholar may crush; the lamp of learning may smoke and need trimming. History teaches that the surgeons of the black robe looked down upon Ambrose Paré. Molière has shown us in his *Dr. Diaphoribus* a type which we know must have been true to life. Pedagogic authority ruled, and in Germany even as late as the middle of the past century, all instruction in medicine was given in Latin. It is not strange that the profession of medicine was often ridiculed and mistrusted, for its dogmatic theorizing, unchecked by precision in thought and observation.

As a reaction against this pedantry the medical schools of Continental Europe finally sought academic freedom, and demanded systematic direct teaching in clinic and laboratory.

As every well-organized medical school today attempts to combine the advantages of the direct method of teaching with those coming from the high academic standards of a university in its curriculum, degrees and honors, those interested in the welfare of the Harvard Medical School can justly ask that a statement be made to them describing the present condition of the Harvard Medical School, especially in its relation to the important question of medical education. The members of the Aesculapian Club, which has always been active in its aid to the Harvard Medical School, unquestionably deserve to be kept in close touch with its affairs.

Laboratory research in a medical school is useful, not only in advancing medical science, but also as a stimulus preventing the teaching force from becoming mechanical. Laboratories

should be manned by well-trained, zealous observers, producing work of value, the test of the value of such laboratories being found in their output. Judged by every standard, the laboratories of the Harvard Medical School will be found to be in a most satisfactory condition. The amount of the work is large, and though much of it is of a character to be appreciated only by experts, some of the more recent publications have aroused much general interest. The fact that the "stable fly" is the host in poliomyelitis, demonstrated by Dr. Rosenau, is one of great value, as is also the pathological relation of the germ of pertussis to the cilia of the trachea and bronchi, recently shown by Dr. Mallory. The former points out a new path for an attempt to suppress poliomyelitis, and the latter to the direction of therapeutic measures for the cure of an obstinate and distressing malady. Both are likely to prove of the greatest value in preventive medicine and in the treatment of disease.

Of great importance also is the recent work of Dr. Folin, whose new methods for clinical quantitative determination of nitrogen waste products in small amounts of blood give to the clinician much needed precision in the study and treatment of nutritional disorders. The dietitian has now, to guide him, a test as precise as the thermometer in the observation of fever, and even of more importance in regulating treatment. The recent research work of Dr. Wolbach in the sleeping sickness of Central Africa deserves mention, not only for itself, but also as an illustration of the activities of the School.

From this brief statement of a few only of the more recent publications of its laboratories, it is evident that the Harvard Medical School can be justly proud of its laboratory research workers, who, it may be added, are also excellent and active teachers, both for undergraduate and for research workers.

Criticism of the School has been frequently heard, made chiefly by the older graduates, to the effect that too much time is given to laboratory teaching. Such an opinion, however, will not bear the test of close examination of the curriculum, in view of the great and growing demand in the modern practice of medicine for thorough familiarity with methods in bacteriology, pathology, and chemistry, a familiarity only to be acquired by direct instruction and practical work in well-directed laboratories.

But it is not only in laboratories that teaching and research should be conducted. Medicine is to be taught in hospital clinics, where research is possible through the records of carefully trained observers. The earlier physicians in this country necessarily studied their patients in their daily rounds of country practice, but today the large hospitals form the great schools in medicine. An understanding of this fact leads to a better comprehension of the true function of a great public hospital. Originally a hospital was a place of shelter for the needy;

later it became an institution where the homeless sick were cared for. Today the function of a hospital is a much more important one. It should serve also as a means of protecting a community from disease, educating the inhabitants in the rational care of disease.

In this purpose there should be a close alliance between the hospital and a well equipped medical school. Few hospitals keep in their employ an expert epidemiological investigator and experimenter, but the advice of such an expert would be at once imperative if an unusual disease appears. The medical school also needs the hospital. The expert who can check or prevent the ravages of a disease in a guinea-pig should also have the opportunity to organize the successful application of the best methods in the cure of man.

The need of mutual coöperation between the doctor and the scientist is recognized generally; in some places the medical school has its hospital, and in others the hospital its medical school. In Europe the government owns and directs both, but in our community, as the direction and administration of a medical school differs from that of a hospital, requiring different talents, an economy of effort is secured through the plan of an agreement between school and hospital, based upon an understanding and recognition of their respective mutual interests.

Under such a plan the medical school does not "take over" the hospital, nor does it interfere with any hospital rules or arrangements. The head of a hospital department should be engaged so that he can give the greater part of his time and energy to clinical study not only of his cases but of disease; he should also be aided by adequately paid assistants, who in the early years of practice desire to obtain the advantages of hospital work. Such hospital chiefs perform better hospital service if they are trained teachers and under the direction of a medical faculty which stimulates and demands active investigation of disease and careful study of cases under the criticism of well trained student followers and of colleagues, fellow teachers in a university zealous for high standards.

The connection of the Medical School with Harvard University is of advantage to the former in strengthening its organization as well as in adding to it a valuable academic spirit. It has also aided the School in making satisfactory arrangements with hospital authorities.

Hospitals owned and administered by medical schools tax the resources and administrative abilities of the school. Local hospitals have, as a rule, only a local reputation and command for their staff local talent. A satisfactory combination is made when the medical school is relieved of the responsibility of administering to the needs of each patient, while the hospital can secure a wide field in the selection of its medical and surgical staff if it offers the added distinction of a prominent position in the medical fac-

ulty of Harvard University. From alliances and agreements of this character, the School is now able to offer to its students excellent opportunities for study (clinical as well as laboratory), and for a curriculum meeting all possible requirements for undergraduate and post-graduate work.

Suggestions as to change in the present requirements for admission to the Harvard Medical School have been freely made by two different groups of critics of the School. One of these groups, loyally interested in maintaining broad and high standards in the academic department of Harvard University, believes that it is the duty of our larger universities to preserve at all cost the study of humanities and that culture which is above the utilitarianism, already it is thought too dominant in our land. These thinkers fear that the special schools of the University, training for bread-winning occupations, will fall away from the high standards of philosophic thought which should animate all students of a great university.

It is not difficult to understand these arguments. The Harvard Law School, one of the best in the English speaking world, does not regard merely the educational needs of a young aspirant for a cheap legal practice; it seeks to train in the spirit of the jurist. The Theological School, in the same way, does not attempt to teach those desiring to learn only arguments supporting a dogma, but those searching for truth as far as the human mind can reach in theological thought. It is unmindful of the numbers of its pupils and seeks to provide for the elect in thought. The Schools of Science and Business both wish to devote their resources to the training of those who will be fitted for the larger undertakings in engineering. Why should not the Medical School devote its energies and resources chiefly to the training of the future great leaders in medical sciences?

Prompted by this proper desire for high standards and recognizing the need in America of improvement in medical education, the Harvard medical faculty decided to establish the Bachelor's Degree as a preliminary requirement in the study of medicine.

Objections to this have come both from those who regard the standard as not furnishing sufficient preliminary training and also from those who consider this standard of entrance unnecessary and absurd.

To the first group of these critics it would seem advisable that the A.B. degree, often obtained only through energetic coaching, should be reinforced by a year of training in chemistry, physics and biology. Otherwise, many of the holders of simple A.B. degrees will, from their imperfect training, be incapable of receiving the benefit from instruction, and remain a drag upon the classes of beginning medical students already well trained in these branches. Admitting the justice of this demand, the admission standards of the Harvard Medical School now

require in addition to the A.B. degree, evidence of a practical knowledge in organic chemistry. Are courses in physics and biology also needed as a preliminary training?

To another group of critics it appears that the present admission requirements of the Harvard Medical School keep out from the School a large number of excellent men who, mentally thoroughly qualified for the practice of medicine and capable of doing creditable work, are deprived of the advantages of instruction at the Harvard Medical School, and obliged to study elsewhere, where less strict preliminary educational standards are required.

The justice of the criticisms urged is readily admitted, but it is also evident that it is impossible to devise requirements for medical school education which will be entirely satisfactory when so divergent views are held. Since the establishment of an A.B. requirement by a few of the prominent medical schools of the country several years ago, the cause of the improvement of medical education in America has been energetically and ably espoused by the many interested in the subject in different parts of the country. The Carnegie Foundation, in its reports, also has attempted to show the proper requirements of a thorough medical education, and it is now possible to examine the problem with a better knowledge of the subject and of the situation confronting medical educators in this country.

Those who fear that the Medical School will ever place its standards lower than is befitting an important faculty of Harvard University are not familiar with the history of the School and its relation to the development of medical science in our community. In no part of the University is the record of scholarly zeal more manifest. The great collection of the Warren Museum embodies a century of enthusiastic devotion, and the great hall may well seem a shrine of a temple of the healing art watched over by the memories of remarkable men who devoted their lives to the relief of the sufferings of their fellowmen. It is difficult to escape the influence of such a tradition. There may be a danger from an excess of conservatism, but no fear that the legacy of high ideals will be forgotten.

It should not be overlooked that medical education must be thorough. The law student in the early days of his practice can consult authorities before acting, but the young medical practitioner needs at times to meet emergencies which demand immediate action, with the responsibility of life and death, and for this the medical educators of today recognize that the medical student needs, for the best training, a year of hospital service with its guided experience.

The Harvard Medical School will soon be in a position to offer valuable hospital work to every graduate and to urge his compliance with a requirement of such service. If such an arrangement is made, the School will be able to

offer a complete and excellent system of medical education, but with the disadvantage of adding another year to the period already too long before bread-winning in the profession is possible to the medical student.

That an A.B. graduate of our University at the age of 21 to 22 is to be required to devote from five to six years to medical studies before he begins his life work is a tax which may tend to turn a man of energy to other fields of activity. Would not the law, theologic and scientific schools be depleted if such a prohibitive requirement were presented to every prospective student in the respective fields of activity? Is it just that the study of medicine, necessarily most exacting, should be unduly handicapped? But how the time tax in medical education is to be reduced is a serious question, difficult of solution.

To any one who has enjoyed the privilege of four years' study in one of our universities, there is no doubt of the advantages derived from these years. While it is difficult to define what is acquired, certainly more is learned than the mere proficiency to pass the examinations for a bachelor's degree. The saying of the famous President Kirkland, that it was a benefit to a student to rub his shoulders for four years against the walls of University Hall, expresses a truth, even if with exaggeration. But although such educational advantages are exceedingly desirable, two added academic years demand an additional pecuniary tax, often met with great difficulty. If this is required of all medical students, the profession of medicine will be deprived of the talent of many young men of energy and ambition. If this requirement is maintained only by medical schools presenting the best educational opportunities, many will, if desiring medical study, be forced to enter less well equipped schools. Without doubt, our best medical schools should admit any young man of ability, provided he is mentally sufficiently trained to be taught in the curriculum. The School must have admission requirements. The dullards should be strained out and the men of energetic promise passed. It is to be hoped that the recent changes in the examination system introduced in the Harvard Medical School will serve to help in the matter of preliminary education and admission requirements. This new system of medicine has already been fully described and further details are unnecessary here. In brief it may be said that the examinations are designed to abolish what has been termed the cellular system, by which all that is required of a student is that he shall pass the examination in each branch which satisfies the instructor in that branch. Under the new system he is not merely a proficient in note taking or in the study of notes taken by others of the *ipsisima verba* of instructors, men who are often master only by title. They may be teachers without being scientists, or scientists and not teachers, or even merely pedants. Un-

der the new system it is hoped a better test of the student's actual knowledge will be established and more elasticity be permitted in our entrance requirements than before the improved system of examinations was introduced. It will be extremely difficult for an improperly trained student or one with an inadequate amount of mental breadth to be passed by his instructors in every branch and then also in a searching general examination of the whole field of medical science and practice, conducted by a selected board of educators.

The problems confronting the medical educator today are many and difficult, but they are carefully studied. Medical schools of great excellence are established in many of our educational centers, and thoughtful and energetic educators are striving to direct public opinion that the demand for a high standard in medical education will in time be imperative. The purpose of those entrusted with the direction of the Harvard Medical School should be definite; to utilize its resources so that it becomes foremost among equals, and that the Harvard doctor's degree in Medicine, as in Arts, Philosophy, Theology, should be the hall mark of sterling worth. Associations like the Aesculapian Club, and meetings like the one this evening warrant the belief that our Medical School enjoys the loyal support of all its graduates and of the well wishes of Harvard University.

THE PROBLEM OF GRADUATE MEDICAL INSTRUCTION.*

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THE essential basis for the existence of graduate medical instruction is the wide extent of medical knowledge. No single mind can master this whole subject, in all its essential details, in a life-time. In the four years of the medical course, no student, however brilliant, however well prepared, however assiduous, can attain more than a broad foundation in the essentials of medical science. On this foundation further experience and study will enable him to erect a structure,—his own personal attainments in the realm of medicine. Every live man erects such a structure. It may cover a large or a small part of the foundation; it may be high or low, imposing or modest; it may be well or poorly constructed; it may be serviceable for the public or the reverse;—but it is never a complete structure and it can always be improved. The function of the graduate school is to help physicians to improve their medical knowledge and to enable them to attain better results than they can by their own unaided efforts.

The extent to which the graduate medical school may carry its advanced instruction is

limited only by its equipment and the ability of its teachers. Even the most experienced physicians and the most highly trained scientists may profit by such opportunities, for no one has mastered so much of medical knowledge that there are not many others capable of teaching him many useful things.

From this point of view it is clear that instruction in the methods of research and opportunities for original investigation are not only legitimate parts of graduate medical teaching, but that the graduate medical school which fails to develop this part of its work falls far short of our idea of what such an institution should be. Abundant resources and the highest type of teachers are needed for success in this direction, and the graduate school, even more than the undergraduate medical school, needs the resources and the standards of a strong university back of it. It should properly be a department of a university.

There is, then, no limit to the legitimate aspirations of a graduate medical school in the matter of advanced instruction. Where should the limit be established in the other direction? What should be the minimum requirements for admission? The answer will depend upon our conception of what the graduate school should attempt.

If, as it should be, the graduate medical school is a department of a university, the question at once arises whether it should not establish high admission requirements, commensurate with the requirements for admission to other graduate departments. From an academic point of view this would seem to be the logical position for a university to take. Having established a standard of under-graduate medical instruction in the course for the degree of M.D., the university would naturally adopt this standard, or its equivalent, as a requirement for admission to a school giving still more advanced training. The maintenance of university standards would seem, at first sight, to demand this solution of the problem; yet Harvard University, which is very solicitous about maintaining high standards, is not establishing any such requirements for admission to its Graduate School of Medicine.

This apparent departure from its ordinary standards demands an explanation, and the explanation is not to be found in any laxity of standards, for such laxity does not exist. The explanation lies first in the fact that a course in the graduate medical school does not at present lead to any degree, and secondly in the recognition of a public duty. If a higher medical degree than the M.D. were to be granted for work in the Graduate School of Medicine, Harvard or any university, should require a preliminary training that is equivalent to its requirements for the M.D. degree, but the problem of such higher or special degrees in medicine is as yet unsettled, and Harvard has wisely postponed the consideration of this important

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