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## GRADUATE MEDICAL EDUCATION IN THE UNITED STATES.

BY

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A RECENT visit to America, as representatives of the Royal Colleges of Physicians and Surgeons, in response to the invitation of the National Board of Medical Examiners to visit their examinations, afforded full opportunities of inspecting the chief medical schools. This experience has impressed upon our minds that graduate education is attracting much serious attention, that steps with this aim in view are being actively pushed forward, and, further, that the direction in which the most important developments are occurring is different from that in this country. In Great Britain graduate or post-graduate<sup>1</sup> teaching is mainly arranged for men in general practice who wish to keep up to date, and consists in revision or "refresher" courses of comparatively short duration, or in attendance on the clinical practice of their old schools. In the United States graduate education is divided into (1) short courses, much on the same lines as the post-graduate teaching as usually understood in this country, and (2) a form of advanced and intensive education lasting one to three years, and aiming, as its finished product, at rendering a man fully qualified to practise medicine or surgery in the highest or most specialized branches, or to undertake research or teaching. It is to this form of graduate education that some of the more progressive American schools are paying great attention, and it is for facilities of this kind that American graduates coming to this country may in the future be expected to make inquiry. As this does not appear to be generally recognized in this country it may be well briefly to describe this form of graduate education in America.

<sup>1</sup>It might perhaps be convenient to follow the University of Minnesota in confining the adjective *post-graduate* to the revision or refresher courses taken some considerable time after graduation, and to use *graduate* for education received shortly after graduation and as a continuation of undergraduate study.

For this advanced and intensive graduate education, extending over one to three years, there is already very considerable demand, and it is rather surprising to learn from the recent Report of the Committee on Graduate Medical Education, appointed by the American Medical Association,<sup>2</sup> that during the year 1919-1920 there were probably four thousand applicants for this form of graduate teaching. The vast majority of these applicants were anxious to specialize in some branch of clinical practice, those aiming at a public health career, or at teaching posts, or at research work in the fundamental subjects of anatomy, physiology, biochemistry, bacteriology, or pharmacology, forming a very small minority. Thus out of 1,021 inquiries for graduate work at the Mayo Clinic, Rochester, since January 1st, 1919, four only were primarily for work in the fundamental branches, though 90 per cent. of the "fellows" taking clinical work as their "major" subject chose pathology as a "minor" subject.

To make the general ideal of this form of graduate education clearer the following extract may be quoted from the above mentioned Report of the Committee on Graduate Medical Education:

Most of these men need opportunity to work alone, not in classes though under general supervision, for six months to a year in one or more of the fundamental branches. They then need clinical material and laboratory and library facilities for two or more years of intensive work in diagnosis and treatment. They need personal responsibility for patients, inspiration to investigation, keen criticism, and opportunity for fearless discussion with real leaders in their specialty. They need little, if any, formal teaching, of which most of them have already had too much. It is believed that these needs might be met in large measure by medical schools and hospitals if their present resources were more definitely organized with that end in view.

As regards the steps that have been taken in America to meet this want: although the American Committee consider that "opportunities by which graduate students may properly prepare themselves by long periods of work for scientific and skilful practice of clinical specialties are woefully lacking," a very substantial beginning has been made, especially by the Mayo Foundation, to which reference may now be made.

#### *Prolonged Graduate Instruction.*

The Mayo Foundation for Medical Education and Research was established by Drs. W. J. and C. H. Mayo on a permanent basis in February, 1915, and in the following June the University of Minnesota and the Mayo Foundation entered into an agreement by which the funds and income of the Mayo Foundation are devoted, under the direction of the Regents of the University, to the promotion of graduate work and research in medicine. In 1917 the funds and income of the Mayo

<sup>2</sup> Vide *Journ. Amer. Med. Assoc.*, Chicago, 1920, lxxiv, 1248.

Foundation were transferred entirely to the Board of Regents of the Minnesota University; and the staff, clinics, laboratories, library, and records at Rochester, Minnesota, were also put at the disposal of the University. The graduate school, which is thus extremely well endowed and equipped, is put on the same basis as those of the other faculties, and the graduate student is under the same conditions as a candidate for the degree of Ph.D., say, in chemistry. At the University of Minnesota a student takes seven years to obtain the M.D. degree, and then, if he is accepted as a graduate student, he may after three years' work gain the special degrees of Master of Science (M.S.) or Doctor of Philosophy (Ph.D.) in Medicine, Surgery, Ophthalmology, Obstetrics, Pathology, and so forth. Entrance to the graduate school is not confined to graduates of the Minnesota University, for graduates from other universities are selected on the grounds of their work. For admission the graduates must have the bachelor's degree in arts or science or its equivalent, the doctorate of medicine from an acceptable institution (namely, those in Class A of the American Medical Association's classification) and a year's experience as an intern in an approved hospital or laboratory. This endowment provides fellowships and scholarships for a number of graduates; there are about 17 teaching fellowships of the value of 600, 750, and 1,000 dollars for the first, second, and third years respectively, the fellows doing a small amount of teaching and devoting the whole of the remainder of their time, except a yearly vacation of three weeks, to graduate work leading to a degree. There are also 86 non-teaching Mayo fellowships, of which 60 are in clinical and experimental surgery and 12 in clinical and experimental medicine. As a rule there is only one graduate student a year in each subject, but there is some elasticity in this respect. The competition is severe—thus out of more than 1,000 applicants since January, 1919, 42 fellows have been selected. There is a regular scale of fees. If a student does not promise well, he is got rid of, usually before the end of his second year. Each student on admission selects a "minor" subject which is logically related to his "major" subject—for example, as pathology is to surgery—and is mainly carried on in a laboratory during the first year; in his second year he finishes his "minor" subject and passes an examination in it and in French and German, and devotes himself to his "major" subject; in the third year he does more responsible work; thus a surgeon works in the operating theatre and performs operations of all sorts, and is in charge of the junior assistants; he also writes his thesis for the graduate degree (Ph.D. or M.S.). The Ph.D. degree, which is the most highly prized degree in American universities, as it is not conferred as an honour or compliment, is given for theses of exceptional merit only, and so far only about 5 per cent. of the "fellows" have gained this blue ribbon. The work is done partly at Rochester and partly at Minneapolis, where the buildings of the University of

Minnesota are situated, the students moving to and fro for different phases of their work.

In comparing these facilities with those available in this country it is obvious that no such completely organized scheme exists here. The laboratory work in the "minor" subject—for example, pathology or anatomy—could no doubt be arranged for, on the lines of the "advanced student's" work in other branches of science at the universities and elsewhere; but the third year's work, corresponding to that of chief assistant in a clinic, though open to men at their own hospital, would seldom be obtainable by graduate students from outside, and could hardly be open to American graduates unless they had taken some British qualification.

The organization of the Mayo Foundation and Minnesota University Graduate School is so complete that it has been described at some length, but the idea is being taken up by other universities. Thus the University of Pennsylvania is organizing a clinical graduate school on a considerable scale with opportunities of gaining a graduate degree or certificate. At Philadelphia the Medico-Chirurgical Hospital and the Polyclinic have become a part of the University of Pennsylvania, and form the clinical centre of a graduate medical school. This school, with separate administration offices in the University buildings and a separate dean, has associated with it or affiliated to it a considerable number of the special hospitals in Philadelphia. The central hospital has a service of 300 beds. The object of the University of Pennsylvania in establishing this graduate school in medicine is so to train the acceptable graduate in medicine that he shall be properly qualified to begin special medical practice or teaching, and be stimulated to "productive" medical research, and in addition to perform the public service of affording reputable physicians opportunities to keep in touch with medical advances by coming in contact with the newer things in medicine as exemplified by the practice of masters of the various fields of medical work. It is proposed to give courses of one and in certain subjects of two years' duration which, if satisfactorily followed, may lead to a degree or special certificate. There are also four-months' courses, which appear to be on the same lines as the revision classes for practitioners and may lead to a special certificate. It is intended to develop this graduate school so as ultimately to provide courses and instruction and special work in practically all the branches of medicine and its allied subjects. The special degrees to be given are Master in Medical Science and Doctor in Medical Science. The master's degree is to be confined exclusively to those candidates who have become qualified to begin the practice of a medical, surgical, or laboratory specialty, and the doctor's degree to those candidates who have done "productive research" or work of considerable merit. The Master in Medical Science does not, as in the Mayo-Minnesota graduate school, demand three years' work. The University of

Harvard gives a certificate in Public Health in Industrial Hygiene after one year's work, the degree of Doctor in Public Health (Dr.P.H.) in Industrial Hygiene after two years' work, and the degree of Doctor of Philosophy in Industrial Hygiene after three years' work, but it does not offer a degree for graduate work in clinical medicine alone as in the Mayo-Minnesota scheme. This school in industrial medicine is a new development, for it is both a training school for medical men who intend to take up work in connexion with factories and a research institution, but it is not part of the graduate medical school of Harvard University, which is fully developed on lines more familiar in this country. Several other universities give the degrees of Master of Science or Doctor of Philosophy for research work in laboratories in the fundamental subjects (anatomy, physiology, biochemistry, bacteriology, and pathology), but not for clinical work.

#### SHORT COURSES.

A few words may be added about the short courses of instruction to medical graduates in America, which are more on the lines of post-graduate education as understood here. These courses usually occupy from two weeks to four months; and it has been estimated that in the year 1919-20 there were probably 6,000 applicants for these courses. The applicants are—

(a) General practitioners, anxious to keep their knowledge up to date, who being established in practice cannot devote more than a short time to this object; the time thus afforded is indeed often inadequate, especially in the case of men whose training in the fundamental subjects (anatomy, physiology, bacteriology, and pathology) has always been deficient or has become so from lapse of time. Accordingly there is not time to obtain a proper knowledge of the fundamental data, and without this basis the full benefit to be derived from these short courses may be problematic. (b) A large proportion of the men applying for short courses are "partially prepared clinical specialists," and do so with the object of extending or perfecting their operative technique in general surgery or in some special line of practice.

Most of the applicants for short courses may therefore be regarded as really anxious to obtain a short cut to knowledge. While fully recognizing the difficulty of running these short graduate courses in connexion with undergraduate teaching, the American committee, though expressing their views with great caution, appear to be doubtful if the existing graduate and polyclinic schools, by the provision of lectures, clinical and laboratory demonstrations and training in technique, supply what is wanted; and they urge the university medical schools to give to the better prepared men applying for short courses opportunities for combining diagnosis with treatment. This has perhaps been most fully developed by the University of Harvard, where

the medical school offers to graduates the opportunity of taking out courses of varying duration in most of the branches of medicine and surgery. These are termed "practitioners' courses," and mainly consist of classes, restricted to a small number of graduate students, commonly from four to ten. The organization of the graduate division of the medical school of Harvard University is under the direction of Dr. A. S. Begg, the assistant dean, in charge of graduate courses.