THE FUTURE OF THE M.D. AND Ch.M.

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Many universities have recently revised their regulations for the degrees of Doctor of Medicine and Master of Surgery. Some of the changes are routine amendments involving no change in policy, others reflect a new conception of the function of these degrees. At present both the M.D. and Ch.M. are obtainable wholly or partly by examination in some universities, but the opinion that they should be exclusively "thesis" degrees is gaining ground. There is also a growing conviction that candidates should be practitioners of considerable experience, and several universities now require them to be M.B.s of at least five years' standing. The influence of these views is evident in the new regulations of nearly half the faculties, and further changes in both old and new regulations seem likely in the near future; for these reasons it may be useful to summarize the requirements for the M.D. and Ch.M. and the more important recent changes in the regulations.

Requirements for the M.D. and Ch.M.

Table I shows that both degrees are obtainable by examination, by examination with thesis, or by thesis, but procedure by thesis is allowed for the M.D. much

TABLE I.—Methods of Obtaining the M.D. and Ch.M.

University	M.D.			Ch.M.		
	Examination	Examination with Thesis	Thesis	Examination	Examination with Thesis	Thesis
Aberdeen		+			+	
Belfast	+		+			+
Birmingham			+	+		+
Bristol	+		+		+	
Cambridge			+	+		
Dublin			+	+		
Durham		+		+		
Edinburgh			+		+	
Glasgow		+			+	
Ireland	+	+	+	+		
Leeds		+				+
Liverpool	+		+		+	
London		+			+	
Manchester			+	+		
Oxford			+		+	
St. Andrews		+			+	
Sheffield	+	+		+		
Wales		+				+
Total	5	9	10	7	8	4

* From July, 1953. † From October 1, 1951.

oftener than for the Ch.M. Of the ten universities granting the M.D. by thesis, six allow no alternative method of procedure, and of the four granting the Ch.M. by thesis, three allow no alternative. Table II shows

TABLE II.—Years That Must Elapse Between M.B. and Higher Degrees

University	M.D.	Ch.M.	University	M.D.	Ch.M.
Aberdeen	1	1	Ireland	2	2
Belfast	2	2	Leeds	3	5
Birmingham	2	5	Liverpool	2	2
Bristol	2	2	London	5†	5†
Cambridge	—*	2	Manchester	2	5
Dublin	—*	3	Oxford	—*	5†
Durham	2	2	St. Andrews	1	1
Edinburgh	2	5	Sheffield	2	3
Glasgow	1	1	Wales	2	3

* The standing required is not reckoned from the M.B. † From July, 1953.
‡ From October 1, 1951.

that both M.D. and Ch.M. candidates have to be M.B.s of one to five years' standing, the usual periods being two years for the M.D. and two and five years for the Ch.M.

The position shown in Tables I and II is the result of extensive recent changes, and these are summarized below.

New Regulations for the M.D.

Birmingham.—The regulations were revised in 1950 and the new regulations are now in force. The minimum time interval between M.B. and M.D. is increased from two years to five, and the standard of the work expected has been raised. Formerly the candidate had to "present a thesis based either on original research or on the application of scientific method to medicine"; the new requirement is "published work and/or a thesis . . . which must be a substantial contribution to medical knowledge and must contain original work worthy of publication." Under the old regulations the candidate had to pass an examination "appropriate to the subject matter of the thesis" unless exempted for having presented a thesis "of sufficient merit"; under the new regulations this routine examination is abolished, although "a candidate may be required to submit himself for an oral examination."

Edinburgh.—The new regulations are now in force. The minimum time interval between M.B. and M.D. is increased from one year to two years. The old requirement was examination with thesis; the examination was in clinical medicine, with or without a special subject, and exemption from the examination (or part of it) was granted only "in special circumstances" and if the thesis was "of exceptional merit." The new regulations require a thesis only, although the candidate may be examined in the branch of medicine "in which the subject of the thesis falls."

London.—New regulations taking effect in July, 1953, divide the "examination" into two parts. Part I, open to M.B.s of two years' standing, consists of papers on medicine and pathology, an essay, a clinical examination, and an oral examination. Part II, open to M.B.s of five years' standing, consists of a thesis "dealing with general medicine or with some special branch of medicine and an oral examination on general medicine and on the special subject dealt with in the thesis." Candidates who have held appointments for two years at recognized institutions—hospitals or medical schools, in London or elsewhere—may be exempted from Part I, and the oral examination in Part II is at the discretion of the examiners.

New Regulations for the Ch.M.

Birmingham.—Requirements for the M.D. and Ch.M. are stated in a single set of regulations; this is true of both the old and the new regulations; the changes described above for the M.D. therefore apply equally to the Ch.M.

Cambridge.—New regulations now in force require candidates to answer a question on "a more specialized branch of surgery" (in addition to questions on general surgery), but no special branches are named. According to new regulation 76 "candidates shall be invited to submit to the examiners a record of postgraduate appointments . . . and a list of titles of published work. . . ."

Edinburgh.—The minimum time interval between M.B. and Ch.M. is increased from one year to five years.

Leeds.—By new regulations now in force the time interval between M.B. and Ch.M. is increased from two years to five. The degree was formerly obtainable only by examination; it can now be obtained only by thesis. A candidate must engage in advanced study and research for two years (one of which may be part-time) and "will be allowed to undertake only a limited amount of outside work." The thesis must contain "work worthy of publication"; an oral examination is required "on matters relevant to" the thesis, and a written examination may also be required.

London.—New regulations taking effect in July, 1953, are virtually identical in form with the new regulations for the M.D. described above. The M.S. "examination" is divided into two parts. Part I, open to M.B.s of two years' standing, consists of papers on surgery with surgical pathology, and on surgical anatomy with applied physiology, an essay, a clinical examination, an examination in "methods of surgical approach and the conduct of operations," and an oral examination. Part II, open to M.B.s of five years' standing, consists of a thesis "dealing with general surgery or with some special branch of surgery and an oral examination on general surgery and on the special subject dealt with in the thesis." Every candidate is also required to submit a record of his surgical experience. Exemptions from Part I and from the oral examination in Part II may be granted for the same reason as the corresponding M.D. exemptions.

Manchester.—The minimum time interval between M.B. and Ch.M. is increased from one year to five years.

Oxford.—Under the old regulations the M.Ch. is obtainable only by examination; new regulations taking effect on October 1, 1951, require both examination and a thesis. Part I (the examination) may be taken in the seventh term from the B.M., Part II (thesis and oral examination) in the 16th term from the B.M. According to the Oxford rules there are three terms to a year; candidates will thus be eligible for the M.Ch. in their sixth year after taking the B.M. The object of the oral examination in Part II is "to test the candidate's general competence in his own field," and one of the duties of the examiners is "to examine the candidate orally in the branch of surgery in which he has specialized. . . ."

Wales.—New regulations now in force require candidates to be M.B.s of three (previously two) years' standing, and the former requirement of examination is dropped, a thesis alone being required. There is "an oral or other examination on the subject-matter" of the thesis; exemption from this examination may be granted "in exceptional circumstances."

Discussion of the New Regulations

As compared with the old regulations, the new attach more importance to research and less to the passing of examinations as qualifications for the M.D. and Ch.M. They also require candidates to be practitioners of considerably greater experience and in at least one case fix a higher standard for the research. Another interesting feature of the new regulations is their tendency to prescribe the same formal requirements for both the M.D. and Ch.M., thus removing any difference in status or function between these two degrees.

The extent to which these policies have found expression in the new regulations varies widely. So far as the recognition of research is concerned, the extremes are illustrated by the Cambridge M.Chir. and the Leeds Ch.M., both of which were formerly examination degrees. While Cambridge is now willing to take published work into account, the M.Chir. remains essentially a degree by examination; Leeds, on the other hand, has converted its Ch.M. into a research degree awarded on conditions that make it equivalent to a Ph.D. in surgery. Four of the universities that have revised their regulations have made research the sole avenue to the M.D. or Ch.M.: Birmingham (M.D. and Ch.M.), Edinburgh (M.D.), Leeds (Ch.M.), and Wales (M.Ch.). London and Oxford have been more conservative. Under the old regulations the essential requirement for the London M.D. and M.S. is examination, a thesis being optional; under the new regulations the essential requirement will be a thesis, although examination will still be required as a rule. Oxford has not gone quite so far; although a thesis will be required for the M.Ch., there is no provision for exempting any candidate from the examination.

The only example of the direct conversion of an examination degree into a thesis degree is the Leeds Ch.M.; in all other cases the change has been less radical and is of two types: (1) addition of a thesis to the requirements for an examination degree (exemplified by the London M.D. and M.S. and the Oxford M.Ch.); and (2) abolition of the examination from the requirements for a degree by examination with thesis (exemplified by the Birmingham M.D. and Ch.M., the Edinburgh M.D., and the Welsh M.Ch.).

There is some variation in the increased periods that must elapse between the M.B. and the M.D. or Ch.M., but the outstanding fact is that in eight of the ten instances in which a change has been made the new period is five years.

The universities that have revised their regulations differ widely on the question of the equivalence of the M.D. and Ch.M. Even before the revision, Birmingham regarded the M.D. and Ch.M. as having the same status and function, the only difference between them being one of subject-matter. London, though retaining separate regulations for the M.D. and M.S., also regards these two degrees as of the same status; this is even clearer from the new regulations than from the old, and the recent changes in the requirements—including the much greater emphasis on the thesis—are the same for both degrees. In contrast, other universities retain different policies for the M.D. and Ch.M.; at Cambridge, Edinburgh, and Oxford, for example, the M.D. is a thesis degree, but the Ch.M. is still partly or wholly an examination degree. Leeds and Wales provide the only examples of the opposite policy; the Ch.M. is a thesis degree, but examination as well as a thesis is required for the M.D. Such differences suggest that the two degrees are administered by independent committees; the modern tendency, seen in Birmingham and London, is to legislate for both degrees simultaneously and to reduce any difference between them to that of subject-matter.

The general conclusions to be drawn from the recent changes are that a new policy—the same for both degrees—is emerging, at different speeds in different universities, and that further changes in both old and new regulations are probable in the near future; the

new regulations suggest that in due course both the M.D. and Ch.M. will be exclusively thesis degrees open only to M.B.s of at least five years' standing.

M.D. and Ch.M. Examinations

The M.D. and Ch.M. by examination are declining in importance; this is clear from the recent changes in the regulations. As a result of these changes, only five universities will grant the M.D. by examination, and four of them give the candidate the option of proceeding by thesis; only seven universities will grant the Ch.M. by examination, and one of them allows procedure by thesis as an alternative (Table I).

The main reason why procedure by examination is being abolished is probably a growing belief that higher degrees should be awarded only to those who have made some contribution to knowledge. Another reason is that the M.D. and Ch.M. by examination are superfluous in view of the existence of the M.R.C.P., F.R.C.S., and similar higher diplomas. To be acceptable alternatives to these diplomas, the degrees would have to be standardized—by the universities or an external authority—in the same way as the M.B. and Ch.B., but the result would be a needless duplication. It would not be desirable to convert the degrees into more advanced qualifications than the higher diplomas; the M.R.C.P. and F.R.C.S. should mark the end of examinations and leave the practitioner free to develop his interests in his own way; his professional attainments a few years later could, if necessary, be assessed better by inquiry and interview than by formal examination—in other words, the procedure of a selection committee could be followed.

Procedure by "examination with thesis" is open to criticism on several grounds. A purely practical objection is the variety of forms that the procedure may take. Sometimes the examination and thesis are independent tests, excellence in one not being allowed to compensate for deficiency in the other. Sometimes the tests are linked: success in the examination may be allowed to compensate for an unsatisfactory thesis; or the candidate may have to pass the examination before being allowed to submit a thesis, or may have to submit a satisfactory thesis before being allowed to take the examination. A degree by "examination with thesis" thus has no generally accepted meaning—a disadvantage to the holder and a nuisance to anyone who may have reason to be interested in the graduate's qualifications.

When the thesis and the examination are independent the requirement is excessive—a good thesis is all that can reasonably be expected for a medical higher degree. If the thesis is satisfactory, subsequent examination is unnecessary; if the thesis is not satisfactory, the candidate should be rejected—and not allowed to compensate for it by passing an examination. "Examination before thesis" is irrelevant; the ability to pass examinations has no bearing on research capacity, and all the necessary evidence on the candidate's knowledge can be found in the thesis itself. There is no need to make candidates take an examination simply because they have not worked in approved places. Examinations of this type are presumably intended to protect referees from manifestly incompetent theses, but the necessary protection can be given by a committee that scrutinizes all theses as soon as they are submitted to the university.

Perhaps the strongest argument against examinations is the fact that two-thirds of the medical faculties now accept a thesis as sufficient in itself for a higher degree, and procedure by "examination with thesis" may well prove to be no more than a transitional stage in the conversion of the M.D. and Ch.M. from examination degrees into degrees by thesis. An oral examination on the thesis is sometimes useful, but experience has shown that it is rarely needed.

The M.D. and Ch.M. as Thesis Degrees

The testing of competence achieved after entry into a profession can be safely left to professional institutions, which—as national bodies—are better fitted for this work than universities; the encouragement of research, on the other hand, is a special function of universities, which have resources and experience that no professional body can match. The most appropriate ground for awarding a higher degree is therefore a contribution to knowledge, and in any case every graduate should have the right to proceed to the higher degrees in his own faculty by research alone. The conversion of the M.D. and Ch.M. into thesis degrees will give M.B.s the opportunities enjoyed by B.Sc.s, who can proceed to any higher degree in science unimpeded by tests of professional competence.

The circumstances of doctors and scientists are entirely different, and degree requirements should be adapted to the candidate's occupation. An M.B. should be free—as he usually is now—to do his thesis work when and where he pleases; he should be allowed to decide for himself whether to do it full time or part time, and whether to arrange for supervision or not. It would be unwise for universities to require full-time work for the M.D. or Ch.M.; this would not only close the degrees to some of the ablest M.B.s (for economic reasons) but would also cut off candidates from practice—and practice is desirable both for maintaining professional skill and for obtaining ideas and material for research. Regulations suitable for Ph.D. candidates, requiring full-time or substantial part-time attendance at approved places, are ill suited to M.D. and Ch.M. candidates; part-time research, moreover, need not be inferior in quality to full-time; university teachers, who do much of the world's research, have to do it in the time left after the performance of many other duties.

The pass standard for the M.D. and Ch.M. should be one attainable by an intelligent and experienced M.B. engaged in practice who devotes all his spare time to the thesis for two years, and theses of special merit should receive (as they usually do now) marks of distinction.

An acceptable thesis will probably contain work worth publishing in a medical journal. Some universities require the thesis to be submitted in a form suitable for publication—a requirement that overlooks the fundamentally different objects of a thesis and a paper. A thesis must contain not only a record of work done by the candidate, but also a substantial review of the literature to put the work in its historical setting, and a detailed justification of the methods used—in other words, a thesis must be a demonstration of competence and an anticipation of criticisms. No journal could find room for such a work; much that is indispensable in a thesis is irrelevant in a paper, which should be a record of new facts or opinions with a minimum of historical data. Conversely, the very virtues of a paper

make it an unsatisfactory substitute for a thesis; a candidate seeking a degree on work that has already been published should present it in the more extended form of a specially written thesis (with reprints as an appendix); if there are many papers the thesis should be a detailed summary of them, showing the origin of the work, the relation of the various papers to each other, and the value of the work as a guide to future research. An examiner confronted with a mass of reprints is entitled to such co-operation on the part of the candidate, and a decision may be impracticable until an explanatory thesis has been supplied.

Period between M.B. and M.D. or Ch.M.

The period that must elapse between first and higher degrees is of practical importance, affecting both the general quality of the theses and the status of the higher degrees. Most of the medical faculties that have recently changed this period now require an interval of at least five years between graduation as M.B. and as M.D. or Ch.M.; it is therefore desirable to consider the probable effect of this new requirement.

At first sight five years seems a very long minimum interval between M.B. and M.D. or Ch.M. Certainly the M.D. has been obtained in much less time, and with theses of the best quality; it could therefore be argued that a five-year minimum is excessive and that it will impose needless delay on able candidates. On the other hand, the new period has several advantages over the customary one or two years. An able candidate, knowing that there is nothing to be gained by the speedy completion of a thesis, may spend more time perfecting it, or carry his research further before writing up the results. Five years will allow ability to be tempered by experience, and through starting his research later the candidate will be in a better position to choose his own subject and make his own plans. The work done is more likely to be worth publishing, even though the total time spent on it may be no greater than it would have been with a shorter minimum, for greater general experience will make possible quicker and more efficient work.

The general adoption of the five-year minimum would substantially improve the status of the M.D. and Ch.M. The average level of M.D. work has probably been roughly equal to that of work for the M.Sc.; with a five-year minimum M.D. theses should reach the Ph.D. standard more regularly than they do now, the M.D. thus becoming a doctorate in fact as well as in name. The Ch.M. calls for special discussion in view of the growing tendency to make the requirements equivalent to those for the M.D.

Traditionally the Ch.M. is an examination degree—a technical qualification of high standing, but one giving little or no encouragement to surgical research. The prestige and professional value of the F.R.C.S. make the traditional Ch.M. superfluous; on the other hand, contributors to surgery lack appropriate academic recognition. This could be granted either by accepting surgical theses for the M.D. (as in Manchester) or by replacing the Ch.M. by a doctorate in surgery. The acceptance of surgical theses for the M.D. could easily be a first step towards the abolition of degrees in surgery, which would then be regarded from the academic standpoint as simply one of the many branches of medicine; on the other hand, the modern achievements of surgery—and its great promise—call for the maintenance of

separate degrees. It seems probable that a thesis after five years' experience will become the standard requirement for the Ch.M., as well as for the M.D.; such a requirement is more severe than is usual for university masterhips, and a more appropriate award would be a doctorate.

The degree of Doctor of Surgery is already obtainable (in addition to the M.S.) in the University of Durham, but the regulations are of the Ph.D. type, requiring substantial periods of attendance at approved places. Objections to the Ph.D. plan from the standpoint of a medical man in practice have been stated above, and the suggestion made here is that the degree of Doctor of Surgery should replace the Ch.M. in all medical faculties, being granted on the same terms as the M.D., but for a thesis on a surgical subject or on a topic relevant to surgery.

Need of a Conference

It would be helpful if the universities could agree on a common policy for the M.D. and Ch.M. This is desirable first and foremost in the interests of candidates, who should not be under any disability through having graduated at a particular university. The existence of such disabilities at present is obvious: while most faculties grant the M.D. for a thesis, a minority require the passing of examinations in addition; most faculties likewise award distinctions for theses of special merit, the remainder recognizing only one grade of pass. A common policy would also be to the interest of the faculties, which increasingly desire a distinctive function for their higher degrees among the various higher medical qualifications, and one moreover in line with the usage of the non-medical faculties.

The new regulations reviewed above indicate the probable direction of future changes, and their harmony suggests that the faculties could reach agreement without difficulty. It would therefore be an advantage if representatives of all the medical faculties met in conference to consider the requirements for their higher degrees. Such a conference would place wide experience at the disposal of all the faculties and minimize the inquiries that each faculty has to make of others when revising its regulations. A precedent exists in the conference that resulted in the institution of the Ph.D. Agreement was reached on the requirements for this degree and—after over thirty years—they remain essentially unchanged, though the individual universities have rightly taken their own line in matters of detail. A conference on the higher medical degrees should be equally successful, both in reaching agreement on principles and in leaving unimpaired the independence of the individual faculties.

Summary

The requirements for the M.D. and Ch.M. are summarized and the more important changes in the regulations are described and discussed.

The main changes are: (1) the conversion of both the M.D. and Ch.M. into "thesis" degrees by the abolition of examinations; and (2) an increase in the period that must elapse between M.B. and M.D. or Ch.M. to five years.

The changes bring the requirements for the M.D. and Ch.M. into line with those for other higher degrees, differentiating the M.D. and Ch.M. from the M.R.C.P. and F.R.C.S. and substantially improving their status.

The new requirements for the Ch.M. are more severe than is usual for university masterships, and a more appropriate award would be the degree of Doctor of Surgery.

A common policy for the higher medical degrees is desirable in the interest both of candidates and of the medical faculties. A conference of representatives of all the medical faculties on requirements for their higher degrees would be helpful.

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PUBLIC HEALTH ENGINEERING

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"Who would not give a trifle to prevent
What he would give a thousand worlds to cure?"

YOUNG.

Instruction in public health engineering is now being given at the London School of Hygiene and Tropical Medicine and the Civil Engineering Department of the City and Guilds College, with the help of the Imperial College of Science. The training courses are intended for postgraduate engineers, and last for one academic year. An advisory committee supervises the courses, and instruction is given by members of the academic staff of the London School of Hygiene and Tropical Medicine and of the Imperial College.

The term "public health engineering" will convey little to many persons in this country at the present time. In America it is often used as a synonym for sanitary engineering, but in Britain this term is used in a much more restricted sense and is confined usually to the domestic aspects of water supply and sewage disposal. Therefore the title "public health engineering" has been adopted for the new courses as giving the best indication of the wide range of activities of engineers concerned with the protection of public health and the prevention of disease.

"Environmental sanitation" is another term which has been used to define the work of the doctor, the engineer, and others in this field. A committee of the World Health Organization gave the following definition: "The control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health, and survival." "Environmental" in this connexion must often be interpreted very widely—in terms of whole countries or regions and not merely of houses, villages, or cities.

The study and practice of preventive medicine and the promotion and maintenance of good health in any population are dependent upon the investigation and appreciation of *all* conditions bearing upon man in *all* his activities. Such terms as "social medicine," "environmental hygiene," and "human oecology" have become familiar. The realization is growing that the control of such environmental factors and the improvement of conditions adverse to good health in communities should be in the hands of teams of workers comprising doctors, engineers, architects, and others interested.

Aims of the Course

The teaching of public health engineering is best organized as a joint venture between university schools of public health and engineering schools. It is realized that the members of a health team should consist not only of doctors and engineers but also of other persons whose work affects the environmental conditions of communities. The course provides training in this team work, and the contributions of members of such a team to the attainment of the final objective will be all the more valuable if each member has a basic knowledge of the work of other members.

To give an example: the promotion of health, safety, and welfare among the workers in an industrial plant is not dependent upon any one individual person or department in that plant. The successful promotion depends upon effective co-operation between the medical officer, the works engineer, the personnel director, the welfare officer, and the safety officer. Another well-known example of the effectiveness of such team work has been seen in the work of the Tennessee Valley Authority. An excellent description of this project has been given by David Lilienthal in his book *T.V.A.*

The London course is intended to establish intimate contact between engineers and doctors, and to enable them to appreciate each other's outlook and to approach their common problems with a unified aim. During its planning and early stages many eminent engineers and medical men gave information and encouragement. It is hoped that in the future the course and others like it will play an important part in intensifying public consciousness of problems associated with the maintenance of health and in raising environmental standards not only in this country but also in other parts of the world.

Subjects Studied

The relevant studies fall naturally into three groups:

(a) The basic sciences of mathematics, physics, chemistry, mechanics, hydraulics, bacteriology, entomology, and parasitology. Since the course is of postgraduate standard, a sufficient knowledge of the physical sciences is assumed, and attention will be given to the special applications of these in the field of sanitation, and to the biological sciences, which will be new to most students. Adequate time must be devoted to the latter subjects, since considerable mental adjustment is required in approaching the study of living things, as contrasted with constructional materials, and this cannot be hurried.

(b) The different fields of application, such as water supply, sewage disposal, housing, industrial hygiene, and insect and rodent control.

(c) The general public health background, against which these studies may be seen in a true perspective. This involves instruction in the organization of public health services, and the epidemiological study of the spread and control of disease in general. This work, which will be undertaken at the London School of Hygiene and Tropical Medicine, will bring the engineers in contact with doctors studying for the Diploma in Public Health, and should foster a useful interchange of ideas and outlooks.

A national league has been formed in Sweden for the campaign against cancer. The new association will have low membership fees, and aims at covering a large proportion of the population. Its main objective will be to support scientific research into cancer, which annually causes the death of 12,000 people in Sweden.