Committee on Medical Education of the British Medical Association listed its own suggestions in the report already referred to (*British Medical Journal*, 1956), and this article may end with a glance at them.

The main theme is the continuation of medical education throughout life, undergraduate education being regarded as a preparation for this. Translation of this ideal into practice involves innumerable problems over the whole range of medical work. First, there are the problems common to all doctors, such as methods of study, keeping up to date, travel, writing, and facilities such as libraries and technical aids of all kinds. Second, there are the problems of training men for the very numerous medical careers. Obviously a judicious selection of topics for discussion will be necessary. The task of planning is in most capable hands, and there can be no doubt that the Second World Conference will be as stimulating and helpful as the first.

Summary

The First World Conference on Medical Education reaffirmed the professional ideal of medicine, and the papers as a whole deal with the translation of this ideal into practice.

The best preparation for medicine is a balanced education in both arts and science up to the end of schooldays. Medical faculties should not impose special admission requirements, official or unofficial.

No subject should be studied at school because of its potential technical value in medicine. For medical purposes chemistry, physics, and biology are best studied at the university.

English grammar could with advantage be taught both historically and comparatively. English literature should include works from each century, including the twentieth, and also current newspapers.

Since the medical course is a preparation for postgraduate study, less should be taught, and taught better.

The Second World Conference on Medical Education, due in 1959, is on postgraduate medical education, and may well present medicine as a lifelong study.

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"In the country as a whole, modern schools have only one feature in common: their pupils have not reached the standard required for entry into grammar or technical schools. . . . Some children at secondary modern schools are not academically outstanding but possess considerable practical skill. Yet educational theory is against vocational specialization before the age of sixteen. This places the modern school in the dilemma of having to decide what sort of pre-vocational training is suitable for these children. A greater dilemma is how to deal with the majority of 'average' children who have no discernible special bent and are most likely to be employed in factories on semi-skilled repetition jobs. Should the schools continue with general education alone, or should there be an attempt to make at least some preparation for their future employment? In some areas courses have been developed for older modern pupils which are linked with their possible opportunities in employment and the further education required. Many employers appreciate the evidence of achievement which these courses provide; but among secondary modern teachers there is still much controversy on four points which are fundamental to these developments: the degree of specialization; the age at which specialization should begin; the need for examination; the importance of staying on at school beyond the age of fifteen."—*Nature*, July 7, 1956.

AIMS AND CONTENT OF THE MEDICAL CURRICULUM

BY

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The above title was used by one of the four sections of the First World Conference on Medical Education held in London in 1953. Recently a B.M.A. committee has been considering the work of this conference with a view to the next World Conference to be held in 1959. The subcommittee concerned with the work of the section on the aims and content of the medical curriculum consisted of Professor Stanley Graham, Dr. J. G. M. Hamilton, Dr. F. M. Rose, and Professor E. J. Wayne, together with the rapporteur of the section. Some of the many suggestions made by the members of this subcommittee are incorporated in this article, but the opinions expressed are not necessarily those of the committee as a whole.

Results of the First World Conference

International conferences are not habitually outstandingly successful, save in personal contacts, but the First World Conference on Medical Education was perhaps unexpectedly useful, for it brought together ideas on medical education from fifty-two countries and led to a rather comforting measure of agreement upon the general character and aims of medical education.

It seemed to be generally agreed that the aim of medical teaching is not to train any particular sort of doctor but to develop an educated, thinking man with sufficient knowledge of the principal medical subjects (medicine, surgery, obstetrics and gynaecology) to enable him to acquire readily the additional theoretical knowledge and practical skill necessary for the particular branch of medicine he chooses, whether this be general practice, pathology, orthopaedics, or neurology. He should be equipped to continue learning after qualification, and to do this he must have developed a good technique for learning, a desire to learn, and the sort of critical appreciation which Sir Richard Livingstone described as the "philosophy of the first-rate." This implies that the student has developed a set of standards so that he recognizes and distinguishes between what is mediocre and what is first-rate. It is not, of course, enough merely to distinguish the best from the second-rate—there must be active unwillingness to accept the second-rate. Nor will it do to accept second-rate standards in general practice but demand first-rate standards in specialist practice. That is not to say that the standards are the same, for they are not, but the standard must be the best in the appropriate circumstances. It would be too idealistic to hope that this would always be achieved, but it will be achieved much more often if the practising doctor aims high enough, and one of the objects of medical education is to set up the target, to show it to the student, and to get him to believe it is worth aiming at.

A second point of general agreement is the recognition that the old major subjects of medical teaching have been fragmented by the splitting off of the specialties, and this process continues. Although in the practice of medicine this fragmentation may be necessary in order to achieve the highest technical standards, it has had most undesirable effects upon medical education, for teaching has largely ceased to deal with the whole of the major subjects and has disintegrated into piecemeal teaching on the several parts. In some subjects such as paediatrics (which is, after all, a part of general medicine), the schism has gone far enough to lead to the setting up of separate courses and examinations. This has been justified principally by the

importance of the subject, but it is difficult to see the logic of this. Psychological medicine, which pervades the whole of medical practice, has similarly sought to separate from the parent body. In surgery, orthopaedics and neurosurgery have made the strongest claims to separate representation. It is difficult to see where this process of disintegration will stop. In the end either general medicine and general surgery must disappear altogether from the curriculum or some process of reintegration into one discipline must be achieved.

The First World Conference on Medical Education arrived at a unanimous and strongly expressed conclusion that further disintegration should be prevented at all costs and suggested that a serious attempt at reintegration is necessary. It recognized that each specialist tends to over-emphasize the vital importance of his own field and to regard teaching in other fields as none of his business. But it should surely be the aim of every medical teacher to try to see the whole of medical training as a single co-operative effort and not as his subject and the rest. The desire to impart as much as he can of his own interests to his students is a laudable and essential part of every good teacher's ambition, and the so-called selfishness of the specialist is usually rooted in this. But sometimes he forgets that he is not training his successors, not making more pathologists, anatomists, paediatricians, or orthopaedists, but taking part in a co-ordinated effort to produce "basic" doctors—the rest must come later.

A third point upon which much emphasis was laid was the part which the personality of the patient and his social, economic, and family background play in the management of illness. For the practising clinician this is too obvious to need comment; but that is not so in hospital, and the qualified doctor may realize the importance of this aspect for the first time when he starts to practise independently. So new emphasis has been laid upon the early introduction of this aspect of medicine into the curriculum, and upon the planning of teaching so that it is "patient-centred" and not "disease-centred." Early introduction to the patient at home, through the general practitioner, and visits to antenatal, child welfare, and school clinics and to industrial medical officers in factories can all help to place the management of disease in the perspective of the individual patient and his many-sided environment.

Humanistic Aspects

In the past the humanistic aspects of medicine were taught mainly through the apprenticeship system. This has now lost much of its old character, and the influence of the individual teacher-student relationship has unfortunately waned, owing, in part, to the introduction of more systematic teaching of technical knowledge to large classes, which is an inevitable accompaniment of the increasing technical complexity of medicine. We have made room for this more at the expense of individual bedside teaching than by the pruning of out-of-date scientific material. The balance of the scientific and humanistic aspects of medical training has not been fully preserved, and it is supremely important. Now that we have realized this our present danger does not seem to lie so much in the neglect of the humanistic aspects as in the increasing tendency to teach them in the form of "social medicine," which can degenerate into a sort of formalized arrangement of the dry bones of humanistic medicine if it is taught separately from the practice of medicine. Here, again, the danger of disintegration is manifest—an aspect of medicine which should pervade all medical teaching and practice may be artificially separated from it and regarded as a subject on its own. Psychological medicine is also essentially part of the humanistic approach to the patient, yet it, too, has become separated in teaching, although inseparable in practice.

Medical Education To-day

The medical curriculum does not appear to have undergone a really radical revision since the days of pre-scientific

medicine. At the beginning of the present century the sharp subdivision of the medical course into the preclinical subjects of anatomy and physiology and the three main clinical subjects of medicine, surgery, and obstetrics with gynaecology may have formed a logical framework. But at that time there was little direct connexion between the preclinical and the clinical subjects, and students were sometimes even advised to forget their preclinical studies when they reached the wards. In the last fifty years every crevice in this framework has been stuffed with new material, not necessarily in the logical places, but wherever a gap of suitable size could be found. The structure has now reached bursting point. The student is confused by a mass of material which is often not logically arranged and is sometimes irrelevant or out of date. Nor does the amount of time given to the different parts bear much relation to their educational or practical value for the doctor of to-day.

Anatomy and Physiology

In the days of pre-scientific medicine it was natural to regard anatomy as the basis of pathology and medicine, for almost all we knew of disease was its morbid anatomy and the functional significance of structural changes was little comprehended. Further, anatomy was the basis of the surgeon's training, and surgery provided almost the only really active aspect of therapeutics. All this has changed, and physiological knowledge has become the basis of medical diagnosis and treatment and even of surgery. The dissection of the whole body in detail can no longer be defended as the basis of medical practice. Nor does the teaching of detailed anatomy prove outstandingly successful in medical students. It is much easier to persuade a junior clinical student to enumerate the branches of the internal carotid artery than it is to get him to mark out the lobes of the lungs on the surface of the chest or to state which cardiac chambers lie anteriorly. Matters of broad anatomy which are familiar to any zoologist appear to have eluded the average student, but details such as the roots and relations of the otic ganglion seem indelibly impressed upon his mind. No subject illustrates better the truth of the assertion that it is not how much a student knows for the examination which matters, but how much he understands and uses a year or two later.

The reason for the curious assortment of anatomical facts which the average student remembers is easily discovered—he has learnt his anatomy without understanding its place and purpose in the knowledge of the modern doctor. He has no reason to know this, for the subject is taught in isolation, in great detail, and by laborious and time-consuming dissecting methods, so that all facts may seem of equal value. This is probably good training for the anatomist of the future, and perhaps for the surgeon, but it is a dreadful and stultifying waste of time for the average doctor. These things are not the fault of anatomists, who teach their subject as such quite admirably; they are due to the changes in the importance and relevance of anatomy as a basic medical discipline.

Physiology has suffered from another kind of affliction. Unlike anatomy, it has become of increasing importance in modern medicine, for the understanding of the working of the human body in health is the basis for understanding adaptation to disease, and hence the mode of production of the signs and symptoms of disease. In the last twenty years, however, much of our knowledge of the mechanisms of the body in disease and even in health has been derived not from the physiological laboratory but from clinical observations on man by innumerable new techniques such as those in metabolic medicine, electrolyte chemistry, radioactive tracer studies, and haemodynamic studies by catheterization of the heart and many other organs. Yet the student will not learn much about these methods, which are directly part of medicine, when he studies physiology, though he may still be compelled to become an expert on the frog gastrocnemius. Thus, in spite of the fact that in recent years the physiology of disease has become more and

more closely integrated with clinical practice, the teaching of physiology as an isolated subject has remained almost as remote from clinical medicine as it ever was.

This detachment of formal teaching in anatomy and physiology from the practice of medicine is a problem which seems to grow year by year, yet a solution is not hard to find. Surely the outlines of anatomy and physiology can be taught in a combined, co-ordinated course lasting a year, and then followed up by short courses relevant to the main fields of medicine and surgery when these are studied clinically.

Pharmacology and Pathology

Until the 1930's pharmacology was a subject which dealt largely with ineffective remedies, although there were a few notable exceptions, such as insulin, morphine, digitalis, and liver extract. It still contained great masses of medical folklore, it was still concerned with pill-rolling and the recognition of herbs, with aperients and purgatives, essential oils and tonics. Then the formidable armamentarium of modern medicine appeared in the field with almost dramatic suddenness. It may now be reasonably suggested that the old subject has largely vanished and has been replaced by two subjects—therapeutics, which is an integral part of clinical medicine, and the mode of action of drugs, which belongs to physiology, bacteriology, and experimental medicine. It has become an anachronism to attempt to teach pharmacology as a separate subject divorced from clinical practice and from scientific medicine.

Pathology has similarly undergone great changes in recent years. It no longer consists solely of morbid anatomy and histology, for the most vital and rapidly advancing part of the subject is the study of disordered function. Some attempt has been made to introduce this aspect of pathology into teaching in some schools, but, in this as in other fields, it has been done without enough pruning of the less relevant parts of morbid anatomy and histology. So there is still more for the student to learn. Nor is it easy for pathologists to expand the boundaries of their subject in this manner, for studies of disordered function have been carried out by techniques which have no connexion with the traditional methods of pathology.

The old boundary lines between the preclinical, the para-clinical, and the clinical subjects have thus largely disappeared, for medicine and physiology are inextricably interlocked, pharmacology has largely disappeared as an entity, pathology and experimental medicine are no longer separate subjects, and anatomy has lost most of its original unique place as the basis of medicine and pathology. To tinker with the old framework of the curriculum, patching it here, adding to it there, and scarcely ever removing the useless and corroded parts, will no longer suffice.

It has been argued that the integration of the different subjects in the medical curriculum should be undertaken by the student himself as a valuable educative exercise. Perhaps those who suggest this are unaware of the difficulties which medical teachers themselves experience when they attempt this task, or is it that they are only too well aware of these difficulties? In either event, and no matter how much guidance and help integration in teaching would give, there will still be plenty of hard work for the student in fitting together the many different ideas presented to him by teachers with widely differing points of view.

Future of Medical Education

The First World Conference on Medical Education showed that it is not too difficult to plan a curriculum which would at least be more satisfactory than present arrangements. The main difficulties do not lie in deciding what to teach or in planning the general structure of the curriculum. The real obstacles are administrative—both inside and outside the universities—and financial.

It might be decided to combine the anatomy and physiology courses to form a single course lasting one year

instead of five or six terms, and later to add anatomy and physiology teaching to the study of the appropriate groups of diseases. External difficulties would immediately arise, for these proposals would not fit in with the recommendations of the General Medical Council because they imply that the whole of the body could not be dissected and the time allotted directly to both subjects would be less than that recommended. Although these recommendations have not the force of regulations, they provide an extremely effective screen to shelter those who, for one reason or another, desire to maintain the *status quo*. If the recommendations are not complied with it is embarrassing and inconvenient, if nothing worse. This kind of danger was anticipated in the U.S.A. as long ago as 1925, when a serious effort was made to avoid the restraint of medical schools by external regulations defining the scope and duration of teaching in individual subjects, so that experiments in teaching might be encouraged. It can be argued that this led to wide disparity in standards between the various medical schools in the United States, and this must be admitted.

On the other hand, in this country medical schools are integral parts of responsible universities, and universities, like individual teachers, give of their best when allowed to teach in their own ways. There is, however, a special responsibility in granting the right to practise medicine, for the public must be protected. It is therefore proper that external assessment should be made of the standard of technical competence reached at the end of training, but this need not, and should not, mean that the methods of attaining that end are controlled by regulations, or even hampered by recommendations. The purpose of recommendations should be to set a standard of achievement, not to prescribe the means by which that standard is attained, for these should be open to constant review, experiment, and change. Most universities will aim at much more than a minimum standard, for they will wish to ensure not only an adequate standard at qualification, but also the probability of an adequate standard ten and twenty years after qualification. This will not be possible if the doctor does not go on learning throughout his working life, and much of his ability to do this will depend on how he has been trained and not on how much he has crammed in for the final examination.

The desire to go on learning and the knowledge of how to teach himself are not qualities which examinations can easily measure, nor G.M.C. inspections secure. But they are in some measure the result of sound teaching methods in which the teacher aims to do more than transmit knowledge, and strives to guide and inspire the student, teaching him not facts but how to learn, and how to appraise the information he gathers. No amount of planning of the curriculum will do this: there is no substitute for the right teacher. But recommendations of the wrong sort, and a badly planned curriculum, can make it very difficult to achieve these ends. A good curriculum should provide adequate time for the student to learn for himself and adequate opportunities for small classes based on discussion between student and teacher. To find this time something must be cut out. Upon this all are agreed, and everyone is equally unanimous that the pruning should apply to every subject but his own. Outside this country it has been asked why, when we have such good ideas upon medical education, we do so little about putting them into practice. The answer is fairly clear—medical schools are hampered both by external recommendations and by internal difficulties associated with the changing importance and character of subjects which lead to problems of prestige of departments and individuals. Both these obstacles must somehow be overcome if we are to achieve substantial improvements in medical education.

Difficulties in Reorganization

It is probable that the whole structure of the medical course should be reorganized, but if this is done in a single radical experiment, as at Western Reserve Medical School

in Cleveland, we may make more mistakes than we anticipate. Nor can it be done without radical sudden changes in the staffing and duties of the various departments. If we try to use extensively the method of joint classes to integrate anatomy, physiology, pharmacology, and pathology with each other and with clinical studies, it is obvious that, since several teachers will be present at each class, the teaching load will greatly increase, and this is bound to mean a considerable increase in the staff. A similar difficulty arises in discussion classes, for one teacher can cope adequately with only a few students. In most American schools there is a higher proportion of staff to students than in this country. In practice it is likely that the need for a larger staff will limit the extent to which we can modify the curriculum in this way. We shall therefore be tempted to change only details and leave the antiquated structure basically unaltered.

There is also another difficulty in undertaking major reorganizations, for radical replanning demands a very considerable amount of time from most of the busiest teachers. In Cleveland this difficulty was overcome only by the establishment of an expensive special organization for the purpose of completely replanning the medical course. In this country such radical methods are not likely to find favour, even if they were practicable, but it should be possible to develop a long-term plan with defined ultimate aims to be achieved in stages. In any case no single reorganization will suffice, for advances in all branches of medicine will make repeated revision necessary. There is no possibility of devising any permanent plan of medical education.

THE TEACHING OF SOCIAL AND PREVENTIVE MEDICINE

BY

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At the First World Conference on Medical Education a separate section was arranged to discuss the teaching of social and preventive medicine—apart from the sections on the aims and content of the curriculum and on the techniques and methods of medical education. This fact may perhaps be taken to reflect the opinion of those who arranged the conference that this is a branch of medicine whose place in the education of the student has not yet been generally accepted, but which—if only on the basis of prevention being better than cure—makes cogent claims to receive more attention than it receives at present. In nearly every paper read to this section and in the discussions these claims were pressed. The critical listener at the conference, or the reader of the papers now published, must ask how valid are these claims, and, if valid, what needs to be done in order to accede to them.

Man lives in a social environment consisting of his family, his house, his occupation, and his neighbours. His diet, his habits, and his conceptions of health and illness are largely determined by the customs and beliefs of the society in which he lives and by the place he occupies within this society. The student, working in hospital, sees patients divorced from this environment, and unless his thoughts are properly directed he is unlikely to appreciate either the part it has played in producing their diseases or the way in which it requires adjustment if relapse is to be avoided after discharge. His preclinical training in dissecting-room and laboratory prepares him to accept modern concepts of disease

in exclusive terms of disordered structure or function, and of treatment in strict terms of corrective surgery, or pharmacology, but little is done to interest him in the social disorders which may be responsible for the initiation or perpetuation of disease, or in the various social agencies which may be called upon to correct them. These deficiencies may not be apparent while he continues to work within the hospital cloister, but once he enters practice and has to assume responsibility for the patient in society his lack of training for this role greatly limits his efficiency and his enjoyment of his art.

Consultants, too, if they have no insight into the social origins of disease, but are mere practitioners of somatic diagnosis and therapy, will not have the influence that should be theirs in advocating measures designed to bring society into healthier paths of living. If medicine is divorced from the society in which it must function, the doctor becomes a mere technical expert upon whom a university education is wasted.

This is my understanding of the criticisms of our present system of medical education implied in the papers presented to the conference. Many, while accepting the criticisms, seek answers not in the teaching of social and preventive medicine as a special subject but in a reorientation of teaching within each specialty to take more account of its social aspects. While those concerned with the special study of social medicine would welcome such a reorientation they claim that special departments are needed. To assess this claim we must have a clear conception of the specific subjects which should be the concern of such a department.

Function of Medicine in the Community

At the Conference on Medical Education Professor F. A. E. Crew (1953) claimed that "to a large extent social progress depends upon the degree to which society encourages the advancement of medicine and to the degree to which medical knowledge is intelligently applied to social affairs." This is a claim which some might dispute as it stands, but there can be little dispute if for medicine we were to write "human biology." It is to some extent a criticism of the narrow technical nature of our present medical education that medicine and human biology are not synonymous terms.

In his presidential address to the British Association in 1952 Professor A. V. Hill was largely concerned with the consequences of the blind application of preventive and therapeutic medicine, without regard to its biological consequences upon the populations of the world, especially in the underdeveloped countries. These consequences and the problems they set are matters of profound concern to the medical men who are ultimately responsible for their creation and they should be thinking about them from the start of their education. At home, society is now vaguely conscious of what medicine has done to prolong life and to make it more wholesome and free from suffering, and of the hazards to public health that still await solution. Tuberculosis could be eradicated within a generation if society determined upon it. The air of our cities could be freed from its pollution, our children could be spared the addiction to tobacco which enthralled their parents, and a wider knowledge of correct nutrition might spare thousands of middle-aged men from the menace of coronary thrombosis. These desiderata are more likely to be achieved if medical men are trained to play their proper part in the counsels of the nation. The politician, whether in central or in local government, is slow to learn, and, indeed, once having learnt is at times quick to forget. The lessons learnt from the painstaking work on industrial fatigue in the war of 1914–18 had to be learnt all over again in the war of 1939–45. What a needless waste of effort!