Bone grafting proved of no value in filling gaps in the shaft of the femur or the humerus. Real adequate development rarely if ever was secured even if the graft lived. Several grafts which have been used to make up the deficiency in flail joints have fractured, and in the few that have survived for over a year there is but little promise of adequate stability. The best results from bone grafting are in association with the radius and ulna, and I think that the method described by Hey Groves is best whereby the ends of the bone are freshened, their medullary cavity drilled, and a piece of tibia like a cricket ball is removed and the two sharpened ends are passed into the medulla. This technique is suited to non-union in association with a gap. If bone grafting is decided upon it should be done in two stages—the first being the removal of scar tissue. This allows of better blood supply and lessens the liability of sepsis. In malunited fractures we never operate in the presence of a sinus nor for some months after it has closed. We hasten the healing by free exsection of sinus, scar, and bone. If the alignment of the bone is good and the shortening does not exceed one and a half inches we do not operate. If the alignment is good but there is marked rotation of the limb, we perform an osteotomy some distance from the fracture. In malunion we rarely evacuate the ends of the bone through the wound, but prefer to follow the attached surfaces with a chisel and trust to extension without internal splinting. Rough manipulation stirs up all hostile factors. We should be merely gently efficient. Although we know fractures will unite in the presence of sepsis, the sooner we eradicate sepsis the firmer and better will union become. In recent and in ancient fractures all joints should be kept mobile, and the muscles should be regularly stimulated by electrotherapy.

The restoration of function in joints is too vast a subject to dwell upon. Suffice it to say that forcible movements are rarely indicated. Certain symptoms following manipulation and passive movements indicating injurious strain may be formulated:

If pain occurs after manipulation and is of short duration, movements may be continued.

If pain persists for lengthy periods after manipulation, *rest* is indicated.

If the increased range of movement is maintained after manipulation, further movements can be safely prescribed.

If in spite of movements, even in the absence of great pain, the range is continually diminishing, *rest* is indicated.

The duration of pain when tissues are relaxed, rather than its intensity, should be our clinical guide.

In overcoming adhesions and in subsequent manipulations the joint should be put through its various movements only once. The oft-repeated pump-handle movements applied at each sitting are never useful, and often start inflammatory symptoms. Voluntary movements can safely be allowed, and should be encouraged. They are not followed by obstructive reaction.

A more systematic and thorough education is required in the treatment of fractures. This can only be effected either by setting apart wards for fractures under the care of men who devote real interest to the subject, or by retaining certain institutions solely for the treatment of these cases. Education is sure to be imperfect if the treatment of fractures is to remain in the hands of surgeons who take no interest. We should regard every fracture as the potential cause of disability. In England, and I should imagine to a certain extent here, the demand for beds is so pressing in our civil hospitals that a junior officer will gain no favour if fractures are admitted in numbers or are retained for long. This, after all, is only a repetition of the story of early evacuation in time of war. It has no justification in time of peace. If general hospitals are not prepared to segregate cases of fracture, properly superintend them, and to treat them until evacuation is safe, they are far better without them, from the point of view of the surgeon and the student, and of the unfortunate victim.

Your nation taught us a valuable lesson when a committee was appointed to standardize splints, and all the surgeons were taught to master their construction and use. This again should be of value to us in civil life. If the

simplest and best splints were standardized by a committee of experts, and their application thoroughly taught to every student it would clarify a complex problem. The student should be taught not to be out and out adherents to an operative, a fixation, or a mobilizing school. He should be taught to cultivate a sense of proportion, and above all, he should be taught how to make a diagnosis without first consulting an x-ray picture.

War has taught us the importance of insisting that before a man becomes a specialist he should have a sound working knowledge of general surgery. Nothing is so fatal to progress in any special branch than when, from defect of education, a surgeon is obliged to take a microscopic rather than a telescopic view of a problem. When a firm surgical foundation is acquired he can deflect his energies with great advantage to special fields. One of the inevitable misfortunes of the war has been that able young surgeons with but little pre-war experience have graduated as excellent operators. They should, on their return, supplement their knowledge of the use of the knife by a careful study of conservative methods such as they will find in our reconstructive hospitals. The scalpel is not the surgeon's greatest asset—it may be his greatest curse. He requires a steady head even more than a steady hand.

War has brought to the front the young surgeon. He has left an indelible impression upon the evolution of surgery during a grave national crisis. We must give him more liberty, and make more use of him than we have been accustomed to in the past. His flexible mind has great potentialities. This can only be developed by giving him a fuller responsibility. It is a tragedy to see men between thirty and forty gathering the crumbs that fall from the table of Dives. The experience of age is after all only the product of opportunity. Let the young glean all that is worth gleaning from their seniors, but let us on our part offer the hand of friendship to all who strive to improve upon our methods, and value their loyalty all the more if they maintain a critical spirit.

War has done us one supreme service. It has cemented the two nations we love into a sacred bond of brotherhood. May it last in ever-increasing strength throughout the ages.

SOME REMARKS ON MEDICAL EDUCATION.*

BY

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OF the many questions needing an early solution at this time of change and reconstruction that of medical education is far from the least important. We may do well, then, to consider what changes are possible in dealing with the preliminary and intermediate subjects, and further, whether the teaching of the final subjects as at present carried on is adapted to the production both of the ordinary practitioner and of those whose duty it is to further the advance of the science of medicine and to serve as pioneers and teachers of others.

The spirit of this address is in no sense to raise any question as to the necessity of employing a scientific method in the teaching of medicine, but its object is to lay stress upon the fact that the "doctor" in the ordinary sense of the term is of necessity a practitioner of "*the art of medicine*." He is in a position to further the advance of the science by intelligent observation and logical reasoning, but the nature of his duties and the calls upon his time render it unnecessary to deal with him as a student of pure science, and hence the character of his education should correspond with the nature of the duties he will be called upon to perform.

The development of our present system has been a gradual process, of which one of the most important features—that of fitting a man for the actual practice of his profession—has been removed from the preliminary to the post-graduate stage. Under the ancient system of apprenticeship a boy acquired a knowledge of the essential qualities for successful practice, both from the

* An address delivered to the Medical Society of Manchester, October 29th, 1919.

humanitarian and the economic points of view, before he was compelled to definitely make a choice of his life's work. Some experience of his aptitude for the calling of a doctor was gained not only by himself, but also by others well qualified to judge of his character, disposition, and mental capacity. These advantages—of capital importance to the production of the medical craftsman—have had to be sacrificed to meet the requirements of the ever-increasing share taken by science in the advance of medicine.

The casual knowledge acquired during the period of apprenticeship, supplemented by a course of "walking the hospitals," became gradually supplanted by the "medical school" and a more strictly defined curriculum, to which from time to time constant additions have been made, with again a curious fluctuation in the importance assigned to the earlier and later subjects included.

Fifty years ago anatomy and chemistry provided the chief sources of scientific instruction, supplemented by limited courses of physiology, botany, and perhaps comparative anatomy. The science of physiology was at that time in its infancy, and the essential facts regarding the functions of the various organs and structures of the body required but a small exercise of the mental powers of the student. The same remark may be applied to pathology as a constituent part of the curriculum.

With the growth of the latter two sciences an ever-increasing amount of time was required for the acquisition of the modicum of knowledge to be acquired by the student, until they, together with the other early subjects, began to engross the greater part of the entire medical curriculum. Meanwhile advance in the whole field of medicine, and especially the development of the so-called "specialities," rendered the time available for the acquisition of actual professional knowledge hopelessly inadequate, and as a consequence the curriculum had to be lengthened, and the share to be devoted to the study of the preliminary and intermediate subjects strictly limited. This expedient has since been rendered inoperative by the constant addition of subjects of prime importance, such as the branches of pathology and pharmacology.

This is the position in which we find ourselves to-day—the student burdened with a task wellnigh impossible, worried by the frequency and multiform character of examinations, and yet perhaps less broadly acquainted with the general principles of medicine than he was after passing through a much simpler course.

It may be well here to pause for a moment to consider what place medicine holds amongst the sciences, and how far it is necessary that the practising medical man should be held to be a follower of medical science rather than a practitioner of the art. A suitable preface to this consideration may be found in a dictum of Professor Huxley, laid down in an address to the medical profession, "On the Connexion of the Biological Sciences with Medicine" (*Proceedings of the Seventh International Medical Congress, 1881, vol. i, p. 91*):

It is so difficult to think of medicine otherwise than as something which is necessarily connected with curative treatment that we are apt to forget that there must be, and is, such a thing as a pure science of medicine—a pathology—which has no more necessary subservience to practical ends than has zoology or botany.

This is an undeniable statement, and I think it behoves all concerned in the education of the medical practitioner to bear it in mind in the decision how far that education should be directed towards the development of the science of medicine, and how far towards the production of the efficient practitioner of the art.

The science and the art of medicine are alike founded on the exact observation of the conditions of health and disease; both owe much of their development to the use of the experimental method, by which observations are confirmed, additional facts are obtained, and new fields of inquiry are opened up. In either the science or the art advance depends upon logical reasoning and upon conclusions drawn from the facts observed. The methods employed differ little from each other in character, but while the worker in pure science seeks for the extension of knowledge as to the causation and the process of disease, the practitioner of the art mainly strives to perfect his knowledge of such phenomena of disease and the means and methods of combating it as have already become familiar. Hence the objects of the art of medicine are

more limited in scope and confined to a comparatively narrow field, while those of the science are illimitable and pursued independently of any utilitarian aim. Nevertheless, the science of medicine owes its birth to the observations of the practitioners of the art, and even under the altered conditions which obtain to-day its followers can only work satisfactorily for the advance of knowledge by maintaining an intimate collaboration with the practitioner of the art.

A survey of these considerations should exert a definite influence upon the determination of the nature of the course of education best suited to the development of the doctor upon whose efficiency the happiness and health of the nation so largely depends. It is clear that for the great bulk of the profession a path must be found by which advances in science are utilized for the perfection of the art of medicine, but it cannot be possible to elevate every medical man to the position of an apostle of pure science.

All men are not endowed with a truly scientific spirit; the power of evolving great principles is reserved to the few, and even the correct appreciation and application of those which have been laid down is not a faculty universally enjoyed. Again, the power of reasoning, the possession of initiative and invention, and the facility of developing technical skill, are qualities very unevenly distributed amongst the class of man who adopts medicine as his profession. The reasons which lead to his choice are by no means always governed by the degree of aptitude he possesses for the calling he decides to follow. To some the science of medicine appeals; some adopt medicine from the lofty motive of desiring to benefit mankind; some boys are born to succeed to a family practice; some become students of medicine because the choice coincides with that of a friend; in some business capacity is nil; in others it is the mainspring of the future career and dominates all other feelings or aspirations. Lastly, in not a few instances the initial choice has never been made the subject of serious thought or consideration.

The student of pure science in the past chose a career which for many was equivalent to a vow of poverty and chastity, from single-minded love of the subject and an abnegation of all thought of personal gain or advancement. Matters have perhaps changed somewhat of late in this direction, but a large proportion of the newer recruits are to departments of technical science of a purely utilitarian nature, the practice of which is in no sense to be distinguished from that of an art.

Medicine therefore is not a calling which can be held to stand alone as to the difficulty in determining what relative share science and art must take in the moulding of its followers, and it is evident that, except in the initial stage, one and the same course of study can hardly be calculated to produce the desired end—that on the one hand of producing a student of science, or on the other a practical medical man. Hence it appears evident that in the education of the doctor medicine itself must be allowed to take a more prominent part as an exercise of scientific thought and method, and the attempt to develop a scientific turn of mind by administering smatterings of the ancillary sciences should be abandoned.

Modern tendency has been in the direction of relegating the study of the preliminary scientific subjects, chemistry, physics, and elementary biology, to the secondary schools, and to define the extent of the work to be done by a syllabus which limits the scope of knowledge which will be required at the examination. Can it be maintained that such a method of teaching is that most suitable for the inculcation of broad lines of scientific principle, or does it not rather tend to the initiation of a habit of accumulating a number of details learned more or less by rote for the purpose of passing an examination?

A further objectionable feature in the existing curriculum lies in the hurried acquisition of a minimum of knowledge in short successive stages, at the end of each of which the medical student starts afresh with new teachers and, to him, a new subject, which he is apt to regard as quite unconnected with the subjects he has left behind him. Even in a university, the limited scope of the knowledge demanded from the student of medicine, and the short period of time allowed for its acquisition, places him at a disadvantage when classed with others who are making a serious study of subjects such as chemistry, physics, and biology; hence courses directly adapted to meet his modest needs are commonly arranged for his convenience.

Yet no one can deny the necessity of his acquaintance with the principles and many of the facts of chemistry, physics, and biology, as a part of his training as a medical man.

Two difficulties therefore have to be met: one the short period of time which can be allotted to the subjects, the other the want of co-ordination and continuity in the instruction given, consequent on the present method. In both particulars a retrograde step appears to have been made in the sharp separation of the so-called preliminary and intermediate subjects, and in making the former rather antecedent to than ancillary to the latter.

A difficulty of exactly the same character has become more and more evident in the case of the intermediate and final subjects, and here an attempt is being made to co-ordinate and render them continuous by appointing teachers of applied anatomy and physiology to demonstrate practically the intimate connexion of these sciences with medicine and surgery in the wards.

It may appear presumption on the part of one who has spent his life as a practising surgeon to venture to suggest an alteration in the method of teaching the purely scientific subjects; but it must be accorded that the teaching of these subjects is but a means to the end of producing an individual whose life will be spent in the same manner, with or without the addition of allotting a good half of the time to the service of a hospital and school. I would first point out that those entrusted with the direction of the education of the medical man are not justified in relegating the teaching of the preliminary subjects to the secondary schools, and washing their hands of any further responsibility. This procedure corresponds in character with the feeling of the student that the acquisition of knowledge in these subjects is but a means to the end of placing an examination behind him. There is every reason to encourage the teaching of science in secondary schools, but it is necessary at the same time to ensure that the proper relation of the subjects dealt with to those which are to follow is never lost sight of.

I would suggest that a remedy from some of these evils might be found by regrouping the subjects, and returning in some degree to the simpler course laid out for the student in earlier days. With these objects in view the following changes are recommended:

Elementary biology as a separate course to be excluded from the curriculum, and the congeries of subjects dealt with in the existing syllabus relegated to their respective positions at the commencement of the courses of anatomy, physiology, and pathology.

The first year of study to be devoted to anatomy, chemistry, and physics.

The second year to be mainly devoted to physiology, together with classes in anatomy so arranged that the subjects dealt with run concurrently with those to which they relate in the course of physiology.

The third year to be devoted to the study of pathology and pharmacology, including such elements of the course of *materia medica* as may be retained. During the summer session of this year elementary instruction in clinical methods.

The fourth and fifth years to be entirely devoted to professional subjects as at present.

Examination.

An examination in anatomy and physiology at the end of the second year.

No examination in chemistry and physics to be held by the licensing bodies, but the whole responsibility for sufficient instruction in these subjects to be thrown upon the respective teachers in the schools, who would satisfy themselves by means of class examinations.

An examination in pathology and pharmacology at the end of the third year.

The final examination in professional subjects to be held, as at present, after the termination of the fifth year.

The first criticism of this scheme which may be made is that it tends still further to curtail the time to be devoted to the practical study of anatomy. As an old teacher of anatomy this point has been thoroughly debated in my own mind, and the objection dismissed, for the following reasons:

The dissecting room has of necessity long ceased to be the centre of life in a medical school which it used to be, and this depends upon the following reasons: (1) The need for economy in time, (2) the scarcity of anatomical material for dissection. Neither of these difficulties are likely to become less—in fact, there is unfortunately reason to apprehend that the latter is likely to become increasingly urgent. Hence the tendency is for the practical teaching

of anatomy to pass still more from the dissecting bench to the classroom, with, it is true, a risk in decline in delicacy in manipulation and in intimate knowledge of the finer details of structure, but with a distinct economy of time.

Against these disadvantages the following points must be considered. Allowing intimate knowledge of the anatomy of the human body to be the most important item in the earlier study of medicine, the plan proposed gives to the anatomical teacher the manifest advantage of virgin soil into which to instil instruction, while the class teaching in direct connexion with the course of physiology in the second year ensures a proper sense of the relation of the structure of the body to its functions to be grasped. Again, the use of sections of the body and of x-ray photographs allows the student to gain a true sense of the relations of the various structures in the architecture of the body more readily than used to be the case.

A more weighty argument lies in the urgent necessity which exists of carrying on the knowledge gained in the anatomical department and utilizing it in relation to the study of the later subjects. Its relation to the course of physiology has already been dealt with, and it is no less important that as an applied subject it should take its proper place in the courses of pathology and in all the different sections of medicine and surgery. If this be properly kept in mind and arranged for, the study of anatomy will only cease with the termination of the medical course.

I think that the relegation of the commencement of the study of physiology to the second year is justified by the assumption that it is better for the student to become first acquainted with the structure and mechanism of the human machine, and that the purely mechanical side of function is a more suitable introduction to the study of physiology than the more intimate problems dependent upon an appreciation of vital action. It would be presumption on my part to make any further suggestion regarding the teaching of physiology beyond making the broad statement that it should be so designed as not only to progress together with the study of anatomy, but also in sympathy with that of the chemical laboratory, the pathological laboratory to which it is an introduction, and later that a special course should carry the application of physiological knowledge to the wards.

In considering the question as to how far the student in the past has benefited by the physiological course, it should be pointed out that the responsibility lies equally between the teachers of the intermediate and advanced subjects, and that while the physiologist should strive to make his course strictly appropriate to the needs of the student of medicine, the clinician himself should point out and dwell upon the light that physiology sheds upon the many problems of disease that are dealt with in the wards.

The direct passage of the student from the study of anatomy and physiology to that of morbid anatomy and physiology is becoming more and more generally recognized as the rational sequence of progress in acquiring an elementary knowledge of the science of medicine, and the same may be said for the combination of pathology and pharmacology as the logical introduction to the clinical study of disease. The sequence is not only rational but also an easier one for the student, freshly primed as he is with the facts of anatomy and the methods by which the normal vital functions of the body have been investigated and determined.

The allocation of the whole of the third year to these subjects, moreover, is not so prodigal of time as may appear on first consideration, since the student becomes acquainted with a large part of the general principles of medicine, and during the summer session commences to acquire familiarity with clinical methods while the lessons of the physiological laboratory are fresh in his mind. To obtain the full advantage of this rearrangement of the preliminary and intermediate courses some readjustment would be necessary in the various departments, particularly in the case of the assistant teachers or demonstrators.

The first element for success would lie in a close co-ordination between the heads of the several departments concerned, the teachers forming a small board to meet frequently to discuss matters connected with the course of instruction, and also the progress of the individual pupils.

The second would lie in establishing a closer bond of intercommunication between the demonstrators. This

could best be effected by arranging that as many as possible of the demonstrators should work in more than one department. Thus anatomy and physiology, particularly with regard to histology, physiology and pathology, physiology and pharmacology, chemistry with chemical physiology and chemical pathology, while demonstrators of anatomy and physiology might take part in the courses of practical surgery, and those concerned with instruction in clinical methods. There can be no doubt that in a medical school the class of man willing and able to undertake such combined duties would be easily found, and for those who take up the duties of a demonstrator only as an educational phase of their career the appointments would be particularly valuable.

I do not propose to dwell upon the work of the two clinical years, because the existing system appears to me the only remaining portion of the old curriculum calculated to evolve the type of man fitted to undertake the duties either of the consultant or the general practitioner. These two years of hospital life now furnish the sole opportunity to the student of acquiring confidence to face the responsibilities which lie before him, and to learn by precept and example what should be the attitude of the doctor towards his patient. It is during this period that the student gets to know his teacher and the teacher his pupil. It is now that the student gets an insight into professional manners, acquires the proper humanitarian feeling towards his patient, and gains his first intimate knowledge of human nature. Science alone, apart from a knowledge of human nature, and the capacity to read men and sympathize with their weaknesses and difficulties, can do little towards the evolution of the successful practitioner.

I would only enter a plea for the utmost simplification in methods of diagnosis and the need for exactitude of observation being constantly kept before the student. It should be impressed upon him that an x-ray examination is to be regarded as affording corroborative evidence and not as a means of making a diagnosis, that surgeons long before the days of bacteriology were able to draw a distinction between staphylococcic and streptococcic infections; in fact, that the natural senses properly cultivated suffice for the very great majority of the work that he will be called upon to perform. The habitual resort to special methods, and the belief that complicated apparatus is necessary in the investigation of the ordinary problems of disease, is likely to do as much towards the destruction of the art of the practitioner as the methods of science can do to help it.

Up to this point we have been concerned with the undergraduate and the attempt to inculcate in him a broad acquaintance with the principles of medicine and of the practice of the art, and it is claimed that in a scheme such as has been outlined proper compromise has been effected to ensure a sufficiently scientific basis upon which his future life's work can be built up. From this stage a great majority of the men pass from the schools, some after fulfilling the duties of the various junior posts in the hospitals, to the actual practice of their profession, and a new sphere is opened up to them in which they will need to rely on the experience and example of their senior fellow practitioners to complete their education as a doctor. A minor proportion will desire to remain and increase their store of knowledge and experience, to become workers at the science of medicine, or eventually to take part in the education of others.

Can it be said at the present time that the best opportunities exist for this latter class, or that arrangements allow such a course of study as has been suggested to be amplified to meet their needs? It is true that a man in his own school and amongst his own teachers is in a position to follow out some line of investigation he may wish to embark in, and again certain special hospitals not directly connected with a medical school may offer him opportunities for following their practice, or even to undertake a research—for example, in neurology, ophthalmology, laryngology, or urology. He also has the opportunity of meeting financial difficulties by undertaking the duties of a junior teaching post in his own school. Nevertheless such men have in the main to work out their own salvation, and conditions are far from favourable for easy or continuous study.

For the graduate from the provinces, from the dominions, or from abroad, except for the possibility of establishing an arrangement with an individual teacher, matters are far

more difficult, and should he desire to follow up more than one subject he will probably require to visit a number of institutions, neither of which he can regard as his home.

I do not think that graduates from abroad are to be regarded merely from the point of view of men who may carry the prestige of the British School of Medicine into other lands, but rather as members likely to contribute an important share towards the success of the school to which they may become attached. The same advantages obtain to the entry of students from any source in the British empire, each introduces a different experience of men and of methods, the diffusion of which may exert a vivifying and stimulating influence on existing lines of thought and on the direction of action. Under existing circumstances these men are in a position to do little beyond "walk the hospitals," or to undertake research in a laboratory as individuals and not as members of a school for which they may develop a lasting pride and affection. Their presence in the past in a primary school of medicine has been an actual source of embarrassment, for, if in any numbers, they necessarily either engross a large part of the attention of the teachers to the detriment of the undergraduates, or they fail to attain the object for which they have come.

A still larger class of graduate student needs to be alluded to: the practitioner who wishes to refresh, modernize, and augment his store of knowledge and fill in the gaps in his powers which experience has made him realize; or those who wish to perfect themselves in the practice of one or more of the so-called specialities. Certain provision exists for men of this class, but even in dealing with them it has come to be realized that special arrangements are necessary. In London successful attempts have been made by the West London and the Seamen's Hospitals, both of which institutions are entirely devoted to this object. They have performed particularly valuable work for members of the services and for many practitioners, but their resources are not sufficiently large to meet the future needs. The attempt made to provide for post-graduate instruction by the polyclinic, even supported by the energy and enthusiasm of Sir Jonathon Hutchinson, a pioneer in this field, failed from the fact that the essential element for success, an attached hospital, was lacking.

At the present moment, therefore, powerful incentives to the establishment of an efficient system of graduate instruction exist. A strongly awakened desire to further the advance of medicine in this country, the wish to attract the student who has been accustomed in the past to seek post-graduate teaching in the schools of the Continent, and the need to meet the growing tendency of the practitioner to fit himself to practise one or more of the so-called specialities with efficiency. In the light of the assumption that this latter class may augment enormously in numbers if the system of out-patient clinics be developed by the Ministry of Health, the wants of these men may become urgent.

Recent movements (in London) have been in the direction of trying to organize and co-ordinate the teaching of the large medical schools and the special hospitals, and by a common effort to supply the opportunities desired. It must, however, be allowed that this is by no means the first occasion upon which the establishment of such a scheme has been attempted, and that previous attempts have been attended by very modified success or by absolute failure. The reasons of this want of success in the past are probably not far to seek, the main elements being the absence of a strongly organized centre and the fact that schools adapted to the purpose of primary instruction in medicine are ill suited to the needs of the graduate student.

The combined demands of hospital practice and duties in a medical school are as much as any consulting physician or surgeon is in a position to meet. To add a separate series of lectures and classes is to throw an additional task upon an already overburdened man.

The courses of work, suitable for the instruction of undergraduates are practically useless for the man who has already obtained his degree or diploma. The most successful teachers of undergraduates, probably by reason of the dogmatic nature of the instruction given and the necessary limitation of its scope, are by no means necessarily those who can interest and enthuse the graduate, as anyone who has passed his life in a medical school is well

able to appreciate. Many teachers who are able to enforce broad general principles founded upon practical experience, may lack the necessary knowledge of literature and acquaintance with the results of the most recent methods of scientific research needed by the graduate. Yet, literary erudition and extensive acquaintance with the most recent methods and results of research, while not essential for a teacher whose task it is to produce an efficient practising "doctor," are necessary qualifications for the leadership of the graduate who aspires to follow the higher paths of medicine.

In the foregoing remarks it is not intended to suggest that the highest qualifications are not advantageous in imparting the most elementary instruction. If we consider the example of the greatest teachers of the past, such as Huxley or Michael Foster, we find them expending a great part of their energy in imparting the fundamental principles to the junior students, and entrusting to their younger colleagues the detail that the pupil himself is apt to regard as the more difficult part of the subject.

The atmosphere of a primary medical school, where the main object is to impart elementary and practical instruction, is unsuitable to the acquirement of intimate acquaintance with detail, and in a considerable degree to the freedom of thought, the sceptical attitude towards received and adopted views, and the single-minded desire to advance medical science by research which should animate the graduate who seeks to follow the higher paths of medicine. In the primary medical school the performance of the whole of the practical work in connexion with the patients in the hospital is engrossed by the undergraduate students and the house officers. In the laboratories, again, the main energies of the departments are more or less monopolized by the class teaching, and the graduate engaged in a research, except for his direct association with his chief, must work as an individual, and the valuable stimulus of a close relationship with his fellows is missing. How gladly, for instance, would many a graduate undertake the duties of the ordinary junior posts in the hospital, with the abundant opportunities afforded of observation, from which he is debarred by the simple fact that no room exists for his services? In fact under existing conditions, except as the occupant of one of the junior teaching posts, the graduate student forms the fifth wheel of the coach in a primary medical school.

If these premisses be correct, it is clear that in making provision for the many sides of graduate study which exist, adaptation of the present system will scarcely suffice; for the needs of the student of advanced medical science, and those of the practitioner of medicine, are of different degree and nature, and even for the latter the position of the graduate and undergraduate is quite distinct.

Graduate instruction requires to be utilized for more exacting purposes than that of merely improving the capabilities of the practitioner—it must also include facilities for workers at the science of medicine engaged in experimentation and investigation, and afford opportunities for those preparing to occupy professorial chairs. It cannot be restricted to affording help to the practitioner and giving foreign visitors a glimpse of the views held and the methods in use in this country. We cannot be contented alone with a series of courses such as have been held in the past in Vienna, in which the greatest amount of information is given in the shortest possible period of time—a system in many respects comparable to the cramming for a scholarship or other examination in the early part of a student's career. The question requires to be solved by establishing a system which not only co-ordinates the extensive fields of observation and sources of instruction which already exist, but also by the founding of secondary schools of medicine, one of which might form a centre for the whole country.

The former of these objects is already the subject of serious consideration and organization, and I propose to make little further allusion to it than to express the opinion that the entire direction of this work should be under the control of the secondary medical school to be now outlined.

The first essential for a graduate school is the possession of a large and well-appointed hospital entirely devoted to the purpose, with sufficiently well-equipped and extensive laboratories directly attached. No distinction should be

made between these two departments of the school; for the hospital is the first-line laboratory of the student of medicine—it provides him with his field of observation, here he discovers the points which require investigation, it is the ever-welling fountain that engrosses his thoughts, and its inspiration tends to keep him on the direct track and prevents him from wandering into the by-paths of abstract lines of investigation.

The greatest of the services of the great war has been to demonstrate the advantages which accrue from the presence of the worker in pure science in the field of practical medicine—an observation definitely substantiated by the experience gained in all attempts to establish laboratories for pathological research, except in direct connexion with a working hospital.

Speaking in the presence of a number of members of a large and important university in the provinces, where medical education is already centralized, I am aware that some of the further remarks I am about to make may not be strictly suitable; but while the arrangements which may have to be made may not be of a similar nature in consequence of the better organization and equipment of the departments for the teaching of the preliminary and intermediate subjects, yet the principle suggested, that graduate instruction needs special provision to be made for it quite independent of undergraduate instruction, is equally applicable. It is also, I believe, certain that the need for post-graduate instruction throughout the country is likely to become a much more general and urgent matter, should the system of out-patient medical clinics be set up in the near future by the Ministry of Health.

London, with its many medical schools under only nominal university control, and the numerous hospitals, laboratories, and museums already in existence, offers a more complex question. I believe, however, it is in some respects a more easy one of solution, in consequence of the greater number of graduates likely to avail themselves of any advantages offered and the more numerous teachers who could be called upon.

The staff of the school should be of the professorial type, but I think it would be neither practical nor advantageous for it to be composed entirely by permanent whole-time professors. In the laboratories this would probably be necessary, but in the case of the clinical work any difficulty might be surmounted by adopting the system followed by the Assistance Publique of Paris in appointing physicians and surgeons to the individual hospitals for a limited period. Under such a system officers from the various schools in London might be seconded, say, for a period of five years to serve as professors in the secondary school. The method would possess the advantages of regularly infusing new blood into the graduate school, of giving a valuable experience to the teachers of undergraduates, and in establishing a common bond of sympathy in mode of thought amongst the several schools. It might do much to raise the general standard of education, while at the same time it would not disturb the time-honoured and successful method of clinical teaching now in vogue.

Not a few of us must, I think, have been interested in the views put forward by Sir James Mackenzie concerning the difficulties which attend the teacher whose life is passed in consulting practice in his limited opportunity of observing the beginnings of disease or of tracing the continuous progress of the disease in the individual when it has once become established. Mackenzie argues that the general practitioner is the only man suitably placed to elucidate the problems of the commencement of disease and their progress towards their eventual termination. Hence he asks that the general practitioner should take a more active and prominent part in the education of the student. I do not think that this proposition affects the question of primary medical education. In the short period at the disposal of the undergraduate it is enough for him to master the fundamental facts regarding the normal structure and functions of the body, the effects upon them of disease, and the characters of disease when developed. The first steps in his education must necessarily consist of the investigation and appreciation of the strongly marked types, and the extension of his knowledge by following the gradually weakening links which stretch backward to the normal must be the study of the man

who has at least reached the status of a graduate. In the secondary school, then, the accomplished general practitioner might find a proper place.

The hospital would furnish a certain number of graduates with opportunities for observation and research, and also afford facilities for practical work and technical development of the highest class. The graduates would take the place of the junior officers in a hospital attached to a primary medical school, acting as assistants to the professors. These advantages, however, could be enjoyed by only a limited number, and the occupants would need to be selected with care and due consideration of the aims they had in view.

The further field of action is identical in intention with the efforts that are at present being made for the co-ordination of existing sources of instruction, and making them available for the practitioner who desires to go through a limited course for purely utilitarian purposes. It is obvious that if the scheme of a central secondary school should find favour, that the associations who have the work of co-ordination in hand are the proper agency through which the entire scheme could be completed.

This being the case, the school would be the centre to which all graduates of either class would gravitate, and from it the men would be allocated in whatever special

direction and to whatever special teacher they might desire. Thus the whole wealth of material possessed by the hospitals, infirmaries, laboratories, and museums of the metropolis would acquire a bond of union, and a vast amount of opportunity now so cursorily utilized might be opened up to any graduate student. The graduate provided with such a central institution would no longer be a wanderer tilling a solitary furrow, for his school would not only provide a vast field of action, but would also bring him into contact with workers from every school and land—an association which could hardly fail to widen his horizon and extend his experience, not only of methods, but of men.

The advantages to be gained, moreover, would not be confined to the student alone; the teacher also would benefit in no small degree from contact with the different class of pupil, to whom his duty would consist in stimulating the acquisition of knowledge of the highest grade and arousing the faculty of research. Again, the existence of a school of medicine with this scope and these ends in view could not fail to react inspiringly upon the primary medical schools around it. It would tend still further to the elimination of dogma and empiricism from the practice of medicine, and to heighten the standard of education throughout.

A GIANT MUCOCELE OF THE APPENDIX.

BY

W. GIFFORD NASH, F.R.C.S.

THE following case is reported because examples of such great distension of the appendix appear to be very rare. Kelly, in his work on the vermiform appendix, fol. 288, gives an illustration of this condition. He mentions a case related by Sonnenberg in which the appendix was 14 cm. in length and 21 cm. in circumference. In my case at the time of removal the length was 17.7 cm. and circumference 19 cm. Virchow described a case in which the appendix was as large as a man's fist. In the case related below there is no evidence as to the duration of the change in the appendix, as the patient appears to have had no symptoms until a few days before admission. Kelly says that the walls of the cystic appendix are attenuated and transparent, but in this case they were extremely thickened.

The patient, a male aged 64, was admitted to the Bedford County Hospital on June 27th, 1918. Two days before admission he was seized with abdominal pain, followed by vomiting. The pain began in the umbilical region, but later settled in the right inferior quadrant of the abdomen; it was relieved by morphine. The bowels were constipated and an aperient was given without result.

On admission to hospital the general condition was good, the pulse was 92, and temperature 98.6° F. On palpation there was rigidity of the muscles and tenderness over the caecum. A swelling could be felt in the caecal region, but hyperaesthesia and rigidity made it difficult to palpate.

Operation (June 27th).—An incision was made over the caecum, and a large elongated firm lump was then felt lying behind the caecum and ascending colon, which suggested an enlarged kidney. This was delivered and found to be attached to the apex of the caecum. It was removed, leaving an opening into the caecum half an inch in diameter. A purse-string suture was applied, and the stump invaginated.

After the operation vomiting continued for several days, which caused a good deal of exhaustion and difficulty in feeding. The man left the hospital quite well on August 1st.

The tumour which was removed was 7 in. long, 7½ in. in circumference, and weighed 8½ oz. It was sent to Mr. S. G. Shattock, F.R.S., at the Museum of the Royal

College of Surgeons, who very kindly supplied the following report:

A vermiform appendix enormously enlarged from the accumulation of mucin within it, after its occlusion. The distended structure, which is somewhat pyriform like the gall bladder, measures 14 cm. (5½ in.) in length and 6.5 cm. (2½ in.) in greatest transverse diameter. Its surface is of a dull white colour and quite smooth except for the presence of a few shallow sub-circular pits like those seen in the peritoneal thickening over the spleen or liver or on ovarian cysts. The wall of the sac, which is of extreme density, is 0.7 cm. in thickness.

Two-thirds natural size.

Microscopic sections show that it is constructed of parallel lamellae of dense fibrous tissue furnished with a moderate number of flat connective tissue corpuscles, uniformly distributed and regularly disposed between the fibres. The cells increase in number towards the inner aspect, where there are, in addition, lines and larger groups of lymphocytes in the clefts. The innermost zone of all, however, is devoid of cell nuclei and in a state of necrosis, the cells, as shown by the use of scharlach, being represented only by elongated groups of fat droplets.

There is no trace of epithelial lining, the necrotic fibrous tissue being immediately succeeded by an adherent layer of mucin in which there are embedded calcareous molecules and larger spherules, the chief of which have a laminar structure. On the narrow, proximal and less thickened end there may be recognized a small patch of the mucous membrane of the caecum which was opened in the removal of the appendix.

AN out-patient department for the treatment of nervous diseases is being instituted in connexion with the Bethlem Royal Hospital, London, S.E. Persons of the educated classes, in a presumably curable condition, are alone eligible for admission as in-patients and are received either free in necessitous cases or at a fixed inclusive rate of three guineas a week. With a view to the early treatment of eligible cases voluntary or uncertified cases are admitted. It is hoped that the new department will prove to be of great help to those requiring early advice before their condition has become so urgent as to require the medico-legal label of insanity. The department is established in another building, quite apart from the main institution, and will be known as the Hospital for Nervous Diseases. The address is 52, Lambeth Road, S.E. Consultation between members of the hospital staff and the medical practitioner in attendance upon the case will be encouraged.