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EDUCATION IN SURGERY FOR GENERAL PRACTICE

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At the present time there is a somewhat widespread feeling of discontent with the medical curriculum, and various plans are being discussed for its amendment and improvement. It is generally conceded that with the immense additions to knowledge in the last two decades, with the development and growth of specialties, and with the wealth of technical detail which each of these involves, the medical student of to-day tends to have brought before him more than he can assimilate, and is thus apt to lose balance and perspective. The need for a thorough grounding in the fundamental sciences has become more and not less necessary. The plea that all the earlier subjects in the curriculum should be vocational in their ambit loses sight of the fact that the medical course is essentially a training of the mind, not a technical course in practical methods for dealing with the sick.

Before considering the teaching of a subject such as surgery—how it should be taught, when it should be taught, and what should be taught—it is essential that we should have our object clearly in our minds. I believe I voice the general opinion when I describe the object of the medical course as the training of the mind of the student so that he can face any new problem or unusual situation, observe and assess the conditions, and deal with the problem—be it an individual patient, an outbreak of disease, or a question in preventive medicine—in a scientific, a rational, and a reasonable manner. The first two years of the curriculum have given the student the habit of thinking along scientific lines. It is eminently desirable that this habit be not broken when he is introduced to the study of patients in the wards. Thus the earlier teaching in both medicine and surgery should be devoted to those conditions which allow of accurate observation, logical deduction, and rational therapy. In the latter half of the curriculum teaching has become more difficult if more interesting, because it is the teacher's duty to sift out from the mass of accumulated knowledge the general principles and illustrate their application.

In the teaching of surgery to undergraduates we must first consider what should be taught, and then discuss the best ways and means of giving such teaching. To draw clearly demarcated boundaries between the provinces of the physician and surgeon in teaching is not only artificial, it is wrong. Our object is to educate rather than to instruct the student; the surgical ward may offer the best opportunities for education in medicine, just as the indica-

tions for surgery may become most evident in the wards of the physician. The greater the co-ordination and harmony of effort in teaching of the two great divisions of medicine, the more complete and generous will be the education of the student.

What Should be Taught

Complete agreement exists that surgical teaching must include the treatment of wounds and broken bones, of many deformities, of certain acute infections, of a considerable number of abdominal emergencies, of a variety of tumours and new growths, and of certain forms and stages of visceral disease. It is not only desirable but necessary that along with this teaching the practical aspects of anatomy, physiology, and pathology should be intimately correlated.

The methods of teaching available are lectures, tutorial classes, classes in applied anatomy and physiology, clinical bedside teaching, clerking in the wards, attendance at operations, work in the surgical out-patient department, and resident clinical clerkship in a hospital. Much criticism has been directed at the *didactic lecture* which at one time occupied the foremost place in surgical teaching. It is admitted that with the numerous textbooks now available the need for a long and complete course of lectures on surgery has gone. On the other hand I disagree entirely with those who belittle the value of the lecture and the spoken word. The function of the lecture is not to replace but to expound and annotate the textbook. If the lecturer can, from the multitude of facts, extract the essential ones which bring out a principle; if this principle can be expounded and its application illustrated from the lecturer's own experience; if thus the rational basis of surgical practice can be portrayed, the student will read his textbook with understanding and will be in a position to gain the greatest benefit from his work with patients in the wards.

After experience of several methods of presenting surgical lectures I believe that the best plan is to give an introductory course (say thirty to forty lectures) to students who have just finished their anatomy and physiology courses and are starting their clinical work. These lectures deal on broad lines with the surgery of wounds, infections, fractures, tumours, and, in the same manner, with the surgery of special regions and viscera. Such lectures form

part of a combined course with medicine, and are correlated with lectures on pathology, bacteriology, and pharmacology. At its best this system of correlated instruction during the student's third year has a broad educative value, not exceeded by any other part of the medical course. It has been our experience in Edinburgh that the students who shine in the co-ordinated examinations of this course almost without exception take the highest places in the final examination.

A second course of lectures on surgery may with advantage be given in the final years of study with this proviso—that the last three months before the final examination shall be left free of all lectures. In this course of senior lectures (fifty in number), which will follow regional lines, the lecturers on special branches of surgery should take their places, each being allotted by consent a certain number of hours. The applied anatomy, physiology, and pathology of each region will be dealt with as a preface to the surgical aspects. In this way interest in the earlier scientific subjects will be continued throughout the entire course.

Coincident with or immediately following the introductory course in surgery the student begins his work in the surgical wards. This may form the most valuable part of his training, or it may be more or less of a sinecure. Owing to the complicated character of many of our surgical procedures, and the smooth and aseptic healing of wounds, the student's opportunities of actually dressing wounds are very limited. The term "dresser" is now a misnomer and is disappearing. The great opportunities of the surgical wards are in diagnosis and in the acquirement of a clinical sense. If the students will examine the patient and discuss the clinical features, and, after all observations have been made and their significance debated, will come to a reasoned diagnosis, any operation on such a patient becomes a real and interesting lesson.

May I state here that the method of conducting a ward clinic on such a patient is important. In some respects it may be interesting and impressive that the surgeon should elicit the history, conduct the examination, and then by logical steps come to a diagnosis. In my experience this has little educative value for the student: only by active mental processes can he gain the education we desire. The duty of the teacher is to guide the student in eliciting information, conducting a physical examination, and coming to a final diagnosis. If the teacher does all the active thinking the student may be taught; he is not trained. The less a clinic approaches a lecture and the more it resembles a debate with many active minds participating, the greater its educative value.

Attendance at Operations

This brings us to the vexed question whether, as some hold, students are wasting time by attending operations. To spend hours watching from a distance intricate technical procedures is unquestionably waste of time for the undergraduate. On the other hand, to see displayed the living pathology of the condition, the diagnosis of which has been the subject of hot debate, is to learn a lesson which will be indelibly printed on the students' minds. The clerk of the case should be on the floor of the theatre, and should read his notes and then discuss the diagnostic features, coming finally to a fixed diagnosis. If this is confirmed at operation he gains in confidence and keenness; if it prove to be wrong the reasons for the error are discussed.

A considerable amount of applied anatomy can be taught at operations, and the lessons of accurate haemo-

stasis, of minimizing trauma to the tissues, and of preventing all undue exposure and shock can be given by both precept and example. Particular stress must be laid on the attendance at emergency operations. This means that the student shall be in hospital on certain evenings when the majority of such operations are performed. The value of seeing the patient on admission, taking the history, making the physical examination, coming to a diagnosis, and then seeing the findings at operation and following the after-course, particularly if all steps are followed by discussion, cannot be overestimated.

While it is desirable that a senior student should know the essential steps of certain emergency operations, such as those for perforated duodenal ulcer, strangulated hernia, acute appendicitis, and ruptured ectopic gestation, it is not the operative technique or procedure so much as the correlation of symptoms and signs with living pathology that gives this experience its singular value.

Operative Surgery

In most medical schools a compulsory course on operative surgery on the cadaver, combined with applied anatomy, is given. The value of such a course is the training in handling a knife and doing the amputations and minor operations which any graduate might be called on to perform. The arguments against such a course are the scarcity of subjects, the dissimilarity between the lifeless tissues and the living body, and the relatively small amount of practice which the individual student gets in such a course. I believe that the course should not be dropped, but rather that it should be strengthened by co-ordinating it with the teaching of applied anatomy, and so giving the final brush up in this subject in the undergraduate course.

Post-operative Observation

The careful study of even a few patients after operation will give the student an insight into the troubles and the worries of the sick man and what can be done for them. He sees the distress of post-operative vomiting, and perhaps assists in washing out the stomach. If vomiting persists he notes the signs of dehydration and the remarkable relief given by fluid replacement by rectal, subcutaneous, or intravenous routes. If vomiting be absent the diet given to patients after various operations is studied in individual cases, the sedatives required, the doses and effects. He will learn how to deal with flatulence and with retention of urine. He may see develop before him a chest complication such as massive collapse of a lobe of one lung. If he witnesses the sudden distress and cyanosis, the rise in temperature and in pulse rate, and finds dullness with diminished breath sounds at one base and the heart pulled to that side, diagnoses a collapse, and sees the treatment carried out, he has had a life-long lesson in practical medicine. Or a patient develops a small pulmonary embolism and the student witnesses the symptoms, signs, and course of an infarct of the lung.

Another patient develops auricular fibrillation following operation, and the complete course and the response to treatment of this complication are got by first-hand study. Following on a peritonitis from a perforated peptic ulcer or appendicitis a patient develops a subphrenic abscess or a pleurisy with effusion going on to empyema: the whole clinical picture, with its constitutional and local features, evolves before the student's eyes.

The observation, study, and record, followed by discussion, of any of these post-operative troubles, providing

the facts are actively assimilated, digested, and understood by the student, gives not only a lasting knowledge of certain maladies but a method of approach and a habit of mind which can be applied with equal value to the solution of all other problems in practical medicine.

I have stressed the importance of post-operative observation because I believe that some of the most profitable studies of the early phases of certain acute medical diseases can be made in surgical wards.

Surgical Out-patient Department

The importance of attendance and practical work in the out-patient rooms is realized by both teachers and students. The treatment of minor wounds, of whitlows and cellulitis, of sprains, of fractures of the upper limb, and of various minor deformities so important to the man in general practice, is all carried out in the out-patient rooms. It is a serious handicap to our surgical teaching that in some of our larger schools it is impossible, owing to the number of students, for all to work in the out-patient rooms. Possibly when we get extended facilities for resident students this defect in our present system may be remedied.

Residence in Hospital

The most important advance in medical education which could take place would, in my opinion, be the provision of facilities whereby every student before graduation would be required to spend three months as a resident clinical clerk in a hospital. In the Irish medical schools this has become a valued tradition; in some British schools it is possible for a minority of students, and wherever it is possible its peculiar worth is indisputably recognized. It matters little whether the student is attached to medical or surgical wards, for he probably sees some of the work in both; the great gain is continuity of observation, a real personal interest in and responsibility for his patients, and the chance of acquiring practical experience in the clinical methods which later practice will demand.

It is impossible that all our young graduates can get resident hospital appointments. Apart from the relative paucity of the latter, considerations of finance compel many young graduates to plunge into practice. The value of a resident hospital appointment is patent and unquestioned. I consider that the greatest and most valuable benefaction to practical medicine in this country to-day would be the provision of resident accommodation at our great teaching hospitals and at a selected and approved number of provincial and municipal hospitals so that every graduate from our teaching schools would have that background and outlook which practical contact with accurate scientific clinical investigation alone can give. Research in medicine, possible for the very few, will never lack financial backing. Training those who man the outposts is just as important as the staff work at the base, for it brings scientific medicine to the homes of the people.

Special Branches of Surgery

Some branches of surgery are now recognized as specialties and, in large centres at least, are practised exclusively by specialists. It is eminently desirable that the student should have the best instruction in these branches, and the only difficulty is to keep a real balance and a proper perspective in such teaching. In respect of undergraduate instruction the nearer such branches are kept to the parent stem the better the education. While the intensive cultivation of a specialty unquestionably favours advance in knowledge it tends to prejudice perspective and

make teaching lop-sided. The specialist is naturally impressed with the many points which his experience has shown to be of capital importance in his practice, both on the side of diagnosis and on that of treatment, and to him it seems only fair that the student should learn of these. The trouble is that the poor student's brain will not absorb and carry the multiplicity of important points which specialized experience has given during years of work.

It is thus imperative that instruction in the special subjects should be on the broadest lines, with a minimum of technical detail. What the student should be taught in each special subject is the method of investigation required to gain the most accurate data on which to found a diagnosis. In short, the student must be trained in how to acquire knowledge of disease, no matter which region or system is affected.

Surgery of the Ear, Nose, and Throat.—What systematic teaching is required in this subject might well be given by a specialist in this branch in the course of senior surgery lectures; to keep it in its true perspective the number of lectures should not be more than three, or at most four. The important part of the training in this branch should take place in the special out-patient department, where the student can examine patients and make himself familiar with the methods of investigating the ear, the nose, and the larynx. This practical training is of the first importance for general practice, and a certificate of proficiency in the simpler methods of examination should be required before the final examination.

Orthopaedic Surgery.—This specialty, which during the past two decades has become firmly established in this country, deals with lesions that are of great significance to the student and the practitioner: to the student because many of the lesions are readily visible and demonstrable and give great scope for developing powers of observation and accurate record; to the practitioner because so many deformities can be prevented or greatly lessened by timely recognition and treatment. Certain principles can be readily propounded and illustrated in clinical cases, and a few (two or three) lectures on general lines might be given in the junior surgical course. Attendance at an orthopaedic out-patient clinic should be compulsory. It is here that the student learns the rational application of splints and plaster-of-Paris, and by handling patients appreciates the necessity for systematic and thorough examination before coming to any decision as to the diagnosis and therapy. In the senior course of lectures on surgery six lectures on orthopaedics should be given by the lecturer on that subject. The custom of treating the majority of fractures in the orthopaedic dispensary or wards is now established in some teaching hospitals. Whatever views we may hold as to who should treat fractures, it will almost inevitably tend to become more and more the perquisite of the orthopaedist. The follow-up and rehabilitation departments attached to this unit should form a valuable training ground for the student. The handicap resulting from faulty alignment, the benefit from voluntary effort in restoring function, the various deformities and disabilities resulting from faulty treatment, and the ways in which they can be obviated and corrected, all these can be demonstrated in such a way as to leave a lasting imprint on the student mind. Attendance, on say eight occasions, at the orthopaedic ward or Cripples' Hospital, should be compulsory. Both offer splendid material for training, and most students are attracted by the visible and palpable lesions which come under review.

Neurological Surgery.—This, one of the youngest of our specialties, should be dealt with in the senior surgery lectures, say three lectures illustrated, if possible, by clinical cases. It goes without saying that the elaborate operations performed in this branch of surgery should not engage the student's attention. What should be taught are the broad principles governing cerebrospinal surgery and the various types of lesion which are amenable to operation.

Thoracic Surgery.—Up to now teaching in this subject has been done by general surgeons, and, whilst an occasional lecture from one of the men who have devoted themselves to developing this branch of surgery would be both interesting and instructive for students, a special series of lectures is not yet called for.

Urology.—In this country urology is still largely in the hands of the general surgeon, and is taught by him. Whether it will ever break off completely from general surgery is doubtful. The special accurate methods of coming to a clear diagnosis in this field are unequalled in any other branch of surgery. The student must see the diagnostic methods carried out and learn with what accuracy a lesion may be tracked down. I find that there are very few students who are not thoroughly familiar with all the modern methods of diagnosis in this specialty, which at the present time has the highest percentage of accurate pre-operative diagnoses of any branch of visceral surgery.

Anaesthesia.—The teaching of anaesthetics to students has been handicapped of recent years by the multiplicity of methods and of drugs that have come into use. In this essentially practical art lectures have comparatively little value. All students should give, under supervision, ether, gas and oxygen, and local anaesthesia. It is here that the student who is resident in hospital or is acting as an un-

qualified clinical assistant gains such valuable experience.

Radiotherapy.—In the treatment of malignant disease of the buccal cavity the surgeon has been largely replaced by the radiotherapist. As there is a tendency to segregate these cases for radium or x-ray therapy one must ensure that the student is kept in touch both with their diagnosis and with their treatment. At least two visits to the radiotherapy unit should be made by each student. In the course of senior lectures on surgery two lectures on radiotherapy, its possibilities and limitations, should be given by the specialist in that subject.

I have omitted to refer to venereal disease as it is now controlled and taught by members of what is almost a special branch of medicine. My only remark would be that, important as the subject and high as the standard of teaching undoubtedly are, this specialty must not be given an undue proportion of the student's time.

Conclusion

To sum up, the teaching of surgery offers great scope for training the student in accurate observation and in living pathology. Intensive study of a particular case is infinitely more important than learning the accumulated wisdom of others concerning the patient's disease. To acquire the habit of correlating clinical symptoms and signs with pathology is the essence of medical training, and surgery offers a fruitful field for this acquisition. The young graduate who starts in practice versed in the broad principles which surgical teaching supplies, trained in the methods of examination whereby facts may be disclosed and in the logical inferences that may be drawn from them, may know very little of operative technique and detail, but will have the essentials for successful and enlightened practice.

THE PROFESSION OF MEDICINE

In accordance with long-standing custom we preface the main contents of the annual Educational Number of the *British Medical Journal* with some remarks by way of guidance to those who contemplate entering the profession of medicine. What is said here will follow the lines laid down in previous years; but readers of each subsequent section should bear in mind that not only the methods of medical education but even its purpose are still under close scrutiny in responsible quarters.

THE STUDENT'S CURRICULUM

A revision of the medical curriculum has been under consideration for the last few years. Four important reports on medical education have been issued—the final report of the American Commission; the report of the British Medical Association's Committee; a Bulletin on "Medical Education and the Reform of Medical Studies" issued under the auspices of the Health Organization of the League of Nations; and the report of a Conference of Representatives of the Universities of Oxford, Cambridge, and London, the Royal College of Physicians of London, the Royal College of Surgeons of England, and the Society of Apothecaries of London. They may be said to be essentially at one as to the main points in which reform is required. So far as relates to the British position, there is common agreement that it is undesirable to lengthen the five years' medical course, but it is recognized that the course should be regarded as beginning at the time when

the study of human anatomy and physiology is entered upon, and that this should be at approximately the age of 18 years—slightly later than is permitted under the present regulations. It is held, further, that a higher standard of general education than the present minimum should be required of those entering upon this course; that the requirements as to knowledge of the basic sciences of physics, chemistry, and biology should be modified and extended; that instruction in psychology, genetics, and methods of clinical examination should be introduced into the first two years of the curriculum; that the course should be regarded as a whole, with greater co-operation among the teachers of the several subjects, and not divided into segregated departments; and that, throughout, the preventive and psychological aspects of medicine, the living human personality in health, the sociological duties required from medical practitioners, should receive more prominent attention than has hitherto been common. At its meeting in May last year the General Medical Council passed new resolutions and recommendations carrying into effect the suggestions just enumerated. These are to come into force on November 1, 1938. Though the new pre-registration requirements will not apply in every respect to students entering on their studies before that date such students may well familiarize themselves with the changes which become operative before their period of study is completed. Moreover, parents of intending students should have in mind that