THE VALUE OF ANATOMY.

BY

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THE interesting address by Sir Berkeley Moynihan on "The approach to surgery," published in the *BRITISH MEDICAL JOURNAL* of October 8th, 1927, emanating as it does from such an authoritative source as the President of the Royal College of Surgeons of England, commands the serious attention of those of us who are engaged in the teaching of anatomy. His strictures on the present-day teaching of anatomy, supported as they are by Sir Arthur Keith, the distinguished curator of the same institution,¹ surely constitute a challenge to all anatomists. Unless someone attempts to meet the charges they will pass for true, and the temple of anatomy will be destroyed and false gods may be set up in its stead.

It is not quite clear whether the distinguished President, when he advised a limited study of anatomy, was directing his advice only to those who wished to specialize in surgery, or whether he wished his remarks to apply as well to the general undergraduate approach to the surgical side of the medical qualification. The mere fact that he addressed his words to undergraduates, and to those who are responsible for their teaching, leads one to believe that they were meant to apply in this case also, and that he is on the side of those who would restrict the opportunities for the study of anatomy.

I venture to think that his views will not meet with the approval of all surgeons, but it is as an anatomist that I wish to challenge them, because I think that there is a great danger of the position of anatomy in the medical curriculum being still further jeopardized. It is already wedged in, in many schools, between the clamorous preliminary sciences, that precede it, and the actively growing clinical subjects, such as bacteriology, that succeed it.

The gravamen of the charge against anatomy would appear to be that anatomists do not teach sufficient function, for it cannot surely be maintained that they neglect this entirely. I do not think that it is fully realized what an enormous amount of knowledge of function is presented by anatomy without acknowledgement. An accurate knowledge of the attachment of muscles makes the functional result of their contraction obvious. Nay, more, as the surgeons must admit, this is almost the sole means of explaining the displacement of the parts in a case of fracture, and a consideration of the relative anatomical position of the structures is the guide in treatment. So it is with the joints, the action of which is determined by the shape of the bony surfaces involved, and by the position of the ligaments, such as the hinge ligaments. There is no need to repeat platitudes about the nerves and blood vessels. Suffice it to say that we seem to have inherited too easily a vast tradition of knowledge, which, like the art of walking, we do not appreciate till there is a danger of our losing it.

The case must be different with regard to such organs as the kidney. The anatomist seems to me to have done his duty when he has located its position and relations and described its structure. It remains for someone with an entirely different training, based on chemistry and physics, to deal with its function, and someone else with a still different training and opportunity to discuss the various derangements of structure and function. It is surely not necessary, in these days, to defend the many advantages of legitimate specialization. Whilst it is no doubt true to say that many of the great masters in the past successfully combined a number of subjects, all of them necessarily limited in outlook, it is no longer right to aim at being "a Jack of all trades and master of none."

It is difficult, therefore, to understand what Sir Arthur Keith meant when he stated in the paper referred to above: "Sooner or later—and the sooner the better if the student is to be served—a new dividing line has to be drawn between the departments of anatomy and physiology, and that dividing line should not separate structure from function." Surely there is a case for separating the

teaching and study of human biology on structural and functional lines. The former method of approach depends on a training with the scalpel and the microscope, the latter on a knowledge of chemistry and physics. The sterility which, after a fruitful start, has come over histology in the hands of the physiologists is largely the result of its having been placed in uncongenial surroundings. There are signs of a rejuvenation in this subject now that it is being restored, in so many schools, to its proper place—namely, in closer relationship to anatomy than to physiology.

Nothing that is said above is to be taken as indicating that the teacher of anatomy should not avail himself of every opportunity of suggesting in a word that structure and function are invariably harmoniously related, and that our interpretation of the reactions of tissues to disease is predetermined by the conceptions we have already formed of the two former. Nor can one afford to neglect the light that is shed on all aspects of disease by a knowledge of morphology in its widest sense. In this last connexion it is only necessary to refer to the knowledge of, and control over, pituitary disease that is being gained by suitable co-ordination of researches into the anatomical, developmental, morphological, physiological, pathological, and clinical phenomena of this curious organ. But it is not possible to expect that any one man could be suitably qualified to discuss all these aspects of this one problem. A certain amount of isolation is therefore unavoidable, and in fact has its advantages, provided some means of co-ordination can be evolved lest the student be unable to see the wood for the trees.

The second charge is that anatomy is a somewhat lifeless subject. This must be true in so far as it is necessitated by the nature of the material, but I doubt if the mental effort necessary on the part of the student to transfer the knowledge gained from the dead body into terms of the living patient is any more difficult than in the case of pathology. Nor is it scientifically or pedagogically less sound to teach the living structure from the dead than to transfer by analogy the results of observations and experiments on the lower animals to the case of man, as is done in so many of the other medical sciences. The fact remains that anatomists, like all other medical teachers, are attempting as far as possible to adjust their teaching to its ultimate purpose—namely, the education of the efficient medical practitioner.

The study of anatomy is often regarded as the mere memorizing of a vast number of relatively useless and even meaningless facts, and, taught at its worst, it is possible to look on anatomy in this light. There is a greater danger of this happening if the anatomist or even the physiologist has not had sufficient clinical experience. It is apt to be forgotten, however, that anatomy is one of the most accurate descriptive sciences, and a training in the art of putting into words the appearances of things seen must be of no small virtue for medicine, whose advance depends on accurately recorded observations.

Apart altogether from the great intrinsic value of the facts of anatomy, one of the greatest advantages which accrue from its study is the training which it gives for the hands. My own experience is that students come from school and from their previous training utterly devoid of any manual skill. A comparison between a man's first efforts at dissection and his last is a sufficient demonstration of the great development of his sense of touch and of his manipulative, not to mention artistic, skill that has been acquired in the interval. This is sure to stand the future practitioner in good stead, for in his practice he will have ample need to use his hands. Yet the medical curriculum is not over strong in the training which it provides in this direction, for in the existing circumstances a large part of even the surgical training is received in the galleries of operating theatres. It is true that it is an inspiration to see the highest flights of anatomical craftsmanship being executed on the living by masters like Sir Harold Stiles, but the masters have one day to be understudied by the interested spectators, and we are here discussing the best methods of approach to the ideal surgeon.

As I see it there seems to be a confusion of ideals as regards the type of training necessary to make a good

¹ Sir Arthur Keith, *BRITISH MEDICAL JOURNAL*, September 4th, 1926, p. 410.

doctor or surgeon. Whilst it is always desirable to introduce students to the methods employed in research, this should not be done at the expense of a good technical training in the procedures that are known to make efficient practitioners. Although the two ideals are compatible and constitute the essence of good teaching, yet there are times when one aspect is apt to be overstressed. There is a danger that, in emphasizing the value of an experimental training for the surgeon with a view to qualifying him for research, we may neglect to make the good craftsman, which is just as important, at least for the patient.

It is not as if the experiments undertaken had always much of intellectual virtue in them. The pedagogic practice of shaking two known solutions in a test tube and getting some foregone conclusion is of doubtful value, nor is there much to be gained over reading in making an analysis by rule of thumb. There is little training in technique and less in judgement in the usual routine tissue observations, following as they do cut-and-dried lines. There is room, therefore, for much putting of the house in order, but there is no need for bolshevistic methods, nor are all the defects to be laid at the door of anatomy, nor can all the reforms be made at her expense. The use of living models by anatomists is a step in the right direction, but the next step must be the rewriting of the textbooks of anatomy with a new orientation towards the other medical subjects, and paying more regard to the relative importance of the various details, and to the limited time at the student's disposal.

Nevertheless, and without feeling unduly complacent, anatomists have every right to review their two thousand years of continuous scientific teaching and study with a good deal of satisfaction. Although some would hold that the golden age is past, there is little need to disparage a subject that has for so long been regarded as the basis of pure art and the foundation of scientific medicine. Even the moderns need not despair of a science that in recent times has given birth to the hefty twins morphology and embryology, which have provided the thunder for the theory of evolution that has transformed human thought. Nay, more, anatomy is still fertile and pregnant with the new science of physical anthropology, which if it fulfils its promise will revolutionize medicine with the light which it may throw on the human constitution and its structural predispositions to disease.

Even if the lean years appear to have fallen upon some countries it is a consolation to know that, in American schemes of medical education, anatomical laboratories are rightly dominant and productive, so that the sun of traditional anatomy is apparently not yet set.

CANCER OF THE RECTUM.

ANALYSIS OF RESULTS OF OPERATION.

OF all deaths registered as due to cancer of the digestive tract the largest proportion occur within the rectum. In this situation cancer is readily accessible both for diagnosis and treatment, yet surgeons have often complained that about half the cases when first brought to their attention have advanced too far to warrant an attempt at radical removal. Since education seems so necessary on this subject it is fortunate that the Ministry of Health Departmental Committee on Cancer decided to choose cancer of the rectum for special statistical investigation. The report of this committee has now been published.¹ As with previous reports, such as those on cancer of the breast and uterus, the method adopted has been a comprehensive survey of the literature, in this case embracing the publications from ten different countries concerning nearly 6,000 cases of cancer of the rectum. We propose to quote briefly the conclusions of the report, and then to comment on certain important questions which this statistical analysis raises for discussion.

Main Deductions.

The findings of the inquiry are as follows:

1. On the average a period of twelve months elapsed between the occurrence of the first symptom of the disease and the patient coming to operation.

¹ Ministry of Health. Reports on Public Health and Medical Subjects. No. 46. H.M. Stationery Office. 1927. Price 1s. 6d.

2. Rather less than half the cases when seen by the surgeons were considered to be operable.

3. About one-sixth of all the patients who underwent a radical operation died as the result of such operation or from causes connected with it.

4. There is evidence, though limited, to show that the mortality from operations is much higher than the average among those patients who are in an advanced stage of the disease.

5. Two out of five of those submitted to radical operation were alive three years afterwards.

To put the whole conclusion in one sentence—patients come to the surgeon too late, radical removal is itself a serious risk, and less than half of those who submit to it are alive three years afterwards.

The Questions at Issue.

Faced with this sombre picture we are entitled to ask if any advantage is gained by surgical treatment. How long will a patient with cancer of the rectum survive if he receives only palliative treatment, and how does his expectation of life compare with the average patient who enjoys the full benefits of surgical skill?

When the Ministry of Health report is searched for an answer to this question some details are found which seem to be well worth bringing more clearly into view. Thus, an analysis of 2,543 cases submitted to radical operation during the past fifty to sixty years shows that the average number of years of life for each patient up to the end of five years after operation was 2.53. This may be regarded as the expectation of life for the average treated case destined to die within five years. The figure for the untreated case (obtained by a modification of the survivorship table in Dr. Greenwood's "Natural duration of cancer," Report No. 33) is 1.59; so that, on the average, radical operation prolongs the life of a patient by 0.9 year (for patients dying within five years), or, in other words, the patient submitting to radical operation but dying within five years has an advantage of 59 per cent. over the untreated patient.

Whether or not the treated patient will receive the full benefit of this advantage from surgical intervention appears to depend to an unexpected degree upon the nationality of his surgeon. This fact is strikingly illustrated in Table 9, which gives the published results for six countries since 1890. Of 2,344 patients with regard to whom the necessary information is available 39.9 per cent. are estimated as having been alive three years after operation, but when grouped according to their country of origin the percentage is found to vary from 26.9 to 51.4 per cent. It is gratifying to find that England heads the list with the highest percentage of three-year survivors. But a careful study of other sections of the report will suggest many reasons for the wide range of variation in the operative results of different countries, two of which—the standard of operability and the type of operation performed—are of particular importance in this connexion.

At present there are no generally accepted criteria of operability in cancer of the rectum, each surgeon being guided largely by his own personal experience and the type of operation he practises. Obviously a cautious interpretation of the operability standard is likely to produce better statistical results. The whole question of operability is discussed in the report, and 5,231 cases are reviewed from this point of view, but this part of the abstractor's labour has been comparatively barren. It would not be too much to say that operability in cancer of the rectum could only be expressed in exact figures when statisticians have found a way of measuring surgical initiative and experience, and assessing the operative facilities available in any particular circumstances. The type of operation performed, however, is eminently a subject for statistical analysis, and in this respect the report offers useful figures, though not perhaps so large as could be wished.

Chief Types of the Radical Operation.

The radical treatment of cancer of the rectum has come to be standardized into three chief types of operation—the perineal, the sacral, and the combined or abdomino-perineal. When the results are considered in relation to