Arris and Gale Lecture

ON

ANATOMY, ORTHODOX AND HETERODOX,
IN RELATION TO SURGERY.DELIVERED BEFORE THE ROYAL COLLEGE OF SURGEONS OF
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BY

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WHAT was orthodox in 1646 when Edward Arris founded the lectureship was that the holder of the office, which I have the honour to-day to possess, should be a "Reader of the Muscular Lecture." I leave it to you to judge exactly what was meant by this title, for by it I shall undoubtedly be heterodox now. My later predecessors in office were styled "Masters in Anatomy," and included Percivall Pott and John Hunter.

John Gale founded the Gale Lectures in 1655, nine years after the foundation of Arris, but the earliest recorded lecture under this trust was in 1698, when Dr. Havers, of Haversian canal fame, was appointed to deliver "an Anatomy Lecture called Gale's Anatomy." Subsequently it was styled "The Osteology Lecture." Thus we have these two ancient foundations concerned with muscles and bones, and I am not so very sure that we have got away from the trammels of osteology and musculature even in the present, when the student starts learning facts concerning these, and spends perhaps far too much time thereon. In 1810 the foundations were united, and in 1857 the title of the lecturer was changed to that of Professor of Human Anatomy and Surgery. In 1864 it was enjoined that there be three lectures each year, and upon human anatomy and physiology, but it was with the desire to revert to the older title that I have chosen the subject of my lecture to-day. Our President, Lord Moynihan, held the lectureship in 1899 and 1900, and possibly he may remember how he thrilled his audience by his dissertation on retroperitoneal hernia, and the rarer forms of hernia, a subject which I had, and still have, very much at heart.

Now what is orthodox and what is heterodox in anatomy? Orthodoxy we must take to mean merely the holding of right or correct opinions—that is, such opinions as are currently accepted as correct. We have to remember that the stake has claimed some who held similar opinions. Heterodoxy is presumably the opposite—that is, holding opinions not in accord with established doctrine or practice.

Orthodoxy in anatomy may be described as the orthodoxy of the textbook, the teacher, the teaching, and the examination, both anatomical and surgical. Many a student has said to me that if a statement is found in a textbook it must be correct. But it is the wise man who doubts even infallibility, though he must be prepared possibly even to suffer for his rashness.

A statement, further, may be right, but it may be so interpreted by the reader as to be wholly wrong. You know the tale of the candidate in an examination in chemistry who astonished his examiner by asserting in his written reply to a question concerning hydrogen that this gas "was not found in Ireland." In the viva voce he was taken to task concerning his statement, but persisted that he was right, and that it would be found in his examiner's book on chemistry. The volume was procured, and on the appropriate page there appeared these words: "Hydrogen is seldom if ever found in the free state." To such—may I call them parasitic students?—I have generally ventured to say that with greater experience they would find that modification of exact statements even in textbooks is good for the soul, although it

might lead to a shaking of faith in so-called "orthodoxy." Many a younger teacher has confessed to me that he was in the trammels of the textbook orthodoxy, and dare not attempt to escape therefrom when instructing those under his tuition. This is deplorable. Better be bold than cowardly, better break the bands of tradition than continue to stereotype what is not true to fact.

The teaching of anatomy, it is often said, must be along orthodox lines because the syllabus and the examiners force it to be so. It is true that the overpressure of examinations is too great, but it is almost inevitable. Sir Michael Sadler, when commenting recently upon this subject, said that examinations acted as a "cold shadow on education," and that students thereby "learn things on paper instead of going direct to the facts themselves." What a sidelight this is on the student reading anatomy in the library rather than dissecting in the rooms or feasting his eyes upon the beautiful anatomical preparations of our College museum!

Heterodoxy in anatomy implies, it would seem, a disbelief in much of the old tradition and teaching, in conforming less and less to the preconceived ideas of our forefathers when facts force us so to do. Careful observation is the father of correctness in description, and familiarity with form tends to improve comparison.

ERRORS OF OBSERVATION AND DESCRIPTION.

Anatomy has been built solely on the results of observation; imagination works havoc if it is allowed to enter this domain. But some very obvious errors—obvious to us—have been perpetuated as the result of observation on the cadaver. An extraordinary example of this is the term "artery," an air-conveying tube. Nothing is farther from the truth, but it would perhaps be sheer pedantry to attempt to change the name of this type of vessel after so long a usage. It is probably on account of this error that even the modern novelist attributes much more importance to the "veins" than to the "arteries" of the "subject" with which he is dealing.

There are, however, many other glaring instances of looseness in nomenclature and of description, which should have been based on careful observation, and should be changed even to-day. I will mention but a few of these to show what I mean thereby.

Submaxillary lymphatic glands. This is wrong. There are two maxillae and there are lymphatic nodes—not glands—and these are not directly below either of them, but they are beneath the mandible. Therefore, these lymphatic nodes should be styled submandibular lymph nodes.

Deep cervical fascia. I venture to assert that no surgeon, however many times he may have undertaken dissection in the neck of a living person, has ever seen this structure. The elaborate description given in most textbooks on anatomy serves only to bewilder the student and is of no use to the surgeon.

Pott's fracture, which should be termed the lateral fracture dislocation at the ankle-joint, is usually stated in the surgical textbooks to be a fracture of the fibula with tearing of the internal lateral ligament of the ankle or separation of the internal malleolus, and displacement of the foot outwards, and this, regardless of how the anatomical factors insistently influence the production of the lesion and the displacement of the foot. Reviewed from an anatomical point of view, this fracture-dislocation should be described thus: The strain of the body weight being suddenly brought to bear upon the mesial ligament of the ankle-joint, the mesial malleolus is dragged off at its base, the bone being more brittle than the elastic ligamentous tissue. The force now acts through the astragalus on to the lateral malleolus, but the fibula is held firmly to the tibia by the distal tibio-fibular ligament. Hence the strain is in reality on the fibula at a spot which is proximal to the ligament, and the fibula gives way, with the line of the fracture from above downwards and laterally. Then displacement of the foot occurs immediately, and in a direction which is lateral, with eversion, and backwards and upwards by the pull of the strong

gastrocnemius and soleus muscles through their calcaneum tendon. (See Figs. 1, 2, 3, and 4.) The description, I grant, is "heterodox" when viewed from the traditional textbook read by the student, but it is really "orthodox" when viewed in the light of anatomy. I leave you to judge which is the better.

of the m. obliquus externus . . . giving rise to an acute angled space." Obviously, this is intended to convey the idea that the superficial inguinal aperture is a triangle, and not an annulus.

Turning to the most recent textbook on surgery, still worse nomenclature is perpetuated. The expression

FIGS. 1, 2, 3, AND 4.—Illustrating the anatomical bearings in a typical Pott's fracture.

The Anatomy of Inguinal Hernia.

I have paid particular attention to this subject, and especially in the living person, and I am convinced that a large portion of the orthodox description of the parts as given in many of the leading textbooks of to-day, both of anatomy and surgery, is grossly misleading. Time will not permit me to give more than a few instances to prove my contention.

The latest edition of one of the most popular textbooks on anatomy makes the following preposterous statements: "A triangular opening, the subcutaneous inguinal ring." But how can a triangle be a circle? (See Fig. 5.)

Again, "The inguinal canal extends from the abdominal inguinal ring to the subcutaneous ring." I venture to ask each one of my listeners this afternoon, has any one of you actually seen an abdominal inguinal ring? Frankly, no such opening exists in the living subject. I am quite willing to admit that when an oblique inguinal hernia is present, the sac at its connexion with the parietal peritoneum may have a thickening upon it, which may be styled a "ring," but this is a pathological condition, and not one to be found in the normal body. There is no such opening as that which used to be called the "internal abdominal ring." Then why perpetuate its existence or quasi-existence?

To crown all, we are told "the seat of stricture is either the abdominal or the subcutaneous ring; most frequently at the former situation." Extraordinary! How can strangulation be caused by the edges of a non-existent opening? But another textbook on anatomy makes a still more astounding statement: "The place of exit of an inguinal hernia is a split in the aponeurosis of the obliquus externus." And yet a patient may die of the results of strangulation of an inguinal hernia which lies completely within the inguinal canal!

Lastly, here is a quotation from a Continental anatomical work. "The annulus inguinalis subcutaneus . . . is formed by the separation of the lowest fibres of the tendon

"internal abdominal ring" cannot be maintained on any grounds, even if such an aperture existed, for it is not "internal" but "deep," it is not "abdominal" but "inguinal," and it is not a "ring" but an "aperture"; but above all it does not actually exist, except perhaps as an abnormality. Now this from the same book: "It is always possible to invaginate the skin of the scrotum and insert the finger into the hernial aperture, to explore its extent and relations, and to detect any impulse." No wonder an action was brought once against a medical practitioner who performed this manoeuvre, his patient alleging that his doctor had actually caused his "rupture"!

I have recently seen instructions issued eighty-five years ago for determining the physical fitness of candidates for the City of London police force. Among the more common

causes of rejection is mentioned "Hernia, or a tendency to that disability from preternatural enlargement of the abdominal ring." This "ring" I take to be what the examiner in those days would have called the "external abdominal ring." This aperture, of course has nothing whatever to do with the incidence of an oblique inguinal hernia, and not often greatly to do with its progress. I much fear that examination has not advanced greatly since that day in 1844, for I recently heard several well-known surgeons still teaching this nomenclature, when, of course, the right term is "superficial inguinal aperture."

Fig. 5.—Diagram of the superficial anatomy of the inguinal region.

the inguinal region, but it is only one example of many which I could quote to prove my contention of the need of more "heterodox" anatomy. I now turn to what I may call "heterodoxy in the teaching of anatomy."

I was impressed as a teacher myself, and perhaps still more as an examiner in this subject, with the cramping character of the "isolated" anatomy taught and its effect upon the examinee. By "isolated" I mean anatomy unconnected with the future professional work of the student when he becomes a general medical practitioner, and not

THE TEACHING OF ANATOMY.

I have been, perhaps, too insistent on this one area of

only in the "surgery" of the same, but almost equally in the "medicine" of this class of practice.

I am still of much the same opinion, although a quarter of a century has passed since those days. But in order that I might be really up to date in information on this matter, I wrote to a large number of the present-day professors of and lecturers on anatomy, putting before them two questions:

1. Are you satisfied that the present system of teaching anatomy to the average student conduces to a knowledge really helpful to general practice?
2. If not, what changes would you suggest?

I have been honoured by replies from twelve, and their answers have been so helpful to my subject that I shall venture to make general use of much given, and to refer in detail to some of them. Seven—more than half—are not satisfied that a really useful knowledge of anatomy is obtained by the average student. This opinion is not due to modesty in teachers who desire improvement and are uncertain that their method of teaching is the best. Their teaching has to be "orthodox," partly because the student is examined in the "orthodox" manner, and partly because the textbooks are still too "orthodox." Some give examples of this contention, and I will inflict one upon you.

Here is an "orthodox" anatomical question, which on the surface looks quite sound: "Describe the ankle-joint." While to the "book student" it should have no terrors, and the reply to the question may be all that is required by the examiner, there is but little in it to draw forth that deeper knowledge which is going to be the practitioner's standby in practice. The same question couched in heterodox terms might be: "What movements can take place at the ankle-joint? Describe how they are controlled and limited." There is "spirit" in a question put in this way, while the former is "dry" bones or little more.

The teaching, therefore, for the "orthodox" question need be no more than the stereotyped textbook description, but for a good reply to the "heterodox" question it would be necessary that the teaching should be admittedly "heterodox." To carry out such methods of teaching would necessitate the use of an x-ray plant for screening the joint and its movements, the employment of a living subject for the same, and the inspection of a badly set fracture-dislocation at the ankle-joint. In this manner can be demonstrated the reason why the anterior dorsal surface of the astragalus is broader than the posterior, and that lateral movement can only be obtained in plantar flexion because of the locking which occurs in full dorsiflexion. Structure and function are here depicted and closely co-ordinated, instead of the divorce so frequently found in the orthodox teaching.

In a recent examination paper in surgery every one of the questions, and perhaps rightly, had a distinct anatomical bearing. The two questions above the line, one of which had to be answered, were purely anatomical, as intended they should be, and were very orthodox at that. One referred to the prostate and the other to the pronator radii teres. The other four "surgical" questions were concerned with "cut-throat," obstructive jaundice, acute otitis media, and caries of the lower thoracic region, and not one of them could be answered well and sufficiently without a good practical understanding of the anatomy of the several regions involved. Now, did the students who sat for this examination have their anatomy brought before them in the orthodox manner, and with little reference to abnormal conditions such as those upon which they were being examined, or was their anatomy presented to them as a "living" subject fraught with all the probabilities of their actual work in practice?

If, then, anatomy looms so largely in many examination papers, for this reason alone it is desirable that the student in his later years of the curriculum be taught more anatomy from the clinical point of view than perhaps he has ever been so taught before. I was so struck with this necessity that in 1906 Dr. C. R. Box and I collaborated in writing a book on "Clinical Applied Anatomy," to which we gave a sub-title, that of "The Anatomy of Medicine and Surgery." Nearly half a century previous to this John Hilton had produced his classical work on "Rest

and Pain," and we were imbued with the idea that the right way in which to approach clinically applied anatomy was just the opposite to that in which it was usually approached.

The "orthodox" manner was to deal with the different parts of the body and to link on to the description of them some remarks as to the abnormal conditions that might appear therein. The "heterodox" view that we took was that the subject would be better reviewed by taking the various diseases, disorders, and injuries to which the human frame was liable, and show how anatomy influences their incidence and progress. In this endeavour we purposely omitted all non-essential anatomical points, and made the work a practitioner's rather than an anatomist's view of anatomy. Some may possibly regret that this work is now out of print.

It is essential that the student during his fourth and fifth years should maintain that knowledge of anatomy with which he was endowed when he entered upon his clinical studies, and it would probably be to his advantage if he even added to it. But I am convinced, and I think the opinion of most of the teachers of anatomy is the same, that much more of the "heterodox" anatomy should be available for the student prior to his entrance to the wards, if he is going to have the anatomical knowledge so needed in elucidating his cases therein. To this end I would further urge that it should be made possible for the student during the time of his dissecting the body to see typical clinical instances which illustrate common points in anatomy.

There are numerous "chronic"—that is, permanent—cases, which should be available at the time they are needed. I am thinking of such as a typical uncured ulnar nerve paralysis, which should show more forcibly than all the textbook description, and even the dissection of the nerve, its peripheral distribution, the characteristic position of the digits, and particularly that of the ring and little fingers. Then the anatomical reasons for the results can be demonstrated, and the student impressed with the fact that, after all, anatomy is of some real use.

I know that most of the teachers of anatomy would welcome a much closer connexion between their department and the clinical side. When the medical school and the hospital are adjacent, there should be no real difficulty in bringing about this co-operation, if both parties were really keen on the matter.

Why should not the anatomist be invited to the ward, there to give a short dissertation on the anatomical bearings of the case at hand? Or why should not the surgeon visit the anatomical department, and there instil into the anatomy student a desire to know anatomy because it is going to be a matter of real importance to him in the future?

CONCLUSIONS.

I would sum up what I have endeavoured to put forward in this lecture.

1. Anatomy must be freed from the trammels of "orthodoxy" if it is to be of real use in surgery, and particularly the surgery of general practice.
2. The teaching of anatomy is still far behind what it should be in reference to surgery, and the anatomical knowledge of the average general practitioner is not practical enough.
3. The teaching of so-called "clinical applied anatomy" requires to be organized in a much more definite manner, and should occupy even more time than it does when it is taught best.
4. The recriminations, still extant, of anatomist on clinician and of clinician on anatomist might all disappear, and watertight compartments obtain access to one another.

What of the future of anatomy? We need have no anxiety. Anatomy will ever be with us, and that is good. Anatomy will never change—it is the most concrete of sciences, except perhaps that of mathematics. But the facts of anatomy are not likely to diminish in number; they will grow, and probably grow enormously, as knowledge of the human body increases. Then it will be still

more impossible, if this can be, for one human brain to assimilate the whole of these facts and put them to practical use. The burning question even now is, How many of these facts is it desirable—should we say necessary—for a general practitioner to know?

What I wish to further is the teaching of anatomy in such a manner that the finite mind may obtain and retain those which are essential. I consider that this requires a good deal of "heterodoxy" in the relating of anatomy to surgery.

A British Medical Association Lecture

ON

THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS.*

DELIVERED BEFORE THE FIFE BRANCH, OCTOBER 31ST, 1929,

BY

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(With Special Plate.)

To attempt, in however sketchy a fashion, to cover the ground indicated by the title of this address, appears little short of ridiculous. But a bird's-eye survey, if it can be compassed, admits of some sort of perspective, and thus helps to compensate for its superficiality. It is in this hope that I shall put before you, not a synopsis of the monstrous literature which has grown up on the subject, but a brief and I hope practical summary of the procedures on which I mainly rely for diagnosis and treatment in the tuberculosis department of Gloucestershire, the county to which I am attached.

That county, it may be mentioned, shows significant variations from other counties in its arrangements for carrying out the medical services statutorily imposed on it. As regards tuberculosis, there is a fusion of the offices of tuberculosis officer and sanatorium superintendent, which is, or ought to be, very valuable; and the county also possesses a treatment scheme, peculiar to itself, initiated over eight years ago through the pioneer work of the county medical officer of health (Dr. J. Middleton Martin). Under this scheme fifteen centres have been opened throughout the county staffed by the local practitioners and designed to treat the various types of cases for which a local authority has responsibility. The doctors have at call the services of the recognized consultants in the area. This scheme has recently been commended to the Council of the Association by the Gloucestershire Branch as the ideal method in a county area of securing the co-operation of private practitioners in public health services. An integral part of the scheme is that cases raising the suspicion of tuberculosis are grouped for examination at my periodical visits. As these out-stations are additional to the usual dispensary organization it will be seen that the opportunities provided for a second opinion are particularly good. My experience in the county comprises over 14,000 patients, and the sanatorium under my charge has 250 beds. For the sake of simplicity I shall, in what follows, exclude children from consideration.

DIAGNOSIS.

It is a curious fact that doctors, in the matter of diagnosing tubercle of the lung, tend to fall into two groups: those who on the strength of a suspicious symptom or so, with occasional indeterminate signs, such as a few scattered rales, are prepared almost light-heartedly to label a case tuberculous; and, on the other hand, those who wait

till physical signs cry aloud for judgement. For a department like mine, needless to say, the line of least resistance is: when in doubt, diagnose tubercle. There is an ever-present danger that this diagnosis becomes simply a dumping ground. Yet a lifelong handicap may be imposed on a patient because of an ill-founded diagnosis of pulmonary tuberculosis, and however successful a sanatorium may be as a general convalescent home, that is not its function.

Of the cases sent to us year by year we give an opinion that tuberculosis is not present in between 30 and 40 per cent. It may be objected that early cases are being missed, that the golden opportunity is being allowed to escape. This, of course, is the bugbear of a tuberculosis officer's life. To that objection I reply, first, that in a large number of cases an alternative diagnosis is established. The symptoms are found to be due to diabetes, or cancer, or heart disease, or syphilis, or pernicious anaemia, or some other debilitating or wasting disease. I have also seen quite a number of young girls whose symptoms were dependent on an unsuspected pregnancy. These conditions, and many others, which like them have nothing to do with the lungs, have been found during the ordinary dispensary examinations.

In the second place, I reply that, with regard to lung cases, we have to face a formidable test of the accuracy of our negative diagnoses. Unless the patients remove from the county altogether, the fact of a subsequent notification of tuberculosis, by whomsoever made, is known to us. And should any of these patients die, and the word "tuberculosis" appear at all on the death certificate, that fact also infallibly reaches us. This furnishes a severe and continuously operating check on our accuracy or otherwise. There is, fortunately or unfortunately, nothing resembling it in ordinary general or hospital practice. From these ultimate tests we have so far emerged without finding cause to modify our standards.

But assuming that a patient is suffering from tuberculosis, we are doubtless all at one in wishing to have the diagnosis established, if possible, at an earlier stage than it commonly is at present. The need for this is admitted on every hand, though the frequent assumption that early diagnosis necessarily implies a good prognosis is not always well founded. Delayed diagnosis is not necessarily the fault of the doctor. Two weeks ago I saw at a dispensary a man who had seen his doctor for the first time only the day before. He had not lost a day's work; he said he felt well and took his food well. His only complaint was undue tiredness. Yet his temperature was 102° F., and he had active tuberculosis of most of one lung, with a large cavity. There must be few diseases which can advance to such a stage without arousing the urgent interest of the patient in his own condition. But this is rather an exceptional case. I think it must be admitted that there are other cases, even in considerable numbers, where the opportunities for examination have occurred and in which any doubt as to the diagnosis might have been resolved earlier by everyday clinical methods.

I hear very often the statement that chest cases are extremely difficult. Admittedly an obscure chest case may present as difficult a problem possibly as any met with in practice; but my point is that such cases are not nearly so common as some medical men suggest. Certainly I see many cases in which the diagnosis is *too* easy—cases which should cast no strain whatever on the clinical acumen of the examiner, but which have managed to get through the meshes of the diagnostic net.

SCHEME OF EXAMINATION.

Let me put before you, shortly, elementary though it may be, the scheme which I adopt for the investigation of a case of suspected pulmonary tuberculosis.

First the medical history is taken, and the symptoms elicited. There are some writers on tuberculosis who do not hesitate to diagnose on symptoms alone. I do not agree with them. Even haemoptysis, that most dramatic and significant of symptoms, may lead one astray. Having obtained the patient's story (and this well repays the time spent on it) he is then examined, stripped to the waist. It is surprising how often this first principle of chest examination is violated. If at all possible, the patient should

* The lecture was illustrated by numerous lantern slides.