ON OBSERVATION.*

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IT is a very great honour for a member of another School, but in the same branch of Medicine, to be asked to give this annual address; I appreciate it more than I can say, and I thank the members of the Council very sincerely for the privilege.

It is also a great opportunity, but this has certain limitations, for it would be unwise of me to speak of technicalities peculiar to our branch of Medicine, seeing that these will be dealt with in your postgraduate lectures, not only more fully, but much more efficiently than I could hope to do: and I say this, not out of mere courtesy to the teaching staff, but because recent examinations in our subjects have proved the high quality of the teaching at the Central London.

I have chosen the general topic of Observation as it applies to our department, and I have done so for the reason that, in the regular classes and lectures, there is no time to speak of so elementary a subject; especially too, because I regret that when I was in the stage which you, gentlemen, have now reached, the years round about thirty, my own teachers did not create in me the impression on this point which I most sincerely hope to convey to you, though perhaps it will only be to two or three of you.

You have reached that glorious stage in your career at which you have already felt the beat of your strong wings and are now starting out upon a fresh flight through the genuinely boundless atmosphere of medicine; your attitude of mind is one of complete optimism as you make that start, an attitude which, I believe, is not only essential for success, but which is perfectly justifiable.

I believe that there is no bar to any one of you becoming a great surgeon. Of poets, painters and mathematicians this could not be said; something inherent seems to be necessary for greatness in their fields; but for you who have already discovered that your hands are capable of obeying your desires, there is no such bar. If there are one or two here to-day who belong to the same generation as myself, they will I am sure agree that we have seen men who showed no extraordinary

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qualities in their student days, rise in due course to great things. And I think my contemporaries will also agree that such men have been conspicuous mainly for enormous diligence and untiring energy: diligence is not merely in routine duties but also in reading, so as to learn quite definitely both the resources at present at command, as well as the limitations of those resources up to date; in a word, so as to know just how far the art has progressed and in what direction fresh progress is required: diligence not merely in reading but in contemplation of the knowledge they acquired, and in the comparison of the new acquisitions with the old, so that seeing, as it were, round the corner, they added insight to their knowledge, and saw actually further than the writer: thus upon his scaffolding they erected lasting edifices.

A surgeon must also be untiring, for in his life opportunities do not occur hourly, and he must at all seasons be ready to seize opportunities and do the best possible. Ask your teachers and they will agree that surgical calamities usually occur at the end of a long séance in the operating theatre when forgetfulness of detail is apt to creep in. Therefore, preserve your bodily vigour by careful habits and by sport, and avoid unnecessary fatigue and wearing anxiety by the employment of good Staff work; that is to say, work out a formula for every kind of clinical examination which you have to make so that you need not weary your brain, wondering if you have not, for instance, omitted some essential test. In due course organise your teamwork so as to avoid errors in your assistants, and also unnecessary disturbance and breakdown in the face of crises.

All these things are common property which any vigorous man can develop. With experience, he will add to them surgical judgment, which is nothing more than the fruit of clear, straightforward, well-informed thought upon surgical problems. If in addition to these things a man has courage, enterprise and ingenuity, there is no reason why, granted opportunity, he may not be a great surgeon.

Opportunity is a point worth remembering; in every generation a few men carve out for themselves a great position though everything is against them; but good fortune has been a big element in most careers. I could name a case where a career was determined by a man chancing to stand at a certain door at a certain moment; and another, where the chance visit of a servant opened up a great position. I am not

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speaking of instances of success as estimated in motor cars and country houses, but of posts and responsibilities of national importance. The men concerned had great qualities and proved themselves capable of filling great positions, but it is likely enough that a dozen of their less fortunate fellow-students would have filled these positions equally well. At all events, be ready in case fortune smiles on you, and do not forget that opportunities in our profession have of late years enormously extended. Medicine and surgery have made great advances, but the most beneficent advance of all has been the diffusion of knowledge, experience and skill throughout the country. Some of us can recall the time when certain operations could be performed adequately by, say, only half a dozen men, whereas to-day they are the routine at every Cottage Hospital, and small towns everywhere now offer chances of advanced surgery.

Your entrance at this Post-Graduate School is in itself evidence of your intention not merely to be ready to seize opportunity, but of your determination to excel. There is no obvious reason why that determination should be thwarted, and it is almost a certainty that one or two of you will attain genuine excellence.

My theme to-day is that all the qualities and activities which go to the make-up of a good surgeon, can be, and daily are, nullified by the lack of correct observation. That of acute observation is among the humbler of the surgeon's faculties; it is possessed in a high degree by all the great men, and these, taking its possession as a matter of course, are apt to omit it from their teaching. It is supposed to have been grounded at the kindergarten stage of life and thoroughly confirmed in the anatomical and physiological laboratory; but that supposition is not true of all of us.

I go so far as to say that actually the majority of us do not see the things we look at nor hear what we listen to, and that that very humble faculty of correct perception is very generally absent. Lacking it, you may, granted other valuable qualities, make a large income, even larger than the acute and accurate observer; but you cannot be a great surgeon. We have all seen cases treated by good and honest men for weeks for Disease A. Better observation would have shown them that the case was Disease B, requiring wholly other treatment, or perhaps none at all. It is an instance of failure.

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But at the outset, let me urge no one to be discouraged when error in observation has been proved against him, for I assure him that it occurs in the "best possible circles" in our department of surgery—and it is absolutely certain to occur during your first months of work here.

There are certain pitfalls and facilities for error in our specialty. Firstly, we use unnatural, artificial reflected light, and often have to examine images reversed in a mirror. I have noticed among my own post-graduate students, a marked facility for misusing the forehead mirror. I suppose all text-books give the details of the business: these you read at night, and probably forget in the out-patient room. May I venture, therefore, to remind you that you are the master of the forehead-mirror, and not the mirror of you; that you must twist it till it permits you to look down the centre of the illuminating beam with your head in comfort, while that beam is thrown upon the object along what is often, in essence, a narrow tube. The object, the orifice, the window in the mirror and your eye, these four things must be in one straight line as you sit in comfort with arms free for skilled manipulation, and the beam of light must correspond with that line. If you are not at ease, do not be satisfied until the demonstrator has put things right, and then practise on your fellow students until it becomes a second nature. You cannot observe accurately when in a state of physical discomfort.

Secondly, much of our observation is monocular. It is a complete but common error to suppose that with monocular vision you cannot judge distances. To do so is not so easy and natural as with binocular stereoscopic vision, but it is perfectly feasible at all the distances we deal with, if only you will focus a clear image of first one and then another part of the picture. If you are inclined to think this remark fantastic, try the test of the Royal Flying Corps wherein with one eye, the candidate attempts to bring a movable object to a level with a fixed object at 20 feet distance. At my first three attempts, I found my eye correct short of $\frac{1}{4}$, $\frac{3}{4}$ and 1 inch respectively at 20 feet.

The phenomenon of parallax helps in this judgment of distance. An owl on a perch, before he seizes food held before him, moves his head in a circle on a plane perpendicular to his vision; some such movement of the surgeon's or the patient's head is particularly helpful in examining ears.

But I must not go further into technicalities such as these,

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lest I annoy members of the teaching staff present; but if I prick one or two of you gentlemen of the classes into a slight degree of pique, I shall not be sorry. I am not indeed going to insult you as do the Pelman memory text-books, by asking you to name the numbers of the lamp-posts in your street, nor the colour of the Pimlico omnibuses; but I do frankly challenge you to observe quite clearly and definitely, almost any of the anatomical appearances to be seen in the, presumably, new fields—ears, nose, throat—which are presently to be your study. I challenge you to write just one really comprehensive description every day and get your expert teacher to criticise it. I am confident that you will not get an aggregate of 50 per cent. correctness during your first two months here. Observation and description are of course different affairs, but the latter gives the only available evidence that the former is correct.

You will find a number of things conflicting against your accuracy. I have spoken of the lighting and the monocular vision. As to the newness of the objects, that at first should help rather than distract you; it will be towards the end of the two months that familiarity will tend to breed slack observation of the normal parts. It is well recognised that repetition confuses one's image in memory. Scarcely any artist can draw his own wife's face without making her sit for the portrait, whereas almost any of them can draw a recognisable likeness of a railway porter seen for only half a minute. In our work as indeed in the work of those pictorial artists who have any success, Nature cannot be copied line by line; we have to absorb a memory of the thing seen and then create a picture either in words or lines. For instance, Sargent, the great landscape and portrait painter, would stare at his subject for half an hour and then work at his canvas until that cupful of memory was exhausted; then another long drinking in of his subject and so forth. In our work this creation of an image in memory is almost always essential, with the added difficulty that for us the inspection must, for instance, as in the laryngoscope or down the bronchoscope, be fleeting in time, and all the more concentrated in intensity. As you become more skilful in the manipulations, so will you have more leisure for observation, but the latter will remain a highly concentrated, unleisurely affair.

The concentration concomitant with the keen observation of some particular object, say a small tumour in the larynx,

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or a foreign body in a bronchus, is in itself a fruitful source of error.

It is no business of mine to give away my own errors in surgery, so I will transfer the field for a moment.

In the holidays I amuse myself by sketching, and while yachting the other day, sheltering from a storm behind Lundy Island, I attempted a sketch from the heaving deck. The most conspicuous object at the south end of the island is a large modern church, which dominates the landscape on the skyline, and upon it the draughtsman's attention inevitably is concentrated. My drawing of this scene was approved in its proper measure by my companions, not only by myself. At the same time I took a snapshot photograph. On my return home I compared the two, and found that I had drawn the church more than twice its proper height as compared with the cliff on which it stood, and none of us at the time noticed my error.

It is not my profession to draw churches correctly as it is your business to observe throats correctly, but even if it were, my error would have been made in the very best of company. Painters with scarcely an exception invariably exaggerate the heights of the mountains. Even Turner, whose accurate observation of Nature was, as we see in his earlier drawings, quite perfect, so perfect that in later days he could play upon Nature like an instrument and make music with her, nevertheless in his later years made the most incredible errors in proportion. You know the old wheeze of asking your friends what is the apparent size of the moon, which is a non-pedantic way of asking what angle does its diameter subtend in the field of vision. The usual answer is, "The size of a dinner plate," that is at the normal distance of a dinner plate from the eye, namely, at about 22 inches. You probably also know that this statement is about 2000 times wide of the truth, and that the moon is in fact the size of a pea upon that dinner plate; a pea at 22 inches and the moon in the heavens both subtending an angle of about half a degree. Now, Turner has gone further and painted a picture with a moon as big as a cartwheel a few paces off in the same drawing.

Sir John Millais again, as *Times* readers recently will know, drew in his famous "Blind Girl" a secondary rainbow with its colours the wrong way about. [It is perhaps amusing to see that an extremely erudite and careful critic writes a few days ago, that Millais repainted that bow when it was explained to him

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that the "secondary was a reflection of the primary," a statement fully as erroneous as Millais' original mistake—nor has Millais got things right yet. Such is our so-called age of Science.]

If these great ones can make egregious mistakes in pictures, we cannot for a moment afford to do so in our practice. We are compelled, for instance, to form an accurate conception of the size of a foreign body in a bronchus before we can choose the forceps with which to seize it; we must really see the thing clearly and remember it accurately.

If we are of necessity hurried in our glimpse of an object, let us avoid that hurry which is not of necessity. I mean, let us avoid looking at too many cases in the hour. I am quite certain that this is a terrible source of erroneous observation, and that the out-patient room can create a world of heresy. If an excessive number of patients have to be got through in a stated time, concentrate upon a few cases and give the rest a placebo, and an order to return. Hasty examination is a thousand times worse than none at all;—I have this very morning seen a case of acute suppuration of the ear in which a clinical assistant (not one of mine, gentlemen) had failed to see a great plug of wool packed firmly into the fundus; and he had sent the patient away to go about her normal business.

Recently, a very complicated case of mine was taken by his doctor to another aurist for a third opinion. A perforation occupying half the drumhead was present. This highly competent aurist entirely failed to see it, and instituted treatment with disastrous results. Such a thing is incredible, but there it is, and the results of his mistake still exist. Perhaps it is my duty to point out his error to my friend; it is just possible that he needs glasses. Some of us are not aware of our defects of vision. I have all my life thought my own eyesight to be very serviceable, and it was not until increase of years demanded "clearers" and I consulted an ophthalmic surgeon, that a slight degree of astigmatism was detected; I am eternally grateful to my ophthalmic colleague for giving me vision far clearer than I ever enjoyed in youth. That is a point worth thinking of if you find yourself making mistakes in your observations.

While on this subject of glasses I would strongly urge you to employ magnification in your work and by daily use get familiar with the instruments. Some of us go so far as to think that an ear has not been fully examined until Siegel's

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magnifying speculum has been used, and, if your teachers do not agree in this, they will, I know, corroborate my statement that every week we see egregious mistakes made by men very competent in other branches of medicine who should, but will not, use the aid of lenses. Personally, I consider for instance that the small terrestrial telescope is one of the most important adjuncts of the bronchoscope. I can at all events say with confidence that I have seen fantastic errors occur, such as the mistaking of the carina for a foreign body, which could not conceivably have been made had the telescope, properly focussed, been employed.

But whatever you may think about magnification, the point I want next to stress is that it is no good getting a general idea of the appearance of a throat- or ear-picture. You must get clear, precise vision of every point concerned. If you fail to do this, you will inevitably, before long, make some egregious error, for the consequences of which you will be responsible. Every one of us has made these errors, but that is no excuse for their repetition, and no source of comfort to the community.

Besides inaccurate visual perception there are intellectual causes of wrong observation. Preconceived ideas as to the appearance of things are potent among these, and I cannot help thinking that the conventional print stamps of larynges, and so on, may prove stumbling blocks for students. An expert, of course, reads them with a grain of salt and regards them as symbols, but in the case of a highly intelligent student, not yet confident in his manipulations, the inability to see, say, an anterior commissure tumour which in fact is hidden by the epiglottis but which is drawn for all to see on the case-sheet diagram, must make him, quite unjustly, accuse himself of lack of proper adeptness.

It would be absurd to say that you must have no preconceived ideas as to the appearance of normal structures, but I will say that in our special areas, with perhaps the exception of the ossicles of the middle ear, there is no normal, typical appearance of these structures.

Spend one afternoon drawing the epiglottis and the arytenoids of twenty larynges taken at random, and I am certain you will agree with me. Ever after you will be far less likely to make false observations concerning abnormalities and diseases. I am almost ashamed to make a practical suggestion like this to such an advanced audience. I venture

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to do so, however, because in the elementary lessons on observation, I mean those far-away demonstrations on the paranephric organs of the earth-worm or on the fourth pair of legs in the crayfish, the exact appearances were pointed out to us by the demonstrator. But you cannot expect a surgical demonstrator to describe curves, lengths, proportions to you; he merely says, "You observe the right half of the larynx to be normal." That, of course, is not a description; you must supply the description yourself by careful observation, and until you have done this scores of times, you cannot be secure against committing grievous errors. I will risk the assertion that if at this moment you were confronted with well-drawn laryngoscopic pictures of the right side of, say, a dozen larynges, you could not be sure which were normal and which abnormal.

If stereotyped pictures are a source of error, so also are stereotyped phrases; to say that the left vocal cord is in the cadaveric position is by no means an adequate description of a laryngeal picture, nor is it evidence of the precision or the completeness of your observation.

Errors are made by even distinguished laryngologists through not including the whole picture in their observation. This of course is not due in their case to slack examination but rather to the limitations of our special work; sometimes we have to make the most of rapid, fleeting views, often limited in number by the intolerance of the patient. To make the most of the successive glimpses which we get in such cases it is well to concentrate vision first upon one and then upon another area, and so create a composite picture out of the many short observations.

May I repeat this for your consideration. The phrase "The left vocal cord in the cadaveric position" is not a genuine description. It implies, of course, that you have seen no tumour or abnormality to account for it, but it leaves the reader of the notes in complete ignorance of the condition of the arytenoids left and right and of the pyriform fossæ; nor can he tell from it whether the observer's mind is not also blank concerning those structures. Some of us have seen quite remarkable misunderstandings of a case arise out of the lack of information about the picture as a whole. If you ask me how to describe in words such a picture, I will refer you to your teachers, some of whom have that faculty in a very eminent degree. For my own part, having no literary gifts,

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I fall back upon the kindergarten method and draw pictures —and I believe that almost anyone can draw recognisable pictures of the areas—at all events such as are sufficiently intelligible to the draughtsman himself, for future reference and comparison.

An extraordinarily potent source of error is anticipation of what you are expected to see.

A few weeks ago, I was sailing along part of the West Coast of Scotland where one of our colleagues and his family were spending their holiday close to the house of a mutual friend who owned a yacht. At sea in fine weather distractions are not over numerous, and I had been looking out all day for my friend, who knew I was sailing there and expected to meet me. Towards evening, a ketch passed us half a mile away, and with the glass I made out my friend standing by the mizzen, tanned, and all the better for his holiday. His ladies were very smartly dressed, evidently turned out for the Highland Gathering which had taken place near by on that day; and one of them, on whom I had just operated, looked remarkably well. The ladies returned my waved greeting with vigour—my colleague did so with less warmth, and I saw that he had been bored with the long day at the Games. I had made, you see, a rapid but fairly complete observation of the business, and indeed have a pencil record now of the ketch, her rig, and the hilly background.

When I met my friend three days ago in London and referred to his glum greeting of me on the seas, he replied, "But none of us set foot on a boat all the holidays!" I tell this story partly to make it clear that I have no illusions about my own faculties of observation (very much the reverse, hence, to tell the truth, my choice of this subject for the address), but I tell it more particularly as an example of the gross and inexcusable distortion which expectation can lend to an observation.

I think I am correct in saying that once during the early days of the Laryngological Society of London when anyone could examine the cases without possessing special aptitude or knowledge, an exhibitor by a slip of the pen put "right" for "left" upon the case card. Several of the inexpert "saw" the tumour, or whatever it was, on the healthy side of the larynx. Certainly we have all seen students recognise paralysis on the wrong side of the larynx, where they have been asked to examine what was described merely as a case of paralysis.

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On Observation

Expectation can be a deadly source of error, and I am sure your teachers will agree that they find it unsafe to allow a student to remove a foreign body through the bronchoscope until he has either made a word- or pencil-picture of that object and its surroundings (unless of course a responsible surgeon is checking the student's observation by means of the prism). This is a good instance of what I want to drive home. The surgeon may say, "You will see a narrow white object with its long axis anteroposterior, and a space to right and left of it occupied by foam." I maintain that the surgeon cannot forthwith tell the student to seize it and remove it until the latter has made a detailed description of the picture he has observed; because the words employed by the teacher do not contain a description so complete as to exclude error, and it is not certain that through an inadvertent shifting of the tube the student is not observing and preparing to seize the carina. Action must be preceded by evidence that the student has made a complete observation; one cannot afford merely to ask, "Have you shifted the tube since I handed it back to you?" The surgeon must demand detailed description in words or drawing as evidence that the tube has not shifted. I am sure everybody will agree.

My little story about the yacht is a case in point. I could not make out the features of my friends in the evening light, but their waved greeting seemed to identify them, while the locality, the number, age, general appearance of the personnel, all fitted in with my expectations. It was only the absence of wireless facilities which prevented us taking action and asking them to dinner. It is evident that no one can afford to take action without verification of his observation by the possession of data adequate for a genuinely detailed description.

It has been rightly contended that through neglect of this quite puerile and unintellectual business of correct observation, the advances in medicine have been slower than they might have been. To men of my generation, it seemed incredible that it should have been left to Wilhelm Meyer to discover adenoids, and it is, I am sure, equally incredible to you that we for years failed to observe things which are now common knowledge.

I welcomed the chance of giving an address at this post-graduate school as an opportunity of reminding men of wide knowledge and considerable experience and skill, of this almost

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childish element in our surgical activities (and, frankly, it has taken some courage to do it); because I believe that if such a body of men—men whose general knowledge already gives them confidence in the manipulation of patients and a critical judgment as to what is worthy of notice—if such men will make a daily practice of complete detailed observation, some of them will almost certainly light upon one of those chances which, when appreciated, constitute the great advances in medicine. I need not stress the well-recognised point that such come often enough by chance; like the recognition by Röntgen of the importance of the quite accidental fluorescence of some barium platinocyanide (1895), and Richet's discovery of anaphylaxis.

The most secure and the simplest method of becoming an accurate observer is that of reducing observations (not all your observations amongst the out-patients, but chosen cases)—either to drawing or to writing. By that I mean something far more detailed and complete than can possibly be included in the official, clinical case-sheets. Especially I would urge men to work in couples, and in the evenings to compare notes and wrangle over divergencies. Such disputes will not end in agreement, but they will almost certainly incite you to re-examination of the cases at the earliest possible occasion and to closer and closer observation.

To those who can draw, I suggest the making of perfectly accurate pictures at first of normal cases, sternly avoiding guidance from the text-books, some of which have handed down from generation to generation quite erroneous pictures. Others in the books are finished as if they were portraits, whereas in fact they ought to have been drawn as diagrams. I am guilty myself of just that iniquity in the series illustrating Semon's important article on paralyses. Draw your own pictures, get your own normals clearly in your head; do not, when you have got to put Santorini's cartilage into a picture, have to go to a text-book for it. If you are a draughtsman, be humble about it, for I am informed that it is only those of low grade intelligence who have visual memories and are capable of drawing. We will remember Leonardo da Vinci, and keep our council on that point!

To the more intellectual among you I would strongly urge the same process of working in couples and of comparison and wrangle, employing words instead of lines. This is a far more

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difficult business, and if you read medicine extensively, you will, I think, agree that the faculty of carrying description successfully over the footlights is far from common. You can test this assertion by comparing notes as to the impression which each has received after reading a given record. I believe you will find that the French writers have this faculty of description in a degree of excellence worthy of study and imitation.

To return to my main theme. Accurate observation is essential to success, but in itself, it leads nowhere. It can in fact be a very great snare: witness a large minority of the books upon your shelf. They are honest, accurate; they are treasuries of facts, and they are of immense value in their measure; but do they lead anywhere or create anything?

Observations without digestion by contemplation and illumination by insight do not bear fruit. The surgical registrar's bookshelves at any hospital are a depressing spectacle.

Observation to be of full value must be of two kinds. One is, one might say, microscopic, the kind I have been speaking about; the other must be from the hill-tops. The man who has the faculty of taking in from an elevation the whole view of the scene before him, and who has not alighted on his point of vantage by a mere flight of fancy, but only after a laborious climb up the path of minute and accurate observation, that is the man who makes history.

Darwin, Pasteur and Lister had the faculty of wide outlook and they changed the whole aspect of thought; in every speech in which their names are mentioned, stress is laid, rightly, on their superb breadth of view and faculty of generalisation: it would, I think, be wise to emphasise at the same time their microscopic envisagement of things.

We can all with care and labour look closely and accurately, and who knows but that, here and there, one of you gentlemen may catch sight of a great landscape and see in it, not merely an arena full of possibilities (we can all do that) but an aggregate of things you have handled and listened to, have seen closely and described.

So, being master of the details, you also may prove to be master of the whole scene, and one who makes history.

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