An Address ON THE PRINCIPLES OF DIAGNOSIS.*

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It is written that there abideth Faith, Hope, Charity, these three, but the greatest of these is Charity. And so in Medicine we have Diagnosis, which is a matter of faith; Prognosis, which is a question of hope; and Treatment, which is only too often an affair of charity; but the greatest of these is Diagnosis. For without accurate diagnosis it is impossible to forecast the course and outcome of a disease or to treat it satisfactorily. Indeed, as someone has truly said, "The first part of treatment is diagnosis, and the second, diagnosis, and the third, diagnosis." I need make no apology, therefore, for directing your attention to some reflections on such an important subject on this occasion.

Diagnosis is based on an accurate interpretation of symptoms and signs. I am aware that there has been in recent times an attempt to ignore any distinction between these and to speak of all the manifestations of disease as symptoms. I think there is an advantage, however, in keeping to the old division and to call "symptoms" all the subjective results of disease which are described to you by the patient, and "signs" all the objective phenomena which you discover on physical examination. It is true that there are some manifestations of disease which occupy an intermediate place between symptoms and signs—disorders of sensation, for instance—but this does not invalidate the general utility of keeping the subjective and the objective separate.

Symptoms are elicited by taking the history and by the cross-examination of the patient upon it. This is the patient's contribution to the making of the diagnosis, and its value cannot be over-estimated. The importance of the symptoms—and therefore of the history—in the diagnosis varies greatly in different cases, but it is perhaps greatest in cases of abdominal disease, and least in cutaneous diseases and organic disease of the nervous system. If you are dealing with a stupid, deaf, or confused patient, or one who has little power of expressing himself in words, your difficulty in eliciting symptoms may be very great. Inasmuch, however, as the whole diagnosis may depend upon your success it is worth while to exercise great patience and to spend much time in the cross-examination.

All symptoms are not of equal diagnostic importance, and in the case of voluble patients a good many of them may safely be ignored. There is usually one symptom, however, which troubles the patient more than any other, and to this the term "presenting symptom" is sometimes applied. Special attention should always be given to it. Although it is a good rule not to ask leading questions when taking a history, it is legitimate—once a preliminary diagnosis has been made on the presenting symptom—to ask for "corroborating" symptoms which the patient may not have specially observed or which he may have omitted to mention.

The detection of signs depends upon observation and training in clinical methods of investigation, both general and special. It may be doubted whether ordinary bedside observation of the signs of disease is as good now as it was a generation or two ago—in the time of such men, to mention only two who were at my own hospital, as Jonathan Hutchinson and Hughlings Jackson. There is, I believe, a real danger lest the increased use of laboratory tests, x-ray examinations, and other short cuts to diagnosis should lead to a neglect of the information to be obtained by the skilful use of the unaided senses, and to a comparative atrophy of these from disuse. Most clinical teachers must be aware of this.

There are two sorts of error in diagnosis by signs—one

negative, the other positive. Negative errors are perhaps commonest, and arise from overlooking signs which are present; they are chiefly made by those ill trained in clinical methods. Positive errors consist in detecting signs which have no real existence—the discovery, in short, of mares' nests. They are chiefly made by those with observational zeal but little knowledge or experience. The apex of the right lung, the pulmonary area of the heart, and the right iliac fossa are the regions in which mares' nests are specially common.

Having elicited the symptoms and signs which are present, knowledge is necessary in interpreting them, for without knowledge one is "mind-blind." I remember well the first case of encephalitis lethargica which I saw, just when the disease was beginning to appear in this country. The symptoms and signs were obvious enough, but the assemblage of them meant nothing. I could not put a name to the disease, and it was only after the publication of cases by Professor Arthur Hall and others that I recognized, retrospectively, what I had been dealing with. Such mind-blindness may at times affect one even as regards a disease which one has seen before, as the result of temporary fatigue; for, as Dr. Samuel Johnson remarked, "Sudden fits of inadvertency will surprise vigilance . . . and casual eclipses of the mind will darken learning." Seen again next day, when one is fresh, the whole clinical picture at once falls into focus.

After observation and knowledge comes judgement as a factor in the making of a diagnosis; indeed, I believe it to be in some respects the most important factor of the three. Every doctor must be a judge. He has to weigh the evidence of symptoms and signs, and allot to each its proper value in making the diagnosis. Now we have Hippocratic authority for the belief that "judgement is difficult," and, indeed, medicine has been defined as "the art of coming to a conclusion on insufficient evidence," so it need be no matter for surprise that errors of judgement so often lead to erroneous diagnosis.

We can increase our powers of observation by training and practice, and we can extend their range by means of special instruments and methods. We can increase our knowledge by study and experience, but can we improve our powers of judgement? I greatly doubt it. Judgement seems to be an inborn faculty, the result of a union of mind and character, which a man either has or has not, and it is almost as difficult for him to increase it as to add a cubit to his stature. As Stephen has said:

"The one talent which is most worth all other talents put together in all human affairs is the talent of judging right upon imperfect materials, the talent if you please of guessing right. It is a talent which no rules will ever teach, and which even experience does not always give. It often coexists with a good deal of slowness and dullness, and with a very slight power of expression. All that can be said about it is, that to see things as they are, without exaggeration or passion, is essential to it; but how can we see things as they are? Simply by opening our eyes and looking with whatever power we may have. All really important matters are decided, not by a process of argument worked out from adequate premisses to a necessary conclusion, but by making a wise choice between several possible views."—Stephen's *Liberty*, etc., p. 332.

What is sometimes called "clinical instinct" is, in truth, simply a power of rapid instinctive judgement, and it may be lacking in men of high intellectual ability and present to a marked degree in those who are in other respects mentally their inferiors. It seems to be much the same as "common sense" and closely allied to a sense of humour, which is the same thing as a sense of proportion. Those who lack it are apt, in making a diagnosis, to fail to see the wood for the trees.

If the natural powers of judgement are to be improved it is only, I believe, by general mental culture, and not by purely scientific training, that it can be done. The study of "humanism," by which is meant the philosophy of knowledge as opposed to its practical application, must be the means. As someone has said, sanity, humour, breadth of view, and powers of criticism are the distinguishing marks of the humanist, and it is at these that we must aim. It is for this reason that I regret the modern tendency to make the scientific studies of the

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medical student begin at an earlier age and whilst he is still at school, and to sacrifice to them much of the old literary and linguistic training. It is, I think, not without significance in this regard that many of the most distinguished physicians of the last generation have also been good classical scholars.

It follows from what has been said that errors in diagnosis may arise from bad observation, from ignorance, or from want of judgement. It is commonly said that more mistakes are made from not looking (defective observation) than from not knowing (ignorance). However this may be, I believe that still more mistakes arise from bad weighing of evidence (lack of judgement). You may increase the accuracy of your observations in a case and the range of knowledge brought to bear upon it by the most skilled "team work," but without a good judge of evidence as captain of the team these things will avail nothing in diagnosis.

I came across, not long ago, a good example of the prevalent under-valuation of judgement and over-valuation of observation as factors in the making of a diagnosis. A practitioner wrote to a medical journal to say that "he had no use for the consultant whose only instrument was the stethoscope." This being interpreted means that this particular doctor is of opinion that he never needs any help in weighing the evidence in a case; all he wants is help in detecting more signs by instrumental and laboratory methods. I take leave to doubt, however, whether such self-confidence is ever justified. Cases must arise often enough in every practice in which what is wanted to establish a diagnosis is not more facts but a new evaluation of the existing facts by a fresh mind—in other words, a revised judgement.

On the other hand, it may be granted freely that a bad diagnosis due to an error of judgement is more excusable than one attributable to want of knowledge or even to faulty observation. The ghosts of dead patients which at the midnight hour haunt the bedside of every doctor who has been some years in practice will not upbraid him with such questions as "Why did you not know that a ball-valve gall stone may produce symptoms like those of malaria?" or still less "Why did you not attach more importance to the rapidity of my pulse and less to the signs in my abdomen?" No; the unescapable questions they will put to him will be such as these: "Why did you not examine my fundi for optic neuritis?" or "Why did you not put a finger in my rectum?"

It must not be supposed, however, that you will in every case *consciously* use observation, knowledge, and judgement in coming to your diagnosis. It is only in the more obscure, intricate, and difficult cases that you will be able to trace the successive operation of these faculties. In the vast majority of cases of disease—at least, when you have had some experience—the stages by which you arrive at your conclusion will be passed through subconsciously, and you will recognize the disease, as you do your friends, at a glance. This power of immediate and intuitive diagnosis—having your knowledge always "on tap," so to speak—cannot be learned from books; prolonged experience at the bedside alone can impart it. The description of a disease in books is like the description of a person wanted by the police, or the word-painting of scenery in a novel—it rarely gives us any real mental image of the thing described. As Montaigne says:

"Like him who paints the sea, rocks, and heavens, and draws the model of a ship as he sits safe at his table, but send him to sea and he knows not how or where to steer, so doctors often make such a description of our maladies as the town crier does of a lost dog or donkey, of such a colour, such ears, etc., but bring the very animal before him and he knows it not for all that."

Most of us are "visuals" and not "auditives," and we must have once seen a thing, or, at the least, an image of it, before we can recognize it again.

The effect on the doctor's mind of a mistake in diagnosis is of some interest. If the mistake is due to bad observation or want of knowledge it should be salutary, though painful, in teaching one greater care or greater diligence in future. On the other hand, I believe that the effect of

an error in judgement is wholly bad, as it shakes that self-confidence which is really necessary to the exercise of prompt and accurate decision. If you make a bad drive at the first tee it often puts you off your game for the whole round by undermining your self-confidence, and it is much the same in diagnosis. For some time after a "howler" one is afraid to come to a decision in any difficult case. That, at least, has been my own experience. Fortunately, however, the diagnostician has a happy knack of forgetting his own mistakes whilst remembering those of other people.

Having made your diagnosis, should you communicate it to the patient? Certainly not always, nor in all circumstances. Some of you may remember what the Poet at the Breakfast Table has to say on this subject:

"Young doctors are particularly strong," he says, "on what they call *diagnosis*—an excellent branch of the healing art, full of satisfaction to the curious practitioner who likes to give the right Latin name to one's complaint; not quite so satisfactory to the patient, as it is not so very much pleasanter to be bitten by a dog with a collar round his neck telling you that he is called *Snap* or *Teaser*, than by a dog without a collar. Sometimes, in fact, one would a little rather not know the exact name of his complaint, as if he does he is pretty sure to look it out in a medical dictionary, and then if he reads, '*This terrible disease is attended with vast suffering and is inevitably mortal*,' or any such statement, it is apt to affect him unpleasantly."

That is the truth of the matter in a nutshell. If the prognosis is good, there is no reason why the patient should not know the name of the disease; if bad, a little judicious vagueness of statement is wiser. The frankness with which most doctors nowadays take patients into their confidence, both as regards diagnosis and treatment, is perhaps to be preferred to the pontifical and mysterious airs so often assumed by our predecessors of another generation, but it is possible to overdo it. It is not every patient who is fit to be told the whole truth about his disease.

In conclusion let me warn you against some common faults in diagnosis. I shall put them, if I may, in the form of some "Don'ts for Diagnosticians."

The first is, *Don't be too clever*. Mere cleverness is apt to be ineffective in most walks of life, and certainly it does not by itself make a good diagnostician. Excessive cleverness is the besetting temptation of the amateur type of laboratory man; it is just when he thinks himself most scientific that he is most likely to make a mistake. As an example I remember a patient being sent to me some years ago, by a practitioner who rather prided himself in being "up to date," with a diagnosis of "albuminuria the result of alimentary toxæmia." He sent with the patient the most elaborate analysis of the stools and most detailed reports on their bacterial flora, but he had quite failed to notice that the patient had advanced mitral disease with commencing heart failure, and that oedema of the feet and congestion of the bases of the lungs were present as well as the supposed "toxic" albuminuria! Laboratory methods, of course, are of the greatest value in diagnosis, but their results have got to be weighed along with all the other evidence in the case. Another way of being too clever is by imitating the methods of Mr. Sherlock Holmes. It is always dangerous in diagnosis to make large deductions from very small indications. "Ex pede Herculem" is not a safe motto for the diagnostician.

Secondly, *Don't diagnose rarities*. Remember the saying of that wise physician Samuel Gee, "Common things most commonly occur." I was associated for a time in my early days with a physician who had acquired a reputation in the diagnosis of unusual and rare cases, although, as a matter of fact, he was oftener wrong than right. I remember going round the wards with him one day when he pointed to a sudden elevation of temperature in a chronic case of pulmonary disease and inquired its cause. I replied that I believed it was due to the patient having developed an ischio-rectal abscess, as he had a tender swelling in the usual situation. "Well," he replied, "I have seen an empyema point there." When at a consultation I hear a doctor begin "I once saw a case," etc., I know he is going to make a bad diagnosis. Cases

so uncommon as only to be seen once are not likely to be seen again.

Thirdly, *Don't be in a hurry.* Wait till you have all the facts, remembering that a laboratory report (for example) may at the last moment upset all your calculations. Reserve your decision, therefore, in a difficult case; take it, as the Scotch lawyers say, "to avizandum." If you come to a premature conclusion it is difficult to alter it afterwards, not only because it involves awkward explanations to the patient, but because, by the mere fact of having made a diagnosis, you become insensibly biased and more impervious to the reception of fresh evidence. It is for this reason that all "snap-shot" diagnosis is to be condemned. It is impressive but perilous. "Life," as Dr. Johnson said, "is not to be sacrificed to an affectation of quick discernment, or of crowded practice, but may be required, if trifled away, at the hand of the physician."

Fourthly, *Don't be faddy.* This is the besetting sin of the specialist. He sees only what he is always seeing and what he wants to see. To the cardiologist few hearts are healthy; to the tuberculosis expert no lung is sound. The syphilographer sees disease only in terms of syphilis; the psycho-analyst only in those of sex. Beware, therefore, when you find yourself always diagnosing the same thing; beware also of the "stunt" of the moment—"avitaminosis," "focal sepsis," "disturbance of endocrine balance," or what not. Try to see the case steadily and see it whole.

Fifthly, *Don't mistake a label for a diagnosis.* Such "diagnoses" as "gastritis," "neuritis," "influenza," "neurasthenia," are, more often than not, mere labels; they have no essential relation to reality. It may be necessary in the exigencies of practice, and in order to satisfy the patient's mind, to use such labels for a time, but don't let them deceive you into thinking that you understand the nature of the case. Be mentally honest.

Sixthly, *Don't diagnose two diseases simultaneously in the same patient.* Remember the law of "paucity of causation." Don't, for example, explain some features of a case by a diagnosis of cancer and others by assuming the presence of tuberculosis. There is, of course, no reason why patients should not run two diseases simultaneously, but as a matter of fact they rarely do. Make it a rule, then, if you possibly can, to account for all the clinical features of the case by assuming the presence of only one pathological process.

Seventhly, *Don't be too cock-sure.* "Think it possible," as Cromwell said to the Scotch bigots, "that you may be mistaken." On the other hand, don't hesitate too long between two alternative diagnoses, like the proverbial ass between two bundles of hay. Cock-sureness in diagnosis is the vice of the inexperienced; excessive caution that of the man who has seen too much.

Eighthly, *Don't be biased.* Avoid preconceptions. Approach every case with an open mind, and don't listen to the opinion of others, even that of the relations or nurse, till you have formed your own. This is the main reason for consultations: the consultant approaches the case, or should do so, with an open mind. It is also the justification for the layman's desire for "an independent opinion"—that is, for the opinion of one who is approaching the case fresh and without any preconceived ideas about it.

Finally, *Don't hesitate to revise your diagnosis from time to time in a chronic case.* Things may change, new signs may appear which put a totally different complexion on the matter, and the original and provisional diagnosis may no longer be able to stand. I was once told by a shrewd and experienced practitioner that he made it a rule always to re-examine his patient on the morning of a consultation. On the one occasion when he omitted to do this he was badly caught out.

In conclusion, let me say that it is quite impossible that you should always be right in your diagnosis, if only for the reason that disease does not always play the game. It is better, however, to be wrong on sound principles than right by chance. Guessing is to be avoided at all costs; for if you once get into the habit of guessing you are diagnostically damned.

RAIN-BEARING WINDS AND EARLY PHTHISIS IN DERBYSHIRE.

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THE county of Derby provides a remarkable proof of the effect of strong prevalent rain-bearing winds upon the course of early phthisis, amply confirming the recent evidence from Devonshire and West Shropshire. Incidentally it also furnishes interesting indications of an effect of subsoil on the course of phthisis which will not surprise those who have followed the work already published regarding the effect of subsoil on the prevalence of the disease. We shall set forth our findings as briefly as we can.

We have dealt with 306 first-stage cases, which had been treated at the County Sanatorium (near Chesterfield), and followed at their homes for four years after their discharge, as was done with the cases in Devonshire and West Shropshire. The results for the whole county of Derby, taken as a unit, are as follows: in respect of south-west, west, and north-west winds—

Mortalities.

Sheltered cases	...	...	...	...	6.96%
Exposed cases	...	...	...	...	14.13%

or, confining attention only to the indisputable cases—that is, deaths certified as due to phthisis and living cases in which tubercle bacilli had been discovered in the sputum:

Sheltered cases	...	...	...	...	14.05%
Exposed cases	...	...	...	...	28.72%

Arrests.

Sheltered cases	...	...	...	...	68.69%
Exposed cases	...	...	...	...	63.87%

or, considering only indisputable cases, as above:

Sheltered cases	...	...	...	...	61.39%
Exposed cases	...	...	...	...	41.49%

These figures, significant as they are, do not, however, show the real extent of the contrast, because of certain peculiarities of the geology, configuration, and rainfall of the county, which we shall now explain.

Access of Westerly Winds.

Derbyshire lies a little to the north of the centre of England, and so receives its westerly (chief rain-bearing) winds as follows.

The north-west wind arrives directly from the sea, with no outside intervening heights to break its force or abstract its rain. The west wind is also a direct sea wind for the extreme north of the county, but for the greater part of its surface comes across the mountains of Wales. The south-west wind, for the entire county, has crossed the Welsh mountains. Of these winds the south-west is the commonest, and the wind which most often blows as gales. Next in frequency, and in gale-frequency, is the north-west. At Buxton the west and south-west winds are rainier than the north-west.

Natural Divisions of the County.

The geological formations of Derbyshire divide it naturally into three great areas, indicated on the accompanying sketch-map, and these areas differ conspicuously in respect of altitude, configuration, and rainfall. They comprise:

1. A north-western area, of high ground, highest in the north (where it culminates in the Peak—2,088 feet high), having a main plateau running nearly north and south, mostly over 1,000 feet in altitude, the whole area presenting pronounced contrasts of exposure and shelter. It has