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SOME ASPECTS OF THE
MENTAL DISCIPLINE
ASSOCIATED WITH
THE 'STUDY OF MEDICINE'

AN ADDRESS DELIVERED TO THE QUEEN
MARGARET COLLEGE MEDICAL CLUB

BY

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SOME ASPECTS OF
THE MENTAL DISCIPLINE ASSOCIATED
WITH THE STUDY OF MEDICINE

LADIES,—No doubt the position I am placed in on your invitation is one of compliment and honour, but it has its own peculiar difficulties. There is at the outset the difficulty of selecting a subject on which I may venture to address you. Should I arrange to speak on some theme associated with the department of medicine which it was my duty to teach in this College, I may reasonably enough be charged with adding an additional lecture to the statutory number decreed by law, and may thus inflict the last and fatal straw on backs already bending beneath the burden. On the other hand, should I select some subject outside my own department, I may well be met with the criticism, “What does *he* know about that?” and it is possible may find myself in more or less acute conflict with one of my former colleagues, with all the disadvantages that attach to non-official utterances. Thus the

medical curriculum offers no resting-place, and I am driven to contemplate some other field. But even as I move to do this, I am sensible of the fact that I am to address the Queen Margaret College Medical Club, and that custom and courtesy alike would seem to demand that, in some way or other, I should connect my remarks with Queen Margaret, or Queen Margaret College, or with medicine, or with medical clubs.

Now criticism of the College is reserved, I understand, for the Students' Representative Council and for the young lady who sparkles in the appropriate column of the University Magazine. Queen Margaret's epitaph I am quite unprepared to write. Of medical debating societies I might perchance dare to say something. I have the kindest and most grateful recollection of my own experience of a students' medico-chirurgical society. In those days we met in the forensic medicine class-room, and under such circumstances it is not to be wondered at that we could scarcely dare to consider ourselves a club. But we had heroic moments all the same, and they did us a great deal of good. For one thing, we blew off steam—a refreshing, even a necessary operation, when youth engenders an excessive supply—and I daresay we were not prevented from rushing confidently along pathways upon which more angelic beings will naturally fear to tread. Our theories were very likely more

abundant than well sustained, and our criticisms over confident and clean-cut. Upon the proper methods of medical education we had decided and forcible views, which we doubtless expressed in energetic phrases; revolutions seemed to us small affairs, and we were quite prepared to set them going; to the problems of medical science we were ready to supply prompt solutions; and, in short, we exhibited, I doubt not, all the faults and follies of rashness, inexperience, ignorance, and youth. Let us hope that at least to some extent we have got rid of these now we have reached positions of less freedom and greater responsibility. In any case, I claim that the advantages and benefits of our mutual association more than compensate for, and are likely to be more permanent than, the follies associated with it. For we learned much. We were stimulated to think for ourselves, even daring—in his absence—to differ from a professor. We found the necessity of trying to give reasons for any opinion we had expressed and to be patient and courteous under criticism, and even under ridicule. And we learned something of the art of giving an answer to an opponent. It was not always a soft answer, and it did not always turn away wrath. But we were none the less happy on that account. I daresay we often strove more for victory than truth, but even in this very censurable proceeding we sharpened our wits and found ourselves com-

pelled to observe the rules of the game. We learned

“it is not decent for a scientific gent
To say another is an ass—or words to that intent,”

and that it is still less decent

“for the man who thinks he’s meant
To reply by heaving rocks at him—to any great extent.”

And last, but by no means least, we received some training in the art of putting our thoughts readily into appropriate words. To have ideas and to be able to express them is the secret of becoming a force in the world; and towards this and many other desirable ends our students’ society offered a definite contribution. It is therefore as an old ‘parliamentary hand’ that I congratulate you on the existence of your medical club, and offer you my best wishes for its success. But as you are already members of such a club, and are doubtless convinced of its advantages, it would be preaching to those already converted for me to address you at length upon the subject. Thus my area of choice becomes gradually narrowed. Queen Margaret is beyond my ambition; the College is for other critics; of the virtues of medical clubs you are yourselves an illustration; concerning therapeutics I have already had more than my fair share of opportunities for speech; in other departments of medicine you may quite reasonably object to my intrusion; and politics,

though active enough in college life on certain recognised occasions, are, I doubt not, strictly excluded from the severe scientific atmosphere of the Medical Club.

It thus appears that there are very good reasons why I should not address you on any subject whatsoever, and I am quite sensible of the temptation provided by this argument. So far as I can get out of the logical *cul-de-sac* circumstances have provided for me, I propose to do so by examining certain medical relationships which may possibly have some interest for us as members of the profession.

The public position and relationships of medical study and practice have necessarily often attracted the attention of those who contemplate the various aspects of social civilised communities, these relationships being of so pressing and intimate a character both to the body politic and the private individual. Thus it happens that medicine has never wanted its commentators and critics, and the criticism of these critics has not unnaturally been a frequent resort of the distressed medical orator called upon to deliver an address and conscious that all the good things have already been said by his more acute predecessors. It is no doubt important that we should hear and know what our critics are saying about us, and should be familiar with the conception which the public generally take of the

profession. We may thus learn some faults and failings of which we might otherwise be unaware, and may in our turn get opportunities of removing misconceptions which but for the spoken criticism might have remained uncorrected. It is, I take it, most important that every medical practitioner shall be prepared to justify on the broad grounds of public policy the customs and proclaimed attitude of the profession. It is only on such grounds that a worthy defence and justification can be placed. No doubt nowadays we hear many comparatively pleasant things said about ourselves, and, indeed, considering only some recent public declarations, it might be urged that we rather require to prepare ourselves for the woe proclaimed for those of whom all men speak well than to be ready to explain and justify the attitude adopted by the profession towards the public and public questions. But this, I suggest, is a mistake. There are still points and aspects of professional policy which require explanation, and on which you are individually at any time liable to be challenged. Hence it is important that you should be prepared to meet the challenge—important for your own satisfaction and credit—important for the profession which you represent, and, most of all, important for the welfare of the public. I therefore commend to your notice both here and elsewhere this aspect of professional life, and urge you to prepare yourselves to meet such

criticisms and comments upon professional policy as may be suggested to you by the ordinary intercourse of social life or by your own experience and reflections, and not to rest satisfied until you can provide a justification placed upon the broad basis of the general welfare of mankind. I may venture to say that education on this subject ought to be one of the gains of college life, and I can scarcely doubt that you do receive definite assistance to this end—in so far as this is insufficient there is all the more need for energy on your own part in order to complete your equipment.

It is less my desire just now, however, to offer the apology of the profession for its existence and policy than to contemplate some of the features of medical study and practice as these concern the individuals engaged with them, and to reflect upon some aspects of the mental environment which medicine offers to those who elect to spend their lives in her service. It is *à priori* highly probable that work having such a special character should carry with it certain special influences and discipline. Some of these influences are peculiar to the medical atmosphere; others, no doubt, are also more or less present in association with various other branches of scientific study, but even these are likely to be modified by the consideration that they play their part in a special world, and are dominated by the end or purpose for which medicine exists. As we are

all subjected to the influences which our mental environment provides for us, and must be more or less moulded by these according to the degree of our plasticity and our natural aptitudes, it is not unwise that we should consider the play of the forces in the midst of which we have voluntarily placed ourselves.

And I remark in the first place that medicine provides an education in the appreciation of evidence or testimony. The first question to be settled in connection with every case that comes before you is the nature of the ailment. And this can only be settled by a consideration of the evidence submitted and discovered. It is all important in such an inquiry that you should distinguish between what is valuable as evidence, and what is valueless—what, indeed, is evidence, and what is not. Now, speaking generally, you find in each case two kinds of evidence—the statements provided by the patient himself and his friends, and the facts which an examination by the physician reveals. These last may be capable of different interpretations, but as facts of testimony, provided the physician is competent and careful, they remain, and no issue or opinion is to be allowed which does not include them within its inference. They are evidence of the most definite and concrete kind. But the statements of the patient are in an entirely different position. They may be absolutely accurate and correct, but

we have no complete guarantee of this. The intrinsic nature of the statements, their harmony with the undoubted facts of the case, the general bearing of the patient, our knowledge of his power of careful observation and his capacity for accuracy in description, may lend to his statements considerable probability, and even such a high degree of probability that no question of their accuracy arises in our mind, but all the same they do not stand in the same secure position as the facts we have learned by the use of our own senses, and we ought not to place them in the same mental category. And frequently we find that as evidence or testimony the patient's statement is of comparatively little value. I do not refer to cases in which there is wilful deception, but to that much larger class in which inaccuracy is the result of imperfect observation, failure of memory, limited descriptive powers, or that excessive love of the dramatic which is incompatible with strict veracity. In the mind of the physician therefore the appreciation of the value of statements offered to him as evidence has constantly to be cultivated, and he must have more or less clearly before him the rules or circumstances under which the value of such statements as evidence is determined. I take it that these rules are somewhat as follows. In the first place there is the ability and character of the individual, his power of accurate observation and correct description, and his capacity

for truth-telling. There is in the second place the probability or otherwise of the statements made as this is determined by comparison of previous personal and recorded experience with the observed facts of the case. And of these we find it specially necessary to place the highest value on the last mentioned, not because people generally wilfully misstate the history of their symptoms, but because they are not trained to habits of accurate observation, and thus fall unintentionally into errors of statement. In short, our mental attitude comes to be one in which questions of probability are the determining questions in estimating the value of testimony. If a patient suffering from acute rheumatism tells me he has had three previous attacks of the disease, I am inclined to believe him, though he may be a complete stranger to me, because his statement is in harmony with experience, and because, as far as I can judge, he has no interest in deceiving me. But if a man with symptoms of typhus fever, whom against his wishes it is proposed to move to a hospital, assured me with a view to avoid the consequences of the diagnosis that he had had a previous attack of the disease, I should doubt his statement, first, because the probabilities from experience are against it, and secondly, because I know he considers it his interest to mislead me. And again, if the most veracious person I know told me he had had typhus fever on three occasions I should not believe

him, because I should consider it more probable that he should be mistaken than that an event so distinctly in conflict with all experience should occur. To establish such a statement in my mind as a correct statement, it would need the direct testimony of a physician, not only notoriously attached to truth, but with every opportunity and capacity for making the necessary observations. It comes therefore to this—that in matters of personal testimony, what is said may or may not be important, but who said it is all important, and the value of the “who” is determined not merely by his known desire to tell the truth, but also and mainly by his ability to accurately observe and describe the facts. And further, that the more improbable the statement—*i.e.*, the more it is in conflict with experience—the stronger the evidence needed to make it worthy of belief.

This is the mental atmosphere in which the physician lives so far as the value of testimony is concerned, and I take it to be a very healthy atmosphere. It is quite free from forensic narrowness, which determines by a more or less arbitrary code what is and what is not evidence, and declines (no doubt quite wisely for judicial purposes) to admit as evidence what contravenes that code. It puts no restriction whatever upon the submission of all statements and views that may help to the discovery of the truth. And, further, there are no special

aspects of the case other than complete accuracy to be associated with the sense of personal triumph, and no room for the victory of mere declamation and ingenuity. On the other hand, it is an atmosphere which is quite keen to develop both a demand for evidence as a basis for opinion, and a fairly sure judgment as to the value of evidence, and thus to act as a corrective against a natural disposition to credulity and a love of the merely marvellous. That there is such a natural disposition can scarcely be denied. We commence with Jack and the Bean-stalk and Little Red Riding Hood, and some of us progress through fortune-telling to the sea serpent, the rapping of tables, spirits floating round the room, letters from the Mahatmas, Mr. Stead's Julia, and the clever person who reads your thoughts while you wait. I am not to be held as saying that these phenomena do not occur, all I am contending for is that in order to prove they have occurred or do occur, it is not sufficient for some one person or even for a number of persons to say they have seen such occurrences. And the reason why such statements are not sufficient is that it is a common experience for persons to be deceived or to make mistakes whilst the occurrences predicated are directly opposed to common experience. In all my experience of tables I have never caught them rapping; they have hitherto presented to me habits of fixity and stolidity; and therefore, in order to convince me that they can and do rap, it is not

sufficient to produce one or more enthusiastic witnesses, unless I also know the competence of the witnesses, their powers of observation and judgment, the degree of their natural acuteness, their familiarity with the nature and habits of tables, and with the influence of various conditions under which the rapping or non-rapping properties of tables may be tested.

The mere statement that something has been seen is not in short a proof that it occurred. Hamlet saw his father's ghost; Luther had such a distinct view of his satanic majesty that he threw the inkpot at him; the Roman soldiers saw Castor and Pollux riding on white horses and leading them to victory; many sailors have seen the Flying Dutchman; the countryman sees the pea put under the thimble; every one has seen yards of ribbon, cauliflowers, and globes with gold fish brought out of a silk hat, but no amount of protestation of the fulness and repetition of such observations is considered adequate testimony as to their accuracy. From which it follows that the senses, unless under special cultivation, may give misleading evidence, and even after special cultivation their testimony requires to be checked by experience. In your work you get education in this truth not infrequently. People see and feel tumours where none exist, they recognise paralysis, fits, unconsciousness, and a host of other events which certainly did not

occur ; cancer, consumption, fits, old age, undesirable capillary coloration, and wooden legs are all cured by the use of purple pills for green people ; whilst, on the other hand, very frank and manifest circumstances are entirely overlooked. And the student of medicine learns by sad and painful but ever valuable experience that he himself does exactly the same thing until by slow and laborious training he fits his senses to accurate observation, and learns to control their testimony by reason and judgment and experience. Hence it happens that the study and practice of medicine constitute a discipline apt to develop the reasoning powers and to cultivate sound views as to the worth and value of statements offered as evidence. It has been excellently said that the principal and most characteristic difference between one human intellect and another consists in ability to judge correctly of evidence. The medical practitioner has at least opportunities to establish this difference in his favour, and his sense of the necessity of doing so is constantly sharpened by the consciousness of the serious nature of the penalty, both to himself and his patient, which waits as Nemesis attendant upon error.

A discipline which determines our mental attitude on questions of evidence must necessarily also determine our attitude as to the nature of opinion, which is the result and effect of evidence. Opinion may be defined as a state of mental conviction resting

on an intelligible basis ; it is a judgment, inference, or conclusion resulting from the consideration of evidence. It is in this sense that the practitioner gives and acts upon his opinion in any given case after he has learned the facts or evidence of the case, and it is only after he has learned the facts that he will accept the responsibility of giving an opinion or recommending a certain line of treatment. To act otherwise is on the face of it absurd. A practitioner who does act otherwise may speak about his "opinion," but in so doing he unjustly dignifies his mental condition—it is not that of opinion, but is a mere impression or a piece of pure guess-work. He is not entitled to have an opinion until he has considered all the evidence available, for it is upon evidence alone that opinion can be surely built. Observe that this statement does not justify opinion on the ground of its accuracy. As long as men are fallible they will make mistakes, some as the result of inaccurate or careless observation, some as the result of imperfect reasoning.

An opinion is not always right, but it is always arrived at by a reasonable route, and if it proves to be inaccurate the localisation of the flaw can be determined when all the facts are known. And in respect of accuracy the experience of medicine is continually teaching that the accumulation of evidence is the only method which, on the whole and in the mass, can be depended upon to lead to

accurate results, and that this method alone provides the opportunity for improvement of one's mental apparatus by which the mistakes of one day become sources of guidance for the next. In so far as we submit our minds to this discipline will be the depth and extent of its influence. It is a discipline which teaches that no man has a right to an opinion unless he has considered the evidence on which this opinion rests, and that the fact of accuracy is not the only or, indeed, the main justification of an opinion—it is not a question merely of being right, but of having the right to be right.

These are propositions which by no means find general recognition outside scientific circles. The man in the street usually has an opinion on all things in the heaven above and in the earth beneath and in the water under the earth; and many are the social arrangements which produce opinions *ex tempore* and without the previous exhaustive process of thought. "I am of opeenion," says one of Mr. Barrie's heroes, "that the works of Burns is of an immoral tendency. I have not read them myself, but such is my opeenion." And that is the position of the "opeenions" of many people. The discipline of medical study is to correct this view, and to show that the intellectual state indicated by the term opinion can only be reached by an education in the power of weighing evidence, by the actual weighing of the evidence, and by the inter-

pretation of the evidence in the light of other experiences. You may say that such a conclusion confines the possibilities of personal opinion within very narrow limits. No doubt it does confine them within narrower limits than most people are ready to allow, and I do not scruple to say that the majority of people have no right whatever to many of the opinions they express. But it is to be contended for the view I am now advocating that a confession that on certain, and, indeed, on most subjects one has no opinion, is not only justified by reasoning, but is compelled by necessity. It arises from the very nature of things. And there is this further remark to be made—namely, that whilst the active and energetic profession of an opinion and the advocacy of action based upon that opinion is—as all medical practice shows—quite unjustifiable unless all available evidence has been fully considered, there are subjects on which one may give a tacit adhesion to views which are widely held by competent persons, the probability of accuracy arising from such general adhesion being considerable. But it is to be recognised that this mental position is one widely different from one gained by direct personal examination of the evidence, and does not entitle me to assume a controversial line or an *ex cathedra* attitude. Take an example. Suppose that the three leading physicians of the day, having each examined the same case, come to the same conclusion as to

the nature of the disease. Here the probabilities are surely sufficiently strong for me to adhere to their view, but whilst I do so I certainly have no such mental conviction in connection with the case as will enable me to write letters to the papers about it, make speeches from platforms concerning it, recommend certain courses arising out of the view taken as to the nature of it, or generally to make myself a missionary on the matter. Suppose, again, that two of the physicians I have alluded to take one view of the case and the third takes a different view—what is to be my position? Well, I conceive my attitude must be one of complete uncertainty. I don't know. I have no opinion. How can I presume to have an opinion when competent men who have direct access to the evidence at first hand come to different conclusions? Yet this disciplinary influence produces a result quite at variance with popular practice and habit. In the case, for example, of the fatal illness of a late royal personage, the most skilful laryngologists of Europe, after direct examination of the patient, entertained and expressed directly opposing views, yet I, and I daresay every other medical man, was repeatedly asked for an opinion on the case. Most of my interrogators seemed surprised when I said I had no opinion, and, perhaps out of pity, generally proceeded to give me an opinion of their own.

It comes, therefore, to this. That in cases where I

have direct access to the evidence, and have trained myself to appreciate its significance, I am entitled to an opinion which may and in certain cases must lead to action—practical, and, if necessary, controversial.

That in other cases, in which I have no direct access to the evidence, but in which competent authorities who have such access are practically agreed, and there is thus a decided balance in one direction, I may give a passive adhesion to the doctrine and practice involved, being here rather influenced by authority than evidence, such a position, however, giving me no warrant in active controversy or condemnation, and leaving me compelled to recognise that questions of competence of the authorities, and the amount of preponderance of view required to justify adhesion to their position, may reasonably excite different judgments. I take, for example, the question of vaccination. My knowledge of first-hand evidence on the matter is slight; but I recognise that the great balance of opinion of trained observers is in favour of its value, and I therefore adhere to that view, and the practice which follows it. But I am not prepared to stump the country on the question, or to press the matter into the region of acute controversy, and I ought to be ashamed to take any such course until I have fully and exhaustively considered all facts bearing on the issue.

It is further contended that in a large number

of questions there is not sufficient evidence to justify the formation of an opinion either one way or the other, or that if such evidence exists I am not familiar with it, and that upon such questions I or any other person is entitled to an attitude of mental reserve and uncertainty—is bound, indeed, to adopt such an attitude in deference to his intellectual integrity. When, for example, I am asked for my opinion on the causation of rheumatism, I say I have no opinion, because, as far as I can judge, there is no satisfactory evidence of the truth of any of the theories advanced; and further, I protest against the suggestion that I must and ought to have an opinion, as if opinions could be grown at pleasure, and their absence was an indication of mental poverty and intellectual sloth.

If this principle is extended into other spheres of thought, no doubt it may have effects which many people would regard as surprising. If opinion is only to be formed after careful examination of evidence, if the expression of an opinion is a considerable and responsible action, it will necessarily follow that there will be but few questions on which any one person will be competent or ready to express opinions. Great spaces of silence will occupy areas now busy with the views of the kailyard, the conclusions of 'our special correspondent,' and the opinions of Tom and Dick and Harry. On many subjects men and women must perforce go unlabelled, so that we

shall hardly know how to describe our neighbours when their backs are turned, and thus the art of conversation will be shorn of one of its most piquant pleasures. Even if all this did happen, I do not know that it would be an unmixed misfortune. Perchance grim silence is not worse than irresponsible chatter; and as for applying names and labels to every one, I sympathise with the definition that these are "contrivances invented to save talkative people the trouble of thinking." But there is no great risk of any considerable extension of this mental attitude. The practice of silence which it would induce is not popular. And a confession of absence of opinion on almost any question seems to be regarded by most people as an indication either of cowardice, stupidity, or insanity. If you give signs of this weakness, you will be pretty certain to be regarded with the suspicion that attended the fox who, having the misfortune to lose his own tail in a trap, tried to convince his friends that such an abridgment was really quite the latest fashion. The tendency is, indeed, all the other way. Social, political, and other influences in our environment, are for the most part so arranged that we are constantly cheated into the belief that we have opinions on many subjects with which we are but imperfectly acquainted. Our judgment is so liable to be swayed and moulded by our tastes and prejudices and emotions—our friends for the most part

have tails of their own and do not scruple to display them—that the danger is, not that the habit of mental reserve and uncertainty shall be extended from medicine into other questions, but that the general environment of the world shall drive us to precipitate ourselves into the expression of definite opinions on various scientific and medical questions when the evidence on these questions is either unknown to us or is in its present stage of evolution insufficient to warrant any confident conclusion.

But it may be urged that the circumstances of life often compel action upon inadequate or inconclusive evidence, and that in many cases we have to express decision, or, at all events, action, when in our minds there is yet reasonable and perhaps considerable uncertainty and debate. Granted; but the fact that the need for action on incomplete or conflicting evidence is at times imperative, is no reason why I should be compelled to a mental conclusion when no such need exists. A patient has, say, febrile temperatures, for which no explanation can be found. I must needs, in consequence, take certain action to secure both his welfare and that of others; but because of this I am in no sense bound to accept some, or, indeed, any, doctrine of the essential nature of temperature disturbance in general, or of the cause of the fever in this case in particular. On both these points I am quite entitled to preserve an open mind. I must, indeed,

do so when either I have not fully considered the evidence, or, having considered it, have found it inconclusive. In short, because under one set of circumstances I must be prompt and practical, is no reason why under different circumstances I should be bound to profess an "opinion" on various abstruse and complicated questions concerning which either my mind is not informed or my judgment is unconvinced.

There are still two or three remarks that may be added in connection with the contention that a medical training tends to emphasise the conviction that an opinion is an intellectual conclusion resulting from the consideration of evidence. Such a position means that change of opinion, when access to new evidence warrants it, or even as the result of a reconsideration of former evidence, is not only justifiable, but is, indeed, laudable. No physician is depreciated by his brethren or has his professional coat torn off his back because of a frank and outspoken expression of changed opinions. The discipline of medicine therefore is one of intellectual freedom and candour of conviction. And we may all the more reasonably congratulate ourselves on the enjoyment of such an atmosphere when a very limited acquaintance with affairs outside our own profession will promptly introduce us to associations in which a change of opinion is attended with very grave practical results, and is often regarded with suspicion, and even with contempt.

Again, the consideration we are now concerned with means that, as large numbers of questions in medicine are still open questions, waiting for fresh evidence before they can be solved, there is in medicine the wholesome influence of incompleteness. That is a constant exhortation to intellectual humility and to the recognition of the modesty of human attainment. But incompleteness carries with it other compensations: it is a stimulus to energy and effort, a protest against lotos-eating, and a pressing invitation to "scorn delights and live laborious days:"

"One goal attained, another just in view;
 One riddle solved, another still to guess;
 Something subdued and something to subdue,
 These are the conditions of our happiness;
 I know no harsher ordinance of fate
 Than the stagnation of your perfect state."

But it may be contended that a view of the nature of evidence and opinion such as is here advocated is likely to develop a mental attitude of indecision, and so to paralyse action. There is some truth in this contention. A man may, if he forgets that whilst art is long, life is but short, spend such an amount of time and energy in collecting and weighing evidence that he leaves himself no time for decision and action; or he may be so anxious to impartially weigh all the *pros* and *cons* of every dispute, that he never makes up his mind on which side to cast his verdict, and so dies and makes no sign.

“ In days of old, the schoolmen raised the question,
Suppose an ass on either quarter saw,
When stirred by any motive to digestion,
Two equal heaps of thistles or of straw,
Each equally attractive to his vision,
Each equal in its succulence and size,
Could he arrive at grounds for a decision
Or must he weigh their merits till he dies?
And they inferred that, granting the condition
Of equal appetite and equal claim,
The puzzled beast must die of inanition
Before he could determine on his aim.”

That, no doubt, is an example of, and a warning against, the judicial mind in excess. But from any such fate the practitioner is saved by the practical exigencies of his profession. He *must* in his daily work decide—it is his duty to do so—without proof amounting to demonstration, often, indeed, on a bare probability, and frequently his decision involves action. And a decision to do nothing in a given case, remember, may be a decision involving most momentous considerations for the individual patient. It may well be that the grounds for an opinion as to the exact nature of the case do not exist, but the practitioner cannot, on that account, always fold his hands and do nothing; he has to act according to the probabilities of the situation, and it is always possible to advise your patient—and you constantly have to advise your patient—when you know quite well that the evidence in the case is too obscure or too conflicting to allow its true nature to be deter-

mined. A patient has, say, an abdominal tumour: its diagnosis is quite uncertain after all possible sources of evidence have been collected, but the necessity for decision remains—ought the abdomen to be opened? should the tumour be aspirated? or should it be left severely alone? Here decision is imperative and judgment is purely a question of probabilities. So that, I say, whilst your profession is a discipline in the movements of the mind by which alone a true opinion emerges, it by no means encourages mere intellectual conceits, or ingenious hair-splittings, or dilettante debatings, or scholastic subtleties. Its demands for decisive action, at least in extensive areas, are imperative, and whilst you will be scourged, and rightly scourged, if you jump to conclusions and form opinions without evidence, neither will you escape the lash if you procrastinate and delay when decision and action are called for. Scylla is upon one side, it is true, but Charybdis is upon the other, teaching you, as of old, “thou wilt go safest in the middle way.”

These considerations lead me to claim further that the discipline of medicine is very forcibly in the direction of producing a capacity for accuracy in statement, and again, that it stimulates a high appreciation of the standard of intellectual veracity. Inaccuracy in statement, I mean apart from deliberate lying, is usually a result either of careless observation, of failure to recognise the distinction between facts and

inferences founded on the facts, or of a low standard of veracity in association with a passion for the melodramatic. Against these influences the mental discipline of medicine may be reasonably invoked. Careless observation is a root error, throwing diagnosis, prognosis, and treatment at once on to wrong lines with great possibilities of disaster both to practitioner and patient; medicine provides, therefore, conspicuous warnings against it. It is also a common error to state with confidence as a fact what is really a judgment or opinion on the facts. A patient suffers from pains in his upper limbs, and he will tell you that he suffers from rheumatism; he is annoyed by some sense of discomfort under his right shoulder-blade, and goes about claiming sympathy for some condition of his liver. These and numberless other instances show how frequently, in the popular judgment, theories are confused with facts, and the *post hoc* is argued to be *propter hoc*. But the medical practitioner lives in an atmosphere in which this will not do. Conclusions, judgments, or opinions, as we have seen, can only be reached after the facts bearing on the question have been collected and considered, and even when they are reached, must be distinguished from the facts. I see a patient, say, who is paralysed on one side of his body, and this condition, with certain facts in connection with the examination of the heart and blood-vessels, together with other considerations, leads me to conclude that the

paralysis is due to hæmorrhage into a particular part of the brain. But I quite clearly distinguish between the facts themselves and the inference founded on them. Given accurate observation, the facts must necessarily remain, but the interpretation of them is held with more or less reserve and is ready to be abandoned if further evidence conflicts with it. Such a habit of mind is most helpful both to clear thinking and to accuracy and precision in statement.

No doubt sometimes the inference is justifiably so clear and strong that it would be pure pedantry to show hesitation or diffidence in confidently stating it. It would be affectation to describe a fluid effusion into the knee-joint as *a globular swelling in the situation of the knee, giving a sense of fluctuation when handled, and causing the patella to be so altered in position that a sharp tap over it produces a temporary depression of that bone, the movement of the patella being limited by contact with some hard substance which may possibly be the anterior aspect of the lower end of the femur.* This, I say, would be a piece of mere pedantry, because such facts have so frequently been shown to be the expression of fluid in the cavity of the knee-joint that any other interpretation seems practically incredible. Still it remains all important to mark the distinction between facts and opinions about facts, and medicine offers you abundant illustration of the necessity for this. To darken counsel by words

without knowledge is no part of the mental furniture provided by medical studies.

It is not infrequently charged against the discipline of medicine that it stunts and atrophies the imaginative faculties, and this statement is worthy of a moment's examination, more especially as it oftentimes issues from the interior of the profession itself. It may be admitted that we live in an age in which the conditions generally are unfavourable to the creation of mental images. The creation of such images needs for its vitality, in the first place, a narrow environment of facts with vast expanses of which absolutely nothing is known and which may be peopled with images without arousing a sense of impossibility or of improbability ; and, in the second place, what accompanies such an environment, an absence of the critical spirit. To-day the picturesque imagery of the Greek mythology gives no motive to our lives, because our knowledge of facts is such that the statements there made outrage our sense of probability. Vulcan forging the thunderbolts of Jove in some subterranean cavern could easily be imagined by peoples to whom earthquakes and volcanoes were mysterious phenomena, but at the present day there is a *prima-facie* case against Vulcan, because, to say the least of it, he outrages our sense of probability. Earthquakes and volcanoes we know to be expressions of natural forces, and Vulcan and all his apparatus of artifice we regard as a mere picturesque expres-

sion of the imagination founded upon ignorance. But in the earlier ages of the human mind he and his coadjutors could easily be believed to be, and were believed to be, actually existent; they were images so vivid that they influenced thought and action. In the nineteenth century we are in a different position. No one has seen Vulcan or discovered the remains of his smithy—the smoke and sounds attributed to his forge we know to have quite a different origin, and, therefore, if an unfortunate poet stands up in the market-place and sings about Vulcan and the subterranean manufacture of thunderbolts, we greet him with jeers and possibly with bricks. In short, as the facts of the universe become explored, the area of the region within which images can be formed becomes narrowed, and the probability of occurrences opposed to human experience becomes diminished. The suggestion of such occurrences, therefore, is met with incredulity and a demand for evidence. Observations on the human body have, of course, contributed their quota in this direction. Thus it is no longer possible for any one who has the most elementary knowledge of anatomy and physiology to make images of vital spirits rushing hither and thither among the organs and tissues, or to picture the viscera engaged in the manufacture of beneficent or malevolent humours. Again, as experience has shown that the production of mental images, however amusing and

interesting, has done little to meet the practical difficulties of human life, whilst observation of facts has done much in this direction, it has necessarily followed that the art of making mental images has fallen into comparative neglect. The conditions of the age, therefore, have both increased the difficulty of developing the production of mental imagery, and reduced its influence. The persons who practise medicine, like all other persons, are, of course, limited by the conditions under which they live, and, in so far as these are adverse to the development of the imaginative faculties, medical practitioners are disciplined by them; and if medical practitioners are specially in contact with those conditions of the nineteenth century which are adverse to the production of mental images, they will no doubt feel the influence of these in a special measure. Hence I readily admit that a medical practitioner is far less likely than a person without scientific training to be responsive to a ghost story or to be carried away by some tale or poem which depends for its motive upon an effect contradictory to experience. A man who is ignorant of the action of chloroform is thrilled by the recital of the act of some ingenious criminal who renders his victim unconscious by a passing whiff of the anæsthetic, because the man's ignorance renders the creation of such an image or picture in his mind possible, whereas the medical practitioner, knowing that the statement is absurd, laughs

at the story as the production of some smart and enterprising journalist. Medical study, by reducing the possible area of the marvellous, does undoubtedly reduce the district within which mental images may be framed. But I am not prepared to admit that medical study does what some contend—viz., holds down the mind to the mere prosaic facts of life and atrophies its power of ranging in the regions of the emotional, the æsthetic, and the intellectual. To such a proposition I say No. The facts of the practitioner's experience are no doubt often hard and painful facts, but that makes it all the more necessary that, whilst he recognises them, he should endeavour to penetrate below their surface, and a whole field of philosophical speculation is then opened to his mental vision. The branches of the femoral artery may, as a recent writer has said, be numbered, fixed, and immutable; and it may be true, as he has said, that they give no play to the imagination, in the sense that they do not give play to some poetic personage to go about saying of them what is certainly not true; but I deny that these and similar facts necessarily limit the mental horizon of the practitioner so that he becomes a kind of petrified Peter Bell. On the contrary, his familiarity with facts is constantly impressing him with the truth that facts apparently widely separated are often closely related; that things often are not what they seem; that below facts are truths of which the facts

are but the expression. And thus his mind, instead of being held in a sort of prison-house and toiling at experiences which are so many arbitrary phenomena, is stimulated and urged not only to think, but to think its thoughts, as far as may be possible, into a perfect whole, to penetrate into the how and if possible into the wherefore and the why, and to seek for, and if haply to find, the secret and conclusion of the whole matter. Surely if any one learns, it is the medical practitioner, that among the existent facts of the universe there is the reality of the dignity and sweetness of human emotion and sympathy, and the unmeasured sphere of human consciousness and influence. Perchance the enigmas of life are presented to him in a sharp setting, but the stimulus to think about them is all the more earnest. I have not the slightest wish myself to develop the power of fancying something to exist which does not exist, and against this disposition of the mind medicine I believe to be a very wholesome discipline, but I deny that in such discipline I am confined to facts of the "branches of the femoral artery" order, and I say further that even these facts are not so many dead walls for the practitioner, blocking up his mental horizon, but rather that they invite a mental effort to determine their relationships, and, if possible, to unlock their meaning. In such effort the free and generous use of intellectual earnestness and mobility is encouraged. No medical practitioner's life can be insensible of

the reality and charm of emotion, and no medical experience but teaches that man's mental life and power, his individual and social ideals and failures, and his capacity for noble ends, are as truly facts of his existence as are the branches of the femoral artery, and present him in an aspect not less real than his anatomical construction and physiological plan.

“Because a man has shop to mind
 In time and place, since flesh must live,
 Needs spirit lack all life behind,
 All stray thoughts, fancies fugitive,
 All loves except what trade can give?”

In many branches of human work such “thoughts and fancies fugitive” are no doubt something entirely outside the daily round, and thus

“a butcher paints,
 A baker rhymes for his pursuit,
 Candle-stick maker much acquaints
 His soul with song, or, haply mute,
 Blows out his brains upon the flute!”

But in medicine even such sad mechanic exercise as exists is a direct avenue and entrance to the contemplation of the entire field of human nature and human thought.

“Shop is *not* shop only.

· · · · ·
 Chaffer is scarce his meat and drink,
 Nor all his music—money-chink.”

I pass to the consideration of another aspect of the discipline provided by medical work. It is

associated with the art of prognosis. The medical practitioner has not only to arrive at a diagnosis, that is to form an opinion on the existing evidence as to the nature of the case, but, in addition, he is compelled by many practical influences to endeavour to shape a prognosis, or to endeavour to foretell what is likely to happen. Hence he is drilled by the conditions upon which such forecasts rationally rest—that is, he has conspicuously in his life the elements upon which a rational expectation of future events depends. And he finds, I suggest, that such expectation depends entirely upon past experience, and that he is accurate and correct in his forecast of the future exactly in proportion as he is informed as to what has happened in similar cases in the past. And, further, that his statement as to the future is confident and definite, in direct ratio as past experience has seemed unvarying. In short, he finds that the forecasting of the future, as far as this is possible, depends upon a knowledge of the past, that the only rational basis for expectation is experience, and that the degree of liveliness in such expectation is determined by the apparent uniformity or contradictions of the past. He sees, for example, a case of scarlet fever, and he foretells with every confidence that in the course of a week or more there will be desquamation of the cuticle, because all previously recorded experience shows that in cases of scarlet fever such desquamation

occurs. Again, he sees a case of diphtheria: he knows that such a case may be followed by paralysis, but he also knows that many cases are not so followed, and therefore his prognosis is guarded and indefinite. He sets a fracture in a young and healthy adult and says, with considerable confidence, that in the course of a few weeks the bone will be healed. I repeat that in all these cases it is past experience that guides him, and that his tone is confident in proportion as that experience has appeared uniform. It is not absolutely certain that a scarlet fever patient will desquamate, and there may have been, for anything we know to the contrary, scarlet fever patients who did not desquamate. But there is such a mass of positive testimony that this event has occurred in the past, that the probability of it occurring in the future forms in the mind so confident an expectation that we should be surprised if desquamation did not occur. In the same way the probability that the broken limb will be whole in a few weeks is a very high probability, so high that we are justified in allowing our patient to make arrangements, say, for taking a journey at the end of that time, and the probability is a very strong one because a broken bone in a young healthy adult has in the past for the most part healed in the course of a few weeks. But it has not invariably done so, and hence our expectation of the future is to some extent tempered and qualified. Our prediction

for the future in the case of diphtheria is much more qualified, because experience in the past appears to be conflicting on the point, and the probabilities are fairly evenly balanced. The child, judging from the past, may or may not suffer from paralysis, and therefore we feel that the less we say about the future the better. It is much more probable that the patient with diphtheria will have paralysis than that the scarlet fever patient will be paralysed. We cannot say the latter event is absolutely impossible, but the possibility, judging from experience, is so remote that we do not entertain it in our anticipations. Now I say all this is a mental discipline which inclines us to place our expectations of future events upon a rational basis—viz., upon the probabilities as these are estimated by our knowledge of the past. The practice of medicine is, indeed, a constant endeavour to estimate probabilities, for it is the estimation of the probabilities in each case which determines the advice you give to your patient, and, as Hippocrates puts it, “he will manage the case best who has foreseen what is to happen from the present state of affairs.” And such foreseeing is to be gained by a contemplation of the past and a transference of the past to the future in all our inferences.

There is some need, it would appear, to define the mental conception arising from the practice of prognosis on the basis of experience. But a short time

ago an address on the subject of prognosis was delivered to an important medical audience by a well-known physician. That address consisted for the most part of a statement of the facts of experience in connection with various diseases, showing what actually has happened as regards complications, death, and recovery in connection with each disease. In a leading medical journal the writer of an article, in dealing with the address, said that "the orator does not sufficiently make clear the difference between rules, such as those he so admirably illustrated, and laws of nature in the strict sense." And, further, the writer goes on to say that "if such rules are not to become a mischievous bondage, they must be continually compared with nature and recast in the light of new discoveries." In my judgment these passages betray a confusion of thought which shows that the writer has been very imperfectly disciplined by his course of medical study. There is, I contend, no difference between what the writer calls mere rules, and laws of nature in the strict sense. All that we know about laws of nature is that they are rules. They are brief statements summing up the hitherto recorded experience in the subjects with which they deal. "All men are mortal" is a law of nature. It is based upon the fact that up to this date men have died with remarkable unanimity, and that from this unanimity there is a correspondingly strong proba-

bility that men will continue to die in the future. Patients who suffer from scarlet fever have hitherto desquamated, and so "desquamation follows scarlet fever" is a law of nature; and similarly, according to its regularity in the past, is the probability of its repetition. Both "all men are mortal" and "desquamation follows scarlet fever" are rules based upon an observed order of facts, and one as much as the other requires to be continually compared with nature and recast in the light of new discoveries.

No doubt some people argue that in every "law of nature" there is an element of necessity, and that behind each law stands some force which has in the past unvaryingly manifested itself, and must continue to do so in the future. Even if such forces exist, we know nothing of them except in respect to their manifestations; and certainly we have no guarantee, apart from the probability established by experience, that their operations will continue in an unmodified form. That all men have each two ears is a rule or law of nature, but there is no known necessity that a man should have two ears; and similarly there is no known necessity that all men should die, or that all scarlet fever patients should desquamate. But in each of these respects experience has been so consistently uniform that we shape that experience into rules or laws and found our estimate of the probabilities of the future upon them. But we are, and must be, quite prepared to continually compare

these rules with nature and to recast them in the light of new discoveries. According to the writer to whom I have referred, this procedure should be adopted when a scarlet fever patient does not desquamate, but should not be adopted when a man is proved to have had only one ear, or to have given evidence throwing doubts on his mortality.

Our knowledge of the so-called laws of nature, indeed, is even less confident than stated above. In support of each one of them we possess, no doubt, a considerable body of positive evidence provided by numberless individual events. But we have no certainty that they have been of invariable and universal application. We expect, and reasonably expect, that an apple, unless supported, will fall to the ground, because we have undisputed and countless testimonies that in the past apples have so fallen, and at the same time we have no established record that even on a single occasion an apple under these conditions has failed to fall. But we are not entitled to say that as a matter of absolute certainty every apple when loosed from the branch has fallen to the ground, however probable we may believe this to be, and we could not possess such certainty unless the course and movement of every detached apple had been under strict observation. But in the presence of such an overwhelming mass of positive evidence, and in the complete absence of proof of even a single negative

instance, we are justified in expecting, are indeed practically compelled to expect, apples to fall in the future, though we cannot be absolutely certain that they will do so. Should one be proved to have failed to fall, then we must be ready to revise our rule and to recast it in the light of new discoveries. This is the position in which we are placed. And it is exactly the position to which medical study and practice accustom us. For successful prognosis you must accumulate facts under strict observation and on the sequence of observed facts base your expectation and promise of the future.

But, you may retort, what have you to say about the prognosis in such a case as diphtheria in relation to paralysis, or in rheumatism in relation to heart disease, as in these conditions experience seems to be contradictory? Some diphtheria patients suffer from paralysis, some do not; some cases of rheumatism acquire heart disease, others escape. How can you compare a series of recorded events which seem to be in conflict with a series in which experience is uniform? My answer is that, whilst the past seems in these cases to offer no basis for confident expectation in the future, the apparent contradiction of experience is not a real conflict of events. It is true that some diphtheritic patients become paralysed and some do not, and that in a given case we cannot say whether paralysis will or will not appear. But why is this? Is it not because our observation

of the manifestations of diphtheria is not yet sufficiently full and accurate to enable us to separate, before the paralysis appears, two groups of cases between which there must be some essential difference? If it is not the case that one diphtheria patient is paralysed and another is not paralysed because there is some essential difference between them, then the influence that produces paralysis, whatever it be, does not act according to rule, but irregularly and, as it were, by chance. It is, so to speak, the work of a malignant demon which acts not under certain definite conditions and circumstances, but fitfully and capriciously, selecting its victims on its own prompting, and merely because it is its humour so to do. If this is so, then there is one department of nature in which, instead of order and regularity, there is confusion and chaos. There is no escape from this alternative. Either the paralyzing agent acts according to rule, or it does not. If the agent does act according to rule, then there is a rule or law of nature of its action, though we may not yet have been able to observe or formulate it. If the agent does not act according to rule, then there is a natural field within which confusion reigns, and here no rational expectation of the future can be framed. And if Nature can be thus fitful and capricious in one sphere of her activity, she surely can be in others; and so we are brought into a position in which our confidence in the future,

based as it is in a belief in the constancy and uniformity of natural events, is shattered and destroyed at one blow. The discipline that we live under ought to provoke the view, not that it is a mere toss-up, an off-chance, as to what will happen, but rather that a confident probability of the future is to be determined by an intimate acquaintance with past and present experience, and that where such experience is conflicting, such conflict is the result of imperfect knowledge on our part and the consequence of confusing in our minds conditions which are essentially distinct.

“The fault . . . [it] is not in our stars, but in ourselves,
That we are underlings.”

These are some of the reflections which may be submitted in support of the thesis that medicine offers to those who pursue it a mental discipline capable of resulting in a broad and liberal education. It is no mere “culling of simples,” no “beggarly account of empty boxes, green earthen pots, bladders and musty seeds,” not even simply a utilitarian art, though this aspect of it has its own elevation, dignity, and benediction. It offers to the student, on the contrary, a wide field of natural history rich in phenomena, physical and psychical, and a discipline which compels attention and clarifies thought. If we fail to make ourselves capable of judging of evidence ; if opinion is to us the mere froth of the moment and not the issue of mature consideration ;

if our conceptions of the order of nature are crude and barren and narrow, the fault lies in ourselves and not in our environment. That any man takes out of medicine the full benefit of its mental discipline may be doubted, and in so far as failure is one's own fault the pity of it is the greater. To be careless in observation, superficial in judgment, self-satisfied in reflection, dogmatic in assertion, and loud and vain-glorious in achievement, are not elegancies in any man, but in one to whom Medicine has offered her rich opportunities, such a result is the less worthy.

“ Who but must laugh, if such a man there be,
Who would not weep if Atticus were he ? ”

From such a fate the discipline of Medicine is well calculated to preserve us ; and whilst the range and elevation of her demands may well sometimes cause our hearts to fail there is at least the comforting thought

“ Who aimeth at the sky
Shoots higher far than he that means a tree.”







