AN ADDRESS ON SOME ASPECTS OF MODERN MEDICAL THEORY AND PRACTICE.

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[AFTER expressing his thanks for the honour done him by election as President, Dr. Carter said:]

Everything in motion obeys the law of rhythm. In the rhythmic progress of our Branch-work the present occasion marks the beginning of another systolic impulse of activity, for which preparation has been made (as we may hope and believe) by power and energy stored up during a diastole extending over a comparatively restful summer. Standing, then, as we do upon the brink of a fresh departure, it seems to me to be a specially favourable opportunity for glancing at some of the general principles which underlie our work, and for allowing our thoughts to travel for a little while into some of those larger and broader questions, which are bound to arise from time to time in the course of our daily experience as practitioners of medicine. In an address which it was my privilege to recently deliver as President of the Birmingham and Midland Counties Branch, I was at some pains to emphasise the importance of cultivating an intellectual interest in our work, as supplying one of the most effective means of escaping the demoralising influence of monotonous routine; and I further pointed out that it is only when such interest is created our work really progresses and prospers.

It is in the hope of contributing something that may in a humble way tend to stimulate and keep alive such an intellectual interest that I ask your attention for a few reflections—fragmentary though they be—on some of those features of medical doctrine and practice which are more especially characteristic of our own time, and tend to throw light upon the attitude in which we stand to-day with regard to the art that we profess. My training and experience do not qualify me to deal with surgical questions, although the remarkable progress of surgery in these latter days by the aid of anaesthetics and strict conformity to the laws of cleanliness is obvious enough to be grasped even by the uninitiated. But the progress of medicine, if not so triumphant as that of surgery, has been equally great relatively to the position that it occupied at the beginning of the century. Whatever difference there may be between the two necessarily follows from the much greater difficulty of the subject matter with which medicine has to deal, the more complex inferential methods which are necessary for diagnosis, and the more obscure and subtle operation of the therapeutic agents which it employs. But it is waste of time to labour any comparison between them. Each has its work to do, though that work is conducted upon different lines, and appeals to different aptitudes. Each supplements the other, and both combine in an honourable combat of absorbing interest with the physical ills which beset our frail humanity.

My reference to medicine as an art justifies a passing allusion to the oft-discussed question as to how far it may be regarded as a science. Primarily and essentially it is without doubt an art—an art which has for its object the cure or prevention of disease—an art which demands both experience and skill—an art which deals directly with individual sufferers, and not with speculative problems. I entirely agree with Dr. Pye-Smith, who, in a recent excellent address to the Association, said, "We must never allow theories, or even what appears to be logical deduction, or explanations however ingenious, or statistics however apparently conclusive, or authority, however venerable to take the place of the only safe rule of practical medicine—observation and experience." This is unquestionably sound teaching, but it does not deny, nor is it incompatible with a sphere of usefulness to each of these matters in their proper place. Indeed were we to exclude them from all consideration we should rob our

art of its interest and vitality, and reduce it to a dead level of unqualified empiricism. On the other hand, there is unlimited scope for the employment of scientific knowledge and for the exercise of scientific method; and in proportion as we avail ourselves of either, we may rightly claim to be scientific practitioners. A fruitful source of confusion arises from a promiscuous use of the word "medicine" to denote medical pathology as well as the art of healing. Pathology is a pure science, studied with a view of evolving definite laws of disease, without any immediate consideration of their application for practical purposes. Indeed a very considerable amount of pathological knowledge is not at present available as a guide to practice in the sick room; and it is undoubtedly true that a pathologist, however able, who was nothing more, would cut but a sorry figure as a practitioner. It is, however, the bounden duty of each one of us to carry as much pathological learning into the sick room as will serve to illuminate, guide, and help forward our art; and the same may be said with regard to other sciences, such as physics and chemistry. But it is not only by the application of scientific knowledge to actual practice that modern medicine claims to be scientific, but also by the exercise of the scientific method in practice, by which I mean the orderly classification of facts observed, with a view to establishing their mutual relations, and to educing some general truth, principle, or law.

In spite of all, a large—perhaps the larger—portion of our art still remains on a purely empirical basis. But the fact need not dishearten us. All science takes its origin in empiricism, and the latter is not of necessity opposed either to reason or common sense. It may be employed with intelligence, and has in the past been productive of fertile additions to our stock of organised knowledge. It is only when allied with ignorance or indolence that empiricism degenerates into scepticism or quackery.

Among the characteristic features of the thought of the latter part of the nineteenth century we find a spirit of realism exerting a profound influence alike in art, literature, and science—a spirit which manifests itself by a strong disposition to regard the actualities of Nature as alone worthy of consideration, and to exploit everywhere the real at the expense of the ideal. In the sciences it especially manifests itself by a disproportionate or exclusive cultivation of inductive methods of inquiry. We hear on every side congratulation on our emancipation from the speculative systems of the last century and the beginning of the present, from which no doubt the realistic spirit to which I refer is partly a healthy and natural reaction. Without for one moment depreciating the splendid results of inductive inquiry and the rich harvest of material which it has yielded, yet it seems to me that its very success has in some quarters brought about a tendency to regard the intellect as "a sort of independent faculty, acting on its own account, and able to verify anything and everything by some fixed and certain standard of its own," to the exclusion of co-operation on the part of any other attribute of the mind. By the exercise of reason pure and simple we can question, analyse, and classify the phenomena of Nature; but such a method, when exclusively employed, merely resolves itself into weary and endless investigations, resulting in the accumulation of an enormous unwieldy mass of material, which, taken by itself, is void of meaning, points to nothing, and is of little practical value. What is needed is the vivifying, formative, and simplifying power of imagination. Only by the skilful and intelligent exercise of imagination can we give unity to the products of inductive research, evolve a law from a mere sequence of phenomena, convert a stream of tendencies into a definite purpose, or raise a mere procession of changes into a living process of evolution.

Here is a passage culled from an address of the late Professor Tyndall on the scientific use of the imagination which is much to the point I am urging:

"Philosophers may be right in affirming that we cannot transcend experience; but we can at all events carry it far from its origin. We can also magnify, diminish, qualify, and combine experiences, so as to render them fit for purposes entirely new. Urged to the attempt by sensible phenomena, we find ourselves gifted with the power of forming mental images of the ultra-sensible; and by this power, when duly chastened and controlled, we can lighten the darkness which surrounds the world of the senses. There are Tories even in

science, who regard imagination as a faculty to be feared and avoided rather than employed. They have observed its action in weak vessels, and are unduly impressed by its disasters. But they might with equal justice point to exploded boilers as an argument against the use of steam.....In fact, without this power our knowledge of Nature would be a mere tabulation of coexistences and sequences."

It would be easy to provide innumerable illustrations of the magnificent service rendered in the past to science by the discreet use of the imagination, and to trace out what it has done for medicine would by itself provide interesting subject matter for a whole address; but my present purpose is only to emphasise its essential value in the progress of all knowledge. Imagination has always more or less occupied its proper place in art, and it is beginning to find a more general acceptance in literature, but with science it has been, so to speak, under a cloud. We have been taught to discourage and repress imagination as untrustworthy and disturbing, and no doubt in so far as we make our facts fit our thought instead of strictly confining our thought to the interpretation of our facts, we are pretty certain to go astray. This was the dominant fault of many of the theorists of the past, who attempted to build up where there was no solid foundation, or at most a very inadequate one. Such attempts not only lead to error, but they tend to crystallise and fix it in such a way that it interferes with and chokes off further inquiry. But as Professor Tyndall says, the abuse of imagination is no sound argument for setting it aside and dethroning it.

What we need and wait for to day in medicine is something corresponding to those splendid flashes of imagination which yielded the heliocentric theory of the planetary system, the theory of gravitation, the undulatory theory of light, the theory of evolution, and the germ theory of infective disease—some fundamental and far-reaching generalisations in pathology and physiology which would vivify and vitalise some part at least of the mass of dead material facts which have been accumulated.

Genius, you will say, is necessary for such masterly strokes of creation as those I have quoted, and such genius is a rare gift of the gods. It cannot be commanded, and the hard intellectual atmosphere of our time is not favourable for its appearance. But constructive imagination would probably yield much richer results than we at present enjoy—though possibly on a lower plane of generalisation—were it not for unfavourable circumstances which almost necessarily attach to the conditions of modern investigation. The range of work is now so wide and the technical qualifications required for its successful pursuit are so exacting that extreme specialisation has become inevitable. Each worker, therefore, becomes so absorbed in the particular subject with which he is immediately concerned, that it is impossible for him to keep adequately in touch with the general progress of knowledge, and to bring his own contributions into proper relation with it. The chemists cannot be at the same time physiologists, the physiologists know little of pathology, laboratory workers are out of touch with the practical aspects of disease as encountered at the bedside, and we practitioners more often lack the scientific training and aptitude to make anything like complete and full use of the material which is daily passing in a sort of diamic procession under our eyes. These facts, to a large extent unavoidable, in association with the pressure at which all work is nowadays conducted, are almost incompatible with that breadth of culture, catholicity of interest, serenity of mind, and leisure for reflection which are so much needed—aye, so essential—for the fertile exercise of the faculty of imagination in its best sense.

In a humbler way, however, there is room in plenty both for pleasure and profit by habituating ourselves in our daily work to the exercise of our imagination in picturing to our minds as intelligently and yet as graphically as we can what we conceive to be the morbid conditions of parts hidden from our view in the patients who come before us; to endeavour to form for ourselves as plausible impressions as our knowledge permits of the morbid processes which are taking place—hypothetical though they may be; to fix such pictures in our minds and to compare them with previous pictures of other cases which appear to us to have points in common, in the hope of educing rules to guide our practice; to work out in our minds the probabilities

of causation and their mode of action; and lastly, to acquire by the same power a sympathetic appreciation of the subjective difficulties and anxieties of the patient and his friends in the presence of trouble. You may rely upon it that a ready, quick-witted, and well-stored imagination will help us out of many tight corners of practice, besides yielding an intellectual pleasure which will redeem even the gloomiest situation from despair or cynical indifference.

Among the medical doctrines which are characteristic of our time, that which embodies our present conceptions of the nature of disease is of the first importance. Though capable of further development as our knowledge advances, its essential features may be regarded as definitely fixed. We have learned that disease is a term devoid of absolute signification, and has no meaning except in relation to that normal balance existing between the living human organism and its environment, to which we give the name of health. What we call life is but the capacity or property belonging to organic matter by which it is enabled actively to respond to its environment, and which implies the existence of forces within and forces outside the body. Health represents that balance of relations between the external and internal forces, in regard to the individual component parts of the body, which best subserves the welfare and functional efficiency of the body as a whole. Anything which is capable of disturbing these relations is a potential cause of disease, and the disturbance itself is that to which we apply the term "disease." It will thus be seen that disease is essentially a dynamic condition. In this recognition of disease as a dynamic process we have, as it seems to me, one of the most characteristic and notable of modern medical doctrines, and, being persuaded that it is not so widely grasped as it ought to be, I may be permitted to make a short digression with the object of emphasising its importance. There is still a disposition, I think, to take too substantive a view of disease. We have definitely overthrown the old view of disease as a personal entity, yet some have set up a sort of pathological entity in its place, and this I believe largely results from giving undue importance to morbid anatomy at the expense of morbid physiology. Take such a disease, for instance, as Bright's disease, associated with granular kidney; we are apt to allow our minds to centre upon the renal lesion and its immediate effects, rather than upon the long course of nutritional trouble associated with it, and on which it depends.

What we see in the *post-mortem* room is not the disease, but the results of disease, and more often only the pronounced, ultimate, and incurable results of disease. The value of an acquaintance with morbid structural changes lies, as I take it, in their providing us with suggestions of the morbid processes which have brought them about, indications of the way in which they tend to destroy life, and explanations of disturbed function which have been observed during life. By dwelling too exclusively upon the final structural results of different diseases, there is also, amid their striking contrasts and diversities, the danger of losing sight of affinities and common factors that might be revealed by a closer study and a wider knowledge of the morbid processes which led up to them.

But, to take up again the thread of what I was saying before, it follows that disease must always depend either upon some inherent defect of the organs or tissues of the body itself, or upon some qualitative or quantitative alteration in the environment, or upon a combination of both; and the practical importance of this generalisation is evident, for it provides us not only with indications of the scope of treatment, but also with a measure of its efficacy. Treatment includes everything that makes directly or indirectly for the removal or betterment of defects within and disturbance without the body; and the efficacy of treatment is obviously proportionate to our capacity for selecting and using means to this end. It would be difficult to overestimate the advantage to the art of healing that would arise, both in relation to practitioner and patient, if all our action was uniformly regulated by a loyal and abiding conformity to this guiding principle, by which I mean on the one hand a painstaking and exhaustive inquiry into the circumstances which have led to disease; and, on the other hand, an honest inquiry as to the way in which we expect any selected therapeutic measure to affect and deal with such circumstances.

We also employ the term disease in a particular and limited sense, indicative of certain groups of symptoms and signs, which represent more or less distinctly recognisable types of morbid disturbance. The distinction of types rests much less upon the nature of any special symptoms or signs than upon the manner in which they are grouped together and their mode of evolution. With closer observation, aided by greatly improved instruments and methods of research, we are constantly adding to the list of established symptom groups or disease types. But we must ever remember that this grouping by type is eminently artificial and provisional, and is adopted merely for the sake of convenience until our knowledge has advanced sufficiently to replace it by actual definition. For instance with regard to phthisis pulmonalis, so long as we knew it only as an aggregate of signs and symptoms, the difficulty of disentangling it clinically from wasting diseases, pathologically from structural changes of lung met with under other conditions, and etiologically from pulmonary diseases occurring under widely-varying circumstances, gave rise to endless controversy, and greatly hindered the establishment of sound principles of management. But with the discovery by Koch of the tubercle bacillus, it at once became possible to assign to the disease a precise nosological position, under an etiological definition, as an affection of the lung, induced by the growth and development within it of the tubercle bacillus.

Starting from this relatively well-defined basis, our knowledge of the natural history of the disease advanced apace; its morbid relationships became more intelligible; and for the first time the primary conditions of the problem with which we had to deal began to be grasped—the whole representing progress which has already borne fruit of remarkable practical value. Still we must not for a moment suppose that the establishment of such a definition, and assignment of something like a true nosological rank, by any means exhausts the situation. Far from it; for instance, with regard to the example I have taken, we become familiar at the bedside with several varieties of the disease, differing in their behaviour, course, and local manifestations, which clearly show that the operation of the *causa causans* is conditioned by a multitude of subordinate factors, with regard to which we have only learned a little of what there is to be known, and yet of vital importance to the proper management and treatment of the disease.

And yet again we are confronted by the remarkable fact that the presence of the bacillus in question is not invariably competent to set up the disease; but as to the secrets which lie buried in the mystery of immunity we know at present only very little.

The establishment of definitions analogous to that which I have just quoted will nevertheless, in spite of their inadequacy to cover all the facts established by actual observation, enable us to take a long step towards the attainment of a good classification. The aim of classification, be it remembered, is not only to separate, but also to bring together; not only to distinguish one disease from another, but also to show their affinities; not only to create genera, but also to construct classes. For instance, the modern definition of tuberculosis not only enables us to distinguish the morbid processes to which the tubercle bacillus gives rise, but, at the same time, it brings it into close relation with a large number of other infective diseases dependent upon specific micro-organisms, and to the laws of which it conforms. Unfortunately the present state of knowledge compels us to put up with a nomenclature and classification which is glaringly imperfect and inadequate, and founded upon a variety of circumstances which are profoundly artificial. Whatever opportunities our current nosology affords for labelling any particular disease, it suggests (apart from specific diseases) little to our minds of much practical worth; and, still worse, it encourages the idea that with having given it a name, there is an end of the matter, and nothing more is required. While recognising the undesirability and dangers of reckless changes on the basis of immature hypotheses or imperfectly established facts, it behoves us to be always striving to bring about a more satisfactory state of things. And difficult though the task may be, it is work in which many of us might take some part, and in this way. Since an exact vocabulary must of necessity precede the construction of an exact classification,

no better preparation could be made than by efforts directed to the readjustment of our nomenclature of disease. The fact is, we have outgrown our current nomenclature to a very large extent. What fully satisfied our ancestors with the scanty knowledge in their possession, entirely fails to meet modern requirements with our enormously increased information. Take, for instance, such diseases as rheumatism, epilepsy, diabetes, Bright's disease. It is quite certain that these names are made to cover in each case several different maladies; and, if so, the mere persistence of these names is a bar to progress. Surely something might be done by patient work along right lines to remedy this. Supposing, with regard to diabetes—to take an example—careful records were to be made of a series of cases having glycosuria as a common feature, with special reference to the circumstances under which they occurred (habits, sex, age, occupation, physical surroundings, previous disease, and so on), and also to the manner of their evolution, and that these records were afterwards sorted into groups on an exclusive basis of causal and evolutionary contrasts or resemblances, we should be in a fair way to recognise several different types worthy of being distinguished by separate names, and which might not unlikely come ultimately to be grouped in widely different categories. And even while awaiting final settlement, such grouping could scarcely fail to suggest different modes of treatment. It does not come within the power of all of us to make such contributions to the progress of rational medicine; but for those who have the capacity and the leisure there is here a great opportunity for good and fruitful work.

Passing from the question as to what disease is, we follow on naturally with the How and the Why; in other words, we come to the question of causation about which something must be said. It is only in these latter days that the overwhelming practical significance of causation is beginning to be realised. Preventive medicine owes its origin entirely to the study of the causes of disease, while under the same influence the aims and methods of treatment are taking altogether a new direction.

The doctrine of causation, as I understand it, has for its foundation a firm and abiding faith in the capacity of the normal human being to be healthy and to maintain health in the presence of a normal environment. And if it be asked, What is the normal environment? one can only reply that any surroundings to which you, I, or our neighbours have respectively become comfortably adjusted constitutes for us a natural environment, whatever differences in detail they may exhibit.

Any abnormality either of body or surroundings which is incompatible with such adjustment ranks *de facto* as a potential cause of disease; and thus we arrive at a primary division of causes into external and internal, according as they pertain to the environment of the body or to the structure or functions of the body itself. In the large majority of cases external and internal causes co-operate in the production of disease; or, to put the same fact in other words, the influence of external causes cannot, as a rule, be estimated apart from the condition of the body at the time of exposure to them. But as to the exact share which is taken by external and internal factors respectively, we meet with every degree of variation. At one end of the scale we meet with examples of virulent infection from without, in which the external cause counts for practically everything, and the bodily condition for little or nothing; while, at the other end, we meet with examples of serious structural bodily defects, in which exactly the opposite obtains.

From a practical point of view external causes are the more important because, though vast in number and often difficult to isolate, they are relatively simple in character; their action is easier to grasp, inasmuch as it conforms to physical laws with which we are more or less acquainted; and, lastly, because they are more readily regulated and controlled. On the other hand, internal causes are infinitely more complex in nature and subtle in their operation for the most part, and also far more difficult to identify and control. Again, while in many respects their mode of action lies within the range of physical law, yet they often include factors, involving perversions of thought, will, and feeling which cannot be expressed in physical terms. Apart from grave congenital or acquired defects which cannot be adjusted to any attainable

form of environment, internal causation corresponds with what we are accustomed to call "predisposition," which implies a special vulnerability, or increased susceptibility to disturbance from outside influence. It will be noted that in contrast to the external efficient causes of disease, that the operation of predisposition in making for disease is passive rather than active; and, in general terms, only represents the absence or deficiency of something which the body naturally possesses, and which, had it been present, disease would not have occurred.

In connection with predisposition, heredity plays a dominant part; but there is a good deal of misconception abroad concerning the relation of inheritance to disease which is worth looking into a little. Although we are not as yet in possession of any satisfactory theory of heredity, the laws of its operation are being slowly worked out and are beginning to be understood. It is extremely doubtful whether we are justified in saying that disease is ever inherited *ab ovo*—at least, so far as I am aware, there is no trustworthy evidence of its occurrence. Congenital specific disease, of which congenital syphilis may be taken as a type—cannot be regarded as truly inherited, for the poison on which it depends is as clearly introduced from without—so far as the foetus is concerned—as when contracted in after-life.

Again, it is not strictly accurate to speak of disease associated with congenital malformations as inherited disease. What is inherited is a more or less strong potential cause of disease; and as to whether disease follows upon such a congenital defect depends entirely on the extent to which it permits adaptation to postnatal environment. Thus, on the one hand, a hare-lip is quite compatible with ordinary surrounding circumstances, and is consequently not attended with disease; while, on the other hand, a serious malformation of the circulatory mechanism, which cannot be adjusted with any attainable environment, is altogether incompatible with life. Between these two extremes we meet with every grade of morbid potentiality.

But apart from the lack of all positive evidence of real transmission of disease, there are strong *a priori* difficulties in accepting the probability of its occurrence. The structural and functional traits of the body are the outcome of an evolutionary power, which represents a vast integration of forces and organised energies, reaching far back into the past, and thus acquiring an individuality which makes their transmission possible. The phenomena of disease, however, are mainly—if not exclusively—products of a process of dissolution and disorganisation which have no independent existence as such, and cannot be dissociated from the conditions which give rise to them. It is easy to conceive of the transmission of something which has been built up, but it is difficult to understand in what sense a process of unbuilding can be transmitted. Then, again, a disease like cancer, which is credited with a special liability to inheritance, occurs at a time of life, for the most part, when all sexual activity has ceased. It comes, then, to this, that there is probably no such thing as a true inheritance of disease; and that what passes for such is in reality an inheritance of susceptibility, which is something altogether different. The susceptibility may be so strong that disease will almost certainly follow, but this does not justify or excuse a confusion of thought which fails to recognise any difference between susceptibility as a potential factor in the causation of disease and disease itself.

As to its nature, we can only think of inherited susceptibility as a quality—sometimes of one kind and sometimes of another—attaching to a type of constitution or structure which falls short of the normal standard; and which, in so far as the defect reappears in successive generations of a family or a race, always reacts in the same way to similar external causes. This, as I take it, is the central idea which lies behind the recurrence of any particular disease in members of the same family or race; and this, if I have made myself clear, is something very different from the current notion of inherited disease or inherited predisposition to disease.

Though I cannot admit the direct transmission of disease by inheritance, I am quite prepared to concede the possibility, or even the probability, that disease, under certain conditions, may take some share in the creation of an inheritable susceptibility, or in the strengthening of a susceptibility already in

existence, by some indirect action upon the vitality or nutrition of the sperm or germ cells of the affected person. But I very much doubt whether any effect so produced is specific in its nature. There is no disease, however largely factors of inherited susceptibility enter into its usual causation, such, for instance, as insanity and tuberculosis, with regard to which we do not occasionally meet with cases where no element of heredity can be traced even after most careful and extended inquiry. In these cases it seems necessary to assume that susceptibility of a specific nature has taken no part in causation. So far as I am aware inherited susceptibility carries with it no signification, apart from our conceptions of normal standard development, and the property of resistance attaching it, and amounts simply to a failure or deficiency in the normal evolution of the embryo occurring under the immediate or remote influence of external factors which are unequal to or incompatible with full and complete development, and therefore lacking to that extent the resistance which belongs to normal organs and tissues.

The quality of resistance to which I have just alluded bears such important relations to the principles of causation and treatment of disease that it deserves to be examined at close quarters, in order to see what it really means and what it teaches us. That the body possesses some power of resisting and recovering from the disturbing forces of disease has long been recognised, and represents what is often described as the *vis medicatrix Naturæ*. But with regard to its real nature and operation there has been much difference of opinion, and it is only within recent times that it has been possible to put the matter upon a rational basis. It certainly represents no independent force of any kind; but, as Mr. Herbert Spencer tells us, it is the working out in the body of a law which obtains throughout all Nature—the law of equilibration or balance of forces. The living body is a moving equilibrium of a variety of antagonistic forces, which on the one side is constantly dissipating its energy in the functional activities of its individual parts, and on the other side is being as constantly reinforced by taking in fresh motive power. It is an equilibrium which moving onwards in a rhythmical progress, preserves a constant mean, and tends to re-establish that mean whenever accidental causes have disturbed it. The mean balance of forces in movement which characterises what we call healthy life, unstable as it is, yet as the result of adaptations extending indefinitely back into the past has become sufficiently stable to offer very considerable resistance to disturbance; and if disturbed, short of being altogether upset, it tends to become re-established sooner or later. The limits of recovery from such disturbance, or what may conveniently be termed the index of resistance, varies somewhat for each individual. When the index is high we speak of such a man as strong or robust; when, on the other hand, it is low, as weak or delicate.

The special susceptibilities to disease connected with age, sex, pregnancy, lactation, climacteric period, and the like, correspond to physiological fluctuations of the resistance index; and these again merge by imperceptible degrees into what are called "acquired susceptibilities" which represent pathological forms of diminished resistance due to such factors as inanition, fatigue, exposure to cold, and previous disease. If I am not much mistaken, something of what passes in our medical vernacular as acquired susceptibilities is not to be distinguished from disease. If, for instance, a healthy man attacked by influenza tells us he has "never been the same since," it is probable that in a strict sense he is still the subject of some morbid process left over from the original disease. At the same time there are many cases in which, after serious disturbance never completely recovered from, a fresh balance is established by virtue of the law of equilibration, though upon a permanently lower plane than before, and which henceforth becomes for that person a normal state. Though in some aspects the *vis medicatrix Naturæ* works on passive lines, in other aspects its operation is more active, as by the destruction of noxious agents entering the body, by natural processes of expulsion and elimination, by compensatory overgrowths, and by a slow process of adaptation to new conditions.

But for the natural tendencies of the body towards health when disturbed by disease, the art of healing could not exist; for no treatment can be of the least service which is not con-

cerned either with the removal or reduction of the causes of disease, or with the assistance of the body in making use of its powers of recovery. This is a rule which admits of no exception; and not even the haphazard remedies of the purest empiricism can accomplish anything except in so far as they happen to conform to it. But for the law of equilibration, a morbid disturbance once set up would continue to the point of annihilation; and treatment addressed to the living body is absolutely meaningless except as an appeal to such powers of resistance as a patient possesses. When these powers are practically at zero, as in the closing scenes of any fatal illness, it is idle to expect anything from treatment, as of course we all know.

There is nothing, however, in these facts which justifies an attitude of "expectancy" or non-interference. The provisions for resistance and recovery, necessary as they are, and bounteously as they respond to intelligent control, yet cannot be trusted without it, and for various reasons. In common with all other natural forces, they are inexorable, and represent no deliberate purposive adaptation of means to ends. In any case they are limited in their range of operation. Sometimes they are too feeble to be effective, and at other times they may become a source of danger from their very intensity. The time required for their manifestation and complete development is often far too protracted to be of service, while accompaniments, such as pain, for instance, are apt to seriously discount or to altogether annul their influence for good. Lastly, secondary disturbances may be set up, which, by their unfavourable reaction upon the primary trouble, may lead to the establishment of "vicious circles" from which safe emergence is difficult or impossible. So far then from the *vis medicatrix Naturæ* rendering a sufferer independent of our art, the need for guidance and control is very great, and often exceeds our power of adequately meeting it.

My object thus far has been something more than an academic exercise. I have tried to enforce the cardinal and fundamental importance to practical medicine, not only in regard to prevention, but also to the cure of disease, of a knowledge of the bodily condition and its surroundings from which disease takes its origin, knowledge not either of the one or of the other alone, but of both in their active relation to each other. I have wished to make it clear that diagnosis does not merely consist in labelling a disease and in assigning its seat, but in tracing out its evolution as a dynamic process. I have also tried to show that our efforts in this direction, in order to be successful, must not fail to include a very careful consideration of the self-restorative provisions with which the body is equipped. The textbook which is most needed to-day, in my opinion, is one which, while differentiating between the elements of dissolution and disintegration on the one hand, and the reactive integrating efforts of the economy on the other, would give us as clear and detailed a description of the natural history and evolution of the chief morbid conditions as our present knowledge permitted. In such a work broad types of morbid disturbance should take the place of conventional nomenclature and classification; for the first thing that a man learns on leaving the schools is that disease as he encounters it in actual practice refuses to conform to the hard and sharply faceted categories of the ordinary textbook. No reasonable employment of hypothesis in the construction of such a work would be inimical to its success provided it did not conflict with known facts, and also fairly reflected the best teaching of the day. When I call to mind the deficiencies of modern medical training in presenting knowledge of this kind to students, it is easy to understand how hard it must be for the busy practitioner to attain it afterwards in the scanty leisure of his calling.

But to proceed. The principles which have thus far occupied our attention need to be brought into working relation with actual practice by a knowledge of the effects and mode of action of the remedial measures at our disposal. This amounts to something much more than mere pharmacology. It includes also a knowledge of the physiological action of those powerful agents which, for the sake of convenience, we may call "natural remedies"—namely, diet, heat, cold, rest, exercise, massage, baths, electricity, and climate.

The nineteenth century which is now closing has been marked by notable changes in our therapeutic armament-

arium, occasioned by dropping some things, by adding others, and by readjustment of the whole, with the general result that at no time in the history of our art have our methods been more efficient and yet at the same time simpler than they are to-day.

In the first place, we have come to see that, rightly and intelligently used, the natural remedies which I have already enumerated are entitled to a place in the front rank of therapeutic agents. For example, we now realise that fresh air and good food afford the best means of dealing with the scourge of tuberculosis; that baths and selected exercises may work wonders in refractory cases of heart disease, dyspepsia, and many pelvic disorders of women; that obstinate neurasthenia often yields to Weir-Mitchell methods; that wild nervous excitement may be subdued by judicious use of water applications, and no doubt the list is capable of great extension. This is only what we might expect when we reflect that agents of this class represent the influences under which the body has grown to be what it is, and under which its activities are habitually maintained.

In a general sense the importance of such remedial agents is widely recognised, and in some degree every practitioner nowadays makes use of them. But the great advances which have taken place in our knowledge of their modes of action, the immense improvements which have been made in the methods of their employment, and the extraordinary potency of their influence upon the nutritive processes of the body are still, in my opinion, far from being adequately realised. Nor is this to be wondered at. In none of our hospitals is the necessary equipment for this kind of treatment adequately provided for, and therefore neither teachers nor students have reasonable opportunity for familiarising themselves with the subject. Added to which there are serious practical difficulties in securing such treatment when it is required and asked for. In a few favoured health resorts, it is true, there are limited facilities for one or more branches of general treatment; but besides being only available to the few, it too often suffers from the disadvantages of indiscriminating specialism. It is in connection with the treatment of chronic disease that the want of such provision is especially felt.

There is only one way, I believe, in which the difficulty can be overcome, and that is by the establishment of sanatoria in various parts of the country, provided with all the aids that scientific medicine can devise for the thorough investigation and treatment of chronic disease. In America the experiment has been tried on a commercial basis, and is already at work in various centres on a large scale, with astonishing results. They are more than self-supporting, and the surplus earnings are expended on the treatment of those who cannot afford to pay the ordinary fees. The principle has already been accepted and acted upon in this country in connection with the treatment of tuberculosis, and there is no reason why it should not be extended to other diseases. It, of course, does not follow that all cases of chronic disease should be treated in a sanatorium. On the contrary, all minor cases could be perfectly well treated at home when once the principles of sanatorium methods came to be thoroughly grasped and appreciated by the profession at large. The great value of natural treatment lies in the fact that while it invariably strengthens the powers of resistance and recovery in the most effective way known to us, it in many cases deals directly with the external factors of disease at the same time.

The age has also made its mark upon the treatment of disease by drugs. We possess now a much better knowledge of their action, and have a much clearer recognition of the limits of their application. It is of great use to the sailor, as an old writer says, to know the length of his line, even though he cannot reach with it all the depths of the ocean. We have learned that they take but a very small part in the direct cure of disease. We no longer waste our time in a vain search for specifics, but accept the conclusion that, with very few exceptions, drugs deal with the effects rather than with the causes of disease, and are concerned almost entirely with what is called symptomatic treatment.

Though obviously of secondary importance as compared with that addressed to the primary cause of disease, yet symptomatic treatment has a very real and definite value. For instance, when we are ignorant of the causes of a disease, or are unable for any reason to remove them, it is the only form

of treatment that is available. Moreover, in a variety of ways it may minister indirectly to recovery; namely, by the relief of pain and sleeplessness; by the stimulation of depressed activity; by soothing over-excitement; by supplying materials of which the body is in need, such as lime, iron, or fat; by promoting elimination through the skin, bowels, or kidneys; and by efforts to obviate the tendency to death. Surely this bare enumeration is sufficient to redeem the sphere of medicinal remedies from contemptuous disregard, subordinate and adjuvant though their position may be.

Again, we use far fewer drugs than in former days. On the last revision of the *Pharmacopœia* no fewer than 188 items were omitted, and the Pharmaceutical Society urged the further omission of 82 others, which have been retained. Then, of those that remain, only a very small proportion are habitually employed by any individual practitioner, who finds it far better to know a few drugs well than a large number imperfectly. As a matter of fact, all the most important indications for effective medicinal treatment may be met by a comparatively small number of drugs; and the art which distinguishes the wise practitioner is mainly that of discovering the indication for some familiar drug, and using it at the best time and in the best way. When a great variety of medicines are used for any disease you may be quite sure that very little is known about it, or that very little can be done for it.

Again, our prescriptions are shorter and simpler in their construction than formerly, and there is a growing preference for single drugs in the place of complex galenical preparations. This is all a matter for congratulation, since it makes for greater clearness of purpose in prescribing, greater accuracy in the observation of results, and above all it implies the recognition of the fact that, while drugs have much power to do good, they have also much power to do harm; and that the risk of injury is increased by indiscriminate combinations, especially when the action of the component parts is only imperfectly understood.

At this point I cannot refrain from uttering a protest against the flood of synthetic compounds, vegetable extracts, and proprietary preparations with which we are deluged, in consequence of the ruthless enterprise of manufacturing chemists, backed up by a pseudo-scientific literature, tricked out with all the blandishments of vulgar advertisement. It is a monstrous system, which encourages empiricism of the worst sort, and strikes at the root of intelligent and rational prescription. Here and there no doubt a valuable drug or preparation may be introduced; but such a result is insignificant as compared with the vast amount of rubbish which is offered. It is easier to state the evil than to find a remedy. One can but appeal to the professional self-respect of individual practitioners to do as little as possible to encourage such a lamentable system. I have often thought it might be possible to create some authoritative organisation for the systematic investigation of current new remedies, with access to laboratories and hospitals for the purpose, and affiliated with independent workers over the country, whose business it should be to shift the wheat from the chaff to some extent, and to publish reports of their work at stated intervals, or to draw up and issue from time to time something of the nature of an authorised Extra-*Pharmacopœia*. Such an organisation might also with advantage deal with chemical analysis in relation to the composition of advertised foods, malt extracts, and proprietary articles for the information of practitioners. The idea may be only a vain dream, but the principle underlying it appears to be sound; and perhaps one day the British Medical Association may, in the intervals of its polemic activity, be able to give more attention to the matter.

Any review of modern therapeutic methods would be incomplete without at least a bare reference to the valuable remedies of organic origin which have of late been introduced to us. By extended acquaintance with bacterial products, with their varying behaviour according to the character of their environment, and with the manner in which the organism reacts to them chemically, physically, and vitally, we are gradually acquiring possession of additional powerful means of limiting or arresting their action within the body; and a new era in the treatment of microbic disease, bright with the promise of wonderful possibilities in the not distant future, is being steadily unfolded. Also, as the outcome of a better and more intimate

knowledge of normal physiological action, we have caught glimpses of the important influence exerted upon nutritional processes by internal secretions, which are being turned to striking therapeutic account, and of which Dr. Murray's treatment of myxœdema may be regarded as the first-fruits.

But the passage of time warns me that I must bring these *obiter dicta* to a close. Important and essential as are the principles to which I have referred for the establishment of our art upon rational and progressive lines, yet it must not be forgotten that the real advance of practical medicine depends no less upon the ethical principles by which our art is inspired. Our mission has a far wider range than the mastery of pathology or even the cure of disease. Standing as we do in a more intimate personal relation with the mysteries of life than those of any other calling, honoured by a more unreserved personal confidence than is extended to any other profession, constantly in touch as we are with some of the deepest experiences of existence, we are appealed to again and again as interpreters of problems which press upon those who suffer—problems the solution of which is not to be found in treatises of pathology or therapeutics, but only to be attained by a patient study of ourselves and others in the light of an all-embracing sympathy. Believe me when I say that many of the professional grievances and disabilities under which we now labour would disappear with higher ideals of our calling and its possibilities.

I make no apology for having dealt rather freely with speculative considerations, because I believe that good practice cannot be divorced from intelligent speculation without disadvantage. In this connection I may conclude by recalling a passage in one of Emerson's essays: "The Hindoos write in their sacred books—children only, and not the learned, speak of the speculative and the practical faculties as two. They are but one, for both attain the self-same end, and the place which is gained by the followers of the one is gained by the followers of the others. That man seeth who seeth that the speculative and the practical doctrines are one."

AMBIDEXTERITY.

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I DESIRE to join in recommending the general culture and adoption of ambidexterity. I have given some attention to the subject for many years. Each of our hands is capable of all those refinements, and all that precision of movement, which are usually only developed in and exercised by the right hand. Perhaps there is no occupation in which it is not an advantage to have the full use of the hands, none in which it is not an advantage to be able to use either hand with a power equal to that of its fellow.

It is very likely that Sir John Struthers's reason, as quoted by Mr. Noble Smith, for the general use of righthandedness may have some validity, namely, that the thoracic and abdominal contents on the right side of the vertical middle plane in the human body are heavier than the contents on the left side, so that "the greater weight on the right side leads to resting most on the right leg, and from the pillar of support we naturally use the right upper limb preferentially." I venture, however, to suggest that the normal position of the heart is the efficient cause, or, at least, a chief cause, of the prevalent righthandedness. In the earlier days of the human race, when "those may take who have the power, and those may keep who can," we were a fighting people, a people fighting hand to hand. In such fighting a weapon such as a stick or a sword was used. It is an advantage in so fighting to fight with a stick or with a sword which can be used by one arm and hand only; the other arm and hand being used for balance, for defensive covering, or for offensive seizing. The right hand is preferred for the wielding of the stick or sword, so that the heart may be kept away, as far as possible, from the assault of an adversary. So arising, righthandedness would thence be transmitted by imitation, and by the hereditary transmission of an acquired peculiarity. It will be found in practice that an excellent way for the acquirement of ambidexterity is in the learning of sinistral handwriting with pen and ink. When a "righthanded" man can write comfortably