THE METHODS OF NEUROLOGICAL RESEARCH.

If activity in neurological research is to be gauged by the annual output of neurological literature, it may safely be declared to be in a flourishing state. Were the truth told, it would be admitted that no one can keep himself abreast of this production, in any literal sense, for the task of summarising and assimilating the unending series of papers, monographs and books dealing with aspects of neurology and nervous disease amounts to a practical impossibility. Journals in various languages endeavour to supply their readers with periodical resumés of the results of neurological investigation as they appear, yet even so it may be permitted to question whether the average worker is not so occupied with his own pursuits that he has little leisure for scanning and absorbing the discoveries of others. Every now and then articles of outstanding merit compel attention because of the real acquisitions to knowledge which they contain, and these eventually reach the stage of being incorporated in textbooks, but for one paper of this description there are ten or twenty which can scarcely be said to furnish any genuine contribution to neurological doctrine. Any attempt, however, to curtail literary activity in respect of neurological research would be at once inadvisable and impracticable. In not a few instances contributions of a minor character have as a fact paved the way for distinct advance, while many more ambitious communications are shown in the event to have led nowhere. The path towards the goal of exact knowledge is strewn with the bones of dead theories. It would be easy to provide illustrations of neurological hypotheses that have had their day and ceased to be. Who now hears of the treatment of tabes by dilatation of the urethra, or by suspension? Who makes a diagnosis of urinary paraplegia, or of cerebral hyperæmia? On the other hand, in many instances the accretions to knowledge have been so gradual that they are with difficulty assigned to any single contribution, having in some Topsy-like fashion really "growed."
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More important than any criticism of the notoriously unequal value of average neurological articles is the necessity of correlating advances made by workers in differing departments of research in regard to the nervous system. That vast field is being invaded systematically and with unrelaxing industry by labourers who do not get sufficiently into touch with each other, at least in the earlier stages. The *Spirochaeta pallida* was the discovery of a zoologist, salvarsan of a chemist; and the clinician and the therapeutist have entered into their labours. Similarly, the neurophysiologist has on numerous occasions pointed the way to the practising neurologist and, unfamiliar though he may have been with clinical neurology, has builded better than he knew if we are to judge by the value of the application of his physiological investigations to the problems of clinical medicine.

Much of the ordinary teaching in clinical neurology to-day is the direct outcome of the physiological genius of Sir Charles Sherrington, and in like manner we may justifiably expect distinct gains, of a practical, clinical kind, from the physiological researches of Professor Magnus and his collaborators, recently embodied in his fine volume *Körperstellung*. There can be no doubt that clinical neurology has been to some extent transformed by coming into the heritage of the neurophysiologist; we have gained an insight into neural symptomatology which strictly clinical research would not have so readily provided. Fifty years ago knowledge in respect of the functions of the brain and cord was so limited that it was possible for an exceptional observer like Hughlings Jackson to deduce from clinical data alone physiological principles which were amply confirmed by subsequent investigation; yet even at that time it required the physiological labours of Sir David Ferrier and others to open the way for the clinician. And it is not derogatory to the place occupied by purely clinical methods to say that we are still indebted to the experimentalist for much that could scarcely be acquired by other means.

An entirely different line of research, that of the biologist and bacteriologist, has proved no less remunerative, scientifically and practically. The infective diseases of the nervous system, poliomyelitis, cerebrospinal meningitis, epidemic encephalitis, have yielded or will doubtless yield their secrets to the bacteriologist and the experimental pathologist. Much of the treatment of infective disease has been revolutionised through the work of the clinical and experimental laboratory,
and while an immense amount of inquiry still is requisite as far as some familiar nervous affections are concerned, their problems are now being approached in a more hopeful spirit. If we take as example the common nervous disease disseminated sclerosis, it must we think be acknowledged that the clinician and the morbid anatomist can hardly be expected to make any further contribution of significance. The clue to its still elusive secret lies in the hands of other investigators. It would be some consolation to the neurologist’s _amour propre_ were this to be discovered by one of ourselves rather than by a professional bacteriologist or experimentalist, for we do not like to think that we are doomed to depend in an ever increasing degree on the work of those who never come in contact with nervous disease clinically. Yet such, admittedly, has been the trend in recent years. After all, a healthy rivalry and not a green-eyed jealousy should animate us. The neurologist should be in a position to utilise the methods and technique of other lines of investigation for his own problems, and there are on record many instances of successful application of this kind.

Again, very distinct advance in clinical knowledge is to be attributed to the help which chemistry and biochemistry have given. Chemical methods have been of outstanding value, for an instance, in the study of the cerebrospinal fluid in nervous disease, and useful criteria of differential diagnosis have thereby been established. Nor is it necessary to do more than mention the indispensable nature of the chemical investigation of the blood serum for a large number of nervous syndromes as they are seen at the bedside. We are of the opinion, moreover, that recourse to biochemical method will eventually prove of assistance in the study of the great group of the myopathies and muscular dystrophies, and probably also of the degenerative diseases to which the nervous system, more than any other, appears susceptible.

If, however, the practising neurologist is thus very conscious of his dependence on lines of research, as regards some at least of his clinical material, which he himself may have neither the time nor the skill to pursue, it will be an ill day for him should he conclude this is tantamount to his relinquishing all thought of strictly clinical investigation. No advance along collateral paths can take the place of clinical study. The earliest manifestations of disease of the nervous system come under the notice of the clinician, who is thus in a favoured position and who has need of all his skill to detect and evaluate
their presence and significance. Examples might be cited of clinical discoveries having furnished suggestive points for physiological and other forms of research. Our knowledge of the functions of the basal ganglia is attributable almost entirely to the clinical and clinico-anatomical method; the syndrome of the optic thalamus, an important discovery, is the outcome of the clinician’s acumen. The major part of the significance of clinical analysis of the symptoms occasioned by lesions of the corpus striatum and of the optic thalamus is constituted by the inferences drawn therefrom in regard to outstanding problems of cerebral physiology, and it is no exaggeration to claim that the technique of the experimentalist cannot help us much here and in any case cannot usurp the place occupied by clinical method. When we approach the field of psychiatry and of psychopathology, the latter is more than ever indispensable. Ingenious experiments on behaviouristic lines have been conducted on rats and other animals of a higher grade, and are not without meaning for the student of abnormal human behaviour, but such methods clearly have their limits. Disease is the great experimenter, and just as clinical examination of cerebral cases throws light on cerebral function so does clinical psychopathology provide us with a precious insight into the activities of normal psychological mechanisms.

The follower of the clinical method, therefore, need go through no self-depreciatory phase in these days of intense industry in other sections of the field of research. It was the aim of the late Sir James Mackenzie, pursued with unrelenting ardour to the end, to prove to all and sundry the pre-eminence of clinical inquiry. He used to tell with evident relish the story of the young medical graduate who after a year of indifferent success as assistant to a country practitioner intimated to the latter his intention of leaving it in order to follow his bent towards scientific research in a laboratory. The older man looked at him in silence for a moment or two and then said: “away you go and be a professor, for you’ll never be a doctor.”