BOOK REVIEWS


Twenty years ago physiologists of the Japanese school, and foremost among them I. Tasaki, began to experiment with single myelinated nerve fibres partly separated by dissection from toads' nerve trunks. Their working hypothesis was the view, first put forward by R. S. Lillie, that in such fibres the impulse jumps from one node of Ranvier to the next, the resting nodes being serially excited by outwardly flowing electric currents generated by the active nodes upstream. Since Huxley's and Stämpfli's well-known experiments, saltatory transmission has been generally accepted as a fact. Tasaki's monograph is important in that it is the first compact statement of the strong and pioneering Japanese evidence to be set before British and American readers.

The first discovery was that narcotics retard and eventually block transmission by a selective action on the nodes, and that the threshold for electrical stimulation with a micro-electrode is highest at the middle of the internodes and lowest at the nodes.

Nerves were dissected so as to expose a length of single fibre containing two or more nodes. These nodes were placed in pools of Ringer's solution, each mounted on a glass plate separated from neighbouring plates by “bridge-insulators” of air or paraffin oil. Across these insulating gaps lay the myelin-sheathed internodes. Current generated in the preparation therefore flowed along the axis cylinders from node to node, and traversed the nodal plasma membranes, in a circuit completed by the electrical recording system which linked the pools externally. Stimulating currents could be sent round the same circuit in either direction, and measured by the same recording apparatus.

The reactions of a single node of Ranvier were isolated by inactivating its neighbours by adding cocaine to their pools. Such an isolated node is excited by currents flowing outwards through it. Excitation is signalled by an inward surge of action current. This current is five to seven times larger than the threshold-stimulating current. That excitation is due to current flowing across the nodal membrane, and not to current flowing along the axis cylinder, is proved by sending two currents towards a single node from either side. Their sum, i.e., the resultant outward current through the node, has a constant threshold value; stimulation is independent of their separate magnitudes and of the direction of axial flow.

When the nerve-trunk is stimulated upstream of the dissected region, an impulse passes along the single fibre and causes a twitch in the muscle attached to the nerve distally. Each node shows, first, an outward flow of current generated by previous nodes. This current is five times stronger than that needed to stimulate the node. The node reacts by an inwardly directed action current. And after the impulse has passed beyond it the node shows an outward current due to the activity of later nodes. The stimulating outward current is a little smaller than the action current of the previous node, for it is attenuated by the leaky myelin sheath. This leakage is exaggerated by saponin, which, since weaker stimulating currents excite the nodes with a longer latency, increases the internodal transmission time.

The effect of narcotics on transmission is of the greatest interest. The impulse can jump beyond one or even two locally inactivated nodes. If, on the other hand, the nerve is subjected to progressive narcosis, the threshold of each node is raised and the action current reduced, therefore the latency of nodal excitation is increased, and the conduction velocity of the impulse is correspondingly reduced. The impulse is blocked at the stage when the reduced action-current of one node falls short of the raised threshold of the next. Yet appropriate stimulation still elicits from any node, in all-or-nothing fashion, an action-current of nearly half the normal size. Similar changes in nodal action-current and threshold are brought about by refractoriness after the passage of an impulse, with similar consequences for impulse-transmission.

The book is remarkable for its brilliant analysis of the electrical records. Those showing the effect on transmission of electrical polarization of two adjacent nodes by ascending and descending currents are outstanding in this regard. The argument is throughout clearer and more rigorous than any summary of it can convey.


The Hixon symposium met in 1948, and this book, the report of its deliberations, was published in 1951. When it met, the influence of cybernetics was still fresh and this is reflected in much of the discussion. As a result it occasionally wears an air of the faded enthusiasms of yesteryear. A mathematician, von Neumann, opens the book with a paper on the general and logical theory of automata. He speaks of automata which in theory should be able not only to correct their errors but also to reproduce themselves and construct others.
W. S. McCulloch then discusses the possible similarities between the functioning of computing machines and cerebral activity, especially learning and memory. However, he seems to doubt if such mechanisms will explain all the activities of the human brain, since he concludes "The joy of creating ideals ... robots have it not." Presumably, if one follows von Neumann, they miss the joy rather than the creating: though this is not quite clear. A paper by Lorente de No had to be omitted, though one important point he made, which emerged in discussion, was that there may well be many different types of nerve cell rather than one single kind as is at present usually assumed. K. S. Lashley then discusses the time factor in central nervous system function. The problem may be summarized in one of his own sentences "the architect designing a house... presents a problem of sequences of action which cannot be explained in terms of successions of external stimuli". This excellent paper and its discussion are likely to be of special interest to the neurologist or physiologist interested in the wider aspects of neural function. Kohler describes the changes in behaviour observed in monkeys with occipital and temporal lobe lesions and Nielsen mentions clinical cases. Kohler speaks of the gestalt approach to perception and his own contributions to this theory. Finally Halstead discusses brain and intelligence with reference to local brain lesion, especially of the frontal lobes: and Brosin considers the symposium's bearing on clinical practice in psychiatry.

In general the discussion following each paper benefits greatly by having experts in varying fields taking part. A great many findings of neurological interest emerge incidentally in this way: and much imaginative speculation—an important ingredient for scientific advance—is given rein. Although the impression is created at times that all the problems of cerebral function can be solved, even though with difficulty, by a mechanistic analysis, this is due largely to the language used and in fact there are plenty of instances which suggest that even the discussants of the Hixon symposium see realms of mental life still unsolved in space and time. Certainly the book can open new horizons for the receptive mind in clinical and pre-clinical neurology.


This first volume in an intended biennial series seeks to review advances in clinical psychological practice and research between the years 1946 and 1951. Its 42 chapters (with a total of 2,797 references) cover a range from the better known intelligence scales, through multitudinous personality measures, to more applied branches such as vocation guidance, delinquency, and addiction. Every chapter is written by a specialist in that field, few of whom survey more than the current American literature. Working familiarity with the test procedures and with statistical terminology is assumed.

Most of the studies described in this volume relate either to intercorrelation or to validation of the many tests now available. While some of the authors are well aware that most tests lack adequate validation, the book as a whole reflects the bias in America towards the use of projective techniques, and their interpretation in terms of uncritically accepted psycho-analytic concepts.

The reader in this country should be reminded that the mandate of the clinical psychologist in the National Health Service does not extend to therapy and "counseling", to which a section of the book is devoted.

The volumes in this series should make a useful addition to reference libraries, but will hardly serve as an introduction to the techniques of psychological testing.


In producing a dictionary of terms used in some special field of knowledge it is necessary to steer a middle course between the inclusion of common words whose everyday meaning suffers no real change and can be readily understood in their special context, and the inclusion of neologisms of very limited and probably transient usage. This work suffers from both forms of inclusiveness. "Adventurousness", for example, is defined much as in any standard dictionary (except for the rather verbose and laboured exemplification), while "triskaidekaphobia" (fear of the number 13) almost arouses the suspicion of having been coined in order to appear in this volume! The dictionary fails in another respect which is perhaps unavoidable at the present stage of development in psychiatry. Its definitions of important terms in some special branches such as psychoanalysis tend to be inadequate, because current development has changed, or is changing, usage.

Amongst smaller points of criticism, a long paragraph devoted to definition and exemplification of "Golem", a figure from Jewish mythology, seems misplaced in a psychiatric dictionary. The inclusion of 12 separate words with the prefix "pseudo-" seems a waste of space, since the prefixed words are themselves adequately defined. Similarly, separate definition of the adjectival form and its variants of an adequately defined noun seems unnecessary. This of course assumes that the dictionary is intended for a reader of average intelligence. It is, however, difficult to see what public it can in fact serve, except those who wish to imply a knowledge they do not possess by deckng their conversation with technical neologisms. The fact that a second edition with a supplement has been called for 13 years after the first suggests that such a public is growing. The price of 120s. will limit the sale of the book in this country.


"The National Hospital for the Relief and Cure of the Paralysed and Epileptic" came into being in 1860 at first
BOOK REVIEWS

with only eight beds for women. This adventurous new development owed its origin to the efforts of a Miss Johanna Chandler, a middle-aged woman in poor health, who was shocked by the absence of charities to provide for the paralysed, and "decided to devote her life to supply this great want." This worthy ambition happily coincided before long with a flood of advancing knowledge with regard to the nervous system which attracted some of the best brains in medicine, as a rapidly progressing specialty always should.

In this short book the author describes the dramatic growth of the hospital and the striking personalities of many famous physicians and surgeons who contributed to the unique position of "Queen Square" in neurological history.

Miss Johanna Chandler could hardly have anticipated that her dream would emerge into such a highly scientific organization for diagnosis, treatment, and research, but perhaps she might even to-day feel that there is still more to be done towards relieving the suffering of the paralysed. Those who have worked in the National will wish to have a copy of this interesting book.


This little book sets out to help the practitioner or research worker to find what he is looking for in a medical library—a task which he often finds beyond him—and it more than adequately achieves this aim. Those who have been mystified by the formidable array of index cards which is the vade mecum of any library will find such mysteries elucidated in the chapter on catalogues; and there is, too, a useful chapter giving the various sources of information available for readers who are not fully acquainted with the existing literature on their subject.

In a handbook of this sort it is perhaps questionable whether the historical details given in the newly-added section on abstracting services add more to its value than the full list of these given in the first edition, but there can be no doubt about the usefulness of the list of principal libraries in Britain which gives not only their size and scope but also their accessibility to the would-be reader.

BOOKS RECEIVED

(Review in a later issue is not precluded by notice here of books recently received.)


Downloaded from http://jnnp.bmj.com/ on August 18, 2017 - Published by group.bmj.com