libraries and can be recommended as a very good buy for the individual.

C. M. B. PARE.

2. NEUROLOGY

Headache and Other Head Pain. By HAROLD G. WOLFF. Second Edition. New York: New York Oxford University Press. 1963. Pp. 773. Price £6.

This monograph represents a lifetime of research. In the bibliography the late author lists 111 published titles, including a number of books, by himself, alone or with associates, ranging on practically all aspects of headache. According to Wolff headache can arise (1) from distension of intra- or extra-cranial vessels, (2) from spasm of the cranium muscles, and (3) from traction on or distortion of intracerebral vessels, especially those of the base of the brain. Clinical examples of the first type are migraine or the headaches of the febrile conditions, according to whether or not the mechanism referred to is of recurring nature; examples of the second type (which may occur in combination with the first), are the so-called psychogenic headaches, a term that Wolff does not approve of; lastly, headaches accompanying tumours or hypertensive encephalopathy are offered as examples of the third type. Headache can also be due to inflammation or direct pressure on the pain-sensitive structures, which are enumerated in detail; but the fact is emphasized that raised intracranial or systemic blood pressure *per se* do not cause headache, and the various other factors involved are discussed. Similarly it is stressed that in headaches of the migraine type it is not only vasodilatation that counts, but also the previous state of the vascular tone.

The book is a valuable compendium of up-to-date and critically digested information about this "commonest and one of the most distressing of human discomforts" as headache is described in the foreword. This second edition, 15 years after the first, includes more on the vascular and biochemical aspects of the subject. The approach remains essentially clinical, but the laboratory is quite often called in to verify observations or test hypotheses. Thus, while anatomical and physiological data as well as experimental considerations are to be found in abundance in the 23 chapters of the book, conducing to its comprehensiveness, the patient and his therapy are the author's main preoccupations. This is particularly seen in the way migraine is examined in 6 chapters; one of them is entitled "the relation of life situations, personality features and reactions to the migraine syndrome", which is indicative of the care and interest with which the clinician studied the syndrome. Differential diagnosis of the various headaches *vis-à-vis* the other head pains (e.g. various neuritides) is given adequate space and attention; and the surgical treatment of headache and atypical facial neuralgia is cautiously reviewed. The book ends with a scheme of clinical classification and an index follows the bibliography consisting of 1,095 titles.

E. A. SERAFETINIDES.

The Assessment of Pain in Man and Animals. Edited by C. A. KEELE and ROBERT SMITH. London: University Federation for Animal Welfare and E. & S. Livingstone. 1962. Pp. 324. Price 30*s*.

Our understanding of the neurophysiology of pain has advanced significantly in the last decade, owing largely to two important developments. It has become technically possible to record the responses to different kinds of stimuli of single unmyelinated fibres in the peripheral nerves and this has shown that even among the smallest afferent fibres there is a high degree of modality specificity. It therefore seems that pain must be recognized as a separate kind of sensation with its own pathways and not merely as a response to intense stimulation in any modality. The study of evoked activity in the brain-stem and thalamus with implanted electrodes has also allowed physiologists to trace the polysynaptic central pathways which could not be demonstrated by the traditional anatomical methods, some of which carry afferent impulses following noxious stimuli.

It was an excellent idea of U.F.A.W. to hold a symposium at which the new physiological insights could be brought to bear on pain as it is encountered in the clinic and the laboratory. This volume contains the 27 papers given on that occasion, but without any of the ensuing discussion. About a third deal with the neurophysiology, covering very much the same ground as the shorter Ciba Foundation Monograph on *Pain and Itch* published two years earlier. Many of the others are concerned with the practical difficulties of quantitating painful experience in human subjects and when testing analgesic drugs in animals. These should especially interest anyone concerned with the methodology of drug trials. They include one detailed study of placebo effects, and another on the critical evaluation of alternative test procedures in terms of their information ratio (thereby allowing a choice of the type of trial most economical in time and money)

which could well have wider application. Other papers touch on the historical aspects of the subject, stereotactic surgery for intractable pain and some clinical anomalies of pain sensation. The humanitarian interests of the sponsors are represented by two papers on the avoidance of unnecessary pain in laboratory experiments.

A printing error on p. 241 has resulted in part of the text being omitted and leaves one Table unexplained. This seems to merit an erratum slip in future copies sold.

A. M. HALLIDAY.

Macromolecular Specificity and Biological Memory. Edited by F. O. SCHMITT. The Massachusetts Institute of Technology Press. 1963. Pp. 119. Price $23.

The somewhat forbidding title of this book conceals an account of a very remarkable symposium held at Massachusetts Institute of Technology in the spring of 1961. Its purpose was to probe informally into the possible mechanisms for the coding, storage and recall of memory traces in neural tissue. The outcome is as exciting and stimulating as the list of the distinguished participants would suggest. This includes R. D. Adams, M. P. Barnett, Fernández-Morán, Galambos, D. Gitlin, H. Hydén, V. M. Ingram, Kliver, Lorente de Nó, Morrell, Polay, F. O. Schmitt and O. H. Schmitt, Sperry, Tallant and others. Each contributed to the speculations, but brought also a summary of solid, original and often startlingly new work bearing upon the subject. It is not uncommon nowadays to read reviewers criticizing the growing custom of publishing proceedings of symposia and conferences. There may well be some truth in such criticism, but how else is one to record material as valuable as this together with the relevant bibliography, all in the space of 117 pages?

Some of the first contributions in this volume deal with the cybernetic aspects of the problem, and these are followed by a discussion of the genetic problems posed by protein specificity and its possible modifiability by nerve impulses. The distinctive property of nerve cells, besides conduction of impulses, is their large content of cytoplasmic RNA and the ability to produce correspondingly large quantities of protein. The amount of RNA increases up to a point with the age of the individual, and this suggests that this substance and the proteins produced by it play a leading part in the storage of memory traces. An analogous process is perhaps the production of antibodies in certain somatic cells. It is not surprising therefore that much of the discussion was concerned with the dynamic aspects of RNA composition in nerve and glial cells. Electronmicroscopical studies of neurons and glial cells coupled with biochemical investigations of the various parts of these cells obtained by ultracentrifugation have shown the untenability of some of the classical concepts in the neuron theory. In particular, the old "class structure" of the cellular population in neural tissue, with the subservience of glial cells to the more aristocratic neurones is coming under a long-overdue attack. New data show that the glial cells fill almost entirely the space between capillaries and neurones, except at synapses. But they are not only the active substrate of the blood-brain barrier, but seem themselves able to propagate impulses, which are, however, different and, perhaps, complementary to those of neurones. Glial cells are probably also coupled reciprocally with neurones in the dynamic changes occurring in the RNA bases during activity. Furthermore, the hierarchical concept of glial structure is undermined still further by the demonstration of a lack of clear-cut distinction between the various kinds of glial cells. Other contributions deal with the neurophysiological aspects of learning and the psychological implications of this problem, and, finally, there are also a few brief clinical reports on the amnestic syndrome.

It would be impossible to claim that all the contributions could be understood by many readers. Some are too specialized. In fact, if there are still clinicians harbouring illusions about their ability to keep abreast with the basic sciences, let them try this book as a kind of do-it-yourself psychometry. Yet no one can possibly finish reading it without learning much that is fresh and challenging.

L. CROME.

The So-called Extrapyramidal System. Edited by SIGVALD REFSUM, HANS M. LOSSIUS and PER DIETRICHSON. Copenhagen, Stockholm, Göteborg: Universitetsforlaget. 1963. Pp. 363. Price 50*s*.

This volume (also published as supplement 4, Vol. 39, 1963, to *Acta Neurologica Scandinavica*) consists largely of the report of a Symposium at the 16th Congress of Scandinavian Neurologists at Oslo in 1962, dealing with the extrapyramidal system; there are a further 100 pages on free subjects (including an interesting investigation on vessel-plaque relationships in disseminated sclerosis). One outstanding paper from the Symposium is a consideration of the anatomy by Brodal, who emphasizes that it is not possible to separate anatomically the pyramidal and extrapyramidal systems. Broman reports on the figures for Parkinson's disease obtained from a survey of the frequency of various neurological disorders in