found it hard to believe in the badness of those about him. In the course of the debate over bombing policy, Zuckerman attended one of the midnight meetings of the Defence Committee. Churchill read out a minute of Cherwell's describing the suggested bombing plan as "the brain child of a biologist who happened to be passing through the Mediterranean". But in spite of this and other evidence of Cherwell's ill-will and bad judgement Solly could never quite bring himself to recognise what an odious man he was, though he notes that Isaiah Berlin "used to feel uncomfortable in the presence of the Professor. I never did understand why."

So we are introduced to many of the academics, politicians and soldiers who ruled the world in wartime. It is an invigorating story and shows how necessary it still is to persuade people of the value of applying the scientific method to human affairs. We shall wait eagerly for the post-War sequel. □

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Current neuropeptide perspectives

Peptides in Neurobiology. Edited by Harold Gainer. Pp. 464. (Plenum: New York and London, 1977.) $41.40.

THE principal aim of this book, says the Editor in his preface, is to provide a baseline of information and perspectives in the rapidly moving field of neuropeptides. In this aim I believe it succeeds, but it is never easy reading and it provides, in some of its chapters, a plethora of undigested and indigestible information, too much perhaps for even the most dedicated neurobiologist.

There are 14 chapters, by 23 contributors; and the neuropeptides are described, dissected and delimited in four principal, but discontinuous, subdivisions. In order of appearance these are Biochemical Methodology, Localisation and Analysis, Metabolism and Physiology, Pharmacology and Behaviour.

The opening chapter, by Berta Scharrer, is entitled "Historical Introduction". A great deal more than that, it describes, albeit in less than seven pages, the basic concepts of the modern discipline of neuroendocrinology of which the author, together with her late husband, are the undisputed founders. The ancestral neurone "equally endowed for the dispatch of long distance and strictly localised signals" yields to its successor, the neurosecretory neurone, capable of all degrees of variation between neuronal and glandular function. Acknowledgement of the inherent capacity of neuronal elements for hormone production is qualified by the current view that neurosecretory neurones manufacture chemical mediators to a degree greatly surpassing that of the more "conventional" neurones. Is this really true, or has this function in higher neurones been overlooked because it has not yet been looked for?

The next four chapters (Stein on fluorescamine as a peptide reagent; Straus and Yalow on radioimmunoassay; Sternberger on immunocytochemistry; Leeman, Mroz and Carraway on the isolation of substance P and neurotensin) comprise the main section on "Methodology". Individually excellent, they are not equally germane to the general argument of the work. Usefully set down here, however, they will not need to be repeated when the neuropeptide story is extended by further instalments. Despite editorial denials, there is some degree of overlap in this section.

Brownstein's chapter (6) which follows, begins with some historical aspects of the localisation of neuropeptides and continues with a presentation of the results of microdissection and microassays, particularly as applied to the hypothalamus. Accompanying tables give the quantified distribution of LHRH, TRH, somatostatin, vasopressin and oxytocin.

Next, Reichelt and Edminson append a long list of oligopeptides found in the CNS, discussing their role and ending with the working hypothesis that they represent "the final common pathway of multisignal integration". This exciting but as yet unverified notion gives way to a chapter by Harold Gainer and his associates on the biosynthesis of neurohypophyseal peptides and neurophysin. The work reported concerns the hypothalamo-hypophyseal system of the rat, concentrating on the time course of events by which precursors and peptides are first synthesised and then transported from soma to axon and axon terminal.

A mainly methodological chapter by Marks deals with the conversion of prohormones by specific and non-specific peptidases, and useful lists of the latter are included. This very important field is both lucidly and comprehensively dealt with by the author.

A virtually complete survey of peptides in invertebrate nervous systems is given by Nora Frontali (with Harold Gainer). The authors conclude that the relative prominence of neurosecretion in invertebrates reflects a paucity of endocrine systems and the lowly phylogenetic position of the neurone. The physiological role of neuropeptides is discussed by Jeffery Barker, and his chapter provides definitions of neurohormone and neurotransmitter, as well as listing the distinctions between them. This is a subject where complete agreement has yet to be reached, but Barker concludes that neurohormonal peptides can cause changes in neuronal membranes which are quite different from those produced by putative neurotransmitters.

The concluding three chapters are written by Cooke (on electrical activity and control of peptide release), Klee (on endogenous opiate peptides), and De Wied and Gispen (on behavioural effects). The first of these, devoted to work on the crustacean X-organ sinus gland neurosecretory system, provides evidence that all peptidergic neurones have full electrical activity. Klee, giving an up-to-date but concise account of the present status of the enkephalins and endorphins, is nevertheless moved to supply an even more up-to-date addendum. This emphasises, if emphasis is needed, the extraordinary rapid pace of enquiry in this branch of neuropeptidology. De Wied and Gispen end the book with a chapter describing their own well-documented studies in rats on the effects (shuttle box avoidance response, grooming, and so on) of the intracerebral exhibition of vasopressin and oxytocin analogues, ACTH and MSH peptides, and fragments thereof. The relationships described are complex, and not to be comprehended in a single reading.

With few exceptions, as has been stated, the individual chapters composing this book are not easy to read and there is an unavoidable lack of continuity between one chapter and another. A great merit of the book is the speed with which it has been published, a result bought at the expense of a superfluity of misprints, including an amusing inversion (p81) where the famous Italian apparatus is ascribed to Gogli.

Despite these minor criticisms, the book represents a valuable exposition of the present status of peptides in neurobiology, and it will do until it is overtaken by events and by its successor. **A. G. E. Pearse**

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