mean that in general the whole subject is well covered. The enzymatic processes involved in the cleavage of cholesterol side chains to yield pregnenolone and the regulation of these processes are certainly well covered in this book. The chapter on aldosterone and sodium transport is very interesting, because only a few years ago no information whatsoever was available on the molecular pathways in steroid action on active transport systems. As Edelman aptly points out, we now have the satisfying experience of analysing mineral corticoid action in terms of specific biochemical pathways. Nevertheless, the theory of mineral corticoid action via the induction of RNA synthesis will not be entirely proved until the specific mineral corticoid receptors are isolated. The whole series of chapters on the mechanism of action of ACTH on steroidogenesis and protein synthesis certainly cover (with unfortunately quite a bit of repetition) the present day knowledge of this important subject.

Volume two commences with a chapter on adrenal regeneration and hypertension. The prominent feature of ACTH induced secretion of 18-hydroxydeoxycorticosterone in quantities second only to corticosterone and the absence of 17-hydroxylation in the rat are interesting, especially because 18-hydroxydeoxycorticosterone has an anti-diuretic effect exceeding d-oxycorticosterone in adrenalectomized rats.

The next chapter on the foetal adrenal cortex is very revealing, and the complexity of regulatory mechanisms of foetal steroid metabolism is well recognized. It is hoped that it will be possible in the near future to elucidate the physiological need for the steroid hormones elaborated by the foetal adrenal cortex. The chapters on the biosynthesis at the molecular level describe electron transport mechanisms involved in steroid 11β and C21 hydroxylation and reveals the important role of 3′ 5′ AMP in mitochondrial hydroxylation.

These excellent volumes give the reasoning behind research in adrenocortical functions and an important insight as to the future direction of this important area of research. To the non-specialist some of the chapters may prove to be rather hard going, but, having persevered, the rewards are generously measured in terms of stimulated interest and a new appreciation of how the fascinating subject of the adrenal cortex is developing with the aid of the powerful tools of present day biochemical endocrine methodology.

These volumes should be useful to medical researchers interested in the basic aspects of endocrinology and biochemistry, and useful especially for many years to graduates planning their own research. Although rather expensive, they are certainly a worthwhile purchase.

D. EXLEY

BRAIN RESEARCH

The Neurosciences

A Study Program. Planned and edited by Gardner C. Quarton, Theodore Melnechuk and Francis O. Schmitt. Pp. 962. (Rockefeller University Press: New York, 1967.)

BRAIN research has suffered much in the past from lack of communication between those working in different disciplines. There were anatomists who studied only the distribution of different types of cells, biochemists who determined only the content of metabolites without reference to cells and physiologists who measured electrical potentials with little reference to either. In this stratified system of academic departments the multidisciplinary approach came in like a breath of fresh air and the new science of neurobiology was conceived. Among those who can take credit for the change is Francis Schmitt, whose activities at the MIT have latterly spread to the Neurosciences Research Program at Brookline. Here he not only linked up the traditional branches of brain research, but he brought in high-powered mathematicians, physicists and leading scientists from other disciplines, which gave the NRP a character of its own. If there were times at the work sessions when communication was practically zero, there were also moments of enlightenment which made the experiment as a whole worthwhile.

This book is based on a series of lectures given under the auspices of the NRP and containing 66 chapters on special aspects of the anatomy, molecular biology and physiology of the nervous system. Special attention is paid to topics such as the basis of biological rhythms and the physiology of sleep, which have been the subject of recent research. There is also extensive coverage of recent work on subjects of current interest such as the mechanisms of learning and memory. The contributors are for the most part leading authorities on the subjects about which they are writing, and the general standard, both of the writing and of the production as a whole, is exceptionally high. The individual chapters deal with many aspects of the subject which have generally received little attention in the usual textbooks of physiology and, indeed, in some respects it makes many existing textbooks look out of date. Yet this book makes no claim to be comprehensive. The choice of subjects is selective, and important approaches, such as the study of maturation and the neurochemistry and neuropathology of the brain, are omitted. This book should therefore be regarded as designed to supplement rather than to replace existing textbooks on the nervous system. It can be recommended strongly to all who are interested in reading an up to date account of recent work on the brain.

DEREK RICHTER

LATE EFFECTS OF RADIATION

Late Somatic Effects of Ionizing Radiation

By Charles D. Van Cleave. (Prepared under the auspices of the Division of Technical Information, United States Atomic Energy Commission.) Pp. vii+310. (Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, US Department of Commerce, Springfield, Virginia, 1968.) $3.

EXPOSURE to ionizing radiation presents us with two major issues: one, the impact on the irradiated person, and two, the consequences for future generations, resulting from mutations induced in germ cells. This book is principally concerned with the first issue; namely, the early and the long-term effects of radiation on the soma of rodents and man.

Acute radiation death, following within thirty days of a single large exposure, shows similar features in all the mammalian species that have been investigated. The acute dose of X- or γ-rays to the whole body that kills 50 per cent of a population within a month ranges from about 300 to 800 rads, depending on species and strain. For man, the figure is believed to be about 500 rads. Here, quantitative relations (although not mechanisms) are fairly well understood. Van Cleave deals with these early effects, but rightly devotes much more space to the ill-understood late effects.

The most important late effects of radiation are the induction of malignant change, including leukaemia, and the morbidity and life-shortening arising from non-neoplastic disorders. From the practical angle, we need to know whether the small doses and low dose rates encountered during occupational exposure produce any morbidity and life-shortening and, if so, of what kind and how much. Extrapolations cannot be avoided: from large doses to small; from rodents and dogs to man. Any extrapolation involves theoretical assumptions about the nature of the action of radiation on biological systems. In his final summary, Van Cleave recognizes