

examination of the neurotological patient varies from the simplistic to the completely mistaken ("Because the branches of the upper facial nerve cross in the brainstem, preservation of function in the forehead indicates central disease." p. 10). The chapter on testing the dizzy patient covers nystagmography in a hopelessly confusing manner. Figure 3 illustrating the workings of caloric nystagmus shows heat causing the perilymph in the semicircular canal to fall. The only way this figure can be correct is if downward in the figure means upward in reality.

The other chapters in the book fall somewhere between these extremes. The chapter on audiological evaluation considers little outside of acoustic neuromas. It does not mention the different tests for central auditory dysfunction and relegates the stapedius reflexes to less than a page. There is inappropriate repetition between chapters on the use of the auditory brainstem responses in the evaluation of patients with tumours of the acoustic nerve, and there is too little said about the other neurological disorders that may affect the auditory evoked potentials. Other chapters deal with electrocochleography, tomography, immunology, metabolic disorders and genetics.

I would not buy this book, but I would take it out from a library and read three of the chapters.

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**VISUAL NEUROSCIENCE.** Edited by J.D. Pettigrew, K.J. Sanderson and W.R. Levick. Published by Cambridge University Press, 1986. 448 pages. \$166Cdn approx.

The nineteen fifties were a watershed for research on the neurophysiology of vision. British traditions in optics and physiology combined with the maturing art of electronics and the new microelectrode techniques. Substance was given to the exciting notion that the responses from single neurons would reward close study and might allow, in so interesting a place as the visual system, a functional tracing, one cell at a time, from stimulus to brain. Several important schools of visual research can trace their roots to these beginnings. This collection of twenty-seven brief scientific articles covering theoretical, physiological, and psychophysical aspects of vision is a celebration of the school that arose at the antipodes and in particular the man who founded it, Peter Bishop. The origin of the book was a conference held in his honor on Lord Howe Island off the Australian coast and the contributors have all been students, collaborators, or colleagues of his, their respect and affection apparent in the short biographical notes at the end of the book.

Divided like a textbook into a sequence of sections on retina, retinogeniculate connections, development, comparative physiology, cortex, and integrative aspects the book is thorough in touching all areas of its subject. Far from being a textbook though, in a watered down or pedantic sense, this collection rings true to the varied interests of each individual author and will reward the motivated reader far more than any ordinary textbook. While editorial comments help to tie the sections together, the many points of view of the different authors is a strong point of the book. The contributors are widely international but there is a sense of that admirable, now Australian, stereotype of individualism so nicely at odds with much of current research in many fields.

Here are the diverse ingredients, from communications theory to natural history, that make vision research so attractive. The leading article by Horace Barlow considers the problems with which the visual system must deal, physical, informational, connectional and concisely reviews concepts of image processing, signal transmission, encoding and others. There are examples of fine graphics in the articles by Heinz Wassle and David Vaney, each drawing a retinal mosaic, art as well as science. Here is a well reasoned and reasonable discussion by Bill Levick of what "parallel" means in the early visual pathway and what it is good for. There is an informative summary of visual optics by Austin Hughes. From here things move along many paths through the lateral geniculate nucleus and on to the cortex and expand to include visual development and evolution. The final section on integrative aspects ranges widely and interestingly from cellular level theories of vision and responses to illusory contours, to clinical experience of visual hallucination and information processing approaches to understanding vision.

For the uninitiated some of the articles will be challenging but the writing is remarkably and consistently fine for such a multi-authored piece; concise and dense with information but nearly always clear. A close reading will be well repaid and ample bibliographies provide further direction into the literature. As review, for the more seasoned student, the articles are a rare pleasure for their economy of style.

There is much to be admired here, the authors, a lively and active group, have contributed hugely to current views on vision. Still, the reader seeking an introduction to the subject should be reminded that the better schools of almost anything seldom offer balance. For example, the anatomical perspective, on the scale encountered by the microelectrode, gets little emphasis here. Once the planar world of the retina is departed, attention is seldom paid to how the signalling of cells may be systematically related to their positions in relation to their neighbors. This functional architecture, revealed primarily in the work of Hubel and Wiesel, has been a major key to understanding principles of organization in the visual system. It is now revealing the cortical organization of colour processing and promises new insights from the use of voltage sensitive dyes.

Completeness, though, was not the intent here, and no one school can do justice to all perspectives and no one book is likely to. This is a first rate, informative and very readable collection. It offers a good dose of systems level biology, removed from the molecular view and reminding one how far that reductionist perspective may be from answering so many important questions.

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**EXCITATORY AMINO ACID TRANSMISSION.** Volume 24 (Neurology and Neurobiology). Edited by T. Philip Hicks, David Lodge and Hugh McLennan. Published by Alan R. Liss, Inc., New York. 454 pages. \$92Cdn approx.

As explained in the introductory overview to this book, excitatory amino acids were once not even thought to be involved in neural transmission. In recent years, a massive body of

knowledge has accumulated concerning these compounds, and this book represents the state of the art of this knowledge.

One criticism that can usually be levelled against proceedings of symposia is that it is not worth collating the secondary publications, often having been published elsewhere, into a hardcover book. Component articles or chapters are often out of date, and do not form a coherent textbook. None of this obtains in the present volume. The articles are current, contain new or recently published information, and together give a comprehensive background in the field of excitatory amino acids, which cannot yet be obtained in any other book, since this information has not yet filtered into classical textbooks.

The book is organized into an introductory overview, and sections on receptor classification, receptor interaction, neurotransmitter identification and localization, clinical implications, subcortical synaptic transmitters and cortical synaptic transmitters. These divisions are logical and organize the book well. Information derived from cell culture and tissue slice preparations forms the bulk of the book, which might therefore be thought to interest only neurophysiologists. However, as emphasized by a section on clinical implications, this is a field which the practising neurologist and neurosurgeon can no longer afford to ignore. The reason for this is that these compounds are often capable of killing neurons, which has given rise to their appellation "excitotoxins" as coined by Olney, when considered in this context of neurotoxicity.

It is impossible to mention individually all the tantalizing concepts and tidbits of information in the various chapters. Suffice it to say that this book is a must for any neurophysiologist working in the field of excitatory amino acids, and also for any clinical neuroscientist who wishes to have a grasp of the vast and burgeoning literature of excitatory amino acids in a current volume.

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**ELECTROMYOGRAPHY FOR EXPERIMENTALISTS.** By Gerald E. Loeb and Carl Gans. Published by University of Chicago Press, 1986. 373 pages.

Gerry Loeb and Carl Gans are scientists interested in the architecture and neural control of muscles in various animal species. Amongst their studies the authors have tackled the difficult task of recording from neurons, peripheral nerves and muscles in awake behaving animals in order to correlate neural activity with the changes in muscle length and tension. In the course of these studies they have developed enormous expertise in recording electrical and mechanical events and it is this practical experience that they share in this book. The book is in two sections. The first covers the theoretical background. This includes chapters on electricity and electronics, how muscles generate electrical signals and how these depend on muscle's overall architecture. There are chapters on recording electrodes, the principles of material science relevant to such electrodes and how to decide where the recorded signals are coming from. The second half of the book is entirely practical and includes chapters on the design and construction of electrodes (with such basic information as good soldering techniques), choosing and using amplifiers, tape recorders and stimulators and dealing with noise and artifact. There are also sections on mechanical recording, surgical and histological techniques and even one on preparing illustrations.

All of this is written in a practical and down to earth style like the explanations of a sympathetic supervisor anxious to get information across to a new student. The book is clearly directed at neuroscientists working in an animal neurophysiology lab and doubtless all research students in this situation will thank the authors for this "hands on guide". Even experienced scientists in this field will find something new and useful in this book. For clinical neurophysiologists the theoretical sections on electricity, muscle physiology, amplifiers, artifact, and noise are all relevant and this information is not readily available elsewhere. The practical advice on designing electrodes, the use of electronic equipment and on understanding and reducing noise would be invaluable to clinical neurophysiologists embarking on research projects.

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## Books Received

**ADVANCES IN HEADACHE RESEARCH SERIES:** Current Problems in Neurology: 4. Edited by F. Clifford Rose. Published by John Libbey and Company. 280 pages. £28

**CELLULAR AND MOLECULAR BASIS OF CHOLINERGIC FUNCTION.** Edited by M.J. Dowall and J.N. Hawthorne. Published by VCH Publishers. 941 pages.

**CONSCIOUSNESS, AWARENESS AND PAIN IN GENERAL ANAESTHESIA.** M. Rosen and J.N. Lunn. Published by Butterworths. 195 pages. \$46Cdn approx.

**CORRELATIVE MICROSCOPY IN BIOLOGY-INSTRUMENTATION AND METHODS.** Edited by M.A. Hayat. Published by Harcourt Brace Jovanovich (Academic Press) 437 pages. \$116Cdn approx.

**FROM MESSAGE TO MIND: DIRECTIONS IN DEVELOPMENTAL NEUROBIOLOGY.** Edited by Stephen S. Easter, Jr., Kate F. Barald, Bruce M. Carlson. Published by Sinauer Associates, Inc. 368 pages.

**INFECTIONS OF THE NERVOUS SYSTEM.** Edited by Peter G.E. Kennedy and Richard T. Johnson. Published by Butterworths. 284 pages. \$60Cdn approx.

**INTEGRATIVE NEUROENDOCRINOLOGY: MOLECULAR, CELLULAR AND CLINICAL ASPECTS.** Edited by S.M. McCann, R.I. Weiner. Published by Karger. 244 pages. \$160Cdn approx.

**NEUROLINGUISTICS AND LINGUISTIC APHASIOLOGY: AN INTRODUCTION.** By David Caplan. Published by Cam-