Reviews

Visual perception: physiology, psychology and ecology by V Bruce, P R Green; Lawrence Erlbaum Associates, London, 1985, 369 pages, £26.95 cloth, £8.95 paper (US: $39.95, $14.95)

This book differs from most of the standard texts on visual perception and as such deserves a place on the bookshelf.

It sets out to deal with visual perception by the examination of the three approaches in the title; the first section deals with the common features of visual systems in all species, including neurophysiology, and introduces the concept of the 'optic array' as a way of describing the input to the system. The second deals with some of the theories of information processing. Here, the authors proclaim their own bias by giving greatest emphasis to the theories of David Marr. The third section deals with the ecology of perception, based mainly on Gibson's 'whole organism' approach, and contains some fascinating examples of perception at work, such as the discussion of how a baseball batsman times his actions to cope with balls travelling at different speeds.

In the understanding of visual perception the three approaches may be taken as conflicting. In the final chapter, the authors discuss the usefulness of each approach in its own right, and attempt to reconcile the three. This attempt is successful, at least for me, and provides a stimulating discussion. However, the aims of the authors are not made clear until the last chapter. The reader is thus left a little in limbo, especially at the transition between the second section, which deals particularly with Marr's theories, and the third, which makes a sudden leap into what, at the time, appears to be a totally different field—that of ecological psychology.

The authors have clearly intended a particular line of argument, restricting the source material and demonstrations to the range dealing with their approaches. There is nothing wrong with this; there are many texts on visual perception which cover the 'established' range, and it is refreshing to find one which unashamedly has a limited goal, and which therefore offers the unexpected. But it does mean that the book has a rather curious format and can be somewhat difficult to read, with the reader often wondering why a particular topic has suddenly appeared and why other topics, which might be expected to follow, are not discussed.

The book cannot be considered a reference text; it requires to be read rather than dipped into. But for anyone interested in visual perception the effort is probably worthwhile.

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Models of the visual cortex edited by D Rose, V G Dobson; John Wiley, Chichester, Sussex, 1985, 586 pages, £40.00 (US: $69.95)

Imagine a group of eminent literary critics being invited to write a critique of Othello without mentioning Desdemona or Iago! Incredibly, this is precisely what Rose and Dobson asked their contributors to do, by writing about visual cortex in reference to striate cortex only. Even more incredibly, so many of the scientists they approached actually accepted. And most incredible of all, they managed to do a pretty good job.

In fact, of course, vision depends upon the integrity of the entire visual cortex, in which there are many separate areas and of which the striate cortex is but one. It is, nevertheless, the most extensively studied of the visual areas for a variety of reasons, not least of which is the fact that it was the first to be discovered and charted. But the notion that one can begin to understand vision by reference to the striate cortex alone, or build models of visual processes based on what we know about the striate cortex only, is obviously absurd. However, it is also true to say that no model of visual processes or visual cortex in general will be complete without incorporating what is known about the striate cortex, any more than it would be so without a detailed knowledge of the retina. Hence this volume, which in its various chapters gives a good account of most that is known about the anatomy and physiology of the striate cortex, together with some theoretical insights, is a very valuable contribution to the subject. As a reference work and a guide, it deserves to be on the shelves of every laboratory.
The problem of the striate cortex is severalfold. What kind of signals does it receive? How are these compartmentalized within it? What does it do to these signals? What local interactions occur within it? Where does it distribute its signals? To varying extents, these are subjects which are well explored in the book, with orientation selectivity, the relationship between various types of orientation selectivity and its development, claiming the most space. Colour selectivity and motion sensitivity get less space and disparity tuning even less. But, even though it is unique in its structure, the important question of what the striate cortex shares with other cortical areas is little explored, with the exception of the chapters by Barlow and Mackay. In spite of this, there is much in the many chapters dealing with orientation selectivity to provide clues and insights in considering other selectivities, even beyond the visual cortex. It is thus a volume which, as an easy and well-written reference work providing a glimpse of much that is exciting, one can readily recommend to those interested in cortical physiology in general.

Perhaps the most satisfying chapters are the ones written by those actually undertaking anatomical and physiological work in the field. Almost all have thrown in valuable speculations, some easily testable, others less so but, in general, simple and comprehensible. The least satisfying chapters are those of the pure model builders. Largely ignorant of details, the latter have in recent years come to claim vast amounts of space and money but, with a few rare exceptions, have made little contribution of note and certainly nothing to compare with the contributions that even the humblest anatomists, peering down their microscopes, have made consistently over the years. Though they do not possess the grand postures and the mathematical pitchforks of the model makers, their contributions turn out to be the more durable. Here, Rose and Dobson have rendered a valuable service. By restricting the length of the chapters, they have saved the reader from boredom. By juxtaposing the contributions of the model makers with the theorizing of those actually getting their fingers dirty, they have also rendered a valuable service to those thinking of making their careers in the field. Perhaps even more significantly, their book might even make the model makers take the humble anatomists and physiologists a little more seriously than is their habit.

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Drugs and the brain by S H Snyder; W H Freeman, New York, 1986, 228 pages, $32.95 (UK: £15.95)

This is a tour of the high (and some of the low) points of the investigation of the pharmacology of the central nervous system (CNS), written in a generally pleasing and accessible style by someone who has himself made distinguished contributions to this area of science. It will be of interest to students of neuroscience, to scientists from other disciplines who want a digestible overview of CNS pharmacology, and to the proverbial intelligent layman. Almost no previous knowledge of pharmacology is assumed, though occasionally a smattering of chemistry would be helpful.

There is a lucid introduction to the necessary background: how neurons communicate and transmit information, how drugs can affect synaptic transmission, and how drugs vary in their ability to travel from blood to brain. At this, and other points in the book, some classical experiments are described (eg Loewi's study of the cholinergic control of the heart), which give the reader a feel for the history of the subject, but also for the way scientists work.

Individual chapters deal with separate drug/neurotransmitter systems, though there are attempts to show (and to speculate) how they might interact to control mood, perception, thought, and behaviour. The topic areas covered are opiates, neuroleptics, antidepressants, stimulants, anxiolytics, and psychedelics. There are interesting historical sections, eg on opiate and stimulant usage, and graphic sketches of how various drugs came to be discovered or synthesized. The main studies which have led to our present understanding are also covered, with clear descriptions of the theoretical, technical, and interpretative problems facing the scientists concerned, and how they were solved. Workers in perception may be especially interested in the sections on dopaminergic and noradrenergic systems, and the corresponding
accounts of schizophrenic symptoms and the effects of psychedelic drugs. As might be expected from the publisher, there are excellent coloured illustrations throughout the book, which is well produced.

Apart from its coverage of CNS pharmacology, the book seems to me to have several virtues: Snyder writes with enthusiasm, and captures the fascination, disappointments, and occasional euphoria of science. In a measured way, he shows how drugs may help us to glimpse the answers to such difficult questions as the neural basis of the psychological division between 'self' and 'nonself'.

Pharmacologists have reason to be proud of their contribution to the alleviation of human suffering. Despite the unwanted effects of some drugs, and the abuse of others, this is surely a success story, which is not yet complete. But the author shows how much this success has depended on hunches, and chance discoveries—a reality which students or nonscientists will rarely find in conventional papers or textbooks.

Occasionally, we see something of Snyder the man, as well as Snyder the scientist. Who could fail to warm to the remark in the preface—in a passage where the author describes how he took premedical courses, rather than study the philosophy in which he was most interested—that "philosophy is hardly a proper vocation for a nice Jewish boy"?

I enjoyed reading this book, and recommend it to anyone who wants to begin to learn about the pharmacology of the CNS. I wish that it had been around when I first became interested in the topic.

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Books received

Gregory R L (ed.) The Oxford Companion to the Mind Oxford University Press, Oxford, 1987, 856 pages, £25.00 (US: $49.95)

Hess R F, Plant G T (eds) Optic Neuritis Cambridge University Press, Cambridge, 1986, 310 pages, £37.50 (US: $69.50)

LeDoux J E, Hirst W (eds) Mind and Brain: Dialogues in Cognitive Neuroscience Cambridge University Press, Cambridge, 1986, 449 pages, £40.00 cloth, £13.95 paper (US: $54.50, $18.95)

Sanford A J Cognition and Cognitive Psychology Lawrence Erlbaum Associates, London (first published by Weidenfeld and Nicholson, London), 1985, 435 pages, £19.95 cloth, £9.95 paper (US: $29.95, $14.50)

Smyth M M, Morris P E, Levy P, Ellis A W Cognition in Action Lawrence Erlbaum Associates, London, 1987, 346 pages, £19.95 cloth, £8.95 paper (US: $27.95, $14.95)

All books for review should be sent to the publishers marked for the attention of the reviews editor. Inclusion in the list of books received does not preclude a full review. The opinions given in these reviews are those of the reviewer alone and do not necessarily represent the views of the editors or publishers.

1988 R H Wright Award in Olfactory Research

The purpose, nature, establishment and support, and rules and eligibility are as listed in Perception 1986, 15(4) 510 for the 1987 Award.

Nominations: The names of proposed candidates and supporting information (including description of their contributions, literature references, and biographical information) should be received by 15 February 1988. They should be sent to Dr B P Clayman, Dean of Graduate Studies, Simon Frazer University, Burnaby, British Columbia, Canada V5A 1S7