Reviews

Photosensitive epilepsy by P M Jeavons, G F A Harding; Spastics International Medical Publications, London, 1975, 121 pages, £4.50

In this duograph the authors describe a syndrome in which epileptic seizures can be triggered by visual stimuli. The book begins with a review of earlier reports of such cases, and then goes on to describe the authors' own study of 460 photosensitive patients. Although rarely diagnosed at present, photosensitive epilepsy may occur in more than 1 in 10000 of the population. It is commoner than true petit mal, and is found most frequently among adolescents.

Readers of Perception will be most interested in the types of stimulus which can precipitate fits in photosensitive patients. Reports that seizures sometimes occur while patients are watching television has led to the study of flicker and pattern as relevant stimulus parameters. Jeavons and Harding systematically plotted the range of stroboscopic flash rates which would induce seizures in their patients; in some cases this range was very narrow. A fine grid pattern placed on the face of the stroboscope facilitated the induction of seizures. The effects of the stimulator were markedly reduced if one eye was closed, or if the image did not fall on the fovea. The authors found that the colour of the stimulus made very little difference. From the abnormal shapes of the visual evoked potentials recorded from the scalp, and the presence in some patients of spiking in the occipital EEG, Jeavons and Harding suggest that a failure of inhibition in the visual cortex may be the cause of the epileptic discharges.

The authors are to be congratulated for their attempt to approach the problem of photosensitive epilepsy so comprehensively. Their emphasis on the standardization of testing procedures (especially the quantification of the stimuli provided by different makes of stroboscope) is particularly welcome. On the other hand, the reading is made difficult in places by the variety of styles of writing used throughout the book, the lack of a summary at the end of most of the chapters, and the division of the (admittedly heterogeneous) sample of patients into so many groups and subgroups. Nevertheless, the book is a useful source of information, not only for practising clinicians, but also for researchers into epilepsy who seek a precise model to use in studying the mechanisms of seizure initiation, and for the many researchers in vision who are interested in the practical applications of their work.

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Movements of the eyes by R H S Carpenter; Pion, London (distributed by Academic Press, London and New York), 1977, 420 pages, £13.50 (US: $27.00)

There is an ancient proverb which says that people will bow down even to the servants of a king. The eye reigns as supreme monarch among the human sense organs, and the oculomotor system has achieved some prestige by its subservience to this master. Much of this prestige is indeed justified because the exquisite precision of localization and resolution in the sensory mechanism of the eye demands a matching precision from the system that is responsible for placing and holding it in position. But, in addition, the system controlling eye movements demands study in its own right as an exemplar of biological control systems.

Historically, World War II indirectly generated an upsurge of interest in the physiology of eye movements. The exigencies of military technology brought about the development of the theoretical analysis of automatic control systems, and new methods were evolved for handling 'information' as a measurable quantity, subject to its own natural laws. The design of automatic control systems demanded of engineers the solution of the very same problems that the evolutionary process had been solving, by trial and error, in the development of biological control systems; to point a finger, to aim a gun automatically, to lock a radar beam onto a moving plane, and to direct the eyes at a moving bird, are closely analogous processes. Two features of these processes were understood only imperfectly by 19th century physicists. The one concerned the consequences
that arise in a system whose behaviour depends not only on influences acting on it from outside, but also depends on the consequences of its own behaviour. This is the property that we now call ‘feedback’. The second feature of such systems is that their operation depends not upon transformations of energy, but upon transformations of information.

The development of the appropriate theoretical tools led to the expansion of research into biological control systems in general, and the control of movements of the eye in particular. There are aspects of the oculomotor system that make it an attractive subject of study. Among these is the simplicity with which the magnitudes of its inputs and outputs can be defined, and the relative ease with which the former can be generated and the latter measured. Furthermore, the intellectual challenge is well tuned to the skills and technical facilities of modern physiology. In the elegant words of this book “it functions at a level of complexity somewhere between the banality of the spinal reflex and the inscrutability of the voluntary act”.

In the course of time, the number of scientific papers dealing with movements of the eyes has grown, and several volumes reporting the proceedings of international conferences have been published, but the appearance of a definitive textbook dealing with the subject has been noticeably lacking—until now.

The physical attributes of this book are attractive. It is easy to handle; the typography, though small, is clear; and the diagrams are abundant, neat, and illuminating. These add to the pleasure of reading a worthy text. The most fitting adjective to describe the contents is ‘thoughtful’. Thoughtful in planning, in selection, in discussion, and, above all, in expression. The author has not shirked complexity, and leads the reader gently but firmly through the intricacies of many devious discussions. The understanding of the theory of control systems by the nonspecialist is supported by a helpful appendix.

The declared purpose of the book is that it should be a teaching text, and it fulfills this purpose admirably. It may be unfair to say that it falls short of a good review source for research workers. The all-or-none system of criticism, whereby a research paper is either quoted or not, is too coarse for this purpose.

The reference list is extensive. Its value would be increased if the text pages where the papers are cited were given. It would also be helpful if junior authors were cross-indexed. However, these are minor matters that can be given consideration during the preparation of the second edition—an event that surely and deservedly must happen.

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Handbook of perception volume V Seeing edited by E C Carterette, M P Friedman; Academic Press, New York, 1975, 528 pages, $29.50 (UK: £20.95)

At least seventy-five percent of this handsome but rather expensive book is excellent stuff. Of the twelve chapters which make up the five hundred pages of text, at least eight are genuine handbook material. That is to say, they are thorough and well-written reference texts containing, in a well-organised, clear, and interesting form, fundamental data and classic findings. In general, these chapters achieve the stated aim of the series as a whole, namely “to give a précis of the state of knowledge in every area of perception”.

There is a—naturally—highly competent chapter on photometric methods by Le Grand, who also opens this collection with a chapter on the history of research on seeing. At first sight this historical section seems rather oddly placed, since volume II of this series deals specifically with the Historical Background of Contemporary Perception. However, Le Grand’s chapter will at least be a fruitful source of arcane knowledge, by means of which the unscrupulous speaker can impress his audience with the breadth of his scholarship. (Did you know, for example, that the first known diagram of the eye appears in a 9th century book by Hunain Ibn Ishaq?)

There are workmanlike contributions from Ganz and Thomas on “Temporal Factors” and “Spatial Resolution and Spatial Interaction” respectively, and also four chapters which deserve special mention. These are: firstly, John Robson on receptive fields—a carefully considered and extremely valuable summary; secondly, R and K de Valois on the neural coding of colour—a
detailed but clear treatment of a complex topic; thirdly, Boynton's thorough coverage of the psychological aspects of colour perception. (I wonder whether these last two contributions could have been even more valuable than they already are if the authors could have exchanged manuscripts before preparing their final drafts? An editor's lot is never a happy one, but this does seem to have been a missed opportunity to emphasise the correspondences and the contrasts between the two approaches.) And finally there is the chapter by Whitman Richards on space perception. Any one of these would provide an excellent grounding in the topic covered.

There are, however, two chapters which are slightly less happy, and one chapter which I think is simply inappropriate to such a volume. There are two chapters by Dodwell; one is on “Pattern and Object Perception”, which is ... well, fine, if you like that sort of thing. But the other is a philosophical piece, the main burden of which seems to be characterised by his question: “How much of colour perception is adequately explained by the findings on photopigments and electrophysiological opponent processes?”. A perfectly reasonable question, you may feel; and see my comments above about the lack of common ground between Boynton and de Valois. But Dodwell goes too far, as a single example will show. Citing Helson as his authority, he says that the visual system “will adapt to just about anything”. From this he deduces the following: “Therefore, anything visible must have a neural correlate that is subject to adaptation”—hardly a powerful or novel theoretical discovery! The argument is tenuous, to put it delicately.

I am also unhappy about the final chapter, by M H Pirenne, on “Vision and Art”, which is largely about perspective and his father. It is interesting enough, but quite out of tune with the rest of the book.

My single real criticism, however, concerns Sekuler's chapter on “Visual Motion Perception”. This is simply not about motion perception in general; it is mainly about the work of Sekuler and his collaborators (of nine illustrations, seven refer to investigations by Sekuler or one of his coworkers). One looks in vain for the 'comprehensive survey' promised in the Foreword. Moreover, the Editor is fully aware of this fact; in the Preface he states flatly that Sekuler “has chosen to break away from the classical work on motion”. But surely, in a handbook, the classical work is precisely what one would wish to have collated and evaluated? I think a little more editorial influence might have been exercised here.

Nevertheless, the volume as a whole is entirely worthwhile. At £20.95 it is certainly not cheap; but everyone who teaches or researches in visual perception will want to have access to a copy since, while it is by no means perfect, it is about the best book of its kind around.

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Handbook of perception volume VII Language and speech edited by E C Carterette, M P Friedman; Academic Press, New York, 1976, 501 pages, $29.50 (UK: £16.50)

Language and Speech, volume VII in the Handbook of Perception series, is the first in the second section of four volumes covering the “perceiving organism ... [in] the wider view” (p xiii). The series is designed as a reference work primarily for the psychologist, drawing together strands from all aspects of perception. As such, it is perhaps unfair to discuss this book as a self-contained unit; it is clearly not designed for cover-to-cover reading. However, some aspects of the organisation of this volume would make it difficult to use even for its avowed purpose. For instance, the first two parts are “Fundamental Aspects of Language and Speech”, and “Coding, Perception and Hearing”. The distinction in the chapters themselves, however, is not nearly as clear-cut as this division implies. For example, “Research Methods in Psycholinguistics” by Olson and Clark appears in the former; while “Semantics: Categorisation and Meaning” by Deese is classified with the latter; and “Sentence Comprehension” by Carroll and Bever, which covers very similar ground to the Olson and Clark chapter, is in part II as well. These organisational problems combine with an uncomfortably large number of typographical errors (e.g. “prediction of speech” for “production of speech” on p xvi, the diagram on p 86, where centre, front, and blade of the tongue are rather confusingly crowded together, and p 244, where f, v, θ, and δ are classified incorrectly as affricates rather than fricatives) to present a somewhat confusing approach.
Part I provides a wide range of papers, ranging from a discussion of the formal nature of language and language development, to the neurobiology of language. As a linguist reviewing this book, with little background in neurophysiology, I found the chapters on the production of speech and language difficult to follow because of the extensive use of technical language. More generous use of diagrams for details of anatomy that are less familiar than tongue positions in speech (which were amply illustrated) might have helped the naive social scientist.

Part II presents some of the better papers in this volume, although chapter 7 stands out awkwardly as the explication of a particular model, rather than the more general approach to a discussion of the issues, as in the other chapters. Inevitably, with the organisational problems referred to above, there are many duplications across chapters, particularly chapters 3, “The Production of Speech and Language”, 6, “The Perception of Speech”, and 7, “Phonetic Coding and Serial Order”; and chapters 2, “Research Methods in Psycholinguistics”, and 9, “Sentence Comprehension”. At the same time, a more thoroughgoing discussion of computer models of natural language might have made a useful addition to this section.

The first two parts form the bulk of the book; only seventy pages remain for the final two parts. Part III is devoted to language disorders, presenting a comprehensive survey of aphasias and speech production disorders. Again, as in the chapter in part I on neurophysiology, more diagrams would have helped to make some points clearer.

Part IV is called “Trends in Psychological Tests of Linguistic Theory”, and consists of one paper, which, while excellent in its survey of the development of generative semantics and context-based approaches to linguistic development, deals only briefly with the ostensible topic of the section. A broader approach would have been better here, particularly as this is one of the shortest chapters.

In general, length of chapter and approach to topic seem unrelated throughout to complexity of issue. The reader is left with dissatisfaction with the editing of the volume, rather than with the chapters of any particular authors. The vast amount of bibliographical material, however, makes this book very valuable for reference purposes. It remains to be seen whether the remaining volumes in this section of the Handbook will provide a more coherent approach to both general and specific issues.

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Books received

Bower G Human Memory: Basic Processes Academic Press, New York, 1977, 549 pages, $14.00 (UK: £9.95)

Defeudis F, Defeudis P (Eds) Elements of the Behavioral Code Academic Press, London, 1977, 389 pages, £15.00 (US: $29.35)

Evans E F, Wilson J P (Eds) Psychophysics and Physiology of Hearing Academic Press, London, 1977, 525 pages, £14.00 (US: $27.35)

Fieandt K von, Moustgaard I K The Perceptual World Academic Press, London, 1977, 680 pages, £32.00 (US: $62.50)

Kohen-Raz R Psychobiological Aspects of Cognitive Growth Academic Press, New York, 1977, 127 pages, $11.00 (UK: £7.80)

MacNamara J (Ed.) Language Learning and Thought Academic Press, New York, 1977, 296 pages, $19.50 (UK: £13.85)

Metzler J (Ed.) Systems Neuroscience Academic Press, New York, 1977, 271 pages, $12.00 (UK: £8.50)

Reber A S, Scarborough D L Towards a Psychology of Reading Lawrence Erlbaum Associates, Hillsdale, NJ (distributed by John Wiley, New York and Chichester, Sussex), 1977, 337 pages, $22.90 (UK: £12.80)

Scandura J M Problem Solving: A Structural/Process Approach with Instructional Implications Academic Press, New York, 1977, 591 pages, $17.50 (UK: £12.40)

Schiffman H R Sensation and Perception: An Integrated Approach John Wiley, New York, 1976, 434 pages, $20.95 cloth, $10.80 paper (UK: £11.80, £6.15)

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.