



Perception.

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useful brief reviews of their respective topics for readers interested in the mammalian forebrain. None, however, has a particularly comprehensive bibliography. Other chapters which may be useful are those by the members of the host committee from the Department de Morfolgia of the Universidad Autónoma de Madrid, which bring together much of the connective anatomy of the cat forebrain. Chapters by Bennett on electronic synapses and by Krasne on the physiological analysis of learning in invertebrates may also serve as convenient surveys for the casual reader.

The remaining chapters are on rather specialized topics or deal specifically with a particular experimental paradigm. For those whose work is in the behavioral attributes of prefrontal or parieto-temporal cortex, they may hold some interest, although most have probably appeared elsewhere.

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PEPTIDES, HORMONES, AND BEHAVIOR.

Edited by Charles B. Nemeroff and Adrian J. Dunn. SP Medical & Scientific Books (Spectrum Publications), New York. \$125.00. xiii + 944 p.; ill.; index. 1984.

A volume devoted to a survey of the influences exerted by peptides and hormones on behavior is welcome. Although there have been several, perhaps too many, recent works on neuropeptides, there has not been a concerted effort to bring together, as this book does, some of the previous work on steroid hormones with the extensive data now available on neuropeptides. The organization of the book into 20 chapters, each by an acknowledged expert, covers most areas of relevance to the field.

The first chapters deal with peptide secreting neurons (E.M. Rodriguez), distribution of peptides in the central nervous system (L. D. Grant, G. Bisette and C. B. Nemeroff) and biosynthesis of peptide hormones (J. L. Roberts). The control of anterior pituitary hormone secretion (L. A. Frohman and M. Berelowitz) and neurophysiology of hypothalamic neurons (L. P. Renaud) are discussed. All of these initial chapters are informative, well written and up to date. The next group of chapters discusses the effects on the CNS of hypothalamic peptides (C. B. Nemeroff and colleagues), ACTH and related peptides (A. J. Dunn), the endorphins (G. Koob and associates), and the neurohypophysial hormones (by T. B. van Wimersma Greidams and D. H. G. Versteeg). Topical chapters discuss angiotensin and drinking, gut hormones and feeding, and sleep peptides. The latter chapters of the book discuss the role of thyroid hormones and adrenocortical steroids in

brain function. The last chapter by N. R. Hall is particularly relevant, discussing the recent interest in the interaction between the neuroendocrine system and the immune system.

The book was produced by photoreproduction of typescript, which always makes for less palatable reading. There are numerous typographical errors. But the substance of the chapters is timely and relevant. The volume is a useful addition to those libraries wishing to be up to date in this area.

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PERCEPTION.

By Irvin Rock. Scientific American Library (Scientific American Books, Inc.), New York; distributed by W. H. Freeman & Co., New York. \$27.95. xii + 243 p.; ill.; index. 1984.

The study of perception is divided into two sections. The first, and the one of most interest to biologists, deals with receptors, neurophysiology, and brain function. The second, and the topic of this book, deals with phenomena—particularly what we see and why we see it that way. Although biologists might therefore decide to give this book a miss, they should not because phenomenology often guides physiology in fruitful searches into neural structure and function. Irvin Rock has provided a serious introduction and a good overview to many issues. Unfortunately, since the book does not consider audition, taste, or olfaction, and deals only glancingly with touch and kinesthesia, its title is misleading. Rock presents little current research, but gives a solid, coherent point of view broadly based on years of tradition.

After a brief chapter that describes three approaches to perception—stemming from Hermann von Helmholtz, the Gestalt psychologists, and James Gibson—Rock launches into a discussion of perceptual constancies. This is a good choice, since the perceived permanence of objects and surfaces around us within a sea of optic flux is central to us. The next two chapters discuss objects as arranged in depth around us and as portrayed in art and photography. The fifth chapter, on form and organization, describes certain traditions from Gestalt psychology and discusses where they have led. The overviews of these topics are as good as one will find anywhere, given the space limitations. The later chapters are somewhat less successful. A full chapter is devoted to geometrical illusions, a topic less important than catchy and one that might have been integrated into picture perception. The chapter on the perception of motion would benefit greatly from the results of recent research, particularly from the field of artificial intelligence. Although the chapter on

perception of the upright is interesting, its inclusion seems idiosyncratic, and the final chapter is a somewhat timid theoretical statement about intelligence in perception.

More than most books in the Scientific American Library series, the broad-paged four-color format is well integrated into the author's needs and goals. Fine photographs and fine reproductions of paintings besprinkle the text to illustrate important points. But in this book, more than in other books in the series, the author's own research is over-represented. In the tradition of *Scientific American* this work is a learned, well-written synopsis and, equally in that tradition, it does not provide the serious student with sufficient reference information to pursue leads in other works. This book is glossy and handsome, a fine coffee-table browser and a good read for an omnivorous intellectual household.

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VISION IN *DROSOPHILA*. *Genetics in Microbehavior. Studies of Brain Function, Volume 12.*

By M. Heisenberg and R. Wolf; Coordinating Editor. V Bräutenbergh. Editors: H. B. Barlow et al. Springer-Verlag, Berlin and New York. \$52.50. ix + 250 p.; ill.; subject index. 1984.

How does a fly see its world? This is as much a question concerning the brain as of visual receptors, and it rightly places this book about the visual system of *Drosophila melanogaster* within a series encompassing studies of brain function. The question, as the authors point out, is not a scientific one—yet it is central to any quest to understand the significance for the fly of what it sees in prompting what it then does. The authors set out stochastically to bridge the gap between a cybernetic analysis of the fruit-fly as a machine and the more biological concept of the animal's mind, quite sensibly presenting the reader, at the outset, with the relevant scientific conjectures so as to facilitate understanding of the experimental philosophy involved. Since the idea of comparing mutant forms to reveal natural design and function was first suggested by Benzer nearly two decades ago, the visual system—particularly that of the fruit-fly—has been one for which genetic dissection has been rewarding. This book is a timely review of what has been for the authors (and their friends) an exercise in neurogenetics. Here, they have drawn together in a useful form knowledge of the visual system of flies and other insects as it mediates such behaviors as spatial orientation, flight initiation, and stability and landing.

Part A deals with the receptor and neuronal architecture of the visual system, its biophysics and biochemistry; the treatment is concise and, in con-

text, completely adequate. The authors largely ignore the equally important body of work aimed at resolving the receptor-based transduction process—clearly not a function of the brain. In turn, attention is directed at simple behaviors such as the optomotor response, which is also usefully reviewed and which sets the scene for the following chapters; here conciseness at times becomes an impediment to clarity (as are the few editorially missed germanic sentences!). The authors with some success make redress when correlating structure with function. "To be sure the physiological machinery only makes sense within the constraints of the body and of the ecological niche" (p. 52).

The linking of Parts A and B is straightforward, using the optomotor response and comparing closed-loop with open-loop conditions discussed earlier. The need for the subdivision is not clear. Part B, however, deals with the behavioral structure of the visual system, emphasizing visually mediated behaviors as distinct from the "nuts and bolts" of the machinery. The authors review, for example, endogenous behavior in yaw torque fluctuations, orientation towards objects, and menotaxis and visual control in free flight. The treatment is interestingly informative, providing an up-to-date reference source worthy of a place on any laboratory book-shelf. The authors write with a pleasant personalized style, lapsing only occasionally into their native grammar, and argue their way through a text interjected with a reasoned philosophy that gives the book an attraction beyond a competent review of a decade or so of endeavor.

Whether at the end one is convinced that visually mediated "behavior is irreducibly the result of initiation [conceived as] an internal process of the brain which comprises elements of variation and selection, trial and the elimination of error" (p. 2), akin to Darwinian evolution, is perhaps doubtful. Yet the ideas derived from the experimental studies discussed by the authors are indeed stimulating. Over the last fifteen years neurogenetics and genetic dissection have evolved from novelty to routine within the laboratory and have been incorporated into undergraduate study. In this context the book is indeed timely, drawing together as it does information pertaining to one area in which mutant studies have been rewarding.

The book is both produced and illustrated well and includes two most useful appendices: the first defines the neurological mutants of *Drosophila* used in the studies discussed; and the second lists symbols, dimensions and abbreviations. (I suspect the first will become a well-thumbed section of the book.) A sensible subject index is included as well as a comprehensive bibliography.

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