

Books Received*Vision and Acquisition*

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The main purpose of this book entitled "Vision and Acquisition" is to establish relationships between the physical properties of the eye and the processes executed by the central nervous system, that is between the retinal image and the decision-making part of the brain. The term acquisition covers three specific visual processes: detection, recognition and identification. However, it is the detection phenomenon which is the most broadly emphasized in the book. Consequently, the author discusses mainly visual performance under threshold conditions.

In the first part of this book, the author presents some basic properties of the visual system. This is followed by psychophysiological experiments on threshold detection and the various factors influencing human visual capabilities, such as variability, the environment and types of tests utilized.

The second part constitutes the core of the book. This part is devoted to a comparative survey of the progressive development of models which have been put forward in order to explain satisfactory image evaluation in terms of mathematical functions. The models are discussed clearly and systematically. This survey is more than a simple recapitulation since it points out the limitations of each model. The author (and the reader) is led to the conclusion that the nervous system detects local differences in luminous energy between two adjacent sites in the visual field, and that the visual system enhances the differences by means of inhibitory mechanisms between neighboring neural elements. It is thus, the edge gradients in the retinal image which are an important feature of the visual scene. The problem, however, is that the models do not take into account that real visual scenes are highly structured: many objects have textured surfaces, "frilled" edges etc. . . . in other words, they contain "noise". The author attempts to supplement existing models by proposing a model which combines noise functions with neural processes which require a finite detectable difference in order to operate. His model is termed "a Versatile Physically-based Model". The model is then applied to various simple visual threshold situations used in classical psychology. Its applicability to complex visual patterns such as surface texture and multiple levels of luminance is considered.

The last chapters of the book are devoted to practical visual acquisition, particularly in cases where viewing is accomplished across very great distances. These chapters are of interest to the physicist, astronomer, and aircraft pilot.

The originality of this book lies in its focusing on a single problem, that is, visual detection, and its bringing together of diverse disciplines (surface properties atmospheric physics,

photometry, image evaluation, psychology, and neurophysiology) in such a way as to provide an overall understanding of the issue. A final word about those who will most profit from this book, graduate students clinicians, psychophysicologists, all researchers working on vision and . . . pilots.

Stephane Molotchnikoff
Montreal.

The Synapse. Cold Spring Harbor Symposia on Quantitative Biology. Volume XL., Cold Spring Harbor Laboratory. New York, 1976. 720 pages, \$36.00.

This book contains sixty contributions and constitutes the published record of the proceedings of a recent Cold Spring Harbor Symposium on "The Synapse". The contributions have been loosely subdivided into major sections entitled: Structural aspects of synaptic function; Chemistry of synaptic transmission; The acetylcholine receptors; Gating currents in nerve; Genetic and developmental approaches; Formation and maintenance of synapses; Long-term changes and specificity of connections; Retina and visual system; and finally Model Systems. The book provides a fascinating glimpse of the various directions into which current research on the synapse is being channelled. Individual readers will find their interest held by particular contributions, but such is the scope of the presentation that few will probably peruse it from cover to cover. Although much of the material has been published elsewhere, the present text provides for convenient access to the literature on this topic.

The contributions are generally of high quality and the production of the book is excellent. Researchers and graduate students will find the book useful and it can be strongly recommended for library acquisition. Clinical neuroscientists who have an opportunity to read the book will undoubtedly find it interesting but with few immediate practical implications.

J. W. Phillis
Saskatoon

Structure of the Autonomic Nervous System. G. GABELLA. Chapman & Hall, London. A Halsted Press Book, John Wiley & Sons, Inc., New York. 214 pages £9.80.

Cell Biology of Brain. W. E. WATSON. Chapman & Hall, London. A Halsted Press Book, John Wiley & Sons, Inc., New York. 527 pages. £15.00.

Structure and Function of Proprioceptors in the Invertebrates. Edited by P. J. MILL. Chapman & Hall, London. A Halsted Press Book, John Wiley & Sons, Inc., New York. 686 pages. £19.50.