Physiology of Photoreceptor Organs

Michelangelo G.F. Fuortes 2011-11-11
This volume is a collection of essays which attempts to summarize the recent progress in the field of photoreceptor and retinal physiology. Reflecting the way in which research is organized, each author reports on the studies performed with the techniques with which he is most familiar: morphological, chemical or physiological. The first chapters describe the structure of visual cells and the histological architecture of the retina. Next comes a summary of the laws governing photochemical reactions and a report on the biochemistry of photopigments. Four articles cover the optical properties of invertebrate eyes and the electrophysiology and the interactions of their photoreceptors. These are followed by a discussion of the properties of vertebrate eyes, including chapters on optics, on the electrical responses of rods and cones and on the functional organization of the retina. The final chapter provides an extensive review of retinal biochemistry and metabolism. Even though the experimental approach differs, all studies are directed toward the solution of two basic problems: transduction in the photoreceptors and organization (often called "information processing") in the retina. The central problem of photoreceptor cells is to determine how light produces a response. We know that illumination evokes electrical changes and we have recently learned a great deal about the features of these changes. The evidence indicates however that elaborate processes must be interposed between the absorption of photons by the pigment and the production of electric currents through the membrane. These intermediary events remain to be unraveled.

Handbook of Sensory Physiology - M. G. F. Fuortes 1971

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Physiology of Photoreceptor Organs - Michelangelo G.F. Fuortes 2012-12-06
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**Physiology of Photoreceptor Organs** - M. G. F. Fuortes 1972

**Central Processing of Visual Information A: Integrative Functions and Comparative Data** - H. Autrum 1973-11-26 The present volume covers the physiology of the visual system beyond the optic nerve. It is a continuation of the two preceding parts on the photochemistry and the physiology of the eye, and forms a bridge from them to the fourth part on visual psychophysics. These fields have all developed as independent specialties and need integrating with each other. The processing of visual information in the brain cannot be understood without some knowledge of the preceding mechanisms in the photoreceptor organs. There are two fundamental reasons, ontogenetic and functional, why this is so: 1) the retina of the vertebrate eye has developed from a specialized part of the brain; 2) in processing their data the eyes follow physiological principles similar to the visual brain centres. Peripheral and central functions should also be discussed in context with their final synthesis in subjective experience, i.e. visual perception. Microphysiology and ultramicroscopy have brought new insights into the neuronal basis of vision. These investigations began in the periphery: HARTLINE'S pioneering experiments on single visual elements of Limulus in 1932 started a successful period of neuronal recordings which ascended from the retina to the highest centres in the visual brain. In the last two decades modern electron microscopic techniques and photochemical investigations of single photoreceptors further contributed to vision research.

**Handbook of Sensory Physiology** - Richard Jung 1973

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Handbook of Sensory Physiology: Principles of receptor physiology—Werner R. Loewenstein 1971

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The Enzymes of Biological Membranes-Anthony N. Martonosi 2013-11-21 For a long time membrane biochemistry was almost synonymous with the biochemistry of electron transport and oxidative phosphorylation. Although the successful analysis of hormone receptors, active transport, and other membrane-linked metabolic systems displaced mitochondria from the focus of interest, the field continued to grow and its contributions to other areas of membrane biochemistry played a major role in their dramatic development. The eight chapters in this volume dealing with electron transport provide a concise, critical, and up-to-date picture of the problems and accomplishments of the field. In the remainder of the volume a brief summary of selected receptor functions is presented. The relative novelty of this field naturally limits the factual scope of developments and encourages speculation. Nevertheless these reviews accurately reflect both accomplishments and deficiencies and provide objective guidance for future development. Several receptor functions omitted from these discussions will form one of the later volumes currently in preparation.

Molecular Aspects of Membrane Phenomena-H.R. Kaback 2012-12-06 This book is a compilation of formal presentations made during a three-day invitational conference at Battelle Research Center in Seattle, Washington. The purpose of organizing and publishing the proceedings of the conference is to provide a comprehensive survey of present knowledge on the determinants of membrane structure, the molecular specificity of membrane function, and the dynamic properties of membranes. Each presentation was followed by discussions which, be cause of their informal and spontaneous character, have not been included in this publication. Molecular studies of biological membrane phenomena
have progressed over the past decade to the point where it is now realistic to expect future resolution of the physico-chemical processes or forces governing the organization, function, and dynamic properties of membranes. Drs. Radda, Kaback, and Schwyzer, each presenting a different approach to the biochemical and biophysical study of membranes, devoted four to six weeks as Battelle Visiting Fellows to developing the format and the roster of participants of the conference. The scientific "cluster" concept for planning the conference is reflected in the breadth of topics presented in this publication.

**Human Physiology** - R.F. Schmidt 2013-11-11 Human Physiology is the English version of a time-honored German textbook first published by HERMANN REIN in 1936. We undertook the preparation of a completely revised 20th edition with the intention of making the book accessible to a wide range of English-speaking readers. The subject-matter was therefore organized so as to correspond to the structuring of physiology courses in most countries of the world. The book is directed primarily at students of medicine. Its aim is to enable them to understand living processes in the human organism, providing the basis for the scientific understanding of pathological changes. The material was chosen to give the reader not only the knowledge required for passing examinations, but also information necessary for a subsequent professional career. For this reason special attention was devoted to pathophysiological aspects. We hope that the book will prove a useful reference on the present status of physiology for physicians in private and hospital practice as well as for its primary readership. The book should also serve biologists, biochemists, pharmacologists, pharmacists, and psychologists as a source of information on the physiological principles underlying their disciplines.

**Photoreceptor Optics** - A.W. Snyder 2012-12-06 The above consideration indicates that at present many of the experimental facts on PS in animals can be quantitatively explained within the limits of the "universal" photoreceptor membrane concept. Of course, existence of preferential orientation of the absorbing dipoles in the tubuli of the rhabdomeres can not be totally rejected. We hope that the concept of the "universal" photoreceptor membrane may serve as the useful instrument when dealing with newly discovered properties of visual cells so that true mechanisms of electrical and optical coupling will be searched for instead of assumptions being made on additional properties of the photoreceptor membrane in every new animal under study. 5. Absorption Spectrum of the Universal Photoreceptor Membrane and Spectral Sensitivity of the Photoreceptor 5. 1 Preliminary Notes It seems nearly self-evident that the absorption spectrum of the photoreceptor membrane coincides exactly with that of the visual pigment it contains. Hence, the membrane must exhibit three bands of absorption - the principal band with its peak within the limits of visible spectrum (or a-peak); the secondary band between 340 and 380 nm (S peak); and the third, protein band, in the ultraviolet (UV) at 280 nm (COLLINS et al., 1952). The main peak of absorption is located within the range 433-575 nm for retinol-based pigments and between 438 and 620 nm for 3-dehydroretinol-based pigments, the position of Amax depending on many ecological factors.

**Neuroethology** - J.-P. Ewert 2012-12-06 Historically the search for the neural bases of
behavior goes back a long way. Neuroethology, which is concerned with the experimental analysis of the releasing and control mechanisms of behavior, is a young discipline. Results from this multidisciplinary branch of research, which uses physical, chemical, and mathematical methods, have not yet been extensively treated in textbooks of neurophysiology and ethology. This book is intended as a first attempt to pose major questions of neuroethology and to demonstrate, by means of selected research examples, some of the ways by which these questions are being approached. Inevitably this cannot be a complete and in depth detailed treatment of all of the neurobiology examples, and I realize that such a selection is of a subjective nature. The overall goal of the book is to present an introduction. After outlining some of the very basic neurophysiological and ethological concepts (Chaps. 2 and 3), neuroethological questions and methods are demonstrated extensively by means of a particular example (Chap. 4). There are two reasons to choose the visually guided prey-catching and avoidance behavior of the Common Toad: (1) it is a system which I have investigated for about fifteen years and therefore know best, (2) the toad story is one of the most comprehensive neuroethological approaches so far. Thus, it is possible here to outline the major concepts of neuroethology and to pose the basic questions.

Sensory Research - Ronald T. Verrillo 2014-03-05 This volume is a record of the proceedings of a festspiel held to honor Jozef F. Zwislocki for his outstanding contributions to science and to Syracuse University. His contributions to the knowledge of the hydromechanical, neurophysiological, and perceptual mechanisms of the auditory system are truly monumental. In addition, his contributions to the comprehension of the mammalian auditory system include not only landmark ideas, but also many of the experimental findings in psychoacoustics and peripheral auditory physiology that constitute the database which has provided a springboard for research in laboratories throughout the world. His efforts to link physics, biology, and psychophysics to create a basis for our understanding of the nervous system have had an influence that extends far beyond the science of acoustics. Although the purpose of this conference was to recognize the many achievements of Professor Zwislocki, the spirit of the participants was to honor him in a manner that best characterized his lifetime dedication to research, that is, to report the results of their own work. Consequently, this volume is first and foremost a compilation of scientific papers in the area of sensory research. Some are reports of recent experiments and some present an overview of research efforts extending from the past up to ongoing work. His influence can be recognized in all of the contributions and some explicitly describe the ties between their own work and the germinal ideas planted by him. This volume, in reflecting the rapid progress being made in sensory science and written by those who are making it, is a fitting tribute to Zwislocki, who always stood at the forefront of his science.

Central Processing of Visual Information A: Integrative Functions and Comparative Data - H. Autrum 2011-11-17 The present volume covers the physiology of the visual system beyond the optic nerve. It is a continuation of the two preceding parts on the photochemistry and the physiology of the eye, and forms a bridge from them to the fourth part on visual psychophysics. These fields have all developed as independent speciali ties and need integrating with each other. The processing of visual information in the brain
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**The Behavioral Significance of Color** - Edward H. Burtt, Jr. 2018-02-19 Prior to publication the study of animal coloration was plagued by fanciful speculations, post hoc explanations and untestable hypotheses. This title, originally published in 1979, draws together widely scattered research into the coloration of animals; formulates predictive hypotheses to account for color; documents the accuracy of many of these hypotheses; and suggests directions for future research. The book grew out of a symposium, The Behavioral Significance of Color at the 1977 meeting of the Animal Behavior Society, and presents evidence concerning patterns of coloration and their influence on animal behaviour and interaction. Physical principles of radiation are discussed in Chapter 1, followed, in subsequent chapters, by an examination of the physiological functions of animal coloration (e.g., thermoregulation, hydroregulation, abrasion-resistance, extraretinal photoreception). Treatment of coloration that affects the animal’s visibility to other animals opens with a masterful overview of theories of color vision and its occurrence throughout the animal kingdom. Chapter 6 explores the role of color vision and fruit color in the selection of food by wild primates with comments on the coevolution of fruiting trees and their primate customers. Dr Jack P. Hallman addresses the elusive concept of conspicuousness. He summarizes a strategy for calculating conspicuous coloration based on measurements in natural habitats. Experiments, naturalistic observations and anecdotes of optical communication are exceedingly numerous. Chapters 8 and 9 review these data and suggest general principles of inter- and intraspecific optical communication. Each chapter is enhanced by the critical evaluations of Drs. C. Richard Tracy and W. J. Hamilton III. In closing, the editor discusses coloration as it affects an animal’s own vision (e.g., black eyelines to reduce glare). Most significantly the book emphasizes the need for a balanced, scientifically rigorous approach to the question of evolution of animal coloration. It is an important source for anyone contemplating or currently involved in research in this field of investigation.

**Neurones Without Impulses** - Alan Roberts 1981-02-05 This book reviews all known examples and considers how neurones can function without impulses.

**The Science of Photobiology** - Kendric C. Smith 2013-03-08 The first edition of The
Science of Photobiology was published in 1977, and was the first textbook to cover all of the major areas of photobiology. The science of photobiology is currently divided into 14 subspecialty areas by the American Society for Photobiology. In this edition, however, the topics of phototechnology and spectroscopy have been combined in a new chapter entitled "Photophysics." The other subspecialty areas remain the same, i.e., Photochemistry, Photosensitization, UV Radiation Effects, Environmental Photobiology, Photomedicine, Circadian Rhythms, Extraretinal Photoreception, Vision, Photomorphogenesis, Photomovement, Photosynthesis, and Bioluminescence. This book has been written as a textbook to introduce the science of photobiology to advanced undergraduate and graduate students. The chapters are written to provide a broad overview of each topic. They are designed to contain the amount of information that might be presented in a one-to two-hour general lecture. The references are not meant to be exhaustive, but key references are included to give students an entry into the literature. Frequently a more recent reference that reviews the literature will be cited rather than the first paper by the author making the original discovery. The chapters are not meant to be a repository of facts for research workers in the field, but rather are concerned with demonstrating the importance of each specialty area of photobiology, and documenting its relevance to current and/or future problems of man.

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Physiologie des Menschen-R.F. Schmidt 2013-12-11

The Visual System in Vertebrates-F. Crescitelli 2013-12-11 The vertebrate eye has been, and continues to be, an object of interest and of inquiry for biologists, physicists, chemists, psychologists, and others. Quite apart from its important role in the development of ophthalmology and related medical disciplines, the vertebrate eye is an exemplar of the
ingenuity of living systems in adapting to the diverse and changing environments in which vertebrates have evolved. The wonder is not so much that the visual system, like other body systems, has been able to adapt in this way, but rather that these adaptations have taken such a variety of forms. In a previous volume in this series (VII/I) Eakin expressed admiration for the diversity of invertebrate photoreceptors. A comparable situation exists for the vertebrate eye as a whole and one object of this volume is to present to the reader the nature of this diversity. One result of this diversification of ocular structures and properties is that the experimental biologist has available a number of systems for study that are unique or especially favorable for the investigation of particular questions in visual science or neurobiology. This volume includes some examples of progress made by the use of such specially selected vertebrate systems. It is our hope that this comparative approach will continue to reveal new and useful preparations for the examination of important questions.

The Biology of Sea Turtles, Volume II-Peter L. Lutz 2002-12-17 The success of the first volume of The Biology of Sea Turtles revealed a need for broad but comprehensive reviews of major recent advances in sea turtle biology. Biology of Sea Turtles, Volume II emphasizes practical aspects of biology that relate to sea turtle management and to changes in marine and coastal ecosystems. These topics i

Science of Vision-K.N. Leibovic 2012-12-06 Converging lines of biological, perceptual and theoretical approaches are brought together in The Science of Vision to give a new perspective on the brain sciences and vision in particular. The book contains contributions from experts in the fields of biophysics, physiology, psychology and computation. While reviewing some basic knowledge, it mainly presents fresh ideas and includes some new results. The topics range from cells through perception to neurocomputing and are treated in depth, taking the specialist to the frontiers of research. At the same time the book is written in a manner understandable to the nonspecialist, in keeping with the multidisciplinary appeal of the subject. A glossary of terms also makes the book easy to read. In our age of specialization, this integrated approach is a welcome addition to the literature which will further interdisciplinary research and shed new light on the vision sciences.

Color Science and Photometry for Lighting with LEDs and Semiconductor Nanocrystals-Talha Erdem 2019-01-18 This book reviews the application of semiconductor nanocrystals also known as colloidal quantum dots (QDs) to LED lighting for indoors and outdoors as well as LED backlighting in displays, summarizing the color science of QDs for lighting and displays and presenting recent developments in QD-integrated LEDs and display research. By employing QDs in color-conversion LEDs, it is possible to simultaneously accomplish successful color rendition of the illuminated objects and a good spectral overlap between the emission spectrum of the light source and the sensitivity of the human eye at a warm white color temperature – something that is fundamentally challenging to achieve with conventional sources, such as incandescent and fluorescent lamps, and phosphor-based LEDs.
**Biology of Perceptual Systems** - Edward Carterette 2012-12-02
Handbook of Perception, Volume III: Biology of Perceptual Systems reviews the literature on the biological aspects of human perception, with emphasis on perceptual systems and elements of sensory physiology. This volume is organized into 19 chapters and begins with a discussion of energy transduction, detection, and discrimination, along with the properties of neurons alone and as conjoined in nets. The focus then shifts to psychogenesis, the relatively new field of ethology, and the natural diversity and evolutionary divergence of sensory systems. The chapters that follow examine the genetics of behavior, the facts and theories about the way in which animals and men construct patterned stimulation of receptors into significant objects, and the structure and function of sensory systems on which vertebrates depend for their construction of the varieties of experience. The book methodically introduces the reader to chemoreception, tasting and smelling, cutaneous mechanoreception (of position, velocity, transients), active texture perception, mechanisms of spatial orientation and of motion in space, thermoreception, vision, and audition. In almost every case the underlying physiological mechanisms are related to the psychophysical or perceptual observations. This book is a valuable resource for psychologists, biologists, and natural scientists, as well as for those who are interested in the biology of human perception.

**Vertebrate Photoreceptor Optics** - Jay M. Enoch 1981

**Neural Engineering** - Bin He 2007-12-31
Reviews and discussions of contemporary and relevant topics by leading investigators, essential for all those wishing to take advantage of the latest and greatest in this emerging field.

**Facets of Vision** - Doekele G. Stavenga 2012-12-06
The papers published in this Volume are the fruits of a symposium held in Regensburg in April 1987. The meeting was held to commemorate two most significant events in the development of compound eye research. In chronological order these are firstly, Sigmund Exner's seminal monograph on the physiology of compound eyes of crustaceans and insects, which was first published in Vienna in 1891, and is now shortly to appear for the first time in the English translation [Exner, S. (1989) The Physiology of the Compound Eyes of Insects and Crustaceans. Springer Berlin Heidelberg New York Tokyo]. Secondly, the meeting was also held in honour of Professor Hansjochem Autrum's 80th birthday. Professor Autrum, who is justly acknowledged as one of the pioneers of modern compound eye research, attended the meeting as the guest of honour. In keeping with these historical occasions, it has been our intention in this volume to present a comprehensive collection of short reviews covering the major aspects of compound eye research. Whilst the most up-to-date developments have been included in every field from optics, through photochemistry, phototransduction, integrative processes and behavior, an attempt has also been made to provide a historical perspective.

**Advances in Structural Biology** - S.K. Malhotra 1998-08-02
Volume 5 in the series Advances in Structural Biology is based upon a selection of articles presented at the Workshop on Molecular Bio-physics of the Cytoskeleton: Microtubule Formation, Structure,
Function, and Interactions (August 18-22 1997 at the Banff Conference Centre in Banff, Alberta, Canada). Its main objective was to review the state-of-the-art of the field and stimulate a multidisciplinary investigation into the molecular biology of the cytoskeleton, which is amply manifested in the articles selected and published in this volume.
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