



## Vision: How It Works and What Can Go Wrong (MIT Press)

By John E. Dowling, Joseph L. Dowling Jr.

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**Vision: How It Works and What Can Go Wrong (MIT Press)** By John E. Dowling, Joseph L. Dowling Jr.

Over the past fifty years, enormous progress has been made in understanding visual mechanisms and treating eye disorders. And yet the scientist is not always aware of the latest clinical advances and the clinician is often not up to date on the basic scientific discoveries. Writing in nontechnical language, John and Joseph Dowling, a neuroscientist and an ophthalmologist, examine vision from both perspectives, providing concise descriptions of basic visual mechanisms and related clinical abnormalities. Thus, an account of the photoreceptors is followed by a consideration of retinitis pigmentosa and macular degeneration; an explanation of the retina's function is followed by details of glaucoma and diabetic retinopathy.

The authors begin with the cornea and lens, which project an image on the light-sensitive elements inside the eye, the photoreceptors, and how that process can be compromised by such disorders as cataracts and corneal disease. They go on to describe, among other things, how the photoreceptors capture light; retinal and visual cortical anatomy and physiology; and higher level visual processing that leads to perception. Cortical disorders such as amblyopia are discussed as well as specific deficits such as the inability to recognize faces, colors, or moving objects. Finally, they survey the evolution of our knowledge of vision, and speculate about future advances.

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## **Editorial Review**

### Review

The brothers John and Joseph Dowling, one a clinician and one a biologist, draw upon their combined expertise to offer a unique and comprehensive description of mechanisms involved in vision and their aberrations in disease. They illustrate that clinical observations provide a fruitful source of research questions that may guide laboratory work, that understanding disease mechanisms is dependent upon knowledge of normal function, and that rational therapeutic approaches to disease demand an understanding of the disease processes.

(Alan C. Bird, MD, Emeritus Professor, Institute of Ophthalmology, University College London)

This book, written by two brothers with complementary clinical and basic science expertise, is a lucid overview of visual processing and clinical disorders of vision. Filled with personal anecdotes, it will be enjoyed by lay readers as well as scientists and clinicians. A fun read, accessible and fascinating.

(John S. Werner, Distinguished Professor of Ophthalmology and Neurobiology, University of California, Davis)

If translational medicine connects the laboratory to the clinic, then this intelligent book must be the first example of *simultaneous* translation, seamlessly melding concepts from the visual sciences and the practice of ophthalmology in a remarkably engaging narrative. It reads like a favorite travel book, bringing new insights to both the expected standards and the hidden corners of lesser-known diseases.

(Leonard A. Levin, MD, PhD, McGill University and University of Wisconsin, coeditor of *Adler's Physiology of the Eye* and *Ocular Disease: Mechanisms and Management*)

...John and Joseph Dowling have turned the trick in their brilliant new book called *Vision: How It Works and What Can Go Wrong*. The Dowlings have tucked basic visual science and clinical ophthalmology into a seamless monograph that reaches from mudpuppy retinas to senile macular degeneration. Written for anyone who has ever enjoyed *Scientific American* or Lewis Thomas's *The Lives of a Cell*, it is also a volume for any molecular biologist who has never heard of amblyopia or any clinician who is unfamiliar with A2E and lysosomes.

(*The FASEB Journal*)

### About the Author

John E. Dowling is Gordon and Llura Gund Research Professor of Neurosciences in the Department of Molecular and Cellular Biology at Harvard University.

Joseph L. Dowling, Jr., is a practicing ophthalmologist and the founder of the Rhode Island Eye Institute.

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