To See or To Perceive? That is the Question

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An Introduction to the Visual System, Second Edition, by Martin J. Tovée. 2008. New York: Cambridge University Press, 222 pp., $130.00 (HB); $49.00 (PB).

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The visual system, especially downstream visual perception processes, is one of relevance to all of us in the neurosciences. Martin Tovee's second edition of *An Introduction to the Visual System* is designed for a broad undergraduate audience, but the text could find a place in any neuropsychologist's or graduate student's library. In his Introduction, Tovee describes the purpose of his book as "to provide a concise, but detailed account of how your visual system is organized and functions to produce visual perception." (pg. 1). Each chapter is concluded by a summary of key points that are very helpful for the reader. These summary points are succinct in their treatment of key ideas from the chapter and also include much of the terminology introduced in that chapter. As a matter of fact, occasionally that summary of key points will have a better definition of a term from the chapter than is given in the chapter itself.

Chapter 1 is an introduction, providing the reader with a brief discussion of brain organization, neuronal connectivity,

and various brain imaging techniques (both structural and functional). Chapter 2 discusses the eye, both the structures of the eye and the functioning of the eye. Beginning here, the author intermixes discussion of anatomical/cellular information (e.g., the way the eye focuses an image) and clinical/behavioral examples of that information (e.g., how a cataract affects the eye's ability to focus). This intermixing occurs throughout the text and is helpful in clarifying understanding of the basic information. Chapter 3 continues the presentation of the functions of the eye, through discussion of color vision. The author includes several color illustrations that demonstrate various deficits in color vision. However, all these illustrations are presented in gray scale in the chapter with the color versions of all illustrations throughout the book grouped together in a section in the middle of the text. Perhaps this was necessary for production purposes, but given the importance of color to illustrations on color vision, it would have been better to have these color illustrations coincide with their discussion in the text.

Chapter 4 moves the discussion of the visual system away from the eye to description of the organization of the visual system and its anatomical features. The author discusses the path from the retina, through the optic chiasm, to the dorsal lateral geniculate nucleus, through the optic radiations, to primary visual cortex. Chapters 5-11 are devoted to discussion of various visual processing topics, such as perception of texture (Chapter 5), the brain's perception of binocular vision (Chapter 6), color constancy (Chapter 7), object recognition (Chapter 8), facial recognition (Chapter 9), perception of motion (Chapter 10), and visual neglect (Chapter 11).

In general, Tovee's treatment of damage to the cells of the eye (e.g., night blindness, color blindness) is thorough and his treatment of higher level visual processing (e.g., facial recognition, motion perception, visual neglect) is also good. The latter discussions of higher-level visual processing would be interesting and helpful for most neuropsychologists and certainly for graduate students. However, he moves very quickly into higher level visual processing. An introductory text could have benefited from a discussion of the visual pathway and the functional deficits that may occur with injury between the eye and the higher cortical structures. Specially, there is very little treatment of the visual fields or injuries that may cause various field cuts. Certainly, it seems that the author's goal is primarily discussion of higher level visual processing, but as an introductory text on the visual system, I would have expected more treatment of the visual pathways.

In summary, with *An Introduction to the Visual System, Second Edition*, the author achieves his goal of providing a concise and introductory level discussion of the visual system and visual processing. The summaries of key points at the end of each chapter are very helpful, and factual presentation of anatomical or cellular mechanisms nicely balances the clinical/behavioral examples. This text will not replace all other texts that detail the visual pathways and describe more basic visual field deficits consequent to injury to the pathways; but the remainder of the visual system and visual processing is well covered in a concise and introductory manner.

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