SENSORY BIOLOGY OF JAWED FISHES: NEW INSIGHTS. B. G. Kapoor and T. J. Hara (eds.). 2001. Science Publishers, Inc., Enfield, New Hampshire. ISBN 1-57808-099-1. 387 p. $119.50 (hardbound).—Over the past few decades, edited volumes in the area of sensory biology of fishes have focused on a single sensory system or modality (e.g., Coombs et al., 1989; Douglas and Djangoz, 1990; Hara, 1992; Möller, 1995; Fay and Popper, 1999; Tricas and Gruber, 2001). In contrast, Sensory Biology of Jawed Fishes: New Insights, composed of 15 chapters contributed by 36 authors from North and South America, Europe, Asia, and Australia, covers some aspects of each of the major sensory systems of fishes: vision, hearing, mechanosensory lateral line, electroreception, olfaction, and taste.

This volume samples the range of themes and approaches encompassed in the field of neuroethology, including the structure and function of sensory receptors, sensory processing in the central nervous system, and behavior, and is likely to serve the neuroethology community well. Each chapter provides a case study or a comprehensive review with extensive and current bibliographic resources with, in some cases, an interesting historical perspective. Some chapters present material on the structural and functional aspects of the sensory biology of “model species” (e.g., eye development in Danio, Salmo, and Poecilia, Kunz, Chapter 1) or other interesting species, as a case study (e.g., visual accommodation in a cichlid, Andison et al., Chapter 4; electroreceptor structure in galeoid sharks, Raschi et al., Chapter 11; and electroreception in catfishes, Peters et al., Chapter 10). Only the chapter on electrogeneration in gymnnotiform fishes discusses the generation of sensory stimuli (Lorenzo et al., Chapter 5). Two chapters cover topics that are novel inclusions in such a volume. Meyer-Rochow (Chapter 12) presents an interesting perspective on chromatophores as sensors of environmental stimuli. Using approaches and methodology from the field of functional morphology, Diogo and Chardon (Chapter 15) report on the structural and functional evolution of the palatine-maxillary system in catfish, which is responsible for barbel motility during chemosensory-mediated food finding behavior.

The visual system is the most extensively covered system in this volume (development in model species, Kunz, Chapter 1; structural diversity, Yew et al., Chapter 2; adaptations in the cornea, Collin and Collin, Chapter 3; accommodation and eye movements, Andison et al., Chapter 4). Although readers might be most familiar with the literature on the gross morphology of the eye, the nature of retinal photoreceptors, and the visual ecology of fishes, Collin and Collin (Chapter 3) discuss the functional significance of variation in corneal structure among fishes inhabiting different visual environments. Each feature of the cornea is reviewed in turn, with extensive references providing a valuable introduction to this important but often overlooked aspect of the visual anatomy of fishes.

Andison et al. (Chapter 4) provide an excellent review of visual accommodation and promote fishes as models for studying the mechanisms underlying this process. They present original experimental work on the oscar (a cichlid, Astronotus ocellatus), using photoretinoscopy, a noninvasive method for studying accommodation in freely swimming fishes. Chapters on electrogeneration (Lorenzo et al., Chapter 5) and detection of electric signals (von der Emde and Schwarz, Chapter 6) overlap somewhat. Chapter 6, in particular, is well written and very informative but is best suited for a reader familiar with electroreception.

Mogdans and Bleckmann (Chapter 7) provide a comprehensive overview of the morphology of the mechanosensory lateral line system. They provide an interesting and well-organized treatment of the nature of hydrodynamic stimuli, and give important consideration to the effects of noise on the ability to detect hydrodynamic stimuli. They also deal with central processing of hydrodynamic stimuli and behavior in realistic contexts and provide an excellent summary of recent work with a consideration of questions that can be used as jumping off points for future investigations. Bretschneider et al. (Chapter 8) discuss both the mechanosensory and auditory systems with a well-written section on the physical nature of sound stimuli and a comparison of how these two mechanosensory systems transduce such stimuli. They discuss the role of the swim bladder in hearing, the way in which different parts of the ear process stimuli.