angular separation speeds of components in superluminal sources and the redshifts of the associated optical objects. The graph (appropriately reproduced on the cover of the book) shows the expected inverse correlation of these two quantities and illustrates their large scatter. It warns us that we are a long way from being able to determine any fundamental cosmological data from the observations at present, although given enough examples of superluminal sources and a better understanding of their behavior, the observations can in principle lead to the value of Hubble's constant. However, it is clear from this workshop that even if this hope is never realized, these sources are well worth studying for their intrinsic interest.

This attractively typeset volume provides an excellent survey of the current situation that will be valuable to all those who work on this subject. In addition, it will be a helpful introduction for both those entering the field and those merely interested in one of the more remarkable phenomena revealed to us by radio astronomy.

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Retinal Function

The Retina. An Approachable Part of the Brain. JOHN E. DOWLING. Belknap (Harvard University Press), Cambridge, MA, 1987. xiv, 282 pp., illus. $37.50.

The retina is our window on the visual world. Packed into its dense network are photoreceptors for transducing light into neuroelectrical signals, interneurons for performing computations on these signals, and ganglion cells for integrating the messages from interneurons and encoding them into sequences of nerve impulses that are sent deep into the brain for more analysis.

The retina takes the optical image formed on the photoreceptors by the cornea and lens and makes it into a neural image of activity across the mosaic of ganglion cells. The optical image is a spatial distribution of light energy, but the neural image is a distribution of impulse rates that represent contrast. Contrast is the local change in light divided by the average light level. The transformation from light to contrast depends upon retinal computations done by photoreceptors and interneurons.

A basic principle of retinal function is parallel processing of signals for brightness, darkness, and color. Some retinal ganglion cells are excited only by positive contrast (brightness) and others only by negative contrast (darkness). Still others respond to color contrast because they receive input from interneurons that subtract signals from two types of cone photoreceptor. Other basic principles of retinal function include temporal filtering, spatial filtering, and adaptation to light.

John Dowling's book is an approachable introduction to the function of the retina. Drawn mostly from his own investigations of the retinas of the monkey, mudpuppy, and skate, it illustrates principles of retinal function with numerous examples of retinal responses and functional connections between neurons. There are interesting chapters on the wiring of the retina, types of neuronal response, synaptic neurotransmitters and neuropharmacology, and visual adaptation and photoreception. There is an intriguing section in the synaptic mechanisms chapter on the neurotransmitter dopamine and its role in decreasing electrical coupling between retinal horizontal cells (a type of retinal interneuron). The book is illustrated profusely with figures of very high quality, especially the electron micrographs in the chapter on the wiring of the retina. There are also well-prepared summary diagrams of retinal cell types and connectivity and an appendix of basic concepts and terms in neurobiology. These features will make the book useful and attractive to students.

Some subjects, for example information processing and photoreception, receive less attention and space than others, like synaptic ultrastructure and neurotransmission. This is presumably the result of the author's decision to write about what interests him most. It makes the book less comprehensive but gives it a personal style that should appeal to many readers.

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Behavioral Evolution

Evolutionary Genetics of Invertebrate Behavior. Progress and Prospects. MILTON DAVIS HUETTEL, Ed. Plenum, New York, 1986. x, 335 pp., illus. $59.50. Based on a colloquium, Gainesville, FL, March 1983.

Despite the lag between conference and publication, this is an important volume and one that I would strongly recommend, especially to students beginning doctoral research in the evolution of behavior whether studying invertebrates or not. The book is organized into five major sections that cover the central concepts as well as the methods of modern behavioral research. Three of these sections are concerned with behavioral variation in natural populations: nonreproductive behavior, courtship and mating, and strategies for the success of progeny. The last two sections address problems in the molecular and biochemical genetics of behavior and theoretical questions concerning behavioral evolution. Many of the authors have taken advantage of the colloquium format to present somewhat more expository discussions of their research than might be contained in the average journal article. On the whole, it is this aspect of the volume that makes it particularly instructive and timely.

Several major themes recur throughout the collection, including territorial and aggregation behavior of spiders, the role of oviposition preferences and habitat choice in host race formation, and the relationship between behavior and speciation. The arachnid studies are surprising in several respects. First, they illustrate the potential of spiders as research tools in behavior genetics and how that potential is being realized. The papers of Reichert, Uetz *et al.*, and Stratton and Uetz and the bibliographies therein are a fairly comprehensive review of behavioral genetic research with this fascinating and relatively abundant group. Second, these three contributions document the existence of significant geographic variation in complex behaviors, such as courtship and territoriality, that are the focus of considerable current research in ecology and evolutionary biology. Questions that are intractable in many species of birds and fish can be answered with spiders. Last, and perhaps most surprising, is the evidence that spiders are fairly tractable subjects for the genetic analysis of behaviors and that at least some of the observed geographic variation has a genetic basis.

Habitat choice and oviposition preference and their relationship to host race formation are addressed in six papers. In particular, the experimental studies by Lofsdahl and Via of the cactophilic *Drosophila* and leafminers, respectively, and the theoretical contribution of Futuyma provide an incisive review of the most important questions involved in host-related divergence of phytophagous insects as well as the most powerful empirical methods for tackling the central issues. McCauley's paper on mating success in milkweed beetles is worthy of special mention because it adapts recent measures of sexual selection to facilitate their application to mark-recapture data, one of the most frequently used ecological tools.

In summary, this collection of papers is a