

Actually, aggregating species according to trophic level doesn't seem like such a useful concept after reading this book.

The final chapter presents arguments for the research centers and makes a plea for collaboration. One has to ask if lumping the diversity of species interactions (trophic dynamics, size efficiency hypothesis, key-stone predator concept, optimal foraging theory, and so on) under the single rubric "complex interactions" has produced a useful conceptual framework for funding future research. There is at least a danger of rejection of research ideas because they cannot cover the range of time and space scales necessary to understand the full range of interactions. The goal of achieving the mechanistic understanding required for adequate prediction is admirable, as is the suggestion that we need to have four sets of research lakes (comparable to oceanographic vessels!) to cover the range of gradients. But we must be aware of the possibility that only one research site will be supported. Given that more restricted situation, certain paradigms could be emphasized at the expense of originality. The artificial and counterproductive concept of top-down vs. bottom-up is but one example.

The workshop was designed to set a future research agenda for aquatic ecology. Therefore I feel driven to comment on the fact that only one woman was included among the 40 invited participants. We should consider the full range of diversity not only in our research but in our colleagues as well.

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Monitoring Brightness

High Speed Astronomical Photometry. BRIAN WARNER. Cambridge University Press, New York, 1988. xii, 291 pp., illus. \$59.50. Cambridge Astrophysics Series.

With the advent of large telescopes and the accompanying sophisticated instrumentation for optical spectroscopic work and infrared technology, the concept of photometry is too often currently labeled as "old-fashioned" or "not important." There are a few private institutions and individuals who have persevered in this field, developing and using instrumentation specifically designed to provide the best measurements of the brightness of rapidly varying sources and accomplishing important scientific results with this technique. Brian Warner is one such individual. Being fortunate to have

access to large amounts of time on small and medium-sized telescopes, he (with his students) has provided the astronomical literature with a wealth of photometric data and interpretation of them. His book is a testimonial to the power and value of high-speed photometry and its wide-ranging applications in astronomy. Throughout, the emphasis is on the astrophysics that has emerged from the data that have been acquired. Warner clearly states the value and uses of the data and comments when they have not been used to full potential (as in the high-time-resolution studies on flare stars and the interpretation of the flickering and quasi-periodic oscillations in cataclysmic variables).

The discussion ranges from good coverage of planetary science (occultations) to a very small section on extragalactic astronomy, with the major emphasis on stars (flare stars, cataclysmic variables, pulsars, and pulsating white dwarfs and non-degenerates). The order is based on the chronology of discoveries, which leads to an easy transition to the direct results following from technical developments. It also results in interesting reading including or excluding the astrophysics involved. For example, the path leading from naked-eye measurements of lunar occultations during the time of Copernicus to the determination of the diameter of Alpha Leo from a 1980 trace obtained with the Kitt Peak 4-meter telescope gives a very clear picture of how far we have come in technique and knowledge. Embedded in this description is a good discussion of the physics behind the fringe patterns and their interpretation.

This same concise but in-depth coverage of the physics involved permeates all the discussion of the interpretation of light variability, starting with effects from the atmosphere (scintillation) and telescope (drive errors) through the determination of the correct periodicities in a data string, including effects of possible biases from the sampling frequency and of beat periods and Doppler shift complications in work on binary stars. The inclusion of the equations based on first principles and the numerous well-done plots of light curves, power spectra, and diagrams will make this book very useful for graduate students or astronomers from other disciplines who want to learn about the techniques, problems, and applications of high-speed photometry. The book will also be a good handbook for established photometrists—I found it useful to be able to compare the flickering in cataclysmic variables with that in x-ray binaries and extragalactic objects with the aid of the detailed light curves given for each system.

The references and discussion are some-

what biased toward work accomplished at the University of Texas, but this can be attributed to the large contributions of astronomers there to the study of occultations and of variable stars following their development of innovative photoelectric systems in the late '60s. The references as a whole provide a good overview of the important work being accomplished in each field.

The dearth of results from two-dimensional detectors is ascribed by Warner to the newness of the technique. I expect that the charged-coupled device detectors will affect photometry in the '90s as photoelectric photometers changed the field in the '70s. This will be especially true for small telescopes (CCD photometry of 20th-magnitude stars can now be accomplished on 36-inch telescopes) and for extragalactic sources. Knowledge of photometric variations at timescales of less than seconds will probably change more slowly pending further improvements. I am confident that Warner's celebration of high-speed photometry will continue into the future. Readers of his book will be motivated to join in the fun of making observations of rapidly varying sources.

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Earth Science and History

The Behavior of the Earth. Continental and Seafloor Mobility. CLAUDE ALLÈGRE. Harvard University Press, Cambridge, MA, 1988. xiv, 272 pp., illus. \$35. Translated from the French by Deborah Kurmes van Dam.

"Scientific theories are like talented artists: once recognized their merits seem so obvious that their success is assumed to be due only to their excellence." So Claude Allègre begins his breezy account of mobility theory and its transformation of the geological sciences. He goes on to note that his "attempt to trace in an uncomplicated manner the evolution of the ideas connected with continental mobility . . . is combined inextricably with the goal of explaining mobilist geology and its essential concepts" and that he has "purposely simplified the work to give it a manageable size, make it accessible to the general reader, and place it in its proper sociological context."

Like most books recounting the history of plate tectonics, this one spans the years from Wegener's original proposal of 1911 through the early 1970s, by which time it was obvious to most that a revolution had occurred. In addition to following the well-