

attest. Victorian custom may have kept many women out of the labor force, may have disenfranchised them, but they were still active outside the home, involved in important public matters.

The editor established four goals for this collection: to "provide a better understanding of the impact of pollution on industrial cities . . . establish the foundation for more comprehensive and speculative historical studies of the urban environment, broaden the study of American environmental history to afford more attention to the cities and urban life, and provide essential background for those individuals grappling with current environmental problems." The collection convincingly accomplishes all four goals, but I am disappointed that the sights weren't set higher, that the essays in the second section weren't more speculative, more analytical.

Although some of the essays end on rather negative notes (for example, the New York Noise Abatement Commission disbanded in 1932 without having a significant impact on noise pollution), the book's underlying message is positive. The response to pollution in the Progressive Era was swift and often successful, especially where public health was involved. Whatever else, the reformers successfully heightened public awareness. Our cities are far more livable today than would have been the case had the public consciousness not been piqued a century ago.

LOUIS P. CAIN

*Department of Economics,
Loyola University,
Chicago, Illinois 60611*

Double Stars

Close Binary Stars. Observations and Interpretation. Papers from a symposium, Toronto, Aug. 1979. MIREK J. PLAVEC, DANIEL M. POPPER, and ROGER K. ULRICH, Eds. Reidel, Boston, 1980 (distributor, Kluwer Boston, Hingham, Mass.). xx, 598 pp., illus. Cloth, \$68.50; paper, \$31.50. International Astronomical Union Symposium No. 88.

This large volume of symposium proceedings contains 104 papers ordered in ten major subject categories. It is clearly not possible to do justice to all of the research on binary stars in one meeting or one book, and the volume does not adequately cover work on cataclysmic variables, x-ray results from the Einstein Observatory, or SS433. It does contain a good representation of current trends in sections on Algols, revisited (again!) with definitive data on masses, and on accretion and mass-loss mechanisms. Sections on "theory," mainly concerning evolution and mass exchange, and on RS Canum Venaticorum stars also seem to me to be particularly worthwhile.

Only 31 of the contributions can be read as complete papers. The rest are generally brief summaries of work in progress or to be published elsewhere and are not really useful without further reading.

The "theory" section contains many new ideas and shows that theoreticians are seriously attempting to come to grips with the observations. This is perhaps a result of the present state of maturity of both theory and observation. Many specific evolutionary scenarios are dealt with in this section, and models of mass transfer and accretion phenomena are dealt with throughout the book. These are clearly the outstanding topics of interest in binary star research today.

The section on RS Canum Venaticorum stars is also stimulating—again perhaps because ideas about star spot models and data are ready for critical comparison. The study of these stars is still in the stage of rapid data accumulation, from x-ray, radio, and high-quality optical observations, and we should expect more exciting developments over the next few years.

A section on contact binaries is somewhat dull by comparison but contains an excellent overview of theory by Shu and a discussion of some exciting new data possibilities by Anderson *et al.* The cataclysmic variables clearly suffer from the proximity in time of IAU colloquium 53, on white dwarfs and variable degenerate stars, but I found the two papers on this subject by Mitrofanov stimulating reading. Other sections tend to be filled with short papers of limited interest, but there are some highlights: good discussions of polarimetric measurements by McLean, Aspin *et al.*, and Simmons *et al.*, of Wolf-Rayet star light-curve analysis by Smith and Theokas, and of Wolf-Rayet star evolution by Vanbeveren and de Loore. Both Andersen *et al.* and Kitamura present sound ideas about fundamental research on binary stars for the 1980's, and Plavec presents his exciting International Ultraviolet Explorer data on a new class of mass-transfer systems, W Serpentis stars. Finally, there are a good brief overview of x-ray binaries by Crampton, an interesting presentation on the symbiotic AG Pegasi by Keyes and Plavec, and an interesting discussion of binaries in globular clusters by Webbink.

The editors are to be thanked for the useful subject and star indexes at the back. The book is reproduced from typescript, and typing errors are fairly numerous; my favorite is the "monotoneous" function on p. 77.

JOHN B. HUTCHINGS

*Dominion Astrophysical Observatory,
Victoria, British Columbia V8X 3X3,
Canada*

Vulpes vulpes

The Red Fox. Symposium on Behaviour and Ecology. Saarbrücken, Germany, Jan. 1979. ERIK ZIMEN, Ed. Junk, The Hague, 1980 (U.S. distributor, Kluwer Boston, Hingham, Mass.). vi, 286 pp., illus. \$73.50. Biogeographica, vol. 18.

Red fox populations in Europe have increased an estimated two- to fourfold since the beginning of this century. The causal factor seems to be primarily a reduction in hunting accompanied by changing land-use practices. The population increase has been most noticeable since World War II and has been paralleled by repeated epidemics of sylvatic rabies. From 1972 through 1976 in 11 Central European countries 63,672 cases of rabies in animals were reported, 82 percent of them being in wildlife. Red foxes accounted for almost 75 percent of all wildlife cases. Studies of rabies epidemiology indicate that only foxes maintain the chain of infection.

Because of the magnitude of the fox-rabies problem, the World Health Organization and the U.N. Food and Agriculture Organization have supported and coordinated a research program on wildlife rabies in Europe for the past ten years. Emphasis has been placed on understanding the epidemiology of rabies, especially as influenced by population ecology and behavior of foxes. It is accounts of these studies on population ecology and behavior that constitute the most interesting sections of this symposium volume.

In addition to an introduction and concluding remarks the book contains a chapter on habitat requirements, one on distribution and history of the fox in Europe, three on food habits, three on population dynamics and ecology, four on behavior, two on relations with other species, and four on rabies. The authors include some of the leading fox researchers in Europe. The chapters on social behavior and population regulation alone make the book worthwhile. MacDonald's behavioral studies represent truly

new knowledge and insights into population regulation. Of special interest are his observations on reproductive suppression at high densities and the resulting hierarchies and on the contributions by nonbreeding females to rearing of the young. Lindström, using some of MacDonald's results, presents a hypothesis to explain population regulation of foxes in Sweden. The essentials of this hypothesis are that a range of regulation exists with food supplies at one end and social factors at the other. In unstable environments where food supplies fluctuate drastically, nutritional factors suppress productivity. In stable environments population density is related to food supply, but the proximate regulating factor is socially induced suppression of reproduction. The theory can also be used to explain variations in sex ratios.

In the introductory chapter the editor points out that the book should not be considered a comprehensive summary of present-day knowledge of the fox but rather a stimulant for further research. The editor is being modest. This book contains exciting information that should be of great interest to students of population ecology, wildlife behavior, and disease relationships. It contains a fairly good summary of fox ecology, but, more important, it presents an excellent approach to the study of population regulation and illustrates the importance of behavior for understanding the ecology of a species.

ERNEST D. ABLES

*College of Forestry, Wildlife
and Range Science, University of Idaho,
Moscow 83843*

Echolocation

Animal Sonar Systems. Papers from a symposium, Jersey, Channel Islands, April 1979. RENÉ-GUY BUSNEL and JAMES F. FISH, Eds. Plenum, New York, 1980. xxiv, 1136 pp., illus. \$75. NATO Advanced Study Institutes Series A, vol. 28.

This volume is the result of a meeting whose participants all work on animal echolocation systems. The papers are much better focused on the subject indicated by the title than is the case with most such volumes, and the overall quality is excellent.

The book is fittingly dedicated to Donald R. Griffin, who, working with bats, pioneered echolocation studies some 45 years ago. Griffin has written the first chapter in the book. It is a revealing and amusing early history of research on an

unknown frontier by two students (Griffin and Robert Galambos). Historical reviews such as this and that by Wood and Evans on echolocation in dolphins serve to remind us that good ideas, persistence, and ingenuity were at one time good substitutes for federal dollars. They also give insight into how discoveries are actually made.

Advances made since a similar group convened in 1966 are summarized, and the literature is brought up to date in a masterly fashion. The Russians are doing a great deal of work in this area, and, though the Russian researchers were unable to attend the conference, one of the major deficiencies in the United States in this field, the lack of examination of the Russian literature, is corrected.

The reports deal primarily with the airborne sonar sounds of bats and the underwater sonar sounds of toothed whales. Other animals that are known to echolocate, such as oil birds and shrews, are dealt with to the extent that they have been studied in this regard. Work on echolocation aids for blind humans is also explored.

One of the more startling chapters is that by Watkins indicating the importance of sperm whale clicks in communication, although clicks are not ruled out as echolocation devices. Recent neurophysiological studies in both bat and cetacean echolocation systems are also of considerable interest. Chapters by McCormick, Wever, Ridgway, and Palin, by Ridgway, by Norris, and by Bullock bring us up to date on auditory processing in toothed whales and indicate kinds of research needed on cetacean brains. Such studies are highly desirable for this group of animals, concerning which myth and fact have become confusingly intermixed. Similar excellent studies of echo-processing in bats are presented by Neuweiler, by Pollack, and by Suga and O'Neill. Sound production mechanisms in odontocete cetaceans have been the subject of much debate and are also handled well.

Throughout the book the reader is confronted with reminders that research on echolocation is much further along with bats than with toothed whales. This is indicative of the higher cost and difficulty of work with marine mammals. For instance, the excellent chapter on ontogeny of echolocation in bats by Brown and Grinnell would probably be impossible to duplicate today for dolphins.

We note that one of the most useful contributions in the book, a bibliography of recent papers in the field, is complicated by the inclusion of some refer-

ences to work on other marine mammals in a section whose heading indicates it is restricted to odontocetes.

The book is large and heavy, and our copy was already coming apart when it arrived. In addition, though it is quite legible, its style and lack of justified margins result in less than excellent visual appeal.

But these are personal preferences, and the book is a necessity to anyone working in the field. Separate indexes by author, species, and subject add much to its usefulness. The editors have done a good job of organizing the papers and getting them into print quickly.

MELBA C. CALDWELL

DAVID K. CALDWELL

*Biocommunication and Marine Mammal
Research Facility, University of Florida,
St. Augustine 32084*

Books Received

Advances in Sex Hormone Research. Vol. 4. J. A. Thomas and R. L. Singhal, Eds. Urban & Schwarzenberg, Baltimore, 1980. xii, 364 pp., illus. \$32.50.

Advances in X-Ray Analysis. Vol. 23. Proceedings of a conference, Denver, July 1979. John R. Rhodes and five others, Eds. Plenum, New York, 1980. xviii, 390 pp., illus. \$45.

Aggression and Behavior Change. Biological and Social Processes. Papers from a conference, Warsaw. Seymour Feshbach and Adam Fraczek, Eds. Praeger, New York, 1979. xiv, 302 pp., illus., \$24.95.

The Aging Nervous System. Gabe J. Maletta and Francis J. Pirozzolo, Eds. Praeger, New York, 1980. vi, 338 pp. \$27.95. *Advances in Neurogerontology*, vol. 1.

Algebra. An Incremental Approach. Vol. 2. John H. Saxon, Jr. Prentice-Hall, Englewood Cliffs, N.J., 1980. xiv, 456 pp., illus. Paper, \$12.95.

Algebraic Coding Theory and Applications. Papers from a school, Udine, Italy. July 1978. G. Longo, Ed. Springer-Verlag, New York, 1979. xii, 528 pp. Paper, \$52.60. International Centre for Mechanical Sciences Courses and Lectures, No. 258.

The Alpine Flora of New Guinea. Vol. 1, General Part. P. Van Royen. Cramer, Braunschweig, 1980. 318 pp., illus. DM 100.

Aspects of the Linear and Magnetic Circular Dichroism of Planar Organic Molecules. Erik Waaben Thulstrup. Springer-Verlag, New York, 1980. vi, 100 pp., illus. Paper, \$14.20. *Lecture Notes in Chemistry*, vol. 14.

Aspects of Slow and Persistent Virus Infections. Proceedings of a workshop, London, Apr. 1979. D. A. J. Tyrrell, Ed. Published for the Commission on the European Communities by Nijhoff, The Hague, 1979 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xii, 286 pp., illus. \$42.10. *New Perspectives in Clinical Microbiology*, vol. 2.

Comparative Psychology. An Evolutionary Analysis of Animal Behavior. M. Ray Denny, Ed. Wiley, New York, 1980. viii, 496 pp., illus. \$20.95.