among the contributions, although it can be interesting to see the range of opinions that exists in this active field. Despite its minor flaws, the book succeeds in summarizing a significant component of our current knowledge about star formation and its consequences on galactic scales. It is important reading for anyone interested in the astrophysics of star formation.

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Worthy Animals

A Functional Biology of Parasitism. Ecological and Evolutionary Implications. GERALD W. ESCH and JACQUELINE C. FERNÁNDEZ. Chapman and Hall, New York, 1993. xiv, 337 pp., illus. $59.95 or £37.50. Functional Biology Series.

For most of us, a walk through the woods or along the creekside reveals the living world as we commonly think about it—the flash of a colorful bird, all the shades of photosynthesis, the near-frantic activity of insects as the day warms up. Through the good graces of biology texts and the Public Broadcasting System, we know that these organisms compete, that their population levels are by no means fixed, and that they are in a continuing adaptive process with a changing environment.

Gerald Esch and Jacqueline Fernández ask us to look again. Dwelling inside (and on) most of these organisms are other populations, other communities. Esch and Fernández write about how the parasites of free-living organisms compete with one another, adapt to their living environments, and endure the predictable insults of immune systems and the vicissitudes of passage from host to host.

Although ecological questions have been asked by parasitologists for decades, their findings have been published in the parasitological literature, where they were largely ignored by ecologists. In recent years, motivated by Peter Price's *Evolutionary Biology of Parasites* (Princeton University Press, 1980), evolutionary ecologists have become excited about the possible impact of parasites on host evolution and ecology, and there has been a noticeable increase in books on host-parasite interactions. Parasites themselves also hold delightful potential as objects of ecological scrutiny—the possibility of replicating entire populations and communities in the field or the laboratory, for instance—and *A Functional Biology of Parasitism* is unique among recently published volumes in broadly addressing that aspect of parasite ecology.

Esch and Fernández fulfill their stated purpose, that the book be useful as a textbook and as a reference. They are careful to introduce parasites clearly in the beginning of the book. The emphasis is on helminths, for these animals have figured prominently in ecological studies. The authors define a number of terms but also challenge some widely held ideas about the inevitable harm associated with parasitism and about parasites' "degeneracy." This is the pattern that can be found throughout the book—instruction, good review, and, sprinkled throughout, questions and observations. Students will find much to think about: Do parasites and hosts transfer genes? What can parasites tell us about host dispersal, now and in times past? Genetically, what constitutes a parasite population? How does the presence of a host as habitat alter our consideration of ecological influences?

Chapter by chapter the authors introduce ecological ideas pertinent to parasite ecology. The choice chapters in this regard, especially from a pedagogic point of view, are the ones in which general concepts of host and parasite population biology are introduced. The authors emphasize the work of Crofton, May, and Anderson and follow their account of it with case histories. The entire book is rich in examples, but in the pages on populations their linkage to theory is especially clear.

In places, the book presents somewhat elementary information for students with ecological or parasitological backgrounds. For instance, fitness and competition are defined (the latter in at least two different chapters), and some life cycles are described in great detail. In other areas, more background is assumed. What this means is that students who have had either ecology or parasitology will feel somewhat challenged at times and comfortable at others—not a bad mix.

Parasite ecology has implications for human health and economics, and the authors do not ignore this. Unfortunately, they often substitute "man" for "human"—a convention that needs to be discarded.

As reference material, the book will also be useful. The chapters on biogeography and communities provide especially thorough reviews of the parasitological literature in these areas. This book does not break a great deal of new ground, nor do the authors claim to do so. It does cover existing ground in a way that will be useful to advanced students and scholars alike.

Early in the book (p. 34), I read, "On being digested from the dragonfly in the frog's stomach, the immature parasites crawl back into the frog's mouth" (where, by the way, they live as adults under the tongue). This is a memorable image, and I wondered briefly if it might not epitomize why many biologists, even now, are more eager to learn about birds than about worms. If so, more's the pity, for an animal that disperses in a swirl of frog feces, asexually multiplies in the hepatopancreas and later the gonads of a snail, then develops sequentially in an aquatic crustacean and its dragonfly predator, and finally executes that remarkable journey to the nether regions of the tongue of *Rana clamitans*—such an animal is worthy of our liveliest curiosity, if not our frank admiration.

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Other Books of Interest

Centennial History of the Geological Society of Washington, 1893–1993. EUGENE C. ROBERTSON, Ed. Geological Society of Washington, Washington, DC, 1993. x, 165 pp., illus. Paper, $10.

In the late 19th century, as was recounted in a paper presented by Philip Pauly at last year's History of Science Society meeting in Washington, the federal workday was short, leaving much time for the development of a vigorous after-hours social and intellectual life among the scientists then congregating to pursue their profession in the capital city. One manifestation of this was the Geological Society of Washington, founded in 1893, 14 years after the U.S. Geological Survey, with the survey's Charles Doolittle Walcott as its first president. As the society has always been principally a discussion forum, leaving few formal publications to document its doings, its current leaders have been moved to produce a centennial volume drawing on the society's own records to offset the lack.

The volume opens with a 30-page general history of the society. Along with a thorough account of the procedures by which the society was established, its rationale is discussed, one motivation apparently having been to "restore morale to members of the Geological Survey," which had recently suffered setbacks. The remaining narrative gives information about the character and content of the society's meetings and its relations with other local organizations, most notably the Geological Survey, the Carnegie Institution of Washington, and the Cosmos Club but also including the Pick and

Hammer Club, membership in which was (until its own founders aged) confined to the young, lest "older men . . . infect the meetings with solemnity and repress fearless discussion." That bonhomie has been a feature of the society in recent years is indicated in a number of ways, but most directly by an account of the Sleeping Bear Award, bestowed annually for deeds or words of "genuine good humor" by an anonymous committee whose members "lurk in the audience throughout the year, ever alert for humor, bon mots, grumbles, flatulence, or whatever." Some of this lightening up is attributed to the increased participation of women, who have always been represented in the membership and now constitute about a quarter of it.

The general history of the society having been set forth, the largest part of the book is given over to a series of page-and-a-half biographies, with photographs, of 40 founders and early members, arranged alphabetically from Marcus Baker to Bailey Willis and including the luminaries Grove Karl Gilbert and John Wesley Powell. These are followed by one-paragraph accounts of 55 "significant talks" that have been given at the society's meetings, beginning with an 1896 discussion, presumably involving T. W. Stanton and F. H. Knowlton, of problems of subdividing geological time and ending with Walter Alvarez on the "terminal Cretaceous event" (1990) and Wayne C. Shanks on sulfide deposits in the Escanaba trough (1991). Full lists of officers, awards, and presidential addresses, along with financial and attendance data, round out the history.

—Katherine Livingston

Frontiers of Science. Reports from the Final International Session of the Moscow Refusnik Seminar. YURI B. CHERNYAK and JOEL L. LEBOWITZ, Eds. New York Academy of Sciences, New York, 1992. xxvi, 371 pp., illus. Paper, $90. Annals of the New York Academy of Sciences, vol. 661.

This volume, Joel Lebowitz notes in his foreword, marks a happy end, that of the Moscow Sunday Refusnik Seminar. Since 1973 a group of scientist refusniks (persons who had made open their dissatisfaction with the Soviet regime by applying for permission to emigrate) had been meeting in Moscow apartments to pursue their interest in science both for its own sake and as a means of promoting freedom in Soviet society. In 1989 members of the group began to be informed that "the circumstances preventing your family from leaving the USSR have expired," and within a year or so most had departed, thus ending the informal institution. Sympathetic Western visitors attended the seminar over the years, and five previous volumes of proceedings of its "international sessions" have appeared among the *Annals* of the New York Academy of Sciences. Other volumes have included some recountings of the hardships its Soviet participants faced, but this one is distinguished by a retrospective account of the seminar as a whole, provided by Yuri Chernyak, one of its leaders. In addition to describing the fundamental goals and outlining the progress of the seminar—"probably the first independent group activity in the USSR that was not kept underground and that the authorities eventually failed to stop"—Chernyak tells some anecdotes from its history. One involves the deployment of a "young, pink-cheeked" policeman "confident in his power to stop any hoodlum" in an attempt to remove KGB officers who were blocking access to the seminar. Others have to do with the transport of manuscripts and books to and from the West. Among the imports were two personal computers that enabled the seminar members, who included many computer scientists, not only to offer courses in programming but to correct official lists that greatly underestimated the numbers of refusniks. In another general paper, Jørgen Bennedsen *et al.* describe the 1988 visit of a Scandinavian delegation to the seminar. As to the technical content of the volume, six papers each appear under the headings Physical Sciences, Mathematics and Computer Science, and Biology, Chemistry, and Biophysics. A sampling of titles includes "Mach's principle, inflation, antiinflation" (B. L. Altschuler), "Type III Padé approximants: applications to physical problems" (V. M. Krasnopol'sky), "Two classes of inverse problems for partial differential equations" (M. V. Klibanov), "A method of quasi-periodic stochastic process analysis" (E. Reznikov), "Active clusters and concentration-effect dependencies for biologically active substances" (S. Bushelev), and "Interpretation of a model for a DDT-treated population of *Ixodes persulcatus*" (I. Uspensky *et al.*). A fourth section, headed Miscellaneous, is largely given over to a series of five papers by Chernyak, A. I. Leonov, and A. Y. Lerner outlining a "constructive theory of human behavior," and 16 poster papers end the volume.

—Katherine Livingston

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Books Received

Acoustics of American English Speech. A Dynamic Approach. Joseph P. Olive, Alice Greenwood, and John Coleman. Springer-Verlag, New York, 1993. x, 396 pp., illus. $59.

Bacterial Growth and Lysis. Metabolism and Structure of the Bacterial Sacculus. M. A. de Pedro, J.-V. Höltje, and W. Löffelhardt, Eds. Plenum, New York, 1993. xii, 474 pp., illus. $115. Federation of European Microbiological Societies Symposium no. 65. From a symposium, Mallorca, Spain, April 1992.

Chaos in Dynamical Systems. Edward Ott. Cambridge University Press, New York, 1993. xii, 385 pp., illus. $69.95; paper, $29.95.

The Dictionary of Geographical Literacy. The Complete Geography Reference. Kieran O'Mahony. EduCare, Seattle, WA, 1993. viii, 374 pp., illus. Paper, $19.95.

Electronics, Noise and Signal Recovery. E. R. Davies. Academic, San Diego, CA, 1993. xx, 346 pp., illus. Paper, $24.95. Microelectronics and Signal Processing, 10.

The Fractured Marketplace for Standardized Testing. Walter M. Haney, George F. Madaus, and Robert Lyons. Kluwer, Norwell, MA, 1993. xiv, 347 pp., illus. $59.95, P46.50, or Dfl.130. Evaluation in Education and Human Services.

Guidance and Control 1993. Robert D. Culp and George Bickley, Eds. Published for American Astronautical Society by Univelt, San Diego, CA, 1993. xviii, 630 pp., illus. $120; paper, $90. Advances in Astronautical Sciences, vol. 81. From a conference, Keystone, CO, Feb. 1993.

Handbook of Affinity Chromatography. Toni Kline, Ed. Dekker, New York, 1993. viii, 332 pp., illus. $135. Chromatographic Science Series, 63.

Isotonic Transport in Leaky Epithelia. Hans H. Ussing *et al.*, Eds. Munksgaard, Copenhagen, 1993. 519 pp., illus. DKr450. Alfred Benzon Symposium Series, no. 34. From a symposium, Copenhagen, June 1992.

Language and Communication. Comparative Perspectives. Herbert L. Roitblat, Louis M. Herman, and Paul E. Nachtigall, Eds. Erlbaum, Hillsdale, NJ, 1993. xvi, 502 pp., illus. $89.95; paper, $39.95. Comparative Cognition and Neuroscience.

The Mammalian Cochlear Nuclei. Organization and Function. Miguel A. Merchán *et al.*, Eds. Plenum, New York, 1993. xiv, 517 pp., illus., + plate. $125.

Management and Biology of Carcinoma in situ and Cancer of the Testis. Niels E. Skakkebak *et al.*, Eds. Karger, New York, 1993. iv, 256 pp., illus. $60. From a workshop, Copenhagen, Nov. 1992. Reprint of *European Urology*, vol. 23, no. 1 (1993). NATO Advanced Science Institutes Series A, vol. 239. From a workshop, Salamanca, Spain, Sept. 1991.

El Niño. Historical and Paleoclimatic Aspects of the Southern Oscillation. Henry F. Diaz and Vera Markgraf, Eds. Cambridge University Press, New York, 1993. xiv, 476 pp., illus. $69.95.

Optimal Control and the Calculus of Variations. Enid R. Pinch. Oxford University Press, New York, 1993. viii, 234 pp., illus. $49.95.

Paleomagnetism of the Atlantic, Tethys and Iapetus Oceans. Rob Van der Voo. Cambridge University Press, New York, 1993. x, 411 pp., illus. $89.95.

The Rise and Fall of the Fifth Force. Discovery, Pursuit, and Justification in Modern Physics. Allan Franklin. American Institute of Physics, New York, 1993. viii, 141 pp., illus. $29.95.

Satellite Communication Systems Design. Sebastiano Tirró, Ed. Plenum, New York, 1993. xxx, 837 pp., illus. $110.

Through a Universe Darkly. A Cosmic Tale of Ancient Ethers, Dark Matter, and the Fate of the Universe. Marcia Bartusiak. HarperCollins, New York, 1993. xvi, 383 pp., illus. $27.50.

The Uruk World System. The Dynamics of Expansion of Early Mesopotamian Civilization. Guillermo Algaze. University of Chicago Press, Chicago, 1993. xii, 162 pp., illus. $39.95.

The Vascular Flora of Pennsylvania. Annotated Checklist and Atlas. Ann Fowler Rhoads and William McKinley Klein, Jr. Janet E. Klein, illustrator. American Philosophical Society, Philadelphia, 1993. vi, 636 pp., illus. $50. American Philosophical Society Memoir Series, vol. 207.

The World Treasury of Physics, Astronomy, and Mathematics. Timothy Ferris, Ed. Little Brown, New York, 1993. xvi, 859 pp., illus. Paper, $17.95. Reprint, 1991 ed.

Wetlands. William J. Mitsch and James G. Gosselink. 2nd ed. Van Nostrand Reinhold, New York, 1993. xiv, 722 pp., illus. $59.95.