

MISCELLANEOUS

Bull's Eye: Unraveling the Medical Mystery of Lyme Disease

By Jonathan A. Edlow. Second Edition, 2004. Yale University Press, New Haven and London. 304 pages. U.S.\$29.95 Paper.

There have been few newly-emerging infectious diseases that have generated as much controversy as to their etiology and treatment as Lyme disease. From the "conventional" viewpoint, the disease is easily and accurately diagnosed, and short-term antibiotic treatment is effective; in the "alternative" point of view, the diagnosis of late-presenting cases is often missed due to inaccurate diagnostic tests, and long-term antibiotic treatment of such cases is necessary for a cure. This readable book gives a fair and balanced account of the differing points of view of these two camps. It covers the history of the discovery of Lyme disease, the elucidation of its causative agent, and the development of diagnostic tests and of treatments for the disease.

The disease was first recognized in North America when, around 1975, doctors at the Yale University School of Medicine noticed a new array of symptoms in patients from the area of Lyme, Connecticut. These symptoms consisted of a growing, ring-shaped rash (the bull's-eye) at the site of a tick bite, and swollen joints. Sometimes the rash and the arthritis had appeared without the patient's being aware of a tick bite.

The author, Jonathan Edlow, M.D., is Vice-Chairman of the Department of Emergency Medicine, Beth Israel Deaconess Medical Center, and Assistant Professor of Medicine, Harvard Medical School. He himself describes the book as "a medical detective story" that flowed from a combination of his interest in infectious diseases, and the fact that relatives of his who had moved to the Lyme area in the 1980s were stricken with symptoms of a bizarre arthritis, and/or rashes following tick bites.

The author starts with a detailed and interesting account of how, in the 1970s, residents of the Lyme area were experiencing a baffling array of physical symptoms, including rashes, unexplained neurological symptoms and swollen joints, that eluded diagnosis by their family doctors. Then two women, who together with their families and neighbours, had been ill for several years, were separately urged by their doctors to visit the Rheumatology Clinic at the Yale School of Medicine in New Haven. After hearing their stories, the doctors at the clinic realized that about thirty-five cases clustered in the Lyme area were presenting similar

symptoms, and that an investigation into "what was happening at Lyme" was required. At the same time, U.S. Navy doctors at the nearby base in Groton, Connecticut, observed several patients with ring-shaped rashes which spread over a large area. Their case report in *The Journal of the American Medical Association* (JAMA), was read by a family doctor at the eastern end of Long Island who had patients with tick bites surrounded by a rash, who thought that his patients might have the same disease. He realized it was similar to a disease that had been recognized in Europe since 1910 as erythema migrans (EM). In the European reports, the disease was associated with tick bites and thought to have a spirochaete as the causative agent.

Having set the scene, the author describes the isolation of this causative agent by Willy Burgdorfer at the Rocky Mountain Laboratories, U.S. Public Health Service, who demonstrated that a spirochaete found in the deer tick, *Ixodes scapularis*, caused Lyme disease. The organism was later named *Borrelia burgdorferi* in his honour. But this tick can carry other pathogens (e.g., *Babesia* spp.) causing a co-infection in some patients, complicating both diagnosis and treatment. He further describes how, over time, a definite schism arose between the two groups of doctors maintaining the differing viewpoints mentioned. Patient advocacy groups arose who mainly supported the "alternative" position and, in 1993, a U.S. Senate Committee held hearings on the subject. The author sums up the current position by saying that debate remains about the best way to diagnose the disease, the utility of long-term antibiotic treatment, and the safety of a vaccine.

A drawback in the author's style arises when he uses analogies to try to explain scientific concepts. One example is that of a five-page description (complete with 5 Tables!) of the separation of peaches, apples, oranges and nectarines by machine, in an attempt to explain the meaning of the terms *sensitivity* and *specificity* in assessing the accuracy of laboratory tests. The result is confusion.

Appendix A lists the symptoms of Lyme disease, Appendix B lists tick-borne diseases in humans and animals. The book does not have a bibliography but, following the appendices, gives a list of sources for each chapter.

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The Importance of Species: Perspective on Expendability and Triage

Edited by Peter Kareiva and Simon A. Levin. Princeton University Press, 41 William Street, Princeton, New Jersey 08540. 427 pages. U.S.\$53.00 Paper.

The ecological impact of the economic system we subscribe to could be viewed as the largest of all pos-

sible species removal experiments. Unfortunately for us, this experiment is unreplicable—we only get one shot at it. From the mid-point things don't look good. When the consequences of our personal actions and public policies are compared to the cataclysmic impact

of an asteroid (we are in the midst of the sixth and greatest wave of extinctions on the planet after all) you know we're in trouble. Still, the overwhelming number of species facing imminent elimination has lead some to ask if we need to protect *every* one? Surely of the millions of species we "share" Earth with there must be a few that we could afford to lose? Especially considering the expense and inconvenience of conservation programs.

"The importance of species" sets out to answer that question. Or at least to summarize the collective experiences of the ecological community in examining the idea of species expendability. The initial impetus for this volume came from a symposium to honour the accomplishments of Robert Paine. Dr. Paine's pioneering work on the importance of species began nearly 40 years ago. His investigations were based on a simple idea: if you want to understand the role of a particular species in a community, remove it and see what happens. He works primarily in rocky inter-tidal zones. It was there he discovered that some species are absolutely critical to that ecosystem: remove one of these "keystones" and the community collapses. This conclusion has since been reached by many other ecologists working in different systems, and the book provides a nice introduction to their work. However, while keystone species have been identified in a variety of settings, their redundant counterparts have been harder to locate.

The strength of this book lies in the diversity of voices that converge on a few common conclusions. The most critical outcome of a great deal of research is the recognition that identifying truly redundant species is an extremely difficult and perhaps impossible task. Each paper presents new obstacles. Louda and Rand present a particularly nasty problem in the first chapter. Native thistles of the Great Plains may initially appear to be expendable as a direct result of their being essential! They argue that the native thistles serve to inoculate the community against the invasion of their exotic relatives. The presence of the native thistles supports populations of herbivorous insects which readily switch to feeding on exotic thistle species that have been introduced to the region. In areas where this has been most successful the exotic thistles have been almost completely excluded from the community. Under these conditions the exotic thistles do not appear to pose a serious threat to the community, so the value of the native thistles is not readily apparent.

More generally, the environmental context may determine the relative importance of a species in a community. A keystone predator at one location may have negligible influence at another (Chapter 2). Similarly, the influence of a species may vary greatly over time (Chapter 3). Think of a herbivorous insect that spends nine years in small, widely scattered populations of minor importance, only to erupt in the tenth year to devastate thousands of hectares of forest (and feed

millions of birds...). At a broader temporal scale, Stephen Palumbi (Chapter 15) notes that important ecological associations can evolve rapidly. A species that is redundant now may become an important component of its ecosystem in a few decades. The blink of an eye in evolutionary terms, but an eon measured in funding cycles. Taking a different approach Daniel Simberloff (Chapter 11) examines the impacts of the extinctions or near-extinctions of species one could reasonably assume to be important community members (i.e., American Chestnut, American Elm, Bison etc.). He reveals two related challenges: we have very little data to objectively assess the impacts of these losses, and there is no agreement on what constitutes a significant "ecosystem consequence".

As you would expect from a book with 28 authors the treatment is a little uneven. Given the emphasis on detailed natural history knowledge that many authors present as critical to the question, I was not convinced of the value of theoretical models in predicting which species are expendable. Shahid Naem's (Chapter 6) discussion of ecosystem reliability models starts from the assumption that species are interchangeable, effectively sidestepping the entire issue.

The most troubling essay is perhaps the most important one in evaluating the concept of expendability. Mary Ruckelshaus, Paul McElhany, and Michael Ford collaborate in reviewing their efforts to conserve Pacific salmon species as part of the American National Marine Fisheries Service. Given that five of six of these presumably economically important species are threatened or endangered, you might expect they would approach their task with the objective of maximizing the viability of the various stocks. On the contrary, they outline the process they followed in determining how many more populations they can afford to lose. This is a chilling glimpse of the possible future of conservation biology. The emphasis is not on how best to protect and enhance our biological heritage. Rather, conservation goals are set in a manner that minimizes their impact on economic objectives.

Egbert Leigh's contribution, "Social conflict, biological ignorance, and trying to agree which species are expendable" (chapter 12) provides an insightful review of the entire debate. He identifies a critical need for basic natural history research if we are to have any hope of understanding the relative importance of individual species. More importantly, he reminds us "that social conflict, whether latent or blatant, is the biggest single obstacle to sound conservation. Suppose for a moment that we were Laplacean demons, able to assess the ecological consequences of each and every extinction. Would this circumstance really cause society to close ranks behind conservation? As the world seems organized to destroy any sense of community among human beings, a greater knowledge of biology is not likely to make it easier for society to agree on conservation policy." Leigh reinforces the value of natural

history in dealing with biological issues, while properly identifying the question of species expendability as part of a larger social problem.

This is an important book, and deserves the critical attention of conservation biologists. In an age when we are pressured to apply a business model to all aspects of our society, it is important to examine the consequences in a rigorous way. The essays in this book

allow us to do that. The motivation behind identifying redundant species is that it would allow us to maximize the bang per conservation buck. However, cost-benefit analysis is of very limited value when you cannot quantify either costs or benefits.

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Zoology

***Common Birds of Ontario.** By D. Sept. 2004. Calypso Publishing, Box 1141, Sechelt, British Columbia V0N 3A0. 93 pages, Can. \$12.95.

†**Birding in Venezuela** (revised edition). By M. Goodwin. 2004 Lynx Edicions Barcelona Spain. 332 pages, U.S.\$25.60 Paper.

Birds of the Middle East (Reprint of 1996 edition). By R. Porter, S. Christensen and P. Schiermacker-Hansen. 2004. Princeton University Press, 41 William Street, Princeton, New Jersey, USA, 08540-5237. 480 pages, U.S.\$35. Paper, U.S.\$65 Cloth.

†**Bumblebee Economics** (2nd Edition). By B. Heinrich. 2004. Harvard University Press, 79 Garden Street, Cambridge, Massachusetts 02138 USA. 245 pages, U.S.\$19.95 Paper.

***Damselflies of Alberta – Flying Neon Toothpicks in the Grass.** By John Acorn. 2004. University of Alberta Press, Ring House 2, Edmonton, Alberta T6G 2E1 Can. \$29.95.

Experimental Approaches to Conservation Biology. Edited by M. S. Gordon and S. M. Bartol 2004. University of California Press, 2120 Berkeley Way, Berkeley, California 94704-1012. 358 pages, U.S.\$75.

***Frogs of Australia.** By J. Turner. 2004. Pensoft Publishers. Acad. G. Bonchev Str., Bl. 6, 1113 Sofia, Bulgaria. 276 pages, Eur 34.50 Cloth.

***How the Earthquake Bird got its name and Other Tales of an Unbalanced Nature.** By H. Shugart. 2005. Yale University Press, P.O. Box 209040, New Haven, Connecticut 06520-9040. 227 pages, U.S. \$30. Cloth.

Hummingbirds. By L. Aziz. 2004. Firefly Books Ltd., 3680 Victoria Park Avenue, Toronto. 64 pages, Can. \$9.95. Paper.

***Mammals of Australia.** By J. Turner. 2004. Pensoft Publishers. Acad. G. Bonchev Str., Bl. 6, 1113 Sofia, Bulgaria. 216 pages, Eur 38.50 Cloth.

***The Peregrine Falcon Survey in Canada.** Edited by U. Banasch and G. Holroyd. 2004. Canadian Wildlife Service 4999 – 98 Ave., Edmonton, Alberta T6X 2X3 Canada. No price available.

Seabirds: a natural history. By A. Gaston. 2004. Yale University Press, Box 209040, New Haven, Connecticut 06520. 224 pages, U.S.\$45.00.

***Spiders of Australia.** By T. Hawkeswood. 2004. Pensoft Publishers. Acad. G. Bonchev Str., Bl. 6, 1113 Sofia, Bulgaria. 264 pages, Eur 34.95 Cloth.

***Venomous Reptiles of the Western Hemisphere.** By J. Campbell and W. Lamar. 2004. Cornell University Press, 512 East State Street, Ithaca, New York 14850. 1032 pages (2 volumes), U.S.\$149.95.

***Whales and Dolphins of the World.** By M. Simmonds. 2004. The MIT Press, Five Cambridge Centre, Cambridge, Massachusetts 02142. 160 pages, U.S.\$29.95 Cloth.

Botany

Atlas of Plants of Nunavik Villages. By M. Blondeau and C. Roy. 2004. Editions Multimondes, 930 rue Pouliot, Sainte-Foy, Quebec G1V 3N9. Can. \$34.95.

***Boreal Forest of Canada and Russia.** By W. Pruitt and L. Baskin. 2004. Russian Academy of Science, Leninsky pr., 33, Moscow V-71, Russia. 163 pages, Price not known.

†**Flower Chronicles** (reprinted). By E. B. Hollingsworth. 2004 (original 1958). University of Chicago Press, 1427 East 60th Street, Chicago, Illinois 60637. 300 pages, U.S.\$16.

***Gathering Moss – A Natural and Cultural History of Mosses.** By R. Kimmerer. 2004. Oregon State University Press, 102 Adams Hall, Corvallis, Oregon 97331. 176 pages, U.S.\$17.95 Paper.

Environment

***Experimental Approches to Conservation Biology.** Edited by M. Gordon and S. Bariol 2004 University of California Press. 343 pages, not illus. U.S.\$?

†**Rendevous with the Wild – The Boreal Forest.** Edited by J. Raffan (ed). 2004. BostonMills Press – Firefly Books Ltd., 3680 Victoria Park Avenue, Toronto, Ontario M2H 3K1 188 pages, Can. \$39.95

Miscellaneous

The New Amateur Naturalist. By Nick Baker. 2004. Harper Collins HarperCollins Publishers Ltd., Bloor Street East, 20th Floor, Toronto, Ontario M4W 1A8. 288 pages, £14.99 – approx. U.S.\$38 Cloth.

Wildlife Spectacles. By Russell A. Mittermeier et al. 2004. Conservation International 1919 M Street, NW Suite 600, Washington, DC 20036. 324 pages, £39.50 – approx. U.S.\$74.