NEW TITLES

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A Scientist's Coming of Age in the Computerized Era

Strange Encounters: Adventures of a Renegade Naturalist. Daniel B. Botkin. Tarcher/Putnam, New York, 2003. 272 pp. $24.95 (ISBN 1585422630 paper).

Most "good" science revolves around seeking answers to what so often appear to be fairly basic questions. Scientists are driven by the very questions that inspire their work, yet the answers lead more often to further questions than to satisfaction of the investigator's curiosity. *Strange Encounters: Adventures of a Renegade Naturalist* recounts the experiences of Daniel Botkin, a research scientist at the University of California in Santa Barbara and president of the Center for the Study of the Environment. In this delightful book, Botkin takes the reader on a journey through the elaborate process of discovery, drawing on nearly 30 years of fieldwork around the world.

Unlike many other tales spun by "renegade" naturalists, *Strange Encounters* is a down-to-earth and readable account of the author's lessons learned, from the dawn of modern ecology to the present. It takes readers from the precomputer era to the age of supercomputers, and from radioactive forests in Long Island to the heart of the Amazon Basin. Along the way, Botkin stops to reminisce and ruminate on a few pressing questions, which become the focus of the book. Each chapter presents a separate story with its own lessons, some of which change and some of which are developed further as the book progresses. The presentation of the story line resembles that of a fable: Each chapter carries a small message that can be applied to issues well beyond the scope of the story.

The sequence of the book is roughly chronological, beginning with the dawn of the new field of ecology (with some detail as to how people actually got along without computers). After briefly reflecting on how to arrive at a fair market value for a whorehouse in the wilderness of Idaho, Botkin begins his story in the radioactive forest of Brookhaven National Laboratory on Long Island, New York. "This was my introduction to the world of post-Sputnik, highly funded, high-technology scientific research," Botkin recalls. This later becomes a theme that informs the rest of the book. Another theme emerges while the author is repairing an old mill in New England, one that will be traced through nearly each chapter: old versus new. The author refers repeatedly to his awe of technological advances, and to the disparity between the functional beauty of 19th-century technology and the glamour of 20th-century technology.

The beauty of *Strange Encounters* lies in the simplicity and readability of the text. The content will be comprehensible to most readers and does not require a scientific background. Each chapter presents small lessons in physics, geology, and natural history, and each landscape is depicted in simple and definable terms. The would-be adventure stories of Africa, Amazonia, Costa Rica, and other locations around the planet will appeal to readers who are inquisitive but have little interest in travel guides. That is, the adventure lies more in the science lessons and take-away messages than in the author's journeys. In fact, the chapter entitled "Lost in an African Wilderness" has more to do with New England than it does the Serengeti, yet, as in most of the chapters, the take-home message is universal. In some cases, however, it seems as though content and story line are lost to plugs for physics and efforts to tie in each chapter with the sometimes-redundant underlying themes that trace and bind the stories into a more or less cohesive structure.

The morals of the stories—the lessons—are an essential element of the book, but at times those lessons overwhelm the plot. The story line of the book is at times confusing, and the facts and details often seem dilute and overly simplistic. I was often left craving more detail, more substance. I wanted to know what the author was thinking and feeling more than I wanted to know why, for example, "the search for the amazing triple-canopy rain forest" (in the chapter with that title) is about how policy and myth often conflict with each other. Having had some experience in the rainforest canopy, I had hoped for more of the details that make this three-dimensional realm so fascinating; I found instead an unresolved search for definition.

On the other hand, I was delighted to find the answers to some of science's more elusive questions: How many leaves are on a tree? Is it okay to let your dog drink from the toilet? In addition, readers will be delighted to learn of attempts to answer other intriguing riddles, such as how many hours a whale sleeps, how much food an elephant eats, and how many bowhead whales ever lived on Earth. Each of these seemingly basic questions is its own chapter and, as one might expect, each tells the tale of how an inquisitive naturalist went about answering it—or failing to answer it. Each question also offers insight as to why anyone would care, and shows that the answers are seldom what one would expect.

Strange Encounters will interest a broad audience with a diversity of backgrounds. One need not be a scientist to follow the content and glean lessons from Botkin's book; instead, readers are treated to a simplified account of how one scientist pursued his calling, from the cold war era to the computer revolution, and what he discovered in the process. Sometimes humorous, witty, and weird, the stories allow opportunities for one to learn and to become engaged in the trials and tribulations of a renegade scientist. This very readable book offers a comforting perspective through its numerous lessons taught along the way.

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A MODERN, ENVIRONMENTAL JEREMIAH

Plan B: Rescuing a Planet under Stress and a Civilization in Trouble. Lester R. Brown. W. W. Norton, New York, 2003. 285 pp., illus. $15.95 (ISBN 0393325237 paper).

It is the prophet Jeremiah—that archetype of doomsayers—from whose name is derived the term *jeremiad*, a tale of woe. Lester Brown, in *Plan B: Rescuing a Planet under Stress and a Civilization in Trouble*, offers such a tale of woe (plan A) but also some hope for salvation (plan B). Brown maintains that under plan A, today's status quo, the planet faces four key threats—water shortage; land degradation; global warming; and the social ills of poverty, disease, and illiteracy—that could well prove our undoing. Collectively, these will burst the "food bubble" in which food production is artificially inflated as a result of overconsumption of Earth's natural resources. The barometer of the severity of the world's food shortage will be China, as its grain harvests decrease.

Brown sees the "world incurring a vast water deficit—one that is largely invisible, historically recent, and growing fast" (p. 23). Citing falling water tables, rivers running dry, and the increased diversion of irrigation water to urban and industrial needs, he warns that food supplies in China, India, Pakistan, and Mexico are especially vulnerable, given their high dependence on irrigated crops. Moreover, Brown writes, "perhaps a third or more of...[the] world's cropland...is losing topsoil through erosion faster than new soil is forming, thereby reducing the land's inherent productivity. Where losses are heavy, productive land turns into wasteland or desert" (p. 43). Productive cropland also is giving way to cities and highways, and as the human population grows, there is less and less cropland per capita, a situation that would be exacerbated by global warming. Brown suggests that "the detrimental effects of higher temperatures on yields appear to be overriding the CO_2 fertilization effect for the major crops" (p. 2). Mountain snowpacks that provide summer irrigation water will be reduced, coastal croplands will be lost to rising sea level, and an increasing number of storms will compromise agriculture and its infrastructure. Finally, Brown describes a socially polarized world in terms of life expectancy, disease (especially HIV), poverty, hunger, and illiteracy, all linked to population growth.

These ills he sees as collectively accelerating environmental decline, spreading hunger, and fomenting unrest, creating streams of environmental refugees. Population pressure and a dearth of land will fuel conflicts within and between countries: "One of the biggest risks in this new century is that governments will be overwhelmed by the new challenges that are now emerging.... Worn out by the struggles to deal with the consequences of fast-multiplying human numbers, they are unable to respond to new threats, such as the HIV epidemic, aquifer depletion, and land hunger" (p. 108).

Plan B, the alternative to plan A, entails boosting water and land productivity, cutting carbon emissions in half, and responding to the social challenge of poverty and disease. Brown's book is packed with sensible imperatives illustrated with case examples: Improve water productivity through realistic prices, better irrigation practices, rainwater harvesting, and greater off-farm water efficiency. With respect to land productivity, traditional breeding and feeding approaches have reached their limits and biotechnology holds little promise; therefore, Brown argues, multiple cropping, agroforestry, aquaculture, restored animal grazing and residue consumption, and curtailment of erosion must be pursued. Cutting carbon emissions requires a trinity of measures: energy efficiency, more conscientious use of renewables, and inauguration of a hydrogen economy. The key to addressing social challenges is slowing population growth—accelerating the shift to smaller families through universal education, good nutrition, and prevention of infectious diseases. Accomplishing all this requires both massive government mobilization, particularly in the United States, and "rapid systemic change—change based on market signals that tell the ecological truth" (p. 199).

So besides fairly summarizing its content, how can a middle-of-the-road scientist review this book? One approach is to scour the text for illustrations of the one-sided nature of the data provided. For example, Brown illustrates falling water tables thus: "In the United States, the USDA reports that in parts of Texas, Oklahoma, and Kansas—three leading grain-producing states—the underground water table has dropped by more than 30 meters (100 feet)" (p. 29). Kansas caught the eye of this reviewer, for in a recently completed study in which I participated, Kansas State University colleagues concluded that "irrigators have adopted water saving practices and their groundwater use has declined. The rate of change in mean depth to water for measured wells in Finney County [Kansas] has declined from –0.44 meters (–17.30 inches) per annum from 1978 to 1987 to only –0.07 meters (–2.76 inches) per annum between 1992 and 1995" (AAG 2003). Thus what is omitted is that in many parts of the region, the groundwater decline has slowed considerably. This is true also at the global and national levels. Total global water withdrawal has slowed and per capita withdrawal has begun to decline. In the United States, total withdrawals were down 10 percent (20 percent on a per capita basis) in 1995 from a 1980 peak (Gleick 1998).

A second approach is to examine the underlying theories, assumptions, and framing within which the plethora of arguments and details are placed. In chapter after chapter, population growth is cited as the fundamental cause of environmental deterioration. Indeed, it may not be only coincidence that "plan B" is also commonly used to refer to the emergency contraceptive levonorgestrel. Brown is locked into a basic Malthusian framing of his world concerns, so much so that he ignores or downplays the dramatic slowing of population growth in the last few decades. The rate of world population growth peaked in the 1960s; the annual increment in growth peaked in the 1980s.

Another major assumption that Brown makes is that the use of specific resources or ecosystem services must each be sustainable and not exceed the rate at which they are renewed in nature. Most environmentalists share similar concerns, but we often disagree on the question of substitutability. Natural capital is not fixed; Earth is a dynamic system, and some forms of natural capital may be substituted for by other types of natural capital or by technology. Indeed, most of the cropland Brown rightly values began as forests or grasslands. In turn, topsoils can be replaced by fertilizers, and fertilizers perhaps by genetically modified nitrogen fixation.

A third approach commonly used by critics of Jeremiahs—and Lester Brown qualifies as a modern Jeremiah—is to assert the failure of previous forecasts and thereby discredit the current set of forecasts. Many critics have used this third approach to castigate Brown's work, particularly his selective use of declines in grain reserves, which he often presents as "the number of days of world grain carry-over stocks." For example, in a piece Brown wrote as president of the Earth Policy Institute, he claimed, "The new combination of falling water tables and rising temperatures, along with trends such as soil erosion, has led to four consecutive shortfalls in the world grain harvest. This year [2003] fell short of consumption by a record 92 million tons. These shortages have reduced world grain stocks to their lowest levels in 30 years" (Brown 2003).

Brown's critics often cite his rush to note major declines in reserves and his tendency to seldom acknowledge subsequent or past increases as reserves. For example, if one takes the 4 years (1996–1999) previous to the 2000–2003 period that he cites and uses his data, one discovers that grain stocks rose in each of those years despite the changes in water tables, temperature, and soil erosion that surely applied to those years as well as the years he cites.

But in a lengthy examination of the role of earlier Jeremiahs, I noted that accuracy of forecast was not a fair indicator. For if we heed our Jeremiahs, we may be able to institute timely corrective behavior to ensure that doomsday does not arrive. Indeed, *Plan B* ignores the fact that such corrective behavior is under way even though it is insufficient and needs to be accelerated (Kates and Parris 2003). In an attempt to capture that paradox, I once wrote the following Jeremiah parable:

> I imagine spaceship Earth as a kind of fortunate *Titanic*. On the ship's prow in the middle of the night, Jeremiah Brown peers into the dimness. Faintly perceiving some ominous shapes ahead, he cries out lustily, "Icebergs ahead." Unsure if he is heard, he cries out again and again. On the ship's bridge, the captain, hearing Jeremiah only after some time, turns to the navigator and asks for a course correction to avoid a collision. Ten degrees to the starboard, she says. The captain, thinking, "What luck that I have already started to turn because of the bad weather ahead," orders a five-degree correction. The helmsman looks at his compass and suddenly realizes that he has been dozing for a few minutes and that the ship has actually been drifting—fortunately, though, in the right direction. Without saying anything, he then corrects the course by two degrees. Up ahead, alone and in the cold, Jeremiah awaits a hard starboard course correction, maybe even a reversal of engines. Sensing none, he mutters to himself, "They never listen to me," and prepares for the worst. (Kates 1995, p. 635)

Environmental Jeremiahs like Lester Brown seem to call attention only to the most alarming trends, pointing to them as portents of catastrophe. Then, partly because we already have listened to them and partly because of the more favorable trends they ignore, catastrophe seems averted—until they again remind us of plan A.

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References cited

[AAG] Association of American Geographers, Global Change and Local Places Research Group. 2003. Global Change in Local Places: Estimating, Understanding, and Reducing Greenhouse Gases. Cambridge (United Kingdom): Cambridge University Press.

Brown LR. 2003. Wakeup Call on the Food Front. (29 June 2004; *www.earth-policy.org/Updates/Update31.htm*)

Gleick PH. 1998. The World's Water 1998–1999: The Biennial Report on Freshwater Resources. Washington (DC): Island Press.

Kates RW. 1995. Labnotes from the Jeremiah experiment: Hope for a sustainable transition. Annals of the Association of American Geographers 85: 623–640.

Kates RW, Parris TM. 2003. Long-term trends and a sustainability transition. Proceedings of the National Academy of Sciences 100: 8062–8067.

BIOMECHANICS MADE ACCESSIBLE

Comparative Biomechanics: Life's Physical World. Steven Vogel. Princeton University Press, Princeton, NJ, 2003. 582 pp., illus. $60.00 (ISBN 0691112975 cloth).

A provocative article published in 1998 focused on a disparate group of scientists who pay for their own research (Jon Cohen, "Scientists Who Fund Themselves," *Science* 279: 178–181). Their reasons for self-funding are dissatisfaction with the grant refereeing and awarding process, irritation over the time that grant applications can absorb, and the rejection of new ideas, which hampers innovation. I have met many of the scientists cited in this article and I find them admirable—exemplars who prompt my wistful reflection, "I wish I'd thought of that."

Steven Vogel is one of those cited as using "his salary to fund his own relatively inexpensive research on biological fluid mechanics." A professor at Duke University in Durham, North Carolina, Vogel has established an international reputation, starting with his doctoral work on the flight of fruit flies. His later work has probed such diverse topics as the design and ventilation of prairie dog burrows, leaves and sponges, the way in which the leaves of trees deform to resist high winds, and the design of plant stems.

He is that rare animal, a biologist who is at once fluent in mathematics, conversant with physics and physical chemistry, and an accomplished practical engineer.

More than that, the quality of Vogel's writing allows him to convey complex ideas clearly and make them so accessible that his books are hard to put down. His *Life in Moving Fluids: Physical Biology of Flow* (Willard Grant Press, Boston, 1991) was the starting point for my studies in that area. His earlier *Life's Devices: The Physical World of Animals and Plants* (Princeton University Press, Princeton, NJ, 1988) was so attractive that I have "lost" two copies to my students; that book was deservedly awarded the Irving and Jean Stone Prize for Science Writing for Public Understanding. Steven Vogel is able, thanks to his skill with the pen, to bring his enthusiasm for functional studies of living organisms to a wide audience and thereby (and I write this with admiration) to supplement his salary substantially.

In the preface to his latest book, Vogel makes the point that while "biomechanics" is often taken to refer to human problems, particularly medical ones, the book's title, *Comparative Biomechanics,* embraces the whole natural world. The book is aimed at biology undergraduates at any level beyond introductory courses but, as is increasingly the case with modern biology, it presumes and often requires a passable knowledge of the physical sciences and mathematics.

The four introductory chapters deal with basic physical dimensions and their biological meaningful derivatives, such as power and work, force and pressure. Vogel introduces us to the *Système internationale d'unités,* to which he adheres sedulously throughout the book. He also starts us off on an accepted series of symbols for parameters: Here, accepted usage can be ambiguous; for example, "E" can stand for energy or Young's modulus of elasticity, while "e" stands for efficiency. Never fear: All the symbols he uses are listed on pages 519 and 520 and, where uncertainty could arise in the text, he is careful to guide us.

Part 2 comprises 10 chapters on fluids, starting with discussion of the static properties of gases and liquids and moving to flowing fluids, both around and within organisms. I particularly enjoyed chapters 12 and 13 on the generation of lift and thrust for swimming and flying. This is a rapidly moving and fertile field of biological research and Vogel handles it effortlessly and with great insight (fortunately, the book arrived just in time for me to update my first-year lectures). In my view, this section is a must for anyone studying animal locomotion.

The next 10 chapters deal with solids and structures. Vogel makes the useful points that most biological materials have a far greater range of properties than the materials of human engineering, and that organisms have the ability to alter material properties locally, modifying them in response to stress or the environment. He is careful to point out that organisms are not better engineers than humans and that, indeed, they often make the best of a limited palette of inorganic minerals and organic polymers, which often impose severe structural limitations; nonetheless, he clearly remains in awe of the amazing strength and energy-absorbing capacity of the silk of spiders.

Continuing from materials to structures and thence to mechanisms, he goes on to consider static structures, such as trees or shells, as well as moving structures, such as worms or horses. A key feature of the mechanics of animal movement is their use of muscle, which is the subject of one useful, accessible, and economical chapter. Muscle, Vogel points out, is tricky stuff: It can generate force, but it costs metabolic energy to do so even if it does no work; it can pull, but it cannot push; most curiously, it can be lengthened while activated and thereby absorb energy. In this chapter, Vogel skates around the details of muscle biochemistry and concentrates on its mechanics. This epitomizes the clarity with which he has focused his text.

In the concluding chapter, "Loose Ends and Perspectives," Vogel moves away from his main themes to consider matters such as safety factors—how safe is adequate and in what contexts—and the ability of living organisms to respond mechanically to experience, something human engineering and material science is scratching at but with only limited success. He doesn't believe that nature does it better than we do, merely differently, and cites as evidence our dependence on wheels, chains, gears, and the other appurtenances of machinery, all of which are unknown in living organisms.

A litmus test of any book is the quality of its bibliography. In this book are 25 pages of references ranging in date from the middle of the 19th century to 2002 and, *mirabile dictu*, page citations for the references. Why doesn't everyone do this? There are occasional minor complications: D. E. Alexander is not distinguished in the text from the more prolific R. McN. Alexander, for example.

The standard of presentation and cross-referencing is, given the scale of the book, remarkably high. It is perhaps carping to wonder what the following sentence on page 382 means: "A banana leaf, pushed sideways, twists rather than bends, again using a structure, its petiole (or leaf stem), of very torsional stiffness." Rather more serious is the discrepancy between the equation given for the second moment of area of an elliptical rod in figure 18.3 (p. 368) and that in the text on page 369 (the latter is correct).

One cannot leave this book without remarking on the easy gaiety with which Vogel sprinkles his writing with puns, literary asides, alliteration, and tactical use of one-word sentences. Space constraints allow me to give you only a few examples. On page 334, in the context of how a hole stops the propagation of a crack in a sheet of thin material, he writes, "This removal of further foil should foil the further facility of the foil to fail." You get both pun and alliteration rolled into a single sentence. Again, in his attribution of the use of a polar plot that compares the lift and drag coefficients of airfoils, we find on page 251 that this was "a device introduced by that towering figure, Gustav Eiffel."

Americans seem surprisingly loath to use hyphens, but Vogel does so to great effect: "Molecular techniques now make it unnecessary to seek out those near-oxymorons, functionless anatomical features" (p. 510). I could go on. This is one book I shall not lend to students; I will tell them they must buy it.

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NEW TITLES

Acid Rain Science and Politics in Japan: A History of Knowledge and Action toward Sustainability. Kenneth E. Wilkening. MIT Press, Cambridge, MA, 2004. 340 pp., illus. $19.00 (ISBN 0262731665 paper).

After the Fires: The Ecology of Change in Yellowstone National Park. Linda L. Wallace, ed. Yale University Press, New Haven, CT, 2004. 390 pp., illus. $55.00 (ISBN 0300100485 cloth).

Assembly Rules and Restoration Ecology: Bridging the Gap between Theory and Practice. Vicky M. Temperton, Richard J. Hobbs, Tim Nuttle, and Stefan Halle. Island Press, Washington, DC, 2004. 439 pp., illus. $45.00 (ISBN 1559633751 paper).

Biodiversity of Fungi: Inventory and Monitoring Methods. Gregory M. Mueller, Gerald F. Bills, and Mercedes S. Foster, eds. Academic Press, New York, 2004. 777 pp., illus. $99.95 (ISBN 0125095511 cloth).

Biological Psychology: An Introduction to Behavioral and Cognitive Neuroscience. 4th ed. Mark R. Rosenzweig, S. Marc Breedlove, and Neil V. Watson. Sinauer Associates, Sunderland, MA, 2004. 622 pp., illus. $99.95 (ISBN 0878937544 cloth).

California Desert Flowers: An Introduction to Families, Genera, and Species. Sia Mirnhardt and Emil Mornhardt. University of California Press, Berkeley, 2004. 284 pp., illus. $29.95 (ISBN 0520240030 paper).

Constantine Samuel Rafinesque: A Voice in the American Wilderness. Leonard Warren. University Press of Kentucky, Lexington, 2004. 272 pp., illus. $40.00 (ISBN 081312316X cloth).

Dental Functional Morphology: How Teeth Work. Peter W. Lucas. Cambridge University Press, 355 pp., illus. $130.00 (ISBN 0521562368 cloth).

Early Life History of Fishes in the San Francisco Estuary and Watershed. Frederick Feyer, Larry R. Brown, Randall L. Brown, and James J. Orsi, eds. American Fisheries Society, Bethesda, MD, 2004. 295 pp., illus. $60.00 (ISBN 188856959X paper).

Ecology and Conservation of Birds of the Salton Sink: An Endangered Ecosystem. W. David Shuford and Kathy C. Molina, eds. Cooper Ornithological Society, Camarillo, CA, 2004. 169 pp., illus. $17.00 (ISBN 1891276379 paper).

Ecology and Evolution of Cooperative Breeding in Birds. Walter Koenig and Janis Dickinson, eds. Cambridge University Press, New York, 2004. 293 pp., illus. $45.00 (ISBN 0521530997 paper).

Fitness Landscapes and the Origin of Species. Sergey Gavrilets. Princeton University Press, Princeton, NJ, 2004. 432 pp., illus. $39.50 (ISBN 069111983X paper).

Foundations of Biogeography: Classic Papers with Commentaries. Mark V. Lomolino, Dov F. Sax, and James H. Brown, eds. University of Chicago Press, 2004. 1328 pp., illus. $45.00 (ISBN 0226492370 paper).

The Geese of Beaver Bog. Bernd Heinrich. HarperCollins, New York, 2004. 217 pp., illus. $24.95 (ISBN 0060197455 cloth).

The Heretic in Darwin's Court: The Life of Alfred Russel Wallace. Ross A. Slotten. Columbia University Press, New York, 2004. 302 pp., illus. $39.50 (ISBN 0231130104 cloth).

High Noon for Natural Gas: The New Energy Crisis. Julian Darley. Chelsea Green, White River Junction, VT, 2004. 280 pp. $18.00 (ISBN 1931498539 paper).

Hollows, Peepers, and Highlanders: An Appalachian Mountain Ecology. 2nd ed. George Constantz. West Virginia University Press, Morgantown, 2004. 359 pp., illus. $18.50 (ISBN 0937058866 paper).

The Immune System. 2nd ed. Peter Parham. Garland Science, New York, 2004. 512 pp., illus. $59.95 (ISBN 0815340931 paper).

The Innate Immune Response to Infection. Stefan H. E. Kaufmann, Ruslan Medzhitov, and Siamon Gordon. ASM Press, Washington, DC, 2004. 465 pp., illus. $115.95 (ISBN 1555812910 cloth).

An Introduction to Astrobiology. Iain Gilmour and Mark A. Sephton, eds. Cambridge University Press, New York, 2004. 358 pp., illus. $65.00 (ISBN 0521546214 paper).

Limits to Growth: The 30-Year Update. Donella Meadows, Jorgen Randers, and Dennis Meadows. Chelsea Green, White River Junction, VT, 2004. 338 pp., illus. $22.50 (ISBN 193149858X paper).

Managing Food Industry Waste: Common Sense Methods for Food Processors. Robert R. Zall. Blackwell, Ames, IA, 2004. 182 pp., illus. $79.99 (ISBN 0813806313 cloth).

Metabolic Engineering in the Post Genomic Era. Boris N. Kholodenko and Hans V. Westerhoff, eds. BIOS Scientific, New York, 2004. 456 pp. $159.95 (ISBN 0954523229 cloth).

Microbe–Vector Interactions in Vector-borne Diseases. Stephen H. Gillespie, Geoffrey L. Smith, and Anne Osbourn, eds. Cambridge University Press, New York, 2004. 383 pp., illus. $125.00 (ISBN 052184312X cloth).

Microbial Biofilms. Mahmoud Ghannoum and George O'Toole, eds. ASM Press, Washington, DC, 2004. 440 pp., illus. $115.95 (ISBN 1555812945 cloth).

Modularity in Development and Evolution. Gerhard Schlosser and Gunter P. Wagner, eds. University of Chicago Press, Chicago, 2004. 600 pp., illus. $35.00 (ISBN 0226738558 paper).

Molecular Epidemiology of Infectious Diseases: Principles and Practices. Lee W. Riley. ASM Press, Washington, DC, 2004. 348 pp. $109.95 (ISBN 1555812686 cloth).

On the Origin of Phyla. James W. Valentine. University of Chicago Press, Chicago, 2004. 608 pp., illus. $55.00 (ISBN 0226845486 cloth).

P**hylogenic Trees Made Easy: A How-to Manual.** 2nd ed. Barry G. Hall. Sinauer Associates, Sunderland, MA, 2004. 221 pp., illus. $31.95 (ISBN 0878933123 paper).

Pioneering Research: A Risk Worth Taking. Donald W. Braben. John Wiley and Sons, Hoboken, NJ, 2004. 198 pp., illus. $39.95 (ISBN 0471488526 paper).

The Pneumococcus. Elaine I. Tuomanen, Timothy J. Mitchell, Donald A. Morrison, and Brian G. Spratt, eds. ASM Press, Washington, DC, 2004. 466 pp., illus. $115.95 (ISBN 155581297X cloth).

A Primer of Conservation Biology. 3rd ed. Richard B. Primack. Sinauer Associates, Sunderland, MA, 2004. 320 pp., illus. $44.95 (ISBN 0878937285 paper).

Protein Microarrays. Mark Schena, ed. Jones and Bartlett, Boston, 2004. 469 pp., illus. $88.95 (ISBN 0763731277 cloth).