cations of his own assessment. He makes a devastating case that the very nature of science and law has prevented regulation from reducing pesticide risks to socially acceptable levels. It seems odd, then, that his prescribed solution is better regulation: some refinements of risk assessment, to improve data quality, better account for risk distribution, and deal more frankly with uncertainty; and reforms of the regulatory process, to be more open about risk and make more "precautionary" decisions. He argues for all the changes that Congress enacted this summer, and a few others.

Worthy as these reforms are, they will not get us off the pesticide regulation treadmill. Ultimately, we need policies that focus more on managing *pests*, in safe, ecologically sound ways, and are less centered on managing *pesticides*. Scientists, farmers, and other pest managers, government officials, environmental groups, and others need to concentrate on promoting integrated pest management and other biologically based pest-management strategies. Instead of needing to make pesticide regulation work better, we should be working to make it less needed.

Wargo's book lacks this vision, but it makes a compelling case that such a vision is needed. *Our Children's Toxic Legacy* can't tell us how to get off the pesticide regulation treadmill, but it should remove any residual doubts that we must make the attempt.

Edward Groth III
Consumers Union, Yonkers, NY 10703–1057, USA

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Vignettes: Companion Animals

At home Rover is told to sit up and speak. Polly is asked if she wants a cracker. The news is full of the language of apes and dolphins, who, it is speculated, may be smarter than people. The scientists claim to be doing studies in communication, but the rest of us know what's afoot. We just want the whales and chimps to talk—not just about hunting shrimp or fruit but to speak to our mutual situation, claim our shared purposes, mend what Lévi-Strauss calls "the ultimate discontinuity of reality."

—*Paul Shepard*, in *The Others: How Animals Made Us Human* (Island Press)

Tales of intelligence in pets have been commonplace for millennia. The ancient Stoic philosopher Chrysippus reported a dog that could perform the following feat of reason: coming to a three-way fork, he sniffed down paths A and B, and *without sniffing* C, ran down C, having reasoned that if there is no scent down A and B, the quarry must have gone down C. People are less fond of telling tales of jaw-dropping stupidity in their pets, and often resist the implications of the gaps they discover in their pets' competences. Such a smart doggie, but can he figure out how to unwind his leash when he runs around a tree or a lamppost?

—*Daniel C. Dennett*, in *Kinds of Minds: Toward an Understanding of Consciousness* (BasicBooks)

Multipurpose Organelles

The Peroxisome. A Vital Organelle. COLIN MASTERS and DENIS CRANE. Cambridge University Press, New York, 1995. xviii, 286 pp., illus. $69.95 or £45.

Although the "microbody" achieved its biochemical identity as a peroxisome 30 years ago, its functions remained an enigma wrapped within a single membrane and its very existence was virtually unknown to most biologists until fairly recently. Interest in these organelles has grown with the discovery of their various roles in lipid metabolism (including beta oxidation of fatty acids and dicarboxylic acids and synthesis of lipids, cholesterol, and bile acids) as well as gluconeogenesis, glyoxylate metabolism, and disposal of hydrogen peroxide and toxic oxygen metabolites. Many of these activities had been attributed to mitochondria. Mitochondria-enriched subcellular fractions often contain peroxisomes, and researchers have, unfortunately, generally attributed all activities associated with such fractions solely to mitochondria.

Substantial excitement and research have been stimulated by the elucidation of peroxisomal dysfunction in metabolic diseases. The peroxisome is the first organelle to have a central role in a major feature film—*Lorenzo's Oil*, a moving account of the struggle of two non-scientist parents to find a cure for X-linked adrenoleukodystrophy, a progressive and devastating disease in which the peroxisomal oxidation of very–long-chain fatty acids is grossly impaired.

Included among the peroxisomal diseases are not only those in which a single peroxisomal enzyme is defective but also an intriguing group of disorders related to Zellweger syndrome in which defective membrane peptides prevent the import of peroxisomal enzymes from the cytosol into their target organelle, resulting in empty "ghost" peroxisomes and multiple functional enzymatic deficiencies in individuals in whom enzyme synthesis is normal.

This succinct, well-written monograph is both current and comprehensive and covers the enzymology, morphology, genetics, biogenesis, and ontogeny of peroxisomes in animals and plants along with topics such as carcinogenesis and peroxisomal diseases. Its wide scope will make it useful to specialists in the field as well as to biologists who are ignorant of this fascinating and ubiquitous structure that has now "emerged more clearly from the shadow of its fellow oxidative organelle the mitochondrion and assumed a distinctly individual profile." Unlike the functionally rather restricted mitochondria and chloroplasts, peroxisomes, though lacking their own DNA and an inner membrane, serve as diverse, multipurpose organelles in virtually all animal and plant cells.

Sidney Goldfischer
Albert Einstein College of Medicine, Bronx, NY 10461, USA

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Reprints of Books Previously Reviewed

Adaption and Natural Selection. A Critique of Some Current Evolutionary Thought. George C. Williams. Princeton University Press, Princeton, NJ, 1996. Paper, $14.95 or £10.95. ISBN 0-691-02615-7. *Reviewed* **152**, 338 (1966).

Bugs in the System. Insects and Their Impact on Human Affairs. May R. Berenbaum. Helix (Addison Wesley), New York, 1996. Paper, $15 or C$21. ISBN 0-201-40824-4. *Reviewed* **267**, 548 (1995).

Charles Darwin. The Man and His Influence. Peter J. Bowler. Cambridge University Press, 1996. Paper, $15.95. ISBN 0-521-56222-8. *Reviewed* **252**, 992 (1991).

The History and Geography of Human Genes. Abridged edition. L. Luca Cavalli-Sforza, Paolo Menozzi, and Alberto Piazza. Princeton University Press, Princeton, NJ, 1996. Paper, $35 or £25. ISBN 0-691-02905-9. *Original edition reviewed* **267**, 1530 (1995).

A History of the Ecosystem Concept in Ecology. More Than the Sum of the Parts. Frank Benjamin Golley. Yale University Press, New Haven, CT, 1996. Paper, $14. ISBN 0-300-06642-2. *Reviewed* **264**, 726 (1994).