This book is not intended as a primer for beginners who wish to become familiar with the field; many technical terms, for example, are not explicitly defined. Nor is it textbook-like in its approach; coverage, though extensive, is uneven (for example, the discussion of fruit dispersal focuses exclusively on vertebrates with virtually no reference to dispersal by ants). It is, rather, Thompson's highly personal view of the history of the field and of the directions in which it should go. Just how personal is illustrated by the fact that Thompson cites close to 40 of his own papers, making him overwhelmingly the most frequently cited author in the volume. The main thesis of the book, a theme that underlies it in its entirety, is that "much of the coevolution occurring between species may occur through the geographic interplay of populations differing in defense, counterdefense, and specialization rather than through reciprocal change within local populations" (p. 166). Although Thompson labels this view the "geographic mosaic theory of coevolution," it is, in my opinion more of a perspective than a theory, one that has not been absent in the past as much as ignored or underemphasized. The hypotheses generated by emphasizing that geography determines the outcome of any given interaction are the sort to give headaches to anyone accustomed to constructing straightforward, easily falsifiable hypotheses; Thompson regrettably does not provide any guidelines to investigators who must now ponder how many populations constitute an adequate sample. The greatest contribution of this renewed emphasis on geographic variation, however, is that Thompson has elegantly (and compellingly) deconstructed received notions of "diffuse coevolution," generating in their stead alternative scenarios of interaction cycles that vary in time and space. In doing so, Thompson will undoubtedly inspire researchers to revisit interactions that were previously dismissed as unworthy of the term "coevolution" and to maintain a more thoughtful, open-minded attitude on the subject.

The polemical dimension of the book detracts only in places where Thompson, intent on promoting a generalization, ignores the specific details of the very literature he cites in support of the generalization. To cite just one example, Thompson claims that trenching or vein-cutting, feeding by insects in such a way as to sever conduits that allow the flow of defensive chemicals to particular plant parts, can lead to an expansion of host breadth and to a polyphagous diet—yet the papers he cites in support of this argument describe trenching behavior in at least as many insects with rather specialized diets. This case is by no means an isolated one; the tendency of the author to gloss over inconsistencies renders the book less suitable to novice readers who do not have sufficient familiarity with the literature to evaluate the arguments.

One other aspect of the book that is surprising is that, though there is considerable discussion of genes and their location, there is remarkably little discussion of gene products and their action. Though it is certainly of interest to localize a gene for oviposition preference on a particular chromosome, for example, basic understanding of the mechanisms underlying oviposition preference can only proceed from knowledge of the products and processes controlled by that gene. With the noticeable exception of a discussion of interactions between nitrogen-fixing nodulating bacteria and their host plants, there is virtually no detailed discussion of chemistry in the book. This absence is particularly conspicuous in the discussion of plant-insect interactions; after all, the landmark paper by Ehrlich and Raven (1964), which Thompson himself admits "spawned more work on coevolution than any other single article," focused not only on patterns of host-plant utilization by butterflies but also on patterns of secondary metabolism within and among host-plant families. Even for investigators whose main interest is in the chemical mediation of coevolution, though, this book is an invaluable resource by virtue of its 47-page bibliography alone. If it proves as influential as I think it might, arms races might make a comeback on title pages in quite a number of journals in the near future.

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Vignette: Prognostication

When T. S. Kuhn published *The Structure of Scientific Revolutions* in 1962, he truly knew not what he had wrought. "Paradigm shift" has become a war chant. . . . February 1995 will see an aggressive conference titled The First Annual Conference on Trauma, Loss, and Dissociation: The Foundations of Twenty-First Century Traumatology. . . . The preconference publicity quotes one of the speakers: "Advances in the field of traumatic stress research have led to exciting new paradigm shifts. The conference will break new ground for the 21st century. Perhaps I may be allowed a dour Canadian joke. In 1900 the prime minister of Canada announced, "The Twentieth Century Belongs to Canada."

—*Ian Hacking*, in *Rewriting the Soul: Multiple Personality and the Sciences of Memory* (Princeton University Press, forthcoming)

Protein Penetrants

Handbook of Membrane Channels. Molecular and Cellular Physiology. CAMILLO PERACCHIA, Ed. Academic Press, San Diego, CA, 1994. xx, 591 pp., illus. $150 or £92.

A long, long time ago, there were only three ion channels, Na^+, K^+, and acetylcholine-activated—arcane pieces of specialized molecular hardware dedicated to the task of producing regenerative electrical signals in nerve and muscle cells. Mainly thanks to patch-recording techniques, we now know that ion channel proteins populate a molecular zoo as teeming and elaborate as any functional class of macromolecules. These integral membrane proteins all work by forming aqueous pores right through the heart of the protein and thus across the membrane in which the channels reside, and they create these leaks for a huge variety of physiological purposes.

Like a dedicated Victorian naturalist, Peracchia has set out to collect in a single display as wide an assortment of species as the vessel can hold. The value of this book is that it illustrates the diversity of channel form and function in biological membranes; it utterly dispels the notion that ion channels are owned by the nervous system. To be sure, we initially are shown the customary lions and tigers—the voltage- and ligand-gated channels, whose molecular mechanisms are coming into increasingly sharp focus. But the book gives equal weight to beasts from more exotic physiological climes—epithelial Cl^- channels, gap junctions, aquaporins, cyclic nucleotide–activated channels, mitochondrial K^+ channels, exocytotic fusion-pores, channels in bacteria, yeast, and protozoa, and the Ca^{2+}-release channels of intracellular mem-

branes. Many of the individual chapters, which present a good mix of biophysical function and what we benighted channel-mutagenesis types balefully call "structure," will soon fade as the fast-moving wave of discovery passes; indeed, the glaring absence of the inward rectifier K^+ channels merely attests to the velocity of this wave. Such is the inherent nature of "handbooks." They serve the same useful purpose as do occasional trips to the zoo: intellectual recreation that may stimulate a more lasting interest in particular aspects of a broad subject.

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