hancement with an age-structured model, decision trees, and expert systems. Again, their aim is to emphasize the logic of developing systems that solve practical problems, keeping in mind the role of a model as a critical tool.

The authors did not intend to produce a complete text for modeling, and they recommend that their book be supplemented with books on biostatistics and ecology. However, their verbal definition of a coefficient of determination is ambiguous and a simple equation may have been better.

The application of stochastic modeling requires some knowledge of statistics, and they fail to provide a definition of variance, or refer to a good statistics text in their suggested reading, even though they use regression analysis to fit model parameters. It might have been useful for them to distinguish between demographic and environmental stochasticity and to explore the concepts of risk analysis and minimum viable populations. Furthermore, I could not agree with some of their generalizations concerning stochastic models: a deterministic model is not necessarily suitable when dealing with large population sizes and the spontaneity lost while running iterations of a stochastic simulation, while perhaps a hinderance, need not be debilitating.

These small oversights and differences in opinion do not detract substantially from the text's value. Each chapter is more or less self-contained, and at the end of each there is a detailed list of references for further reading. As an introduction to building models for conservation, it is highly accessible even to those who have no mathematics, statistics, or programming skills, and it fills an important gap in the modeling literature. I found only two minor typographical errors, and the binding, typography, and layout are exemplary. The authors certainly succeeded in writing a book that will generate excitement and promote discussion among those learning how to build models.

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to scholars of science and technology policy because it reflects the pluralistic and redundant funding structure and split disciplinary jurisdiction of funding agencies, which are construed to be a source of strength and a sign of health and vitality for the science enterprise. The volume could also serve as a guide to practicing professional scientists in universities or research labs whose established sources of research support have evaporated due to new fads and fashions in funding policies, and who are trying to diversify established, or uncover new, sources of support.

The book provides a telescopic view of the science/technology establishment, from the general to the particulars, with considerable redundancy and overlap built in. This approach allows for selective and modular use by a variety of audiences on many levels of interest and at the desired level of detail. However, this hardcover version is too expensive to be accessible to students and faculty as a course textbook, or even as a required reading reference. A paperback version would be highly desirable and would make timely reading for the increasingly popular science, technology, and society programs and courses across the nation’s campuses.

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CYTOCHROME P-450


Cytochrome P-450 enzymes, comprising a large number of forms, catalyze monooxygenase and other reactions that in animals are of academic and practical importance in toxicology, pharmacology, endocrinology, carcinogenesis, and other areas. This stems from the role that P-450 enzymes play in synthesis and degradation of biological regulatory molecules, and in the activation or inactivation of foreign compounds including many toxic and therapeutic agents and carcinogens. The bewildering array of substrates and unknown number of P-450 forms has for years constituted the most intriguing enzyme puzzle. In addition, P-450 holds interest from the standpoint of the evolution and regulation of multiple gene families, and from the standpoint of the chemistry associated with its catalytic mechanism.

This book offers a consideration of the structural, mechanistic, and biochemical aspects of this most interesting group of proteins. There have been numerous volumes over the past 15 years, often emanating from symposia, that have dealt with the function and significance of P-450. A volume that appeared in 1978, also entitled Cytochrome P-450 (Sato and Omura, eds. Kodanasha, Tokyo, and Academic Press, New York) considered P-450 as it was known at the time, dealing with biological aspects as well as the biochemistry of P-450. The present volume has a more directed focus on molecular aspects, reflecting the considerable progress in these areas in the past ten years. It presents a critical and up-to-date evaluation of advances in understanding P-450, yet offers background and a synthesis of the knowledge of P-450 covering a wide range of topics.

The organization of the book is quite appropriate, beginning with a review of data from model structures and a consideration of peroxidase function of P-450, both having contributed significantly to the understanding of the catalytic mechanism. The authors note topics, such as the mechanism of molecular oxygen cleavage, which have major questions that remain unanswered; that particular topic is considered further in a later chapter. A chapter on the topology of the active site of P-450 focuses largely on the inferences from structures oxidized by rat liver P-450c (P450IA1). It is clear that such data are available for only a few of the many P-450 forms, and it will be interesting to see how the active site has evolved as additional forms are studied. This chapter is followed by a review of electron transport processes involved in the reduction of P-450, requisite to the catalytic cycle. Much of the material in that review will be quite familiar to those who work with P-450, but it provides essential background for newcomers to the field. It is followed by a consideration of the organization and interactions of P-450 with other microsomal proteins and lipids within the membrane. Such interactions are expected to be important in both the reduction of P-450 and in modulation of catalytic function, but just how this is accomplished is not yet known.

An extensive chapter by S. Black and M. Coon presents current knowledge of the primary and secondary structures of all P-450 forms for which such information is available. The two chapters that follow consider related topics of the catalytic cycle, and the mechanisms by which inhibitors interfere with this cycle. The first discusses the activation of oxygen and oxygen transfer in considerable and appreciated detail. The second provides a thorough and thought-provoking summary of mechanism-based inhibitors. The regulation of hepatic P-450 forms by exogenous inducers is described in a separate chapter, where the discussion is based primarily on polycyclic-hydrocarbon-type induction, the mechanism for phenobarbital induction not yet being known. The regulation and role of steroidogenic P-450 enzymes, and those involved in steroid catabolism, are considered in two companion chapters, which offer a full picture of the P-450 enzymes involved in physiological pathways. There are also two chapters dealing with bacterial P-450 enzymes. In the first, S. Sligar and R. Murray provide a valuable treatise summarizing the diversity and function of microbial P-450 forms. The second is devoted to the crystal structure of P-450cam, the first form to be purified.

It is difficult to select any one chapter or few chapters that are more noteworthy than the others. Each is interesting and thorough, and each points out areas where fruitful research might be done. However, the compilation of primary structure data by Black and Coon, and the appendix by D. Waxman comparing rat P-450 isoforms, should see extensive use as references for comparison with novel forms as more become known, and for comparisons with homologous proteins in different species. The chapters on bacterial P-450 might

BioScience Vol. 38 No. 6