vincing analysis of community structure, where he concludes that parasite communities are generally young, with many niches that are unexploited. That is a consequence of the demands for specialization imposed by the tight linking of parasite and host. Such tight coevolution results in modest interspecies competition and loose species packing. Price's examples are drawn largely from helminths, and his conclusions are more convincing because they are constrained to a defined set of conditions. But extensions beyond that set of conditions—to parasitoids, insect defoliators, protozoans, and bacteria—are suspect.

The emphasis on variability as opposed to constancy, on parthenogenetic as opposed to sexual reproduction, and on mutualism and specialization as opposed to competition is pertinent. And Price's plea for an ecology of rare events and of the small is compelling. When that can be combined with generalizations applied to rigorously defined categories of conditions, drawn from pertinent examples, then the comparative study of parasites will, as he passionately wishes, become a fundamental building block for both ecology and the study of evolution.

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Marine Chemistry

Petroleum in the Marine Environment. Papers from a symposium, Miami Beach, Sept. 1978. LEONIDAS PETRAKIS and FRED T. WEISS, Eds. American Chemical Society, Washington, D.C., 1980. x, 372 pp., illus. $42. Advances in Chemistry Series, 185.

One might expect this book to be an expanded and updated version of the excellent systematic and basic compilation published by the National Academy of Sciences in 1975, which had the same title. Instead, the book is a nonsystematic coverage of the many analytical methodologies that are used in attempts to understand the fate and effects of petroleum in the marine environment. Some results from the applications of these methods are discussed, but the treatment is not exhaustive.

The book contains 16 chapters, all of them dealing with analytical techniques. After a good general overview in chapter 1, the remainder of the book deals with analyses and analytical methods applied to hydrocarbons in petroleum, organisms, water, and sediments. In fact, 11 chapters are devoted totally or in part to the polycyclic aromatic hydrocarbons that are thought to be the petroleum components that are the most hazardous to the environment. Chapter 12 discusses only aliphatic hydrocarbons; the analytical detail and coverage in this chapter seem archaic compared with the sophistication in methods and approaches of the other chapters. Two chapters (7 and 8) consider solubilities of hydrocarbons in water, and one chapter (9) looks into nonhydrocarbons. The reader will likely be surprised to learn that, at least by 1978, no studies had been made of nonhydrocarbons in biodegraded petroleum.

The editors say (p. x) that they wish to reach, in addition to active workers dealing with aspects of the subject, "persons contemplating entering the field and who may be in need of a cogent up-to-date review; administrative or legal personnel who may be dealing with questions of appropriate methodology in proposed work or forensic problems; persons interested in a general overview of the subject; and professors and students who may find the volume a good source of supplementary material in appropriate courses." Will the book adequately serve these persons? Only marginally. For those needing a review of the broad subject of petroleum in the marine environment, the best source is still the National Academy study cited above, if supplemented with chapter 1 of this book and many of the references cited in the other chapters. If an up-to-date review (1978) of analytical methods applicable to petroleum in the marine environment is needed, the book will suffice.

However, persons new to the field may get confused. In chapter 2 we are told that the complexity of petroleum precludes monitoring individual compounds, yet part of this chapter and all the other chapters deal with individual compounds. In chapter 4 selected-ion monitoring mass spectrometry is recommended against, but chapters 13 and 15 report very effective use of selected-ion monitoring. Equilibration methods of extracting low-molecular-weight hydrocarbons from water are touted as best in chapters 8 and 10, but stripping techniques are used in the work discussed in chapter 11. Soxhlet extraction is mentioned in many chapters, but a ball-milling technique (chapter 14) is said to work as well, except that chapter 16 says that ball-milling yields lower results.

Although the arrangement of chapters in the book is not particularly logical, each chapter begins with a thorough summary, and the index is most useful. The illustrations and tables are adequate.

The subject of petroleum in the marine environment is extremely complex and concerns two issues: the quality of our environment and the adequacy of the supply of petroleum to meet our energy needs. This complexity has made progress slow, but it is still disappointing to learn in this book that the development of analytical methods is incomplete, that no suitable standards and standardized procedures are yet available, that intercalibrations for quality control are generally lacking, and that the large existing data base has not in general been interpreted and evaluated because of problems in comparison of results from different laboratories.

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Mesons and Nuclei

Theory of Meson Interactions with Nuclei. JUDAH M. EISENBERG and DANIEL S. KOLTUN. Wiley-Interscience, New York, 1980. xii, 404 pp., illus. $39.95.

Mesons are the quanta of the strong interaction, the force that holds nuclei together. The study of meson interactions with nuclei would therefore seem to promise insights into the structure of nuclei and their internal forces. In recent years, "meson factories" have been built to produce the intense meson beams needed to conduct such studies, and considerable theoretical effort has been devoted to analyzing the many careful experiments that have been done. This book is an excellent introduction to these theoretical techniques.

The major theoretical tool for the study of meson scattering and reactions is multiple scattering theory combined with some sort of optical model. The book does a clear job of explaining the theory, how it is obtained, and how it is used to learn about nuclear structure.

The book is somewhat less successful in explaining why the simple ideas and simple first approximations that are normally used work so well. For example, it is not shown that there is some small expansion parameter that can be used to estimate corrections. Probably it is not so much that the complicated neglected higher terms are in some sense small, but rather that the first-order terms capture the essentially geometric nature of the processes and little is left beyond that of the dynamic details. Precisely because of this lack of sensitivity to dynamic detail,

most of the promise of meson interaction as a means of elucidating nuclear dynamics is unfulfilled. The authors point to reactions such as meson absorption or production from nuclei where there may indeed be sensitivity to the features of dynamics that are special to mesons. However, treatment of these reactions is still at a rudimentary level, and dynamical insight from these remains only a promise. In this area the authors do not do as much as might be hoped to clarify the issues and the difficulties.

This book gives a clear and concise account of those areas of meson interactions with nuclei in which simple ideas have met with surprising success. On the question of meson interactions with nuclei that deal essentially with the meson as the quantum of the strong force there has been far less progress to report.

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