an urgently needed stable natural higher classification for the group. Her assessment of these problems is certainly valid, but perhaps a stronger argument should be developed, on behalf of ecologists, geologists, and biochemists, for a stable, practical guide for identification of sponge genera. Bergquist's optimistic outlook for resolution of taxonomic confusion in the near future cannot be shared by this reviewer.

Though the book presents a very valuable synthesis of recent research results and thus provides a much-needed entry to the literature, it should not be expected to provide species or generic identifications. The reader is directed to the *Traité de Zoologie* (1973) for coverage of sponge distributions and their relationships to physical and chemical parameters.

The organization of the text and the quality of illustrations are excellent, but most of the figures lack magnification scales and many lack identification of the species shown. The placement of the illustrations with respect to references to them in the text is awkward, with page references included haphazardly.

The book is a necessity for all workers interested in sponge research and will be an excellent reference for general invertebrate zoology courses and a definitive textbook for advanced courses. Bergquist has pinpointed a number of persistent research problems which, through her stimulation, may now be addressed.

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Mesonic Nuclear Physics

Mesons in Nuclei. MANNQUE RHO and DENYS WILKINSON, Eds. North-Holland, Amsterdam, 1979 (U.S. distributor, Elsevier, New York). In three volumes, illus. Vol. 1. xviii pp. + pp. 1–434 + index. $73.25. Vol. 2. x pp. + pp. 435–788 + index. $66.75. Vol. 3. x pp. + pp. 789–1156 + index. $66.75. The set, $186.25.

The simple description of nuclei as ensembles of neutrons and protons is adequate to characterize most nuclear properties. This collection of papers aims at the deeper level of understanding achieved by studying the mesonic substructure of the nucleons. When a large amount of momentum or energy is transferred to the nucleus, or when the nuclear medium is compressed to a much higher density, the mesonic degrees of freedom become too important to be ignored. Even static properties of nuclei, such as magnetic moments, are significantly affected by the mesons.

The first paper, by Blin-Stoyle, is a primer on pi-nucleon interactions that presents the basic interactions and perturbation formulas in sufficient detail to make the whole collection of papers self-contained. Neophytes should also find helpful the following two papers, by Kim and Primakoff and by Delorme, which discuss the so-called elementary particle formalism. This formalism emphasizes the matrix elements of relativistic operators, whereas the conventional formalism utilizes the ordinary wave functions.

A basic goal of meson theory is to derive the force between nucleons; this is the subject of the remainder of the first volume. Vinh Mau's paper documents the substantial progress made in the last decade in understanding the mesonic interaction between two nucleons. The two-meson exchange can be calculated by making use of the smoothness of the scattering functions, once the scattering between the two mesons is known. Unfortunately, the exposition leaves out essential details. The reader who wishes to recalculate the interaction, or to apply it to some other physical situation, will need to refer to decades-old preprints and unpublished reports. Other aspects of the interaction discussed in the first volume include many-body forces, in a paper by McKellar and Rajaraman, and the charge dependence of the force, in a paper by Henley and Miller.

The subject of the second volume is the effect of the mesons on the electromagnetic and weak interaction properties of nuclei. It has been known for a long time that the presence of charged mesons increases dipole absorption strength by about 50 percent over the strength for independent nucleons. These renormalization effects are usually calculated in a Fermi gas model, but a more detailed treatment was necessary to reveal the surprisingly large effects in the deuteron. There has also been progress in the accumulation of systematic data on renormalization effects, aided by accurate shell model calculations. These are among the topics reviewed in this volume.

The last volume considers the interesting possibility that phase transitions occur in nuclear matter. The chiral Lagrangian, which is thoroughly described in several papers, leads to a high-density phase transition under certain assumptions. As proposed in a paper by Lee and Wick, nuclei could be compressed to this new state, releasing energy in the process. However, it appears difficult to reconcile this hypothetical phase transition with the properties of ordinary nuclei. In particular, the smallness of many-body forces may contradict the chiral assumptions. This and other uncertainties are discussed in Nyman's paper. A milder phase transition, pion condensation, is predicted more firmly by meson theory. Migdal and other leading proponents of pion condensation contribute papers on the subject. The phase transition might occur at densities reached in the centers of neutron stars or in nuclear collisions at high energy. However, only a small energy change is involved with pion condensation, and its effects might be hard to observe.

Possibly, an even deeper understanding of nuclei might be achieved by considering the quark constituents of nucleons and mesons. Until that happens, this collection of papers, with its encyclopedic coverage of mesonic nuclear physics, should replace many years of journal articles on library shelves. The only major omission is a paper on the phenomenological meson field theory of nuclei, but this simple and successful model is referenced in several places.

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Density and Human Behavior

Residential Crowding in Urban America. MARK BALDASSARE. University of California Press, Berkeley, 1979. xiv, 250 pp. $12.95.

Concern with the relationship of human crowding and behavior has stimulated an immense number of studies in the past few years. Serious interest in the subject was precipitated in the early 1960's by the work of John Calhoun, who found that social patterns among rats were significantly affected by densities within caged pens. Various types of "aberrant" behavior such as homosexuality, aggression, lack of maternal care, and physical illness were more prevalent in the high-density situations. Implications of the studies for humans were drawn, and social scientists quickly discovered a new area for research.

Calhoun's studies had a certain inherent credibility in the eyes of many who had been preaching the horrors of rapid urbanization and population growth in