tissues with their own investigations of the parallelism between histamine and mast cells in a great number of tissues.

Histamine has probably been proposed as a candidate for more functions than any other biologically active molecule. This is well illustrated in the sections on its pharmacology, which treat, among other matters, absorption from the gastrointestinal tract, binding to serum protein in various diseases, toxic effects, and actions on the autonomic nervous system, smooth muscle, circulatory system, salivary glands, and gastric secretion. Despite a very large body of literature, evidence that histamine plays a role in any of these systems except gastric acid secretion and allergic responses is still rather circumstantial.

The effects of histamine on smooth muscle have also been extensively investigated, and much of this information is compiled by J. L. Parrot and J. Thouvenot. In an elegantly complementary section, Rocha e Silva integrates many of these data into a theoretical model of the smooth muscle "histamine receptor."

Histamine release is dealt with more thoroughly than any other topic. The use of isolated cell systems for histamine release provoked by antigenic stimuli has provided an important experimental model for clarifying immunological phenomena. Unfortunately, much recent research working out the biochemical mechanism of histamine release from mast cells is not included. Although each of the sections here presumably treats histamine release by different agents or physiological conditions, there is considerable overlap.

Histamine metabolism is the least comprehensively treated subject in this volume, with the notable exception of a thorough and imaginative discussion of histidine decarboxylase by Richard Schayer. The scope of Schayer's contribution to the present understanding of histamine metabolism is documented in a second chapter contributed by him on histamine catabolism in vivo. Schayer inaugurated the use of radioactive tracer techniques for the study of biogenic amine metabolism in his investigations of histamine catabolism. In the early and middle 1950's he developed isotope dilution methods for measurement of radioactive histamine and its metabolites which are still the most sensitive and precise in the field. He participated in the discovery of the major catabolic pathways of histamine, ring-*N*-methylation and formation of the riboside of the oxidation product of histamine, imidazole acetic acid, and delineated important species differences in histamine metabolism. More recently he has described a ubiquitous inducible form of histidine decarboxylase, the enzyme that synthesizes histamine, which is activated by a great variety of local or systemic stresses.

It is surprising that no section deals with histaminase, or with diamine oxidase, the first histamine-catabolizing enzyme discovered and an important tool in the evolution of histamine research.

Seventy of the 120 pages on the Physiological Significance of Histamine are devoted to a section by Andrew Ivy and W. H. Bachrach on the significance of histamine in gastric secretion. Their extensive review provides a useful background for evaluating current findings in what, in the past two years, has become a very active area of histamine research.

There are several shortcomings in this text, the most significant of which is the obsolescence of many of the contributions. The most recent references are dated 1963, and many sections do not cite any literature after 1960. Moreover, it would have been helpful if summaries in English had been appended to the seven sections in French and the two in German. However, its shortcomings are few, and the treatise is authoritative, comprehensive, impeccably edited, and quite readable. It is now and probably will be for some time the standard reference work on histamine.

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Marine Science

The Encyclopedia of Oceanography. RHODES W. FAIRBRIDGE, Ed. Reinhold, New York, 1966. 1037 pp., illus. $25. Encyclopedia of Earth Sciences, vol. 1.

The publishers obviously like the hard sell: "Unprecedented in concept, brilliant in execution, absolute in authenticity," says their blurb. A soft sell is preferred by the editor, who writes in his preface that he "has tried to remain unbiased, even when opinions diametrically opposite to his own are stated (sometimes with great emphasis!)." He was fortunate to find so many distinguished contributors, whose "labors were donated freely for the good of our science." "The major portion of the editing costs were underwritten to the tune of several thousand dollars by the editor and his wife. So it has been a labor of love."

The product of this vast enthusiasm is a large book containing 245 articles by 126 authors. The editor himself has contributed to 59 and his colleague Takashi Ichiye to 22 of them. Individual contributions are often of a very high quality, with the essentials of complicated subjects set down in a way at once fair, brief, and readable. Perhaps the most useful are those that describe the marine geology and physical geography of many of the interesting ocean areas. These contributions alone will earn the book shelf space in many reference libraries.

There are some articles that seem less firmly based, but the difficulty in producing an encyclopedia is, one imagines, less with the individual contributions than with the choice of topics and the overall balance. Symphonies are harder than sonatas. In the present volume marine geology dominates, followed by marine physics, with marine biology well behind. The words *bacteria, fish,* and *mammal* do not occur in the index, though there is a two-page article on nekton. One even gets the impression that the amount of space allotted to a given topic is roughly in inverse proportion to its difficulty. This might also apply to topics within disciplines: seiches get 14 pages, tides 11, ocean waves 5. There is, to my mind, little justification for an entry on vector analysis, or for one on fluid mechanics which does not refer to the geophysically important effects of rotational forces: large-scale motions are almost always quasi-geostrophic. (If you look up the entry on "geostrophic motion" you will find a reference to a later volume, but there are implicit definitions under several other titles.)

Altogether this is a book which improves on acquaintance. There is more in it than the list of entry-headings or the index would indicate, to say nothing of the many references it includes. And the editor promises volumes on atmospheric sciences and astrogeology and on geomorphology, and a further 13 volumes on various aspects of geology. He has taken on an immense task.

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