

these observations were made, a great deal of information has accumulated about fatty acid metabolism. Much of the material published before 1970, particularly pertaining to higher organisms, has been assembled in this logically organized volume.

The book is composed of nine chapters of somewhat uneven quality. The best part includes the first four chapters, which consider, at some length, fatty acid biosynthesis, the transport and metabolism of free fatty acids, and the relationships between carbohydrates and fatty acids as energy sources.

The first chapter, on fatty acid synthesis by avian and mammalian systems, is quite complete, with discussions of the purification and properties of the enzymes involved and of the mechanisms of their action. There is a brief and somewhat weaker section on diseases involving abnormalities in fatty acid synthesis. Since, with the exception of Refsum's disease, not a great deal is known about such disease entities, the section might better have been omitted. The treatment of transport is, despite its brevity, quite thorough, especially with respect to the dynamics of the unbound free fatty acid pool and of free fatty acid uptake by cells from different tissues. The chapter on metabolism covers not only oxidation and esterification but uptake, penetration, intraorganelle transfer, and the regulation of all the preceding. There is also a balanced discussion of the action of the various lipases which control tissue levels of free fatty acids and their derivatives. These enzymes are themselves controlled by various hormones along with regulation by such materials as glucose and hydrogen ion. The relationships of carbohydrates and fatty acids as fuels in humans are discussed in a chapter which also covers the control of these relationships by hormones, substrate concentration, and enzyme activities. There is a very good section describing the glucose-fatty acid cycle in several of the major tissue types and organ systems. These chapters are all distinguished by thoughtful and successful attempts to fuse isolated data into physiological constructs.

The next three chapters, on the physiological functions of fatty acids, endogenous control of free fatty acid metabolism, and the effects of free fatty acids on atherosclerosis, though interesting, are incomplete. For example, no attention is paid to current information about the functions of the

essential fatty acids as membrane components. Of the hormones that influence the metabolism of free fatty acids, only insulin and the catecholamines are discussed. There is no treatment of the relationships between the different tissues and the mechanisms by which they act upon free fatty acid metabolism.

The last two chapters, on pharmacological control of free fatty acid metabolism and on analytical procedures, are excellent. The central role of cyclic adenosine monophosphate in regulating free fatty acid levels is considered at sufficient length, and other pharmacological agents are also adequately treated. Of special interest is the consideration of the therapeutic uses of the prostaglandins and of such additional commonly prescribed drugs as clofibrate, anorexants, antianxiety and antipsychotic agents, antidepressants, and sedatives. The chapter on analysis is complete, indeed almost exhaustive, covering most of the modern techniques that have been adapted for free fatty acids. On the basis of the material in this chapter an informed choice of methodologies to cover most needs could be made.

In general, the book, though uneven, is well done. The larger and more general chapters provide excellent reviews of their respective areas until the cut-off date of approximately late 1969. The book should prove valuable as a background resource for individuals entering the field or wishing to acquaint themselves with it.

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## Earth Science

**The Encyclopedia of Geochemistry and Environmental Sciences.** RHODES W. FAIRBRIDGE, Ed. Van Nostrand Reinhold, New York, 1972. xxii, 1322 pp., illus. \$49.50. Encyclopedia of Earth Sciences Series, vol. IVA.

This encyclopedia is, according to the editor, a comprehensive reference source designed to provide rapid and accurate access to the sources of information comprising the science of geochemistry. "Every element in nature and all important chemical cycles and processes are treated." It is surprising to find that this entire field, plus the environmental sciences as well,

can be comprehensively covered in the confines of one volume of this size. Examination of a broad cross-section of the some 400 articles, however, discloses that Fairbridge has done a very commendable job in treating the important aspects of the field of geochemistry. The 10,000-odd index entries and extensive system of cross-reference make it easy to find articles on specific topics and the other articles in the encyclopedia related to these topics.

In the preface, Fairbridge sets the stage with a brief history of the major developments in the field of geochemistry, a paragraph on natural resources, instructions for the use of the encyclopedia, and a list of some of the more important basic geochemical references. Turning to the articles themselves, I found the general quality to be amazingly good, considering the large number of contributors and the great diversity of topics. The skill of the editor is reflected in the uniformity of style found throughout the book. Most of the articles contain enough detail to provide the basic background information to lead one into more specialized treatments of the material. Each article is followed by a list of some of the more important papers dealing with the subject, thus providing an entry into the literature.

The majority of articles deal with what I would consider geochemical topics, although the title also implies coverage of the environmental sciences. In the "environmental" vein Fairbridge has included articles on conservation, natural resources, environmental pollution, medical geology, and mineral particles in relation to human disease. In addition, this is perhaps the only recent scientific reference volume in which one can find a comprehensive review (and a quite interesting one) of the "science" of water divining (dowsing).

The book is well manufactured on paper of good quality, the print is easily readable, and the illustrations are adequate, although in some cases larger lettering would be desirable. *The Encyclopedia of Geochemistry and Environmental Sciences* will be a useful volume for persons desiring a concise, readable reference on geochemical topics.

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