of life in the midst of sharply contrasting peoples, developed peculiarly interesting human values the characterization of which is an endlessly challenging problem. Widely diverse among themselves, they nevertheless exhibit a striking unity when set against the solvent flow of merging societies around them. Studies have by no means always been centered on the depiction of the essential Pueblo qualities. As it should be in an attempt to understand any important human phenomenon, investigation has proceeded from many different standpoints. Periodically the varied results have had to be assessed to determine whether or not any direction can be discerned. This is the third major effort during the past 50 years. The result is, as the editor says, a specialized book of interest primarily to those already initiated in Pueblo studies.

The range of topics is wide. There are chapters on the latest speculations by archeologists regarding reconstructions of Pueblo prehistory; the ecological context of ceremonials; the history and results of contacts with other peoples; the various systems of kinship relations; Pueblo languages and techniques for language study; world view and the meaning of ritual clowning; overall patterns of religious thought and practice; literary forms and functions; traditions in music; and demographic factors affecting acculturative change; and finally there is a useful assessment of each contribution by the author of the last synthesis (in 1950) of our knowledge of the Pueblos, Fred Eggan of the University of Chicago.

At least five contributions set new goals and augur important developments in Pueblo studies. One of these is the effort by Richard Ford to develop an "ecological perspective." He carefully defines those features of the physical and human environment which might be quantified to show how Pueblo rituals constitute adaptive mechanisms in an environment of climatic extremes. The paper is programmatic, and it is entirely possible that data are so fragmentary that precise quantification will continue to be elusive. Nevertheless, this clearly conceptualized approach offers the prospect of an important new dimension in our understanding of the already extensively described Pueblo ceremonial life.

Another contribution places us on new ground for the analysis of processes of cultural change. Albert Schroeder discusses what he calls ethnohistory. It is clear that he refers not to history as the Pueblos themselves understand it, but rather to historical research which makes use not only of written documents but also of ethnographic and archeological information. The essay includes many exemplary rules for the synthesis and interpretation of such records which, if excerpted and put together, would make a useful little manual. The important part of Schroeder's essay is his formulation of six phases of Pueblo history based on the conditions under which contact took place and the processes of cultural change which were dominant under those conditions. This has not been done before with this degree of consistency and discernment of what is relevant to the understanding of overall and long-term processes of Pueblo cultural development. It would help for continuing application of the scheme if the assumptions underlying the phase formulation were made more explicit.

Kenneth Hale advocates a means for widening the base and improving the quality of the study of Pueblo and other Indian languages, namely, training Indians not merely as informants, as has been customary, but as full-fledged linguists. He offers as a demonstration a tour de force in the form of 20 pages of linguistic analysis by a Papago linguist, Albert Alvarez, in whose training Hale has participated. The 20 pages are in Papago (with translation) and consist of Alvarez's discussion of what he calls "the sharp-mellow distinction in Papago stop consonants." The value of this approach does not need to be demonstrated in a Pueblo language to be convincing.

Dennis Tedlock's discussion of Zuni oral literature opens up another perspective of some importance. Drawing on his field notes as well as on published texts by anthropologists, he brings us to the threshold of a new illumination of Pueblo literature. The employment of an analysis of formal elements and, more important, what he calls "ethnopoetics," that is to say, Zuni "literary criticism" which embodies Zunis' own classification of literary forms and some of their meanings, seems to open the way to more basic understanding of Pueblo literature.

The editor's formulation of a goal for Pueblo studies in terms of world view seems to me of great importance. This goal is not actually new, but Ortiz's incisively defined concepts are new in Pueblo research and give promise that the special quality of Pueblo culture which has magnetized anthropological (and nonspecialist) interest for so many years can be systematically investigated. The concept guiding this approach is one which has been worked with by others such as Geertz and Lévi-Strauss—the "structure of reality," the fundamental ideas regarding space, time, and being in terms of which Pueblos see and seek to understand the universe. The application of the approach is carried out with respect to a small segment of Pueblo culture, ritual drama and particularly the ceremonial clown, but Ortiz makes very clear the possibilities which use of the concepts and of structural interpretation offers for discovering the foundations of Pueblo thought.

This volume is timely in the sense that Pueblo research badly needed assessment, extremely useful as a summary of results to date, and, most important, direction-pointing for continuing work. The School of American Research in Santa Fe should be congratulated for sponsoring it. It appears to me that the next step in pulling together and giving guidance to Pueblo studies would be another symposium devoted to the subject of "The Pueblos in World Perspective."

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Fatty Acids

Biochemistry and Pharmacology of Free Fatty Acids. W. L. HOLMES and W. M. BORTZ, Eds. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). x, 398 pp., illus. $23.50. Progress in Biochemical Pharmacology, vol. 6.

The importance of free fatty acids as immediate sources of metabolic energy for mammals was not recognized until the 1950's. This delay is ascribable to their low concentration in the circulation; appreciation of their major quantitative and qualitative roles awaited recognition of their extremely high turnover rate and the more general recognition that flux magnitude is as important as concentration. At about the same time, it was also shown that adipose tissue was a major dynamic depot for free fatty acids stored in the form of triglycerides which upon hydrolysis release them to the circulation. Since

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, anorexiants, 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 cutoff 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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