that it should analyze culture process, yet they emphasize the separate events and individuals, the discrete periods that may or may not be periods of stability and "puzzle-solving" and that may or may not have been transformed according to some model for change. They suggest that archeology should explain the past, yet they do not explain archeology's past.

For instance, our implied rise from ignorance to the verge of truth, though emotionally satisfying, casts those who speculated into the inner circles of superstition. Yet we should assume that theory of the day was fitted to facts as they were then conceived. If these relations were not explicated completely (they never can be), then it is the job of the historian to uncover them. Or, again, the rise of the new archeology is traced, but is it explained? Is it the product of an inevitable vector of change—scratch an archeologist and you'll find an evolutionist? Or is it the creative synthesis of one or a few men? Both are implied. Was it purely a cerebral process, or did new techniques —carbon-14 dating, statistics—illuminate irreconcilable flaws in culture historical theory? The emphasis on more scientific research is noted. But what was the effect of Big Science? Did radical shifts in the source of the funding of archeological research from private collectors and museums to the National Science Foundation change the stated goals of archeology? Did they change the practice? These are significant historical questions to which satisfying historical answers could be given. In this book they are not, and one senses underlying uncertainties about what satisfying explanations look like and the theoretical system from which they should be derived.

Thus the paucity of substantive explanatory accomplishment that the authors note for the new archeology also characterizes their history. And the lack of integration of diverse lines of inquiry into holistic models for cultures and culture change also is found here.

Willey and Sabloff's discussion of other shortcomings of the new archeology both highlights and obscures central methodological objectives defined by it. These objectives are, first, that the general should be sought in the particular; second, that generals that seem to account most successfully for cultural stability and change should be the primary focus of explication and analysis; and third, that these generals and their consequences should be confirmed by testing in repeated and diverse empirical contexts.

In contrast to what they feel to be more restrictive suggestions of new archeologists, they approve the direct use of analogies taken from ethnography to explain archeological data, the current diversity of problems, and the defense of non-logical-positivist models for explanation. But it is precisely these activities that contribute to lack of accomplishment and integration. In using ethnographic analogy archeologists have inevitably omitted theoretical analysis of and justification for the posited identity of past and present cases or the observed relation between behavior and material form. Such analogies implicitly assert that certain associations occur under certain conditions, that is, they are based on implicit generalizations, and examination of their general aspect would advance behavioral theory. Ethnographic analogy may produce the feeling that the archeological record has been explained, but it has not led to the explication or testing of theory.

Diversity can be a weakness as well as a strength. Evolutionary theory, ecological theory, and systems theory provide a gigantic umbrella under which many problems can be and are pursued. They do not in themselves provide the stuff of researchable problems. There is little debate and less agreement on the adaptive role of forms of, for example, population growth, technological specialization, social interaction, political centralization, or ritual performance. There have been creative suggestions, and research on such general problems is widely known and highly honored. But there are no communities of researchers that agree on the critical generals and then investigate them. In Thomas Kuhn's recent distinction, archeology is problem-seeking rather than puzzle-solving.

The heat generated by debate over method and forms of scientific explanation may illustrate a principle of organization, namely, when unsure of what to do organize a committee and discuss how to approach the problem. There may be a need for methodological debate, but it is tragically irrelevant in the absence of agreement about the processes to the investigation of which method should be applied. When such agreement is attained, one senses that the proper logical form for the explanation will be of little moment.

Both explicitly and implicitly, then, Willey and Sabloff provide insight into the state of current archeology and its development. I would have preferred more intensive and extensive analysis of intellectual trends. But this short book, full of drawings and photographs that illustrate visually the history of the field, gives one a good sense of the men (but, unfortunately, few women) and the work that manifest the processes of intellectual change. Its richly descriptive text and its extensive bibliography make it an invaluable source book. Even those familiar with the subject are likely to discover little-known and surprising details of acheological history that have been carefully uncovered by the authors. And if, as the archeologist Mark Leone has suggested, archeologists are changing their understanding of the world of scientific research and their place within it, we can expect future editions by the authors or their students to combine with solid chronicle explanation of the processes and their products.

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Conserving Whales

The Whale Problem. A Status Report. Papers from a conference, Shenandoah National Park, Va., June 1971. WILLIAM E. SCHEVILL, G. CARLETON RAY, and KENNETH S. NORRIS, Eds. Harvard University Press, Cambridge, Mass., 1974. x, 420 pp., illus. $12.50.

The whale problem is one of regulating man's activities on the high seas. The authorities on whales concede that some species have been so reduced in numbers that we should no longer kill them but point out that no species has been exterminated by whaling, yet. The Establishment of the International Whaling Commission admits that it failed in the past to control the killing of whales, but they are gaining strength and authority and if everyone will believe in them and attempt to understand them, all will be, they hope, if not well, at least much better than it has been. At least the infamous "blue whale unit" has been abandoned as a management device and quotas have been set. Some people do not believe all these things, and want us to stop killing all whales now, and send us broadsides advocat-

ing the boycott of products of nations they suspect of ignoring all the fine resolutions that have been made in the board rooms of the whaling conventions. Much of this agitation comes from Americans, and those who still hunt whales may remind us that ours was the land of Moby Dick and all the whales our great grandfathers slaughtered for oil and scrimshaw and now it is their turn to kill the whales that are still in the sea for the more worthy purpose of human food. So the whale problem is that everyone else is doing wrong and the whales belong to all of us. The problem is not whales but human nature, not that human nature is completely immutable but that it may change at different rates with different people.

There has always been a contradiction in this whaling business; Captain Scammon, a keen student of the natural history of whales, did not believe in killing them on Sunday but expected his crew to make up for the layoff by killing twice as many on Monday. So at last the United States would atone for Captain Ahab, and in 1970 declared that eight species of whales were officially endangered species and that no parts or products of these whales could be brought into the United States (or, for that matter, sold within the country, so that antique dealers and curio stores can no longer sell scrimshaw or sperm whale teeth even if they came from grandfather's attic). At the same time a conference was called for to discuss matters of biology and conservation of the large whales. Accordingly an International Conference on the Biology of Whales was held in 1971 on the Blue Ridge of Virginia. Representatives of ten nations concerned with whaling and the biology of whales attended; the Russians, although invited, did not attend. Although this book, the result of that conference, is reproduced in unjustified typescript, it has taken unconscionably long to prepare. Such an important conference as this deserved a high-speed effort.

Everybody has tried to be objective, and in addition the protectionist point of view is specifically stated, by Scott McVay. The cetologists include almost everyone identified with the subject except Gilmore and some of the older workers, and among them are a number of authorities on the dynamics of exploited stocks. As might be expected, the participants conclude that we still lack much of the essential knowledge of population structure, of migration patterns, and, most important, of the ecological significance of whales in the trophic structure of the sea and emphasize the need for more research and the application of newer technological advances such as radiotelemetry. Not much of this has happened, however; "The International Decade of Cetacean Research" is yet to begin. The blue whale unit was abandoned after the conference occurred, and J. L. McHugh's review of the International Whaling Commission is a useful and up-to-date summary which, if read, should bring some of the blood pressure down. There is much valuable factual information in this book, which will accordingly be essential to all who are concerned in one way or another with the "whale problem," including those who believe that the whales belong to all of us and must be protected for the benefit of all, most of whom may never see a living whale.

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The Feldspar Group

Feldspar Minerals. JOSEPH V. SMITH. With the assistance of Brenda F. Smith. Springer-Verlag, New York, 1974. Vol. 1, Crystal Structure and Physical Properties. xx, 628 pp., illus. $40.10. Vol. 2, Chemical and Textural Properties. xiv, 690 pp., illus. $42.50.

The feldspars are the most abundant group of minerals in the earth's crust, they are used universally in the primary classification of all but a few igneous rocks, and because of the solid solution between the alkali feldspars and the sodium-calcium feldspars they play an essential role in petrogenetic interpretation. It is not surprising, then, that the feldspars have attracted more attention from crystallographers, mineralogists, petrologists, and geochemists than other mineral groups have received. The task of sorting, sieving, integrating, and, in some cases, making an assessment of the current position is one that few are so well equipped to undertake as Joseph Smith.

The author's description of the work as a "symphony on feldspars" is not presumptuous. These two volumes deal with crystal structures, physical properties, experimental techniques, chemical properties, growth, diffusion, defects, and intergrowths. The third volume will cover thermodynamic properties and phase relations and finally feldspar parageneses. For nonspecialists, the author has provided an extended but very welcome summary, which leaves the reader in no doubt that there are feldspar problems as yet unresolved. This summary sets the style of the work as a whole. The complexities of the underlying structural features and of the resulting properties of both the alkali feldspars and the plagioclase series are presented with admirable clarity; lack of data is not glossed over, and work of doubtful precision and reliability is not spared. Discussion of the more controversial topics and conflicting hypotheses is well balanced, and, commendably, the author's own convictions and prejudices are clearly stated.

The encyclopedic reporting of the literature leads inevitably to a style that can be disconcertingly abrupt. Much of the account of the theory of zoning reads like a tabulation of short notes on the source material. It might have been more useful had the author summarized conflicting contributions, data, and hypotheses. Overall, however, the format and presentation are clear and attractive, the many figures and diagrams are exceptionally well executed, and the work is enhanced by well-chosen and excellently reproduced microphotographs and electron micrographs.

As a work of reference covering all aspects of the feldspar group, the book will be widely consulted, not only by feldspar specialists and more general crystallographers and mineralogists, but by petrologists and geochemists. In synthesizing almost all that is known about feldspars, Smith has produced an outstanding work that will remain the definitive statement on the subject for a long time, especially if he carries out his promise to provide further volumes to cover developing research at 10-year intervals.

Although the price may limit the number of purchases by nonspecialists, *Feldspar Minerals* is an essential piece of equipment for all earth science departments. The volumes will become well thumbed soon after they appear on the library shelves, and two sets will almost certainly be needed.

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