here by Flannery will provide some of the key data and interpretation bearing on this major anthropological problem.

Several papers are concerned with regional settlement surveys of ancient complex societies. Two of the best are by J. Ward-Perkins for central Italy north of Rome, and R. Adams for southern Mesopotamia. Both authors have only limited control over functional variability within or between their sites, and thus they cannot yet adequately describe the successive settlement systems they are dealing with. They can, however, delineate changing regional settlement patterns over broad areas throughout a very considerable time period, and thus make some very sound inferences concerning a variety of cultural processes. Ward-Perkins's study has the additional advantage of having good historic documentation for much of the time period of interest, and his findings may have some applicability to wholly prehistoric situations elsewhere: he finds that major changes in settlement pattern occur in the context of either the construction of new communication-transportation arteries or a massive breakdown in effective governmental authority.

A final theme of great interest is an explicit effort to define the state and process of urbanism. This is a problem that has plagued archeologists for decades. There have been several attempts to provide definitions of urbanism that are useful in a prehistoric context—but these have often proved both imprecise and productive of sterile argument. This problem stems in part from a common failure among prehistorians to consider some of the theoretical bases for distinguishing "urban" from "rural" in different kinds of societies. Papers by M. Smith, D. Grove, and B. Trigger all emphasize the inadequacy of the size and density variables generally employed by archeologists to differentiate urban from nonurban communities: there is simply too much overlap for these to be readily useful. These writers, and others, stress that functional considerations are the key variables—as many archeologists have long recognized. Furthermore, the point is well made that urbanism probably cannot be defined on an absolute basis, cross-culturally, but must be considered in a relative sense for each system under consideration. These are all critical points. The main problem, however, is not directly attacked here: how are we to apply these considerations to prehistoric archeological data?

Two general criticisms of the volume come to mind in conclusion: (i) there is an inadequate treatment of the recent highly relevant advances in the methodology of functional inference; and (ii) there is too limited useful application of many stimulating theoretical issues to bodies of archeological data. The latter deficiency is particularly significant, and it may well indicate that many of the archeological data we now possess are inadequate for the kinds of questions we now wish to ask about process in prehistory.

JEFFREY R. PARSONS
Museum of Anthropology, University of Michigan, Ann Arbor

Philosophical Idea

Hierarchy Theory. The Challenge of Complex Systems. HOWARD H. PATTEE, Ed. Braziller, New York, 1973. xvi, 156 pp., illus. Cloth, $6.95; paper, $2.95. International Library of Systems Theory and Philosophy.

This is a book of six essays on the general subject of hierarchies in the natural world. The point of the whole book is to convince the reader that it is important to analyze natural systems as hierarchies; consideration at one level alone is bound to have severe limitations. It would seem to be something we all knew: has the book made either the need or the process any clearer? The advantages gained, I fear, are very slight despite some excellent essays and some original ideas. The good essays are descriptions of particular hierarchial systems. The two on development in living organisms by Clifford Grobstein and James Bonner are to be recommended. Among the good ideas special note should be made of Herbert Simon's temporal model for the evolution of hierarchial levels. He shows that the grouping of events in time produces stability points that do not disintegrate and that provide stepping-stones for future change. Another important idea is that of Richard Levins, who points out that through natural selection a complex system is bound to evolve into a system of interconnected subunits or hierarchies; hierarchial levels do not all arise by the compounding of simpler ones; they also may arise by the subdivision of a complex system.

The book raises two important points, both of which are found in the larger contributions of the editor, Howard Pattee. First, whereas most of the authors, like Levins, assume that natural selection plays a major role in the formation of biological hierarchies, Pattee adopts the mathematician-physicist position that not only is Darwinian theory basically suspect but there must be a more fundamental "hierarchy theory" that applies equally to physical as well as biological hierarchies. Second, the assumption is made that there is a "hierarchy theory" to be discovered and that once established it will shed an enormous amount of light on all of nature. I find myself quite skeptical on this point. It seems to me that it is essentially a philosophical point, and that in the past the track record for the illumination of science by philosophy has been poor. On the most esoteric level, with all its analytical power, symbolic logic did little for science other than comb out some of the nonsense. A better example might be the earlier interest in emergent evolution and holism, which were to be theoretical frames that would provide greater insight into the nature of biological complexity. To a very limited degree they were helpful as a way of organizing thoughts, and the same can be said of looking at living and nonliving systems as hierarchies (or as objects of "systems analysis"). But, in my view, the advantage gained by such "hierarchy theory" is, and will remain, modest, and hierarchy theory is not, in itself, likely to be the avenue of large, exciting advances in either physics or biology.

J. T. BONNER
Department of Biology, Princeton University, Princeton, New Jersey

Antarctica

Antarctic Geology and Geophysics. Proceedings of a symposium, Oslo, Norway, August 1970. RAYMOND J. ADIE, Ed. Universitetsforlaget, Oslo, 1972. x, 876 pp., illus. $65. International Union of Geological Sciences, Series B, No. 1.

This comprehensive volume on Antarctic geology and geophysics contains 126 papers (seven in abstract form only) which were presented at a symposium organized by the Scientific Committee on Antarctic Research (SCAR). It is probably the most complete and up-to-date work on the structure of the Antarctic continent and surrounding areas now in print. There