cyclic sedimentation (focusing on limestone-marl and limestone-shale rhythms) and black shales (evaluating the interplay of cyclic and event stratification on poorly oxygenated bottoms).

The section on cyclic sedimentation leaves the reader wanting. G. Einsele presents the concepts for cyclic sedimentation of various types and time scales, but neither he nor the other authors (seven papers and two abstracts) adequately present the evidence from their rocks that cyclic sedimentation is, in fact, the cause for the centimeter- to decimeter-thick limestone-marl or -shale alternations focused on here. Most of the effort is spent in attempting to explain the role (if any) of early- and late-stage diagenesis in creating the bedding partings, shaly interbeds, and limestone layers or in evaluating the significance of stable isotope data. Perhaps this is to be expected from a research symposium on a concept that has been embedded in the literature for over 20 years. However, one leaves this section with the feeling that while the enthusiasts of cyclic sedimentation are refining and quibbling over fascinating details others are going to restudy the same rocks and remove them from the category of cyclic deposits. The paper by P. J. Barrett is such a restudy of layered radiolarian chert of Triassic age from the Italian Apennines, in which he offers evidence that the layers are of turbidite origin in a deep basin.

W. H. Berger provides a breath of fresh air at the end of the section on cyclic sedimentation by summarizing recent evidence from the Deep Sea Drilling Project on the role of long-term climatic steps through the Cenozoic and the resultant positive and negative feedbacks (especially albedo and carbon) on deep sea sedimentation.

The section of the book on black shales is a rather commendable attempt to reevaluate the role of episodic events on stratification in poorly oxygenated bottoms—an environment in which annual and longer-term cyclic sedimentation seems to be well preserved. Following an overview of the concepts and evidence for black shale formation by A. Wetzel, ten papers struggle with the origin of black shale sequences. These papers draw on a variety of sedimentologic, paleontologic, paleoecologic, geochemical, and stable-isotope characteristics of the rock sequences.

This book, the outgrowth of a workshop held at the University of Tübingen, is not a textbook, nor is it a balanced review of the causes for stratification. It is, rather, a documentation of the concepts, approaches, and conclusions of a significant group of researchers attempting to understand cyclic and episodic event stratification in the marine environment. Of the contributors 27 are from West Germany (15 from Tübingen), seven from the United States, six from the United Kingdom, and one each from Canada, the Netherlands, and Switzerland. Only two papers and two abstracts focus on American rock sequences.

As the concepts of and evidence for tempestites were evolving in Europe, a parallel recognition of episodic event stratification was evolving in America and has culminated in a recent surge of publications on "hummocky" (referring to an undulatory layering thought to be produced by shallow marine storm erosion, resuspension, and deposition) and allied stratification. This book, however, contains a somewhat more mature development of evidence and concepts for marine storm stratification than is present in American literature. In this it must serve as a cornerstone for future research. Einsele and Seilacher deserve commendation for publishing the proceedings in English so we might more easily learn from and interact with the wealth of sedimentologic research under way in Europe.

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Pteridophytes

Ferns and Allied Plants. With Special Reference to Tropical America. ROLLA M. TRYON and ALICE F. TRYON. Habitat photography by Walter H. Hodge. Springer-Verlag, New York, 1982. xiv, 858 pp. $148.

This handsome volume is the only modern comprehensive treatment of the tropical American pteridophytes and as such will be, as the brochure announces, an important source for years to come. The book contains a wealth of useful information of value to pteridologists and to other botanists. For each genus synonymy, description, classification (often to subgenus or major species group), ecology, and geography are presented and information on spores and chromosome numbers is given. Selective bibliographies and maps showing the American distribution of each genus are also provided.

The format is attractive; wide left-hand margins make the book easy on the eyes and allow space for annotation. Most of the illustrations are outstanding, including excellent habit photographs by W. H. Hodge and many scanning electron photomicrographs of spores.

The introduction is brief. The discussion of fern systematics has a pre-Darwinian ring to it: "The classification presented here is based on character similarities rather than on presumed phyletic relationships." A classification is outlined down to the level of subgenus. (Curiously, the level of tribe is adopted in place of subfamily.) At the family level there is neither extreme splitting nor extreme lumping. The key to families has many exceptions to the leads, however, and the use of trichotomies and the misuse of terms (such as "synangium" in *Ophioglossum* and "joint" for the internode in *Equisetum*) are unfortunate. The remainder of the introduction consists of discussion of biogeography, spores, and chromosome numbers. These subjects are obviously principal concerns of the volume, but although the material provided concerning them is interesting and useful the emphasis on them tends to skew the treatment rather than give a balanced view of fern characters. The high degree of parallelism in spore sculpturing and chromosome number makes the value of such analysis often negligible above the generic level. Sporophyte morphology and anatomy and the gametophyte generation are neglected.

At the genus level the Tryons' taxonomy displays extremes both of lumping and of splitting. *Tectaria* and *Dryopteris* are viewed very broadly to include all closely allied genera, and *Asplenium* swallows up *Phyllitis*, *Ceterachopsis*, and *Antigramma* but curiously not *Holodictyum* or *Camptosorus* (usually the first segregated genus returned to *Asplenium*). By contrast, the cyatheoid tree ferns, Rolla Tryon's specialty, are maintained as six separate genera. The polypodioid (but not grammitid) ferns are split to the extreme, with all the segregate genera recognized except *Phlebodium* (into *Polypodium*) and *Hyalotrichopsis* (into *Campyloneurum*).

The literature citations lack some major papers, notably in cytology one by Lovis (1977) and one by Wagner and Wagner (1980).

The abundant typographical errors, grammatical lapses, and inconsistencies in capitalization of book titles are disappointing in a work of this magnitude. Sentence construction is occasionally awkward and confusing. Careful proofreading would have been helpful.

The danger with any work as large as this, no matter what its quality, is that it tends to give the impression that work on its subject is essentially complete. Bower's three-volume treatise *The Ferns* in

the 1920's stalled fern morphological research for 25 years. The Tryons do point out some matters that require further work, but these indications are not the major point of the book and are obscured by the mass of other data.

Overall, *Ferns and Allied Plants* is a very useful reference volume but should be used with a critical eye.

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Social Change in Early Europe

Ranking, Resource and Exchange. Aspects of the Archaeology of Early European Society. Papers from a symposium, Philadelphia, May 1980. COLIN RENFREW and STEPHEN SHENNAN, Eds. Cambridge University Press, New York, 1982. viii, 168 pp., illus. $39.50. New Directions in Archaeology.

Colin Renfrew has been a key figure during the last decade in applying ideas generated by the "new archeologists" of the United States, such as Lewis Binford, and of Britain, such as David Clarke, to the archeological data of prehistoric Europe. He and his colleagues have been instrumental in developing a new and dynamic approach to the study of the prehistoric past, with attention shifting from the traditional subjects of typology, chronology, and culture history to examination of the processes of change in ancient societies, especially change in economic and social behavior.

This volume provides a sampling of results of such approaches to data from prehistoric and early historic Europe, with emphasis on changes reflecting the development of ranking and the formation of hierarchies among individuals, settlements, and monuments. Renfrew's introductory paper deals with the problem of defining "ranking" and identifying it in the archeological record. Fifteen papers treat specific problems in the archeological material and suggest models to account for the patterns observed. They are arranged in four groups, concerning respectively the Neolithic and Early Bronze ages, the Bronze and Iron ages, early states in the Aegean region, and the early medieval period. Throughout the papers is a strong emphasis on explaining economic and social change in terms of internal dynamics of societies rather than with reference to movements of peoples or long-distance trade relations.

The 15 case studies are for the most part clear and informative, briefly presenting data and then suggesting new interpretations of them. To cite only a few of the especially interesting papers, Sherratt proposes an economic explanation, revolving around exchange of cattle, for the beginning of ranking in early Neolithic eastern Europe; T. Champion describes the development of social differentiation during the Bronze and Iron ages in central Germany in terms of control of critical resources; Hodges relates the emergence of early medieval "gateway communities" to other changes of the time; and Arnold demonstrates the importance of the concept of cultural stress for understanding change in Anglo-Saxon England.

Critical discussions of the case studies, written by two discussants at the original symposium, Robert Whallon and Lewis Binford, are included at the end of the volume. These provide valuable balance, placing the papers in the context of current theoretical debates in the discipline of archeology. Whallon takes issue with the concept of "explanation" as exemplified by the papers, calling for the formulation of more general theories to account for changes than the case-specific mechanisms described in many of the instances here. Binford's principal criticism is that the authors assume that human behavior in the archeological past was similar to that of today. The authors do not deal with the methodological issue of how to derive information about the past from the meager physical remains that survive. Such concepts as prestige, rivalry, and display may not be appropriate to our analysis of past behavior in the same way as they apply to behavior in the modern world.

As Binford suggests, the authors of the individual papers might have benefited from a more critical appraisal of the sources of models used. Many rely heavily on the social-evolutionary schemes put forward by Service (*Primitive Social Organization*, 1962) and Fried (*The Evolution of Political Society*, 1967). Some make use of one or two ethnographic examples as sources of mechanisms to explain change apparent in the archeological data of ancient Europe. The evolutionary schemes cited and the models advanced by ethnographers are interpretations and possess no inherent validity. Instead of relying on other researchers' schemes for models, perhaps European archeologists can begin to develop models of change based upon the very rich and varied data available from the archeological past of Europe.

Some authors here freely use such terms as "prestige goods," "elite group," "status," and "control" in presenting their models for change. These terms are rarely defined, yet it is important that both authors and readers know exactly what is intended by them, both in terms of human behavior and in terms of their representation in the archeological evidence. Furthermore, as Binford suggests, it is necessary to ask to what extent such concepts from modern ethnography are applicable to the prehistoric past. All of these methodological points merit further discussion.

This volume is a valuable contribution to the growing literature on the interpretation of European archeological data in terms of changes in economic and social behavior and organization. The case studies show how productive such approaches can be, and the theoretical and critical essays draw attention to many different aspects of the principal issues under consideration. From this book the reader obtains a rich and varied view of current trends in European archeological research being conducted by an active group of younger archeologists trained in British universities.

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