

nant in the fossil record. Other trends established over shorter time scales appear not to be reversed by periodic mass extinction. Jablonski and Bottjer find that catastrophic perturbations appear not to influence environmental patterns in the origination of morphological novelties and corresponding taxa of marine invertebrates. Orders originate preferentially in shallow, onshore environments, whereas no such bias is observed for the origins of lower taxonomic units. The trends studied by Jackson and McKinney likewise transcend mass extinction events.

This book should serve as a model and stimulus for further studies of the interacting evolutionary processes that emerge at the different tiers of evolutionary time. It guides us to look for syntheses of abiotic, biotic, internal, and external causes acting at multiple hierarchical levels of biological complexity. Gould's three tiers alone may not be adequate, however, to identify all causal discontinuities in evolutionary time. Milankovitch climatic cycles have been identified elsewhere (by K. D. Bennett) as a separate tier of evolutionary time (a periodicity of approximately 20,000 to 100,000 years) falling between Gould's first and second tiers. Studies of marine invertebrates (Cronin and Ikeya) and terrestrial mammals (Heaton) of the Quaternary provide evidence for causal processes originating at this level. On a more microevolutionary scale, discrimination of the opposing causal processes of organismal versus interdemic selection would require further subdivision of Gould's first tier.

These papers demonstrate the exciting and unique role of paleontology in identifying the causal processes of evolution. All neontologists who have ignored recent developments in paleobiology should read this book to see what they have been missing. Even this explicitly paleontological account includes some important neontological contributions, emphasizing the complementarity of these perspectives. Dorit shows how the combination of comparative morphological and molecular phylogenetic data can be used to test hypotheses of intrinsic and extrinsic causes of evolution on a fine evolutionary time scale. Bleiweiss shows the importance of ecological studies for avoiding bias in the interpretation of fossil diversity. I hope that the major impact of this book will be to forge a synthesis of paleontological and neontological approaches which together will illuminate the dynamic causes of macroevolution.

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## A Sociopolitical Shift

**The Mississippian Emergence.** BRUCE D. SMITH, Ed. Smithsonian Institution Press, Washington, DC, 1990. xviii, 280 pp., illus. \$39.95.

Hierarchically organized Native American societies called Mississippian chiefdoms developed about a millennium ago in the eastern part of what is now the United States. Until recently, the immediate cultural antecedents of these ranked social systems were shrouded in mystery. Archeological work in several regions has at last begun to bridge the seemingly great chasm once thought to separate the acephalous tribes of the Late Woodland period from Mississippian period chiefdoms. *The Mississippian Emergence* is an ambitious synthesis of archeological information on this profound cultural transition.

The volume includes—ranked here in order of emphasis—compendia of basic observations on archeological remains, descriptions of the principal transformations in cultural systems, and models identifying the most fundamental determinants of cultural change. The studies focus on, but are not restricted to, the period A.D. 750 to 1150.

Single sites are the subject of four chapters. Two of these describe Mississippi River valley sites in Arkansas, Powell Canal (John House) and Zebree (Phyllis Morse and Dan F. Morse), and one covers the Range site in Illinois (John E. Kelly). Martha A. Rolinson describes a long-term research project at the Toltec mound center in central Arkansas. She also provides a valuable overview of previous excavations in the structurally complex mounds of major Mississippi River valley sites.

Two regional summaries focus on segments of the Mississippi River valley: the American Bottom in Illinois (Kelly) and the area between the Ohio and Arkansas rivers (Morse and Morse). Similar reviews cover eastern Tennessee (Gerald F. Schroedl, C. Clifford Boyd, and R. P. Stephen Davis), west-central Alabama (Paul D. Welch), and the Fort Walton area in the adjoining parts of Florida, Alabama, and Georgia (John F. Scarry). Presumed cultural boundaries within these regions are defined on the basis of site distributions and ceramic styles.

In the final chapter James A. Brown, Richard A. Kerber, and Howard D. Winters consider the role of trade in the late prehistoric Midwest and Southeast, particularly the use of prestige goods by elite groups to buttress superordinate social positions and to further their political objectives. An examination of utilitarian Mill Creek chert hoes, building on Winters's earlier work, shows how studies of artifact distribution

can contribute to the identification of prehistoric exchange networks.

This volume is particularly valuable as a guide through the morass of culture-specific detail, new and old cultural classification schemes, and debates over dating that dominate the archeological literature. New data from recent excavations are combined with already published information, much of it available only in technical reports with limited distribution. Emphasis is placed on defining regional cultural trajectories and the nature of accommodations to local biotic and social landscapes. The wide distribution of small quantities of nonlocal objects and evidence for warfare underscore the need for a closer examination of intergroup cooperation and antagonism.

As regional chronologies are becoming increasingly fine-grained, the timing of some critical transformations in evolving sociopolitical systems can be identified with assurance, whereas others remain as obscure as ever. It is apparent, however, that many significant cultural changes occurred rapidly—over periods spanning generations, not centuries. Taken together, these studies again show that there is no support for the often cited, but long outdated, idea that peripatetic people carrying a distinctive cultural baggage spread the Mississippian way of life. More limited population movement, however, took place in response to challenges posed by varied ecological and social settings.

Readers will not find lengthy discussions of current debates about cultural evolution here. When discussing particular regional trajectories, the authors repeatedly stress relationships among new subsistence strategies, especially a reliance on maize; population growth; and more complex forms of social organization. Other factors receive less attention, although Kelly discusses technological innovations in pottery and Brown *et al.* argue for the pivotal role of exchange in the origin of chiefdoms.

Suggestions regarding causal relationships, when made, are tailored to individual cultural sequences, although population growth and pressure are common themes. To simplify greatly, new subsistence and food-processing strategies fostered population increase (Kelly and Schroedl *et al.*) or resource acquisition practices were modified to feed more people (Welch and Scarry). In both scenarios, larger populations required more elaborated forms of sociopolitical organization. Members of the superordinate social stratum exercised some variable mix of political authority and managerial control over economic activities, and their exalted positions were legitimized in part by religious beliefs. Other chiefdoms subsequently

developed in competitive social arenas in response to their powerful neighbors (Welch).

The chapters accurately reflect the nature of current archeological research in the eastern United States. Since the late 1970s, well-funded surveys and excavations in areas threatened by construction projects have revolutionized knowledge about prehistoric cultures. This volume simply would not have been possible 10 years ago. Paradoxically, the strength of salvage projects—the opportunity to do otherwise prohibitively expensive work—is closely related to their greatest weakness; most of the authors, like their colleagues elsewhere, must try to make sense out of samples from projects whose location and scope are dictated by the needs of sponsoring agencies. Furthermore, several authors make extensive use of information and specimens from projects conducted many years ago. Despite well-known problems with existing collections, these materials are irreplaceable because modern land use practices have destroyed many sites.

Once again, Bruce Smith has been successful in assembling regional specialists to produce a reference work that will be cited

by archeologists for many years to come. These reviews of Mississippian origins in intensively studied parts of the Eastern Woodlands will serve as an impetus for much-needed comparable work elsewhere.

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## An Assemblage of Fossils

**Solnhofen.** A Study in Mesozoic Palaeontology. K. W. BARTHEL, N. H. M. SWINBURNE, and S. CONWAY MORRIS. Cambridge University Press, New York, 1990. x, 236 pp., illus. \$59.50.

The Solnhofen deposits near the German city of Munich are probably the most famous fossil deposits in the world. They yield a unique record of marine and terrestrial life buried nearly 150 million years ago in the fine-grained, limy muds of hypersaline lagoons. Articulated skeletons of fish, flying reptiles, and birds are preserved along with such unusual invertebrate fossils as insects

and jellyfish. In many cases there is evidence of soft structures like feathers and the skin of pterosaurs.

This account of the deposits is presented as a revised and updated translation of *Solnhofen: Ein Blick in die Erdgeschichte* by Werner Barthel. Barthel died in 1978, the year of publication of the German original. The bibliography of the present work lists over 40 references from 1978 or later. These references are widely cited in the text and so influence the discussion that it is clear that Swinburne and Morris have presented us with a new work rather than a revised translation.

The book is divided into eight chapters and has an appendix that includes a complete faunal and floral list for the Solnhofen Plattenkalk. The first two chapters give a brief history of limestone exploitation in the region around Solnhofen and the early development of fossil collections and describe the general geological setting of the region. The next two chapters deal with petrography and environments of deposition. These two chapters may be difficult for readers who lack a geological background. The rest of the book is written in a clear, readable

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