Prehistory in the Tropics

Adaptive Radiations in Prehistoric Panama. OLGA F. LINARES and ANTHONY J. RANERE, Eds. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Mass., 1980. xx, 530 pp., illus. Paper, $20. Peabody Museum Monographs, No. 5.

Adaptive Radiations in Prehistoric Panama is a substantial contribution to our understanding of the prehistory of Lower Central America. Although focused on western Panama, it presents both theoretical issues and data of widespread relevance. With its cultural ecological framework and systematic settlement pattern survey, it is a kind of study all too infrequent in Central American archeology; in both regards the book makes a major contribution and sets an example for others to follow.

The investigation was oriented toward reconstructing the evolution of a tropical cultural system. Environmental differences between the Atlantic and Pacific coasts are delineated, with the Bocas del Toro region on the Atlantic side being considerably wetter than and having a different annual weather cycle from the Pacific Gulf of Chiriqui.

Four major themes run through the book: tropical adaptive systems; diffusion of maize agriculture; the importance of lithic analysis in understanding tropical cultural systems; and the use of ethnographic analogy as an interpretative tool. The book's most important contribution is its demonstration of the great variability of tropical subsistence and cultural systems and the extent to which this variability contributed to successful adaptations.

Archeologically, there is a lengthy record of dietary remains, beginning in the preceramic period. Linares reports that the use of root crops, principally manioc, and tree crops, mainly palms, antedated the introduction of maize agriculture. Ranere also points out that hunting/gathering and early agriculture were not always mutually exclusive activities. Tree crops were planted and maintained, and apparently hybridization developed. House gardens and the attraction of animals to cultivated areas are important examples of the integration of components of tropical subsistence systems.

With respect to the introduction and distribution of maize in western Panama, time, location, and altitude were important variables. The first maize in the area appears to have been the Pollo/Nal-tel derivative of the Chapalote/Nal-tel complex, whose center of development is thought to have been the northern Andes.

Marine resources played a significant role in prehistoric diets on both coasts. Linares states that such resources provided the bulk of protein at both Cerro Brujo (Atlantic) and La Pitahaya (Pacific) and more than once proffers the opinion that the value of terrestrial resources relative to invested time is much higher than that of marine resources. Though this is perhaps true overall, it does not take into consideration the division of labor that marine resources allow, since mollusks and estuary fish can be collected by older people, women, and children. Well-established shellfish populations are also not as vulnerable to overexploitation as larger terrestrial fauna.

Ranere's work on preceramic sites in western Panama has begun to fill in a considerable time gap in the prehistory of Central America. His analyses of the preceramic lithics, which form an assemblage that is morphologically unique in the New World, have focused attention on changes in lithic assemblages as a measure of cultural and subsistence change.

One of the more interesting ideas is that specialists controlled stone celt manufacture. If this could be demonstrated, then the complex pattern of specialized production, use of celts to expand agricultural land, and the related emergence of complex societies would be a systemically valuable model. However, I am not convinced that the data are sufficient to establish the hypothesis. Raw materials were apparently easily available within the intercoastal network, and access to workshop sites need not have been limited to specialists. Although there was a general absence of by-products from celt manufacture in the archeological material recovered, this does not automatically imply specialist production at some other location. Excavations at most sites reported on were not sufficiently extensive to rule out simpler explanations, such as the existence of activity areas within individual communities or compounds. Celt manufacture and refurbishing may also have been carried out where the tools were used. Ranere's conclusion that many of the stone tools were used to make wooden tools is an important one.

Some insights into subsistence patterns are gained from comparisons with recent and contemporary peoples, but the authors do not attempt to integrate the ethnographic and archeological data in a structured way. This is unfortunate, since the data are clearly available for a strong pattern of analogs, and such analogs assume some importance in Linares's summary. Reports of the early Spanish chroniclers are mentioned, but little use is made of historical documents for the area.

In her conclusions, Linares broadly summarizes the prehistory of western Panama and examines what has been learned about cultural systems in the tropics and how they change. The possibility is raised that Talamancan foragers supplemented their diets with some root crops by at least 2300 B.C., when axes and celts first appear in the archeological record. As Linares notes, agriculture almost certainly began earlier in semiarid areas than in the tropics, and Panama was probably not the source of any important cultigens. The question whether horticulture is prerequisite to the invasion of forested habitats is raised; if "invasion" means the establishment of permanent, sedentary villages, then the answer is probably yes. From a "Boserupian" point of view, the richness of the tropical forest environment was sufficient as long as population densities were low and little intensification was required. The eventual development of ranked societies and ceremonial centers required intensification in forested areas that had previously been utilized extensively.

The Late Formative Village and Ceremonial Center period dates from 500 B.C. to A.D. 1 and is thought to have arrived fully developed from eastern Costa Rica. There is a great increase in the number of sites as part of a rapid but localized expansion. Linares describes systems of economic and possibly ritual integration through stone tools. Comparatively, she also questions the validity of dates as early as 500 B.C. for the Zoned Bichrome period in northwestern Costa Rica; however, these dates have gotten earlier (880 B.C., UCLA 2177A) with recent research.

For the 1500 years prior to the Spanish Conquest, Linares deals with the stimuli for coastal settlement and the origin of these settlers, revising somewhat her earlier views. She refers to this as the Pre-Conquest Coastal Settlement period. Support of larger populations through

intensification of marine resource utilization and access to coastal regional and long-distance trade patterns were probably important factors in influencing coastal settlement. Some of the clearest contrasts between the Atlantic and Pacific coasts come during this period; maize is still not in use in some areas of the former by A.D. 600, whereas it has been in use in some parts of the Pacific by at least 300 B.C. and probably much earlier. Linares suggests that a pattern of generalized resource exploitation impedes or delays the evolution of centralized polities, and this inference is borne out by the data.

The analyses in the book show a variety of approaches to archeological interpretation. The excavation methods are generally carefully described, and one is reminded of the particular difficulties of archeology in the tropics; all archeologists suffer under sometimes burdensome field conditions, but few have had a site literally wash away during a 70-hour deluge. Central America lacks any monumental domestic or public architecture, and features at the sites described in this book are limited to living floors, burial pits, caches, and other minor remains. Analytical emphasis is placed on settlement data, ceramics, lithics, and faunal and floral remains. Burial contexts are described when found, but additional information regarding age, sex, pathologies, dental conditions, and so on would have been welcome.

In this book ceramics are utilized to contrast inter- and intra-site relationships, to create part of the chronological framework, and to detect past movements and contacts of peoples and goods. Linares and the computer consultants with whom she worked at the University of Pennsylvania concluded that, for the ceramic problems she was approaching, comparable results could be achieved by hand-sorting and by computer and that hand-sorting was faster and more economical.

The book contains a wealth of data of relevance to other archeological work in Central America and the Intermediate Area. Although it is not possible in a single publication both to present a great deal of data and to compare them extensively with others' materials, more comparative material would have helped make many of the points advanced. Of closest geographical relevance, I question the lack of more detailed reference to Cooke's Central Panamanian data, Snarskis's Atlantic coastal Costa Rican material, and northwestern Pacific coastal Costa Rican material generated by myself and others. This lack of comparative data also affects the conclusions regarding some aspects of the research; although clearly presented, they are sometimes brief relative to the quantity of research that was done.

The book is a collaborative effort among 18 persons who participated in various phases of the research. In order to "maintain continuity in the discussion and presentation of ideas, but also . . . to make documentation easily available" the reports of the data are separated from and placed after the general interpretative chapters.

The first half of the book is better polished than the reports, which are of variable quality. It would have been helpful to have introductions to the individual reports, which would have helped provide continuity among them. Moreover, it is more difficult than the authors perhaps anticipated to go from chapter to report and back again to determine which cultural materials were associated in which contexts. There are occasional lapses in cross-referencing, but the absence of an index is the prime impediment. The lack of indexes in this monograph series, as well as in recent publications from other presses, is a serious slippage in standards of scholarly publishing. If extensive data are going to be published, then a basic aid for locating them must be included.

The quality of the printing and binding is commendable, and the illustrations are generally of good quality and show desired details. However, many of the illustrations, particularly of ceramics, lack scales or other pertinent information. Except in the soil profile of Report No. 17, no Munsell or other color notations are used in the book.

I reemphasize the importance of the data and ideas presented in this publication. Students of Central American prehistory and tropical cultural development will want to refer to it frequently.

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Micropaleontology

The Paleobiology of Plant Protists. HELEN TAPPAN. Freeman, San Francisco, 1980. xxiv, 1028 pp., illus. $95.

For a long time the focus in micropaleontology was on groups, such as the foraminiferans and radiolarians, that attract little interest among neontologists. Recently, however, there has been a broadening of focus to include the photosynthetic groups, about which a great deal more is known by neontologists. For example, much use is being made of diatoms and coccolithophorids in the Deep Sea Drilling Project, and palynologists are paying more attention to the nonpollen components in their preparations of organic-walled microfossils, such as the dinoflagellates, some of which seem to be particularly useful in petroleum geology.

There have been many books on nonphotosynthetic microfossil groups, but the photosynthetic forms have had to be studied from volumes that are either strong on fossils and weak on biology or vice versa. Helen Tappan has attempted to remedy the situation with the present massive volume.

The book is a compilation of information group by group. There are extensive accounts of the general biology of each group, not limited to features of paleontological interest. There are summaries of ecological information that are more extensive than in many other publications, although still superficial. There is an outline of the factors thought to be important in the deposition and preservation of each group. The fossil record and apparent evolutionary trends are concisely summarized. Although the book is not intended to be taxonomic, it contains substantial "tables," some running to 70 pages, outlining the classification of each group. There are extensive reference lists at the end of each chapter. The depth of treatment is indicated by the fact that the chapter on dinoflagellates runs to 237 pages, with over 100 illustrations, many of them composites. This is the most extensive biological treatment of the group available. The same applies to the chapter on coccolithophores. Many of the chapters could serve in a course on living algae.

The fact that one author has handled all this with a high degree of competence is sufficient grounds for admiration. Add to this the clarity of writing and the wealth of illustration, particularly photographic, and the success of the volume should be assured. What, then, are its shortcomings?

The groups covered in the text are not those that might be expected from the title. Although "protist" is not defined in the otherwise extensive glossary, it is evidently used here in the earliest Haeckelian sense to include both bacteria and "lower" eukaryotes, and not in the more widely used sense that excludes prokaryotes. The "Plant" of the title does not include fungi.

Given the decision to produce in effect