

grouse," which it is not. More serious is the entry on the banana (p. 44): "fruit of a palm domesticated in New Guinea. . . ." The banana is, of course, not a palm, and only a rather obscure species (*Musa fehi* CLG Bertero ex E. (DE) Vieillard) was domesticated in New Guinea. The common banana (*Musa x paradisiaca*) is an artificially created hybrid probably "stemming" from Malaysia. No doubt an expert in the classics would find more errors than I have, but at the very least this is a notably reliable work.

Archaeobiologists will find this book particularly useful. The archaeological information is reasonably up-to-date, though not always. (*Panicum* millet is said to have been domesticated in the Caucasus, p. 218; most recent evidence supports China as the source, but the question is still very open.) Archaeologists will want to supplement Dalby's book with site reports.

Ethnobiologists frequently need references on the ancient world, if only because students and the public are often aware of, and very interested in, ancient Greece and Rome. This is clearly the reference of choice, and is a very worthwhile book to add to one's library.

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Discerning Palates of the Past: An Ethnoarchaeological Study of Crop Cultivation and Plant Usage in India. Seetha Narahari Reddy. 2003. Ethnoarchaeological Series 5. International Monographs in Prehistory, Ann Arbor, Michigan. Pp. xi + 175; photographs, glossary. \$65.00 (hardcover), ISBN 1-879621-37-1. \$47.50 (paper), ISBN 1-879621-36-3.

It is a pleasure to read a well-written book that so masterfully welds together archaeology and ethnography about human and animal plant use. The focus of this volume is millets, Harappan sites in the state of Gujarat in western India, and the complementary interactions between pastoralism and agriculture. Although ethnoarchaeological modeling of crop processing for archaeological application premiered with the outstanding studies on wheat and barley by Hillman and Jones in the 1980s, nowhere before has anyone looked at millets. Millets are relatively small-seeded annuals with growth habits that range from strong-stalked, compact-headed inflorescences (Type A crops) to multiple weaker stalks with looser panicles (Type B crops). Domesticated millets originated in southern and eastern Asia as well as Africa, and wild millets are found just about world-

wide. I believe Reddy's observations on millets have general application for archaeological assemblages that include small-seeded annual grasses.

Reddy blends together three lines of evidence: her ethnographic study of crop cultivation and processing in India, the paleoethnobotanical record from two Harappan sites, and carbon isotope studies of dirt and cattle bones from these two sites (millets are C4 plants, whereas most of the associated weeds in the area are C3). Her goal is to model the interplay of crop processing with end product use (e.g., human food, animal fodder, or both) to aid in the interpretation of archaeological evidence.

Reddy's ethnographic observations focused on intensive summer monsoon cultivation of Type A crops (*Pennisetum typhoides* (Burm. f.) Stapf & C.E. Hubb. and *Sorghum bicolor* (L.) Moench) in Gujarat in western India, and extensive winter riverbank opportunistic cultivation of the Type B crop *Panicum miliare* Lam. in Andhra Pradesh in southeastern India. Whereas Type A, thick-stalked and compact-headed crops (*P. typhoides*, *S. bicolor*, and *Eleusine coracana* Gaertn.) are harvested one to three stalks at a time, a strategy that selects against inclusion of weeds, weeds are frequently included in the group harvest of Type B thin-stalked crops (e.g., *P. miliare* and *Setaria* spp.). Other factors that contribute to the inclusion or exclusion of weeds at harvest include the habit of the weed (prostrate vs. erect) and, of course, whether the weed ripens at the same time as the crop. Reddy presents an interesting twist by pointing out that even Type B crops can be harvested weed-free when, as in her case study in Andhra Pradesh, the weeds are prostrate and below the level at which the crop stalks were cut for harvest. Whereas the previous models by Hillman (1984) and Jones (1987) of when and how weed seeds may be processed out of a crop focused on the three weed characteristics of winnowability (ratio of seed surface area to weight), sievability (seed size), and seed headedness, Reddy found the interplay of seed size (small vs. big), headedness (a continuum from free to headed), and weight/aerodynamics (a combination of seed weight, shape, and aerodynamic appendages) to be more germane to the crop-processing strategies. By concentrating on the properties of the weed seeds themselves, separate from any specific crops or "stages" of crop processing, Reddy provides a model that is transferable for use with other crop types. Her handling of multiple combinations of crop/weed characteristics or harvest/processing/use choices is skillful, leading the reader through a labyrinth of possibilities rather than presenting an oversimplification of human behavior that marks too many archaeological studies.

Not only were crops represented by their end use (e.g., as human food, animal fodder, or both), but also as byproducts that could contribute to animal fodder. Products and byproducts may be used green, fresh, or dry; they may be stored or not at various points along the processing continuum; and, likewise, are suitable or not for trade or exchange. Choices made about the location of each of the processing steps affects the likelihood of exposure to fire (resulting in preservation) or the likelihood of even finding that location for archaeological study. In Chapter 4, Reddy supplies illustrated chart models for what products, byproducts, and archaeological findings may be expected at each step along the way of processing either a Type A (thick-stalked, single-headed) or Type B (thin-stalked, loose panicle) crop. Incidentally, she points out that *Chenopodium album* L. is pro-

cessed as a Type B crop in India: *Chenopodium* is another widespread genus frequently consumed by humans or supplied to animals as fodder. To round out her understanding of implications for archaeological interpretation, Reddy conducted experimental charring of millets to investigate the likelihood that seed stalks could be preserved.

What is used for animal fodder may depend on the season or ripeness (green vs. dry), and certainly reflects preferences by species (e.g., whether it enhances milk production or not). Archaeologically, plants used for animal fodder may be represented both in dung (used as fuel or as plaster) and in the isotopic ratios in animal bone. Reddy briefly reports on her pilot study of dung and hearth samples at two archaeological sites in Gujarat. Additionally, she analyzed a total of nine sediment samples from the two sites and 22 cattle bones for an indication of C3 vs. C4 plants. She found that the general background vegetation at both sites yielded C3 soil, as expected. The analysis of cattle bones, however, was mostly unsuccessful and the results inconclusive. In Chapter 7 Reddy models animal feeding for domesticated herbivores such as cattle, pigs, sheep, and goats.

Reddy then applies her models to the two sites—Babar Kot, a very late Mature Harappan site dating to 2200–2050 B.C., and Oriyo Timbo, a Late Harappan site dating to 1900–1800 B.C. She makes a strong argument that Babar Kot was a substantial settlement practicing year-round sedentary agriculture focused on summer and winter crops of millets, legumes, and oilseeds and on animal husbandry. Millets were grown for human consumption. Although millet byproducts likely were used for fodder, she could not prove it. Oriyo Timbo, on the other hand, represents a seasonal settlement used by seminomadic or semisedentary pastoralists who may or may not have been growing their own millet. However, they certainly were bringing highly processed millet to that location for human consumption. Both sites reflect the complementarity of agriculture and pastoralism in the Harappan sphere of influence.

I highly recommend this book—to archaeologists working in Africa or Asia; to ethnographers working with agricultural or pastoral societies; to paleoethnobotanists who work with small-seeded annual crops or weeds; to social scientists who study agriculture and pastoralism; and to students of ethnoarchaeology. It is a well-written, outstanding example of how ethnographic studies may enhance archaeological interpretation. The text lays out a very complex web of interrelationships and weaves them together to present one of the most realistic reconstructions I have seen of the complex daily decisions that had to be made in the past. I warn readers that the models with drawings can only be appreciated by reading the text. The volume is nearly free of printing/editing errors, and I was puzzled by only one statement by the author, classifying *Brassica* (mustard) as a legume (pp. 113, 122, and 128).

My original interest in this volume was sparked because it reported on Oriyo Timbo, a site where I worked in 1981–1982 (Reddy reports on the 1989–1990 season). During 1982–1983 excavations at nearby Rojdi, I observed seasonal cultivation of a river bottom when drought reduced the river to scattered puddles and pools. What struck me most at the time was that what had been a large, seemingly permanent river the year before was now a naked river bed. What

strikes me now is that Reddy has provided a model for how even such ephemeral cultivation practices may be reflected in the archaeological record.

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Nature, Culture, and Big Old Trees: Live Oaks and Ceibas in the Landscapes of Louisiana and Guatemala. Kit Anderson. 2003. University of Texas Press, Austin. Pp. 183 + photographs. \$19.95 (paper). ISBN 0-292-70212-4.

Anyone interested in big trees who has visited Tikal in the Guatemalan Petén will immediately recognize the towering ceiba (*Ceiba pentandra* (L.) Gaertn.) on the book's front cover. Loving big trees and having conducted ethnobotanical research in Guatemala as a graduate student at Tulane (in New Orleans), I was initially drawn to the book by those associations. I became curious almost immediately: why *these* species and not others; what kind of conclusions could the author possibly draw; will the book be theoretically useful or "just" a good read?

The book is divided into five chapters and neither the first nor the second chapter did much to satisfy my curiosity. Chapter One, Introduction: Human Tree Relationships, served its purpose in detailing where the text would go, summarized nicely how big trees have shaped human imagination, and outlined how trees might shed some light on the trajectory of culture. Chapter Two, Dances with Trees: Notes from the Field, is an amalgam of stories from the author's fieldwork in the two locales. The black and white photographs are many and quite excellent, as are many of the stories. However, I finished reading the chapter feeling that the descriptions were somewhat shallow and anecdotal, especially on the side of the Guatemalan ceiba. The chapter's concluding section, Patterns and Questions, did not answer the question that kept coming to me: "Where is this going to go?"

Chapter Three, Natural History: The Secret Lives of Ceibas and Live Oaks, is very well done. The botany, ecology, and natural history was a real pleasure to read—very accurate, detailed, and nicely written. The comparative maps and associated discussions documenting the "natural" versus the "cultural" distributions of the two trees were very revealing and insightful. As in previous chapters, the photographs were excellent, telling, and perfectly parallel with the text. Human behaviors that have affected the distribution of the trees were elucidated and the *meaning* of the text and the reason for its authorship started to emerge.