

mans, and examining artifacts of it for traces of wear or use residues. A literature of several thousands of titles has been produced from this investment. So, as might be assumed from her title, has Luedike provided archaeology a comprehensive guide to the multifarious aspects of chert in less than 200 pages? No. But she has written an excellent, readable monograph on chert as a substance.

Chert is defined and its complicated genesis reviewed. Its chemical, physical, visible, and mechanical properties are described as are its typical diagenetic changes, both culturally and naturally induced. Finally, what is known and not known about the variability of chert is summarized.

One appendix suggests an approach to chert source analysis and the parameters for a data base on chert sources. Another appendix presents basic data on 31 specific chert types, mostly from the Midcontinent region of North America but also from elsewhere in North America and abroad. There is a useful glossary covering the technical vocabulary of the monograph, which derives from archaeology, geology, chemistry, physics, and materials science. Since this monograph is not a literature review, the bibliography is neither comprehensive nor entirely representative of the topics covered.

Luedike emphasizes the complexities and the variability that characterize chert properties, the ways in which they form, and how they change after forming, noting that the monograph cannot cover all geologic, chemical, physical, and archaeological permutations. Her treatment of the geology of chert sources accurately depicts such problems as similarities between unrelated cherts, great variability within single chert sources, near homogeneity of some cherts over wide geographic areas, and recognition of secondary geologic contexts of cherts. The archaeological implications of most topics are clearly identified. Many aspects of chert are imperfectly known, and specific research needs are noted. The work is not without its minor flaws, mostly editorial, but these detract little from the overall product.

Most archaeologists will expand their general knowledge about chert by reading this guide. It will be useful in the initial phases of research by anyone delving deeply into some particular property of chert or seeking to investigate thoroughly the properties of one or more particular cherts. The modest price makes this monograph a good investment for any of these purposes.

This volume can be expected to stimulate research into chert properties and to encourage more sophisticated source studies. As this occurs, updated editions will be needed. I look forward to reading them.

Stone Tool Procurement, Production, and Distribution in California Prehistory. JEANNE E. ARNOLD, editor. Perspectives in California Archaeology, Vol. 2. Institute of Archaeology, University of California, Los Angeles, 1992. 156 pp., figures, tables, references. \$20.00 (paper).

Reviewed by Kathleen L. Hull, Dames & Moore, Chicago, California.

This volume presents findings of three recent studies of lithic artifacts from diverse regions of California, highlighting the behavioral implications of research for the specific projects and bringing attention to directions for analysis of such materials in other contexts. The stated intent of the work is to indicate the richness of archaeological research conducted in contract and management contexts, while encouraging analysis of lithic raw materials and artifacts as fruitful methods for developing a greater understanding of prehistoric lifeways.

The first study by John W. Rick and Thomas L. Jackson presents results of analysis of a cache of obsidian bifaces known as the Great Blades Cache, recovered in the North Coast Ranges of northwestern California. The authors use a statistical approach to detail discussion of both artifact and spatial attributes of the 69 specimens recovered. These data then form the foundation for interpretation of the likely sequence of events in procurement, production, transport, and discard of the bifaces, representing a very specific activity and somewhat distinct archaeological manifestation of behavior.

Jeanne E. Arnold's study of the prehistoric production of chert bifaces in the vicinity of Vandenberg Air Force Base just north of Santa Barbara provides an interesting discussion in which she considers raw-material distribution, acquisition, manufacturing, and use. Bifacial preforms, drills, knives, debitage, and cores are all considered in testing several hypotheses regarding the manufacturing activities likely to be evident at various types of sites.

Finally, Douglas B. Bamforth presents data from various quarry locales in the Cronese Basin and Mojave River area of the southeastern desert region of California, exploring the potential effects of raw-material properties such as accessibility and knapping quality on prehistoric use of quarries. As such, this study represents fundamental research that is critical for insightful interpretations based on lithic artifacts. Relying on statistical analyses of nodule size, raw-material flaws, flake traits, and reconstructed sequences based on artifact refitting, Bamforth concludes that uniformity in production is generally precluded. In addition, these data suggest that subtle differences between sites, including apparent intensity of production, likely reflect regional patterns of raw-material availability.

Although all three papers in this volume rely on statistics to discern patterns and elucidate behavior, the editor has provided three distinct studies of lithic artifacts. The consideration of raw-material attributes as well as artifact characteristics for each paper provides data that are often complementary, and discussions are both thoughtful and thought provoking. As such, the volume succeeds in challenging researchers to broaden perspectives on lithic analysis.

Aspects of Early North American Metallurgy. M. L. WAYMAN, J. C. H. KING, and P. T. CRADDOCK. British Museum Occasional Paper No. 79. British Museum Press, London, 1992. 144 pp., figures, tables, references. \$17.50 (paper).

Reviewed by Robert H. Tylor, Harvard University.

This volume reports on four British collections of metal artifacts from North America acquired before extensive European contact. Since extractive metallurgy was not practiced in the precontact period, the authors focus on identifying artifacts made from native copper or meteoric iron.

Tlingit and Athabaskan-style daggers and ceremonial coppers collected on the Northwest Coast in the late eighteenth century are among 30 smelted artifacts that could have arrived in the Northwest Coast by trade across the Bering Straits, from early explorers, or even in small quantities from shipwrecks or driftwood carried by cross-Pacific currents. Three Inuit harpoon blades collected in the Canadian Arctic in 1738 were made from smelted iron with characteristics typical of mid-eighteenth-century European products rather than of earlier Norse colonies on Greenland with which the Inuit were in contact. In contrast, all but one iron flake from a knife collected by the Ross Expedition of 1818 from the Polar Inuit of northwest Greenland are of meteoric iron, probably from near Cape York. Finally, all of the provenanced ear spoons, gorgets, axe/adze heads, and bracelets in the Squier and Davis collection, excavated from the Ohio mounds between 1845 and 1847, are fully consistent with a native copper origin. Several beads may once have had native silver sheet overlays.

The authors conclude that the quantity of exotic, smelted metal already in circulation at the very start of European contact is surprising but can be explained by direct or indirect contacts with early explorers, fur traders, or as folsam.

Phytolith Systematics: Emerging Issues. GEORGE RAPP, JR., and SUSAN C. MULHOLLAND, editors. Advances in Archaeological and Museum Studies, Vol. 1. Plenum Press, New York, 1992. xxiv + 350 pp., figures, tables, annotated bibliography, indexes. \$49.50 (cloth).

Reviewed by David Rhode, Desert Research Institute.

This is the first in a series of volumes, supported by the Society for Archaeological Sciences, that offers detailed treatment of closely defined topics in archaeological and museum science. The present volume, concerning different approaches to classification of phytoliths, fulfills that promise perfectly. Susan Mulholland and George Rapp give an introductory survey of phytolith systematics, followed by Alex Powers's historical review of European approaches. A general morphological classification system is forwarded by Deborah Pearsall and Elizabeth Dinan. Mulholland and Rapp report on a similar morphological classification of silica bodies in grasses, while Amy Ollendorf assays the sedges. Page Twiss distinguishes phytolith morphology in C_3 and C_4 grasses, with implications for global paleoenvironmental reconstruction. Aileen Miller Rosen identifies silicified epidermis from several Near Eastern domesticates, and phytoliths from grains of 43 cereals from Europe and the Near East are sum-

marized by Lawrence Kaplan, Mary Smith, and Lesley Ann Sneddon. Linda Scott Cummings describes phytoliths found in a variety of food plants, and their utility in reconstructing diet from coprolites. Steven Bozarth surveys phytoliths from diets native to the Great Plains, while John Jones and Vaughn Bryant cover cacti in Texas. Silica bodies in roots and rhizomes are examined by Allan Sangster and Martin Hodson. Irwin Rovner and John Russ explore the potential of computerized image analysis to classify phytolith populations. The volume concludes with an excellent annotated bibliography, provided by Mulholland, Elizabeth Lawlor, and Rovner, listing some 500 international works dealing with aspects of phytolith systematics.

Theford II: A Paleo-Indian Site in the Atsahable River Watershed of Southwestern Ontario. D. BRIAN DELLER and CHRISTOPHER J. ELLIS. Memoirs No. 24. Museum of Anthropology, University of Michigan, Ann Arbor, 1992. xii + 157 pp., figures, tables, bibliography, appendices. \$20.00 (paper).

Reviewed by Kenneth B. Tankersley, State University of New York-Brockport.

This monograph presents the results of a comprehensive analysis of a Middle Paleolithic, Parkhill complex site in southwestern Ontario. The introductory chapter includes a discussion of the field methods (surface survey and excavation), present geological setting (lacustrine terrace), paleoenvironment at the time of the Middle Paleolithic occupation (transitional spruce-dominated vegetation), and an age estimate of the oldest cultural component (ca. 10,600 B.P.). The next four chapters examine the unique characteristics of the chipped-stone artifacts: lithic raw materials in Chapter 2, bifaces in Chapter 3, unifaces in Chapter 4, and debitage in Chapter 5.

Post-Paleolithic features are described in Chapter 6. Middle Paleolithic features occur as artifact clusters rather than as stains in the soil. Spatial distributions of Paleolithic artifacts are illustrated in Chapter 7. Temporal and spatial relationships of the Parkhill complex are compared to other Paleolithic complexes from the Northeast, Great Lakes, Midwest, Southeast, and Plains in Chapter 8. The summary, Chapter 9, provides a review of economic interpretations, cross-cultural comparisons, and caveats from the data.

Perhaps the most significant aspect of this book is that it identifies a suite of technologically and stylistically distinct Middle Paleolithic unifacial and bifacial chipped-stone artifacts. While the authors have previously published these non-projectile-point diagnostics, this monograph presents important detailed descriptions, photographs, line drawings, and metric data. Hopefully, the recognition of these artifacts by non-Paleolithic specialists will help in the preservation of these rare and endangered cultural resources.

As Henry Wright appropriately notes in the Foreword, "this volume is the first major site monograph dealing with a Late Glacial site in the central Great Lakes since 1966" (p. vi). (i.e., James Fitting's Hol-

combe site report).