

wares, arrived from outside the region. This suggests little in the way of a local ceramic industry.

A number of the concerns raised above could have been avoided in the editing process. In the section on glass, for example, the same information is repeated in several places and catalogue headings lack consistency. Repetition in the pottery chapters has been noted above, and the pottery catalogue has no headings. An additional confusing factor is that wares in the catalogue are organized according to different principles: Ware 1 proceeds from closed to open forms while Ware 8 proceeds from open to closed, causing difficulties not so much in the catalogue as in the figures of Chapter 6. Some numbers in the text and appendices do not agree.

Profile drawings are included for all items in both catalogues although the scale of those in the pottery catalogue is sometimes rather too small to illustrate pieces with decoration. Unfortunately, the pottery profiles in the Chapter 6 summary of the pottery chronology have been considerably reduced in size. Photographs are limited to two fine color illustrations of red ware cups/bowls, one group shot of almost complete Slavic pots, a maker's mark on one Slavic pot, and two plates of glass fragments.

Despite these reservations, Roman and Byzantine historians, as well as those of more recent periods, and archaeologists working in the Balkans will find much that is relevant here. They would do well to consult also the earlier volume by Poulter for the full picture. Poulter and his team have clearly made a significant contribution to the archaeology of the lower Danube region and produced an essential reference for the ancient Balkans.

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Aurignacian Lithic Economy: Ecological Perspectives from Southwestern France

BROOKE S. BLADES. 240 pages, 74 figures, 42 tables, bibliography, index. New York, NY: Kluwer Academic/Plenum Publishers, 2001. \$57.50 clothbound. ISBN 0-306-46334-2.

Reviewed by P. Jeffrey Brantingham, Department of Anthropology, University of California, Los Angeles, Los Angeles, CA 90095.

Questions surrounding the origins of anatomically modern humans and modern human behavior continue to occupy center stage within palaeoanthropology and Palaeolithic archaeology. Recent attention to these issues stems, on the one hand, from the declining role played by the Aurignacian, the hallmark of the early Upper Palaeolithic in sw France, as a template for what modern human behavior should look like and, on the other, the failure of a clear alternative template to take its place. New data from both western Europe and areas outside of this traditional heartland of Palaeolithic investigation suggest that the boundary between the Middle and Upper Palaeolithic is not nearly as abrupt as once thought and that the transition does not necessarily culminate in the Aurignacian as traditionally recognized.

Blades reinvestigates the questions surrounding the Aurignacian and the nature of modern human behavior in a study of lithic and faunal assemblages from several sites in sw France dating to early Aurignacian I and later Aurignacian II, approximately 35,000 and 25,000 radiocarbon years B.P. This is a refreshing chronological perspective precisely because it does not tackle sites and assemblages straddling the so-called Middle-Upper Palaeolithic transition, which commenced perhaps 10,000 years earlier. Rather, the perspective offered is from the pinnacle of the western European early Upper Palaeolithic where, notionally at least, we can dispense with any discussion of archaic behavioral and cultural adaptations of the Neandertals and get down to defining what was really going on with modern human behavior.

Blades draws his theoretical perspectives liberally from evolutionary ecology to build an informal model linking patterns in stone raw material utilization with subsistence behavior. Mobility is seen as the point of articulation between these systems. He argues that specialized subsistence strategies organized around large, migratory game such as reindeer brought foragers into contact with distant stone raw material sources via "high-magnitude mobility," or long-distance movement that is distinguished behaviorally from high-frequency mobility. In contrast, generalized subsistence strategies exploiting a greater array of non-migratory, locally available prey facilitated low-magnitude mobility supplemented possibly by high-frequency movement. This latter, it is argued, provided fewer opportunities for encountering distant raw material sources and expanded opportunities for exploiting local stone raw materials. The model is inverted to produce a foundation for two archaeological inferences: 1) low faunal diversity and high percentages of distant raw materials suggest high magnitude mobility, and 2) high faunal diversity and low percentages of distant raw materials mean low magnitude mobility. Blades recognizes that these are arbitrary categories and that behavioral adaptations, Aurignacian ones included, form a continuum. Nonetheless, he insists that such distinctions provide a useful heuristic tool.

Where do the early Aurignacian I and later Aurignacian II fall in relation to these strategies? To answer this question, Blades reexamined lithic collections and the published faunal data from three historically important Aurignacian sites; Le Facteur, Abri Pataud, and La Ferrassie. The sites are all located within 5 to 10 km of each other in the lower Vézère Valley of the French Périgord. Additional Aurignacian assemblages (and one Châtelperronian assemblage) from Roc de Combe and Le Piage are at times featured in the analyses for comparative purposes. The sites were excavated variously and intermittently by pioneering archaeologists Denis Peyrony, Henri Delporte, and Hallam Movius between 1907 and 1973. A number of analytical difficulties arise in dealing with assemblages excavated over such a long period of time and under changing scientific standards. Blades handles these difficulties with variable degrees of finesse, along the way providing general excavation histories for the primary sites and a brief summary of Aurignacian systematics.

Critical to the evaluation of Blades' model are measures of faunal diversity and the relative proportions of stone materials transferred from sources at different distances. Blades also devotes analytical attention to core and tool reduction intensity, as well as the variability in Aurignacian "type tools" such as blades with Aurignacian retouch and steep-edge, carinated end scrapers. Though interesting,

these detailed features of the Aurignacian turn out to be largely ancillary to the evaluation of the model.

Analysis of Aurignacian subsistence diversity focuses on the 11 large mammal taxa identified collectively at study sites, including reindeer, aurochs, horse, mammoth, and chamois. Small game animals are excluded from consideration because of apparent preservation and recovery biases, not an unexpected problem in the reanalysis of older excavated assemblages. Blades settles on Simpson's Lambda as the preferred measure of faunal diversity. Borrowed from ecology, this index measures the evenness of species representation within an assemblage; more technically, the index quantifies the probability that two individuals (in Blades' case identified bone specimens) chosen at random from an assemblage will be from the same taxon (Hayek and Buzas 1997: 356–359). When one taxon dominates an assemblage (i.e., uneven faunal representation) the probability that two randomly selected bone specimens are of the same taxon approaches one. When all taxa are equally represented (i.e., perfect faunal evenness) this probability is less than one. The minimum possible value for Simpson's Lambda is heavily dependent on the taxonomic richness of the assemblage. Blades uses the inverse of Simpson's Lambda so that the index increases as evenness increases. As a point of reference, minimum evenness corresponds to an index value of 1. This obtains when an assemblage contains only one taxon. Assuming a large sample size, maximum evenness for an assemblage consisting of 11 possible taxa corresponds to an index value of 11: Maximum evenness for the inverse of Simpson's Lambda is the same as the maximum possible taxonomic richness.

Blades adopts an index value of two (18% of the theoretical maximum) as an arbitrary cutoff point for high evenness. The majority of the study assemblages (10 of 12) yielded index values of two or less, indicating that most are heavily dominated by a single species. Indeed, in all of these assemblages reindeer comprise at least 70% of the large mammal NISP (Number of Individual Specimens). These nine assemblages are assigned to the low faunal evenness group. The two remaining cases, the Châtelperronian assemblage from Roc de Combe 8 and the later Aurignacian II assemblages from Ferrassie K3-J, yielded index values of around three. At Roc de Combe 8, two taxa, reindeer and bovids, combined to form approximately 80% of the large mammal NISP. At Ferrassie K3-J, bovids alone comprise nearly 40%. Blades places Roc de Combe 8 and Ferrassie K3-J in the high faunal evenness group. The assemblage from Le Piage F yielded an index value just under two but is generously included in the high faunal evenness group.

The model also requires measuring the relative impor-

tance of distant raw material sources among transported stone technologies. Borrowing definitions used by Jean-Michel Geneste (1985) in his work on the Middle Palaeolithic of the Périgord, local stone raw material sources are found within 5 km of a site, while distant sources are beyond 20 km. Materials transferred from local raw material sources generally comprise between 70 and 98% of an assemblage, while materials from distant sources usually represent less than 5%. As a general rule, materials introduced from distant sources also tend to be retouched. Restricting analysis to retouched tool populations thus increases the expected proportional representation of distant raw material sources to as much as 20%.

Of the 10 general varieties of stone raw material found at the study sites, the sources for three of these (Bergerac Maestrichtian chert, Fumel Turonian chert, and Jurassic jasper) fall in the distant zone at least 20 km away. Blades chooses to focus on percentages of "type tools" transferred from different sources and draws the line between "low" and "high" levels of transfers from distant sources at 15% of an assemblage. Unfortunately, the statistical justification for this cutoff point hinges on several invalid Chi-square tests where the assumptions of the test appear to have been violated by using percentages rather than raw counts. Nevertheless, Blades' choice for the cutoff is empirically reasonable. Thus, of those lithic assemblages associated with fauna, three fall within the "high" category for retouched tool transfers from distant sources. These assemblages include Abri Pataud 14, Abri Pataud 11 and Le Piage G-I. The remaining nine assemblages fall within the "low" category for distant raw material transfers. In other words, less than 15% of the retouched tools in these assemblages are made on materials from sources greater than 20 km away.

Returning to the model, we find that three assemblages are classified as having high faunal evenness and low distant material percentages and therefore meet Blades' expectations of a low-magnitude mobility strategy focused on intensive use of the local foraging area. Three other assemblages display low faunal evenness and high distant material percentages and therefore meet his expectations for a high-magnitude mobility strategy that optimally positioned foragers to exploit migratory prey species. The former group contains assemblages assigned to the Châtelperronian, early Aurignacian I, and later Aurignacian II. The latter group contains two assemblages assigned to the early Aurignacian I and one assigned to the later Aurignacian II.

What is perhaps more interesting is that 6 of the 12 study assemblages fall into a third category defined by low faunal evenness and low distant material percentages. This

combination appears to contradict the main premises of the model and has no immediate interpretation in terms of mobility strategies. Blades suggests that a fourth category defined by high faunal diversity and large percentages of imported raw material would be consistent with an interpretation of social exchange. In other words, high faunal diversity would indicate intensive local-area foraging, while high frequencies of distant raw materials would suggest social contact with populations in non-overlapping foraging areas. Unfortunately, none of the study assemblages fall into this category. Blades concludes that these results underscore the importance of analyzing lithic technological organization within a broader archaeological context that includes subsistence organization and other factors of the social landscape.

Despite the conceptual appeal of Blades' model, the reader should find pause in the fact that 50% of the study assemblages appear to defy explanation, even given substantial latitude for arbitrarily partitioning model space. Additional concerns may be raised over the taphonomic histories of the study assemblages and some of the methodological choices made to deal with the associated problems. First, NISP-based estimates of faunal evenness are often preferred because they are expedient compared with the alternative of compiling MNI counts (Minimum Number of Individuals). Unfortunately, NISP-based estimates are still exceptionally sensitive to taxonomic biases in bone fragmentation. Correlations between NISP and taxonomic diversity may tell you whether your diversity estimates include a sample size effect, which they apparently do not in these cases. It is incorrect to assume, however, that demonstrating a lack of a sample size effect is an adequate control for differential bone fragmentation across taxa. A full taphonomic study of the bone assemblages from the study sites would be an ideal next step in further testing of Blades' model. It would also help alleviate any concerns that evenness is simply measuring differential bone fragmentation. Second, Blades did not have complete access to all of the excavated lithic materials from the study sites, for reasons largely beyond his control. Again, it is expedient to assume that the materials to which he did have access are a random sample of all those originally excavated. There is no guarantee, however, that this is the case. A detailed attempt to demonstrate the integrity of the lithic samples would have been warranted.

Is there something unique about modern human behavior as seen through the lens of the Aurignacian? In the final analysis, Blades does provide important evidence to suggest that Aurignacian subsistence behavior and lithic technological organization were dynamic adaptive systems, closely linked in some ways but independent in oth-

ers. The potential links between these features of Aurignacian adaptations and the emergence of complex symbolic behavior are touched upon, but in the end are perhaps wisely left as an open question. Absent a detailed consideration of these broader links, however, there is little to suggest that the organization of Aurignacian subsistence behavior and stone raw material utilization were somehow uniquely modern. Blades himself notes the apparent similarity between his results and those from earlier studies of the Middle Palaeolithic in the Périgord and elsewhere. Blades thus inadvertently reinforces the notion that the Aurignacian does not provide a well-bounded template for modern human behavior, but this need not suggest that we should look for a well-bounded template elsewhere. On the contrary, Blades' work on the early Aurignacian I and later Aurignacian II leads us to a greater appreciation of the complexity of behavioral adaptations and the difficulties that archaeologists have in teasing these complexities apart. It also suggests that the search for a single archaeological template for modern human behavior is in fact evolutionarily misleading.

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1997 *Surveying Natural Populations*. New York: Columbia University Press.

Sediments in Archaeological Context

JULIE K. STEIN AND WILLIAM R. FARRAND, editors. 304 pages, 59 figures, index. Salt Lake City, UT: University of Utah Press, 2001. \$50 cloth; \$25 paper. ISBN 0-87480-703-4 (cloth); 0-87480-691-7 (paper).

Reviewed by Paul Goldberg, Department of Archaeology, Boston University, 675 Commonwealth Avenue, Boston, MA 02215.

This book is a revised version of the previous volume, *Archaeological Sediments in Context*, published originally in 1985. As noted in the Introduction, "The title differs from the original title to reflect the emphasis of this book on the role of sediments in archaeology. The unifying principle here is our focus on *depositional environments* as inferred from the excavated sediments" [p. xi]. In fact, many of the

chapters are devoted to an examination of these environments from a geomorphological point of view and not one specifically focussed on the sediments themselves. Only some of the articles deal with sediments exclusively as their prime focus.

The paper by Gary Huckleberry, "Archaeological Sediments in Dryland Alluvial Environments" is a concise, straightforward, and useful treatment of that setting, and there is a nice balance between sediments and the geomorphological surroundings in which they are found. Furthermore, it deviates from being just another paper on arid fluvial environments by furnishing a number of explicit, basic, and important insights that are the sine qua non of any geo- or archaeological research: "When laboratory analyses are performed in support of geoarchaeological research, it is important to remember that the best and most sophisticated laboratory methods are only as good as an understanding of the physical context of the sediments in relation to both the archaeological site and the landscape" [pp. 84–85].

Bruce G. Gladfelter's thought-provoking article on a similar geomorphic system, "Archaeological Sediments in Humid Alluvial Environments," is not an easy read, but it is refreshing in its somewhat theoretical and thematic bent and its overarching view of this environment. One will not find specific tips on how to collect samples or how to evaluate granulometric curves from different subenvironments. The reader, however, will be treated to insights on how the fluvial system works and to an appreciation of how archaeological sites and people intermingled in this prevalent geological environment, including preservation potential for sites, climatic reconstruction, and location of sites. In this regard, I found the two tables (Alluvial Contexts of Archaeological Material and the Meaning of Some Geomorphic Propositions for Archaeological Interpretation) particularly instructive and useful for understanding the fluvial/archaeological system. The title of this chapter, however, is a bit misleading, as geomorphology rather than the sediments is clearly the focus. A more appropriate title would be "Fluvial Geomorphology and Archaeology."

Lake margin environments are examined by Craig S. Feibel. This setting is not commonly discussed in geoarchaeological papers, possibly because of the relative (and apparent?) dearth of sites in this locale. He does a very good job of integrating sediments, geomorphology, and archaeology. The main examples, from Geshar Benot Ya'aqov, Israel, and Lake Turkana, Kenya, are used to illustrate a number of interesting facets of this environment, and how to interpret the stratigraphic and particularly the artifactual record in which the artifacts themselves commonly behave as lithoclasts. Archaeological sites situated