

## Zooarchaeology

By Elizabeth J. Reitz and Elizabeth S. Wing (Cambridge Manuals in Archaeology). 2nd ed. Pp. xxi + 533, b&w figs. 117, tables 35. Cambridge University Press, Cambridge and New York 2008. \$45. ISBN 978-0-521-67393-8 (paper).

## Quantitative Paleozoology

By R. Lee Lyman (Cambridge Manuals in Archaeology). Pp. xxiii + 348, b&w figs. 94, tables 75. Cambridge University Press, Cambridge and New York 2008. \$85. ISBN 978-0-521-71536-2 (paper).

Many archaeologists may be familiar with the reference handbooks published under the *Cambridge Manuals in Archaeology* series. Designed for students as well as professional archaeologists and researchers around the world, these volumes aim to survey methodologies and analytical techniques important to the discipline. Reitz and Wing's volume, *Zooarchaeology*, represents an updated second edition of an earlier 1999 manual from the series, while Lyman's contribution, *Quantitative Paleozoology*, is a new addition. Both find company in a larger selection of manuals from the Cambridge line that deal with the analysis and interpretation of biological remains from archaeological sites (e.g., C. Classen, *Shells* [1999]; S. Hillson, *Teeth* [2005]; R. Lee Lyman, *Vertebrate Taphonomy* [1994]).

*Zooarchaeology* serves more as a procedural handbook. It is organized in a practical manner, initiating with chapters on the history and theory of zooarchaeology (the introduction and foundation for work) and proceeding to chapters on the principles of basic animal biology and ecology (the nature of the materials), the recovery of faunal remains and taphonomy (the collected sample of materials), methods of processing and analyzing the data (generating results from the materials), and interpretations and discussions of these data. Three central topics dominate the interpretations: subsistence strategies, domestication, and en-

vironments. In addition to bibliographic and reference listings, updates to this volume since its original publication include broader discussions of isotope studies and genetics, two fields that have grown considerably over the past decade. A focus on applications and examples to assist with dietary and ecological reconstructions from archaeological faunal remains limits any exhaustive analysis of the extensive range of animal use, especially in complex societies (such as classical cultures). This processual approach is traditional in zooarchaeological work and consequently may serve to narrow the potential of the discipline for the uninitiated. The authors do, however, acknowledge the potentially complicated nature of reconstructing aspects of ritual, ideological, social, and economic behavior from animal bones, and they provide some general comment in an effort to expand reader appreciation of the incredibly diversified roles in which animals are used in human culture. Overall, the volume provides an excellent introduction to the broad potential of zooarchaeological research, even if depth in discussion is not equally spread across each topic. As a textbook, however, *Zooarchaeology* is exemplary, providing clear advice on the mechanics of faunal reporting backed by an extensive bibliography; quality charts, tables, and illustrations; and several handy guides and keys for skeletal identification and analysis.

*Quantitative Paleozoology* also serves as a practical guide, but to quantitative measures and methods. Quantification is arguably the backbone of zooarchaeological analysis and interpretation, providing the raw or modified data with which to examine trends and patterns in reconstructing the cultural and natural world of the past. The strengths and problems associated with commonly employed quantitative units, including NISP (number of identified specimens) and MNI (minimum number of individuals) are discussed in detail. Subsequent chapters outline other, less commonly used measures (at least in the domain of classical archaeology), such as MNE (minimum number of elements), MAU (minimum number of animal units), ratio scales, diversity indexes, and systems of weighing bones and estimating meat weights. Lyman is fully aware of the biases to faunal counts produced by factors such as taphonomy (i.e., postdepositional processes that can affect the preservation and placement of faunal remains), sampling, and recovery, and she devotes considerable attention to these concerns. Gaps do infiltrate, however. In discussing bone weights, Lyman seems to overlook concerns about differential preservation and mineralization of faunal materials that can affect values. A discussion of inter- and intraobserver errors in identification of faunal remains, with the related problem of grades of identification (i.e., some bones or parts of the skeleton are simply easier to recognize and thus may skew counts), also deserves more attention, as these concerns can significantly affect results. Lyman concludes that NISP is to be preferred over MNI when measuring taxonomic abundances, chiefly because NISP is highly replicable, highly correlated with more complex calculations, and forms the basis for many subsequent analyses. In other words, it is what is known as primary data, as opposed to secondary or derived data, that have undergone some transformation or manipulation. Overall, the volume offers a good assessment and critique of a fairly large swath of quantitative methods used in zooarchaeological research, backed by useful examples of these techniques in practice, with sound suggestions of when and where to implement each in relation to the questions being asked of a particular sample. Like *Zooarchaeology*, it, too, contains a rather thorough index and a fairly extensive reference bibliography for consultation.

The two volumes complement each other. *Zooarchaeology* provides the basics of faunal

data acquisition, analysis, and interpretation, while *Quantitative Paleozoology* expands upon a crucial aspect of analysis: the numerous ways to count faunal remains. There is some repetition between the works; Reitz and Wing also review quantitative methods and in so doing outline many of the same pros and cons inherent to each quantifier. However, the complexity of many methods employed for counting bones warrants the extra detail and explanation provided by Lyman. Both volumes rightly stress the importance of a clear knowledge of the strengths, weakness, and biases of the various analytical methods used in zooarchaeology. The authors warn against sloppy application of principles and procedures without considering the research problems and goals under investigation and without understanding the nature of the zooarchaeological data that in turn form the basis of subsequent cultural, ecological, and biological reconstructions and interpretations. They underscore the direct link between data acquisition and quantification and the questions being asked, stressing in turn that analysts must be cautious, critical, and conservative in their interpretations. Hypothetical faunal data sets are used in each volume to guide the reader through techniques of analysis. This has great merit: the steps of data transformation and manipulation are traceable, and the consequent moves to pattern recognition and interpretation of these data are facilitated. Moreover, the use of these data sets reinforces the interrelatedness of many of the methods. The reader can see exactly how divergent or similar the results obtained from various quantifiers or analytical methods may be.

Both volumes are centered predominantly in anthropological and biological approaches to zooarchaeological research, presumably a factor of the authors' backgrounds and training. There is more of a processual, as opposed to postprocessual, slant to these works. The authors acknowledge this, and do not claim to exhaust all theoretical avenues. *Zooarchaeology* could benefit from greater discussion of animal use as explored through postprocessual theoretical frameworks, while *Quantitative Paleozoology* does have a tendency to steer the reader to particular techniques and methods rather than taking a true neutral stance and letting the reader decide which method might best suit his or her work or research problem. Examples in both volumes are drawn primarily from New World contexts. While each is

generally well articulated and appropriate in illustrating the concepts in question, a more global survey of examples could help the reader appreciate broader cultural similarities and differences in animal use across time and space. A more diverse mix of examples might also highlight for the reader the increasingly global community of zooarchaeologists, as organized in the International Council for Archaeozoology (ICAZ). There is little direct reference to sites of classical antiquity outside the occasional mention, such as in discussions of complex societies in general. Nevertheless, this should not discourage classical archaeologists from using these volumes. Each is indeed excellent in explaining, in a clear, cogent manner, the potential of zooarchaeology in our understanding of past worlds and people. These are well referenced, thorough, practical guides that deliver the important basics in an accessible manner to a wide audience. Each, in turn, also demystifies and simplifies quantification procedures, techniques that might

have previously been perceived as too complex to the uninitiated. Both works highlight the need for thorough, rigorous assessment of animal bones from archaeological sites, no matter what temporal period or culture under study, for indeed these materials inform us about myriad aspects of archaeological cultures. Although meant in the first sense for an interaction between paleontologists and zooarchaeologists, Lyman's plea for enhanced "cross-fertilization" (271) among disciplines encapsulates a much broader message of exchanging ideas and appreciation among all who investigate aspects of past natural and cultural worlds.

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