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Elizabeth J. Reitz and Elizabeth S. Wing
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Zooarchaeology, Second Edition

This book serves as an introductory text for students interested in the identification and the analysis of animal remains from archaeological sites. The emphasis is on animals whose remains inform us about the relationship between humans and their natural and social environments, especially site-formation processes, subsistence strategies, the processes of domestication, and paleoenvironments. Examining studies from all over the world, from the Pleistocene period up to the present, this volume is organized in a way that is parallel to a faunal study, beginning with background information, bias in a faunal assemblage, and basic zooarchaeological methods. A zooarchaeological Hypothetical Collection illustrates the fundamental methods for the collection of primary and secondary data that are applicable to zooarchaeology practice.

This revised edition reflects developments in zooarchaeology that have occurred during the past decade. It includes new sections on enamel ultrastructure and incremental analysis, stable isotopes and trace elements, ancient genetics and enzymes, environmental reconstruction, people as agents of environmental change, applications of zooarchaeology in animal conversation and heritage management, and a discussion of issues pertaining to the curation of zooarchaeological materials.

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Elizabeth J. Reitz *University of Georgia*
Elizabeth S. Wing *Florida Museum of Natural History*



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*Dedicated to our families and colleagues in appreciation
of their support and inspiration.*

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PREFACE TO THE SECOND EDITION

When we were asked to prepare a second edition to *Zooarchaeology*, we anticipated that this would be relatively easy. We proposed to update the literature and work on sections that we or our colleagues found did not “work” in practice. We quickly realized, however, the truth of the statement that zooarchaeology is a dynamic field. We were surprised to find a few major changes in the traditional approaches in the field over the past 10 years and significant advances in archaeogenetic, isotopic, and incremental growth applications. A shift in research emphasis also has occurred. Whereas in 1999 many zooarchaeologists focused on biological and anthropological interpretations pertaining to economies and the history of animal domestication, today publications on environmental change, environmental reconstruction, and applied zooarchaeology constitute a large percentage of the literature. Advances in geochemical applications make it possible to develop holistic perspectives on the human–environment relationship, dissolving problematic distinctions among anthropology, archaeology, ecology, geology, human biology, and zoology. At the same time, after many years of functional interpretations, structural explanations have assumed a larger place in the literature. One of the most gratifying discoveries is the increase in important zooarchaeological studies published in peer-reviewed, international journals by scholars from beyond Europe and North America. This more broadly inclusive community of scholars is a good sign that zooarchaeology continues to be strongly international.

Thus, in preparing this second edition, we made major changes in sections in which the greatest advances have been made in the past decade. Chapters 3, 9, and 10 are substantially rewritten to incorporate new information and research trajectories. Chapter 8 required significant, though less extensive, modifications. We have included literature from 1999 through 2006, as well as inadvertent omissions from before 1999. These new references reflect the directions that the field of zooarchaeology has taken over the past decade. We believe these directions represent the future of the field. We repeat, however, our admonition from the first edition that theoretical interpretations are no better than the methods used to develop supporting data. It is as necessary to be well-grounded in the basics as it is to be guided by good theory.

There are some changes we did not make. As with the first edition, this edition is not intended to replace the many excellent biological references; works focused on single organisms or groups of organisms; methodological descriptions and reviews developed out of specific research needs; or regional archaeofaunal syntheses and theoretical treatments. The focus of the volume continues to be on topics of broadly global applications pertaining to major research trajectories. We do not advocate for or against methods or provide detailed descriptions of specific methods or outcomes. Students should recognize the importance of developing their own research designs, which will be implemented using appropriate methods obtained through their own review of the literature.

PREFACE TO THE FIRST EDITION

This volume is directed to all those interested in the recovery, identification, and analysis of animal remains from archaeological sites. Our intent is to review standard zooarchaeological methods and to suggest the circumstances under which they may be most successfully applied. Because we believe that a background in both anthropology and biology is important for a balanced approach to zooarchaeology, both relevant anthropological and biological information are reviewed. The exchange among archaeological, biological, ethnographic, and paleontological research is the important defining characteristic of the study of animal remains that links the following pages. The development of zooarchaeology owes much to an awareness of the importance both of ecological relationships on human behavior and of the human impact on the planet. Despite its diverse, interdisciplinary nature, zooarchaeology has three common research themes: (1) methodology; (2) continuity and change in human societies; and (3) biological relationships. These are the primary topics explored in this volume.

The animals emphasized include macrofaunal as well as some microfaunal organisms. The term “macrofauna” refers to large vertebrates and invertebrates. All vertebrate classes are included. These are mammals (Mammalia), birds (Aves), reptiles (Reptilia), amphibians (Amphibia), cartilaginous fishes (Chondrichthyes), and bony fishes (Actinopterygii). Invertebrates include primarily molluscs (Mollusca) and crustaceans (Crustacea). The term “microfauna” may refer to small members of these same classes, such as anchovies, or to small organisms, such as land snails or insects. The tissues reviewed include skeletal bone and teeth, mollusc shell, and exoskeleton (such as crab shell). Egg shell and keratinized tissue, such as hair, skin, and feathers, are not stressed here.

Our emphasis is on animals whose remains inform us about aspects of relationships between humans and their natural and social environments, especially site-formation processes, subsistence strategies, and paleoenvironments. Among these animals, those

that offer food, shelter, transport, fuel, tools, ornaments, clothing, and social identity receive particular attention. We also explore material culture related to the procurement and husbandry of animals. Examples are primarily those illustrating modern human (*Homo sapiens sapiens*) uses of these animals. The time period is from the Pleistocene into the twenty-first century A.D.

The geographic range is global. Although examples are drawn from many parts of the world, we make no effort to provide regional surveys of zooarchaeological developments. Smith's (1995) review of the emergence of agriculture throughout the world provides regional surveys of both plant and animal data. His volume is a good place to obtain an overview of zooarchaeological knowledge in the context of broader archaeological research. Our intention is to review anthropological, biological, and ecological aspects of zooarchaeology from the wide variety of geographical settings in which zooarchaeology is practiced and to summarize, broadly, the diverse ways in which humans and animals interact.

The volume is organized in much the same way as a faunal study might be. Familiarity with the history of zooarchaeology and current research topics provides the intellectual background a zooarchaeologist should bring to the study of a specific faunal assemblage (Chapter 2). It is also important to be familiar with biological (Chapter 3) and ecological principles (Chapter 4) basic to the discipline. In Chapters 5, 6, and 7, three sources of bias in a faunal assemblage are reviewed, beginning with taphonomy and excavation procedures. Chapters 6 and 7 present some of the most basic zooarchaeological methods, using an archaeofaunal Hypothetical Collection to illustrate fundamental methods for collecting primary and secondary data. In the remaining chapters, animal remains are interpreted in terms of subsistence strategies (Chapter 8), domestication (Chapter 9), and human interactions with the environment (Chapter 10). The final chapter (Chapter 11) draws these threads together and considers future directions in the field.

This volume is not intended to replace the many excellent biological references available; works focused on single organisms or groups of organisms; methodological descriptions and reviews; regional archaeofaunal syntheses; or theoretical treatments. Extensive references are offered for each topic covered in the following pages. We urge readers to use these as guides to more detailed treatments of each subject. We hope to excite students to pursue their own interests in this diverse field so that they may share, with us, many hours of stimulating puzzlement.

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