Lithics

Macroscopic Approaches to Analysis

Lithics, the practice of stone artifact analysis, has undergone many changes in recent years with the development of new techniques of analysis and the assessment of older techniques. This book is a fully updated and revised edition of William Andrefsky, Jr.'s ground-breaking manual on lithic analysis. Designed for students and professional archaeologists, this highly illustrated book explains the fundamental principles of the measurement, recording and analysis of stone tools and stone tool production debris. Introducing the reader to lithic raw materials, classification, terminology and key concepts, it comprehensively explores methods and techniques, presenting detailed case studies of lithic analysis from around the world. It examines new emerging techniques, such as the advances being made in lithic debitage analysis and lithic tool analysis, and includes a new section on stone tool functional studies. An extensive and expanded glossary makes this book an invaluable reference for archaeologists at all levels.

WILLIAM ANDREFSKY, JR. is Professor of Anthropology at Washington State University. He is the author of *Lithics* (First Edition, 1998) and *Lithic Debitage* (2001) and numerous articles on archaeology and anthropology.

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SECOND EDITION

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To Marilyn and Claire

CONTENTS

FIGURES

TABLES

PREFACE

As a boy I remember my brother and I roaming the fields and woods along the creeks and rivers that empty into the Chesapeake Bay, and finding my first "arrowhead." Such treasures were interpreted by us as "missed shots" by prehistoric hunters, or the spot where a wounded warrior died in battle. However, most of the artifacts were discovered at a site where hundreds of stone artifacts could be found. I often wondered why perfectly good stone artifacts were left at such locations. On a good day sometimes dozens of "arrowheads" could be found at the same place. Did prehistoric people store these artifacts at the site and never return for them? Were stone age people so absent-minded that they would lose dozens of "arrowheads" around their camps? Perhaps the artifacts we found were rejects?

To this day, I still wonder why stone tools which appear to be perfectly functional and useful are left at sites. The more I look at them, the more I realize that many different factors influence their final disposition. Some lithic tools are rejects, others are lost, and still others may not be tools and instead are the by-products of tool production. Stone tools may have different values depending upon the amount of effort expended in their production or the availability of raw materials. The context within which a stone tool is made and used is important for determining how it will be discarded or preserved. All of these variable situational and social contexts are increasingly recognized as important influences in the understanding of stone tools. This book attempts to show how characteristics of stone tools and stone tool assemblages are affected by various contexts.

To achieve this goal I have had to review a great amount of literature related to stone tools and I have necessarily had to standardize several kinds of analysis. In this regard, the book reviews some very elementary concepts associated with stone tool analysis – terminology, classification, attribute definition. These concepts are used in later parts of the book to demonstrate analytical strategies and explain interpretations made from stone tool analysis.

This book was written for two audiences. First it was written for students interested in learning about lithic analysis. It has enough elementary material so that undergraduates who have experience with archaeology but not necessarily lithic analysis can use the book as a guide for understanding lithic assemblages. It also has more complex interpretive and analytical sections to help graduate students structure lithic analysis for their own research problems and regions. Secondly, the book was written for those who teach lithic analysis. The concepts introduced here are universal and applicable to all lithic assemblages. I provide specific examples of analytical studies and specific techniques for the measurement and recording of lithic artifacts, but those examples and techniques are easily adapted to chipped stone assemblages from any particular part of the world.

It is important to realize that this book is based upon many of my interests in lithic analysis. As such, it is worthwhile stating what it does not represent. It is not a "cook book" for lithic analysis. I have tried to emphasize the notion that artifact context is important for understanding how to conduct analysis and to make interpretations. I prefer to view the book as an example of various approaches to lithic analysis that have been used and could be used, given the kind of issues the researcher wishes to address. It is not a review of lithic analysis. Although a great amount of literature is covered, this is by no means exhaustive, nor is it intended to be. The materials reviewed are directly related to concepts and approaches presented. Finally, the book is not a culture historical review of lithic assemblages from around the world. Although examples of artifacts and techniques are taken from six continents, I do not emphasize lithic variability as culture historical markers or as temporal and spatial diagnostics. The emphasis of the book is upon lithic artifact analytical techniques and the interpretations that can be made from such techniques.

PREFACE TO SECOND EDITION

The first edition of *Lithics* was written in 1994, with only slight modifications and additions during the review and printing phases. Over the past decade a great deal of research in lithic analysis has emerged. I like to believe that some of that research was developed in response to issues and concerns raised in the first edition.

The second edition of *Lithics* draws upon some of the new research in an effort to update aspects of thinking about various topics and analytical procedures. Even though the structure of the book remains the same, I have embedded materials and discussion on a number of new topics not included in the first edition: minimal nodule analysis, flake tool reduction indices, microdebitage studies, and the relationship of research questions to analytical procedures. The total number of citations has increased by about a third, with most of the new materials being written after 1994. The second edition still focuses upon macroscopic approaches to analysis. However, a section on microscopic techniques of analysis dealing with artifact function has been added (thanks to the many friends who convinced me that such a section was needed).

One of the things that becomes immediately apparent when gathering materials for a second edition of a book like *Lithics* is the shifting influences and contributions of various scholars. I acknowledge the research efforts of those individuals whom I have drawn upon in pulling this edition together. There are a number of "old timers" (not necessarily chronologically) that were featured in the first edition of *Lithics* who have maintained their prominence in the discipline. Among others, Harold Dibble, George Odell, and Mike Shott have made a significant impact in lithic studies and to this volume. There is also a group of scholars that have emerged in the past decade or so, who have forged new thinking and strategies in lithic method and theory. These scholars (among them Doug Bamforth, Peter Bleed, Peter Hiscock, Steve Kuhn, Mary Lou Larson, Marty

Magne, Bill Parry, and John Whittaker) have linked lithic studies to human organizational models, to evolutionary theory, and to experimental designs. I have unabashedly borrowed their research in crafting the second edition of *Lithics*. More importantly, it is apparent that the field of lithic analysis is getting stronger and more theoretically and methodologically rigorous. I say this because recently there have been a number of publications from a younger generation of scholars that have challenged some of our old premises and introduced new applications. This edition of *Lithics* is influenced by the scholarship and fresh ideas of researchers like Brooke Blades, Andrew Bradbury, Jeffery Brantingham, Chris Clarkson, Randolph Daniel, Jeff Rasic, Frederic Sellet, and countless others.

ACKNOWLEDGMENTS

In large part, this book is derived from a graduate seminar I first taught at the University of Alaska, Fairbanks in 1983. Since that time the class has evolved into a graduate lecture and laboratory course I have taught on five different occasions at Washington State University. The graduate students in those courses over the years helped me formulate some of the methods and techniques that appear within this book. I appreciate the insightful discussions and difficult questions that we dealt with, all of which make this a better study of lithic analysis.

There are 102 figures in this book. I am responsible for designing all of the figures. However, I was fortunate to have two talented artists draw technical illustrations of artifacts and create schematic illustrations to emphasize various points. I can not thank Sarah Moore enough for her excellent artifact illustrations and schematics. Sarah did all of the artwork for the artifacts depicted in the book (Figures 2.1, 2.2, 2.4–2.11, 4.1–4.3, 4.11, 5.3, 5.5, 5.7–5.12, 6.1–6.4, 7.1, 7.2, 7.8, 7.10, 7.14, 7.18, 7.20–7.24, 7.28, 7.29, 7.31, and 8.3). She also did schematic illustrations shown in Figures 2.15, 5.4, 5.6, 7.3, 7.4, 7.5, 7.6, 7.7, 7.9, 7.11, and 7.19. Additionally, she redrew artifacts from sketches of photographs (Figures 2.3, 2.16, and 8.2), and drew the artifacts in schematic diagrams that I subsequently altered (Figures 5.13, 7.15–7.17, and 7.25). Jenny Fluter drew schematic illustrations for Figures 2.8, 2.12–2.14, 2.17, 2.18, 7.33, 7.35, 8.4, and 8.5). Jenny also drew the specimen b in Figure 7.19. I composed and drew the remaining 30 figures with the help of my computer.

The two people who read and commented on the entire manuscript were Louise Barber and Marilyn Bender. They did an excellent job and I am grateful for their enormous efforts. Louise carefully performed a technical edit on the narrative portion of the book. In a short period of time her skills transformed my writing into English. Marilyn read the manuscript and performed the tedious job of insuring my figures and tables actually related to the narrative. She also conducted the reference check and generally made sure I didn't stretch the truth too far.

There are several people whom I drew upon extensively either through their published works or through conversation over the years. These are not necessarily the same people I cite most heavily in the book, but their contributions were very important in shaping my opinions and ideas about specific topics covered. I thank the following people for their contribution to this book, though they may not completely agree with my position on various ideas and interpretations. Much of my basic belief about the way stone tools change throughout their uselife was influenced by the hunter-gatherer research of Richard Gould and Brian Hayden, and by my exposure to Errett Callahan's experimental archaeology field projects in the 1970s. The section on lithic fracturing properties benefited greatly from Brian Cotterell and Johan Kamminga's research. I could not have explained the genesis of chert without the excellent background provided by Barbara Luedtke. My understanding of artifact style and meaning was shaped by the ideas of Meg Conkey. Albert Ammerman and Vin Steponaitis helped me to understand the intricacies of classification. Without the insightful research of Paul Mellars I could not have begun to discuss the properties of Levallois technology. Finally, the section on artifact function was greatly influenced by the work of George Odell.

I also wish to acknowledge the help and support of the team from Cambridge University Press. In particular, I would like to note the help of Jessica Kuper, Simon Whitmore, Jackie Warren, Liz Davey, Sinead Moloney, Annette Youngman, and Maria Angelaki. The copy editors, Francis Brown for the first edition and Janice Robertson for the second edition, did a marvelous job. The peer reviewers for Cambridge made this a better book. I especially wish to thank Randolph Donahue for his suggestions and insights.

The book would not have been possible without the encouragement and support of my wife Marilyn. These kinds of projects take so much away from personal relationships. I am lucky to share my time with someone understanding enough to help me to complete such projects.