STONE AGE INSTITUTE PUBLICATION SERIES

Series Editors Kathy Schick and Nicholas Toth

Stone Age Institute
Gosport, Indiana
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Bloomington, Indiana

Number 1.
THE OLDOWAN: Case Studies into the Earliest Stone Age
Nicholas Toth and Kathy Schick, editors

Number 2.
BREATHING LIFE INTO FOSSILS:
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NUMBER 1

THE OLDOWAN:

Case Studies Into the Earliest Stone Age

Edited by Nicholas Toth and Kathy Schick

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COVER PHOTOS

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1) *Excavation at Ain Hanech, Algeria (courtesy of Mohamed Sahnouni).*

2) *Kanzi, a bonobo ('pygmy chimpanzee') flakes a chopper-core by hard-hammer percussion (courtesy Great Ape Trust).*

3) *Experimental Oldowan flaking (Kathy Schick and Nicholas Toth).*

4) *Scanning electron micrograph of prehistoric cut-marks from a stone tool on a mammal limb shaft fragment (Kathy Schick and Nicholas Toth).*

5) *Kinesiological data from Oldowan flaking (courtesy of Jesus Dapena).*

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9) *A 2.6 million-year-old trachyte bifacial chopper from site EG 10, Gona, Ethiopia (courtesy of Sileshi Semaw).*

Back:

Photographs of the Stone Age Institute. Aerial photograph courtesy of Bill Oliver.

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To our Berkeley professors

J. Desmond Clark

Richard L. Hay

F. Clark Howell

Glynn Ll. Isaac

“Example is the school of mankind, and they will learn at no other.”

-- Edmund Burke, 1796

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THE OLDOWAN:
CASE STUDIES INTO THE EARLIEST STONE AGE

EDITED BY
NICHOLAS TOTH AND KATHY SCHICK
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PREFACE

This volume is the first in a series being produced by the Stone Age Institute. Built in 2003, this Institute is dedicated to the study of the Palaeolithic, essentially the archaeology of human origins, and to the dissemination of information gleaned from such studies. In terms of time, the vast majority (well over 99 percent) of the known archaeological record, and thus of human technological development, took place in the Stone Age. Furthermore, for more than 90 percent of the duration of the Stone Age, all known hominins were anatomically pre-modern (archaic) in form. Thus, the evolution of technology and the evolution of the human lineage are intricately intertwined for most of our prehistory.

The record of human technological development begins with the appearance of the earliest stone artifacts approximately 2.6 million years ago and continues with a primary emphasis on use of stone for tools for most of the ensuing time. The transition to other tools – e.g., widespread use of ceramics, use of metals, development of writing, concerted harnessing of various forms of energy (animals, mechanical devices, machines, electronics, nuclear, etc.) – is relatively recent across the planet, emerging only since the end of the last Ice Age, or within the last 10,000 years or so (somewhat earlier or later in different places depending on local resources, geography, ecology, and contacts between populations). This technological transition coincides in time and is dynamically linked with a gradual but widespread shift from a hunter-gatherer existence to a new means of subsistence, one based on controlling the reproduction of certain plants and animals. This shift to an agricultural subsistence in many parts of the world supported tremendous human population growth and spurred the development of larger, more complex societies through time – culminating in the world we live in today.

But the modern human world is a remarkably recent phenomenon. If the last 2.6 million years comprises at least 130,000 generations of tool-making ancestors, the bulk of these – c. 129,500 (over 99.6 percent) of ancestral human generations – lived a Stone Age existence, and only the last 500 or so generations have lived in the last 10,000 years since the transition began from the Stone Age to our modern world. The remarkable technological, economic, and social complexity of humans today is in reality a thin veneer that overlies an incredibly deep evolutionary foundation forged over the course of millions of years in the Stone Age. This is the reason that we have focused on the Palaeolithic and dedicated a research institute to the study of human technological and biological development in an evolutionary context.

During the past several decades, a significant amount of information and data has been collected in our quest for understanding the archaeology of human origins. New prehistoric archaeological sites have been discovered and excavated; detailed analysis of stone artifacts and faunal remains have been undertaken; and new hominin fossils have been discovered that are broadly contemporaneous with these archaeological occurrences. Radiometric and other dating techniques are refining our chronological framework, and new developments in isotopic analysis and even prehistoric DNA extraction and sequencing are helping us understand the ecological, behavioral, and phylogenetic patterns in prehistory.

A wide range of actualistic studies, including studies of taphonomy and zooarchaeology, ethnoarchaeology, geoarchaeology and site formation processes, and experimental archaeological investigations making and using stone tools, have given us much better means of understanding and interpreting the prehistoric past. These new advances have corroborated some earlier assumptions about human evolution, behavior and adaptation (e.g., earliest origins in Africa, adaptation toward meat-eating), but have also challenged other conventional notions of the Early Stone Age (e.g., early importance of hunting, food sharing, and home base models).

This volume is the first in a Stone Age Institute

Press series dedicated to disseminating new information about human evolutionary and Stone Age studies. The purpose of this volume is to present new approaches to the archaeology of human origins and provide an update to our current state of knowledge. This inaugural volume is an especially fitting commencement of this publication series, as it embodies the multidisciplinary approach central to the Stone Age Institute and so much of its research. It comprises a set of studies focusing on the earliest archaeological evidence preserved in the prehistoric record, called the Oldowan. Oldowan industries consist of early stone artifacts produced by tool-making ancestors starting about 2.6 million years ago in Africa and which ultimately document the spread of ancestral forms out of Africa into Eurasia. As these ancestors are so remote from us in time, physical form, brain size, cognitive abilities, and lifeways, it is especially challenging to understand the significance of early stone tools with regard to their manufacture, their use, and their overall role in the lives and adaptation of the protohumans that made them.

To approach such questions about the early toolmakers and the role of technology in human evolution and adaptation, we first require good evidence–the early archaeological sites constituting our database on this important time period in human evolution, and we then need relevant comparative information–critical tools to aid us in interpreting this evidence. This volume is divided into two such components, the first presenting a close and critical look at early sites and their evidence, including early sites in Africa and the record of the spread of tool-making ancestors into Europe and Asia. The second half of this volume presents a range of experimental and actualistic studies critical to interpreting this evidence and evaluating its relevance to human biological and cognitive evolution. These range from comparative studies of ape technologies in the field and the laboratory, to experimental studies of novice tool-makers, to PET (positron emission tomography) studies of brain activation and kinesiological studies of upper limb motion involved in stone tool-making.

In this Stone Age Institute Press publication series, we plan to produce volumes focusing on a range of Palaeolithic projects and topics as well as produce proceedings of international symposia organized by the Stone Age Institute. Our second volume will deal with studies in African taphonomy, or burial and preservation of organic remains, in honor of South African naturalist and palaeoanthropologist C.K. Brain. Our vision for the Stone Age Institute Press is to provide a vehicle for producing important works concerning Palaeolithic research in high-quality, well-illustrated volumes but in an expedient, cost-effective manner. It is partially a response to the ever-growing price of books produced by profit-making academic and university presses. We hope that this publication series will fill a niche in the profession for data-rich, affordable volumes communicating the results of critical field and laboratory research in paleoanthropology. It is also hoped that this publication series will facilitate extensive dissemination of this important information on human evolution and adaptation to a broader academic and general audience.

The inauguration of this Stone Age Institute Press series follows the recent establishment of the Stone Age Institute in Bloomington, Indiana. The Institute has been established as an autonomous, nonprofit organization–a federally-approved 501(c)(3)–dedicated to scientific research and education and funded through tax-exempt donations from individuals, as well as grants from foundations and corporations. The Stone Age Institute is separate from, but has very close ties to Indiana University, Bloomington, as the Institute hires its senior researchers, rotating postdoctoral associates, and support staff through this major research university.

The Stone Age Institute at the present time comprises a 14,000 sq. ft. facility with a library/great room containing the collection of books and articles of J. Desmond Clark, ten research offices, a room for preparation of publications, three laboratories, storage facilities, and an outdoor experimental archaeology area. It has been constructed on a 30-acre tract of land just north of Bloomington, Indiana, with most of the land constituting a green-space nature preserve. For more information on the Stone Age Institute, including our mission, scientific researchers, field and laboratory projects, sponsored talks, conferences, symposia, and publication series, please visit our web site at www.stoneageinstitute.org.

The Stone Age Institute's goal is to establish a critical foundation for Stone Age studies in the United States, and to our knowledge it is the only independent center specifically dedicated to Stone Age research. It has been founded to give a safe and stable haven for Stone Age studies, providing support and facilities to a cadre of full-time researchers as well as visiting scholars, postdoctoral fellows, and students. The Stone Age Institute thus provides a secure base for vital research into our Stone Age foundations, and the Stone Age Institute Press is a vital component in the dissemination of results of this research.

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