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STONE AGE INSTITUTE PUBLICATION SERIES  
NUMBER 3

*Series Editors Kathy Schick and Nicholas Toth*

# THE CUTTING EDGE:

New Approaches to the  
Archaeology of Human Origins



*Editors*

**Kathy Schick**

Stone Age Institute & Indiana University

**Nicholas Toth**

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COVER CAPTIONS AND CREDITS

*Top: Homo habilis Utilizing Stone Tools. Painting by artist-naturalist Jay H. Matternes. Copyright 1995, Jay H. Matternes. Inspired by a prehistoric scenario by K. Schick and N. Toth in Making Silent Stones Speak: Human Origins and the Dawn of Technology (1993), Simon and Schuster, New York. Pp.147-149.*

*Lower right: Whole flake of trachyte lava from the 2.6 million-year-old site of Gona EG-10, Ethiopia. Reported by S. Semaw (2006), "The Oldest Stone Artifacts from Gona (2.6-2.5 Ma), Afar, Ethiopia: Implications for Understanding the Earliest Stages of Knapping" in The Oldowan: Case Studies into the Earliest Stone Age, eds. N. Toth and K. Schick. Stone Age Institute Press, Gosport, Indiana. Pp. 43-75. Photo courtesy of Tim White.*

*Lower left: Prehistoric cut-marks from a stone tool on Sterkfontein hominin partial cranium StW 53. Reported by T. Pickering, T. White, and N. Toth (2000) in "Cutmarks on a Plio-Pleistocene hominid from Sterkfontein, South Africa". American Journal of Physical Anthropology 111, 579-584. Scanning electron micrograph by N. Toth.*

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# DEDICATION



To F. Clark Howell (1925-2007), professor, mentor, colleague, and friend. His scholarship, scientific contributions, influence, and encouragement to paleoanthropology are inspirations for the present and future generations of researchers.



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# THE CUTTING EDGE: NEW APPROACHES TO THE ARCHAEOLOGY OF HUMAN ORIGINS

EDITED BY

KATHY SCHICK AND NICHOLAS TOTH  
STONE AGE INSTITUTE PRESS, 2009

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# INTRODUCTION

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KATHY SCHICK AND NICHOLAS TOTH

*“Science at the cutting edge, conducted by sharp minds probing deep into nature, is not about self-evident facts. It is about mystery and not knowing. It is about taking huge risks. It is about wasting time, getting burned, and failing. It is like trying to crack a monstrous safe that has a complicated, secret lock...”*

Richard Preston (1996)

*First Light: The Search for the Edge of the Universe.*

*“There’s a pattern here to see, and the point will soon be clear to me...”*

Stewart Copeland (1985)

“Serengeti Long Walk”, from the film soundtrack, *The Rhythmist*.

The co-evolution of hominin biology and technology has been a feature of the human lineage for at least the last two-and-a-half million years. During this time there have been both profound biological changes as well as profound technological changes, as manifested in the prehistoric human palaeontological and archaeological record. We believe that this unique reliance upon tools and technology was one of the primary factors in the evolutionary trajectory of the human lineage and the ability of our lineage to adapt to an astonishing range of environments and myriad of ecological niches over time.

For most of this time, the vast majority of our archaeological evidence for technology is in the form of flaked and battered stone artifacts and, where preservation has permitted, associated modified animal bones. While there is an great appreciation that a rich organic material culture was almost certainly also a part of early

hominin material culture, such perishable tools artifacts (e.g. made of wood, bark, leaves, grass, hide, eggshell, tortoise shell, horn, gourd) rarely if ever survive in the early archaeological record. Thus stone technologies represent the major evidence for the evolution of early hominin tool-making and tool-using behaviors, for the role of tools in the lifeways and adaptations of evolving hominin forms, and potentially for the cognitive underpinnings of such complex behavior patterns in our ancestral lineage.

As tool-related behaviors have been so critical in the course of human evolutionary development, it is vital to palaeoanthropology to refine our understanding of the meaning and significance of early stone tool industries. In view of this need, in October of 2006 the Stone Age Institute hosted its third international conference, entitled “The Cutting Edge: New Approaches to the Archaeology of Human Origins.” Many of the principal investigators of Early Stone Age (especially Oldowan) sites were invited to come to the Stone Age Institute, give presentations, and discuss major issues in the field as well as new methodologies that might be of use to other researchers. Our principal discussant was the late F. Clark Howell, who provided a valuable perspective gained from decades of palaeoanthropological experience. Participants included (showing their current affiliation), Rob Blumenshine (Rutgers University), David Braun (University of Capetown), Parth Chauhan (Stone Age Institute), Charles Egeland (University of North Carolina), Ignacio de la Torre (Institute of Archaeology, London), Henry de Lumley (Institut de Paléontologie Humaine, Paris), Manuel Dominguez-Rodrigo (University of Madrid), Leslie Harlacker (James Madison University), Jack Harris (Rutgers University), Erella Hovers (Hebrew Uni-

versity), Kathy Kuman (University of Witwatersrand), Travis Pickering (University of Wisconsin), Tom Plummer (SUNY Binghamton), H el ene Roche (CNRS, Nanterre), Mohamed Sahnouni (Stone Age Institute), Kathy Schick (Stone Age Institute), Sileshi Semaw (Stone Age Institute), Dietrich Stout (Emory University), Pierre-Jean Texier (CNRS, Valbonne), Nick Toth (Stone Age Institute), and David Zhvania (Georgia State Museum, Tbilisi, Georgia). In addition, we have invited another scholar from Spain who worked at the Institute recently on a predoctoral fellowship, Beatriz Fajardo, to also contribute to this volume.

In Chapter 1, Robert Blumenshine and colleagues discuss changes in raw material transport (quartzite) in lowermost Bed II times (c. 1.785- 1.745 Ma) at Olduvai Gorge, Tanzania that may be related to changes in landscape over time, notably in the pre-incision and post-incision phases. David Braun and John Harris examine in Chapter 2 technological variation in the KBS Member (c. 1.88-1.6 Ma) at Koobi Fora, Kenya that may be related to a shift towards drier conditions through time as well as the possibility of an increasing reliance on lithic technology and the emergence of *Homo erectus*. In Chapter 3, Parth Chauhan reviews the claims for early occupation on the Indian subcontinent, and concludes that, at our present state of knowledge, there is as yet no convincing evidence of a pre-Acheulean occupation of this area of South Asia. Ignacio de la Torre's examination of the technological strategies of hominins at Peninj, Tanzania (1.6-1.4 Ma) in Chapter 4 show that both early Acheulean and Oldowan-like lithic strategies were employed and were probably used by the same hominin groups in different environments.

In Chapter 5, Henry de Lumley and colleagues review the evidence of early archaeological sites in East Africa and Southern Europe, and suggest a "Pre-Oldowan" or "Archaic Oldowan" stage starting c. 2.55 Ma characterized by simple cores and flakes with little standardized retouch and a "Classical Oldowan" beginning c. 1.9 Ma with higher frequencies of small retouched tools as well as polyhedrons and spheroids. Erella Hovers in Chapter 6 examines early hominin knapping skills from the perspective of accidents as seen in broken, hinge and step flakes. She argues that such mistakes are an incidental part of the knapping process and not necessarily good indicators of skill, and that early tool-makers at Hadar site A.L. 894 (c. 2.36 Ma) were able to recover from such accidents and to continue reducing cores. In Chapter 7 Beatriz Fajardo reviews the evidence for an early occupation of Europe, focusing on sites at Orce (Barranco Leon and Fuente Nueva) in southern Spain. Kathy Kuman and Alice Field in Chapter 8 discuss the Oldowan Infill industry from Sterkfontein Cave (Member 5 East, ca. 2.0 Ma), South Africa and the influence of raw material on artifact form.

In Chapter 9, Travis Pickering and Charles Egeland experimentally assess the utility of cutmarks on animal bones and bone fragmentation in inferring hominin be-

havior, and stress that it is not the cutmark frequency, but rather the anatomical patterning of cutmarks that give the best evidence of hominin carcass use- most notably, cutmarks on midshaft fragments indicate processing of fully fleshed limbs and the probability that hominins had early access to carcasses. Mohamed Sahnouni and Jan Van der Made in Chapter 10 review the biochronology of sites in North Africa, and conclude that the sites of Ain Hanech and El-Kherba in Algeria are the earliest securely-dated sites in that region, dating to c. 1.8 Ma based especially on the forms of *Anancus* (mastodon), *Kolpochoerus* (pig), and *Dicerorhinus* (rhino) there. Semaw and colleagues in Chapter 11 look at variability in lithic assemblages at three sites dated to 2.6 million years old at Gona in Ethiopia (EG 10, EG 12, and OGS 7.) Of particular interest, OGS 7 shows evidence for strong selectivity on the part of hominins for higher-quality, finer-grained raw materials and more bifacial and polyfacial flaked cores.

In Chapter 10, Dietrich Stout and colleagues experimentally examine Oldowan lithic knapping skill acquisition in modern humans. Three developmental stages of skill acquisition were identified: 1) relatively uncontrolled; 2) controlled but minimally invasive core reduction; 3) expert with intensive core reduction, larger and more elongated flakes, and more acute exterior platform angles, which most closely resembles the early Oldowan prehistoric archaeological assemblages. Toth and Schick, in Chapter 12, draw upon over three decades of experimental archaeology and other actualistic studies to show how these approaches can shed light on our understanding and appreciation of the world's earliest archaeological occurrences and their behavioral and evolutionary significance.

The primary focus of the conference and this volume was the lithic technologies of Early Stone Age sites, and what they can potentially tell us about early hominin behavior and adaptation, in effect a complement to our Stone Age Institute conference and book on the analysis of animal bones from prehistoric sites, "Breathing Life into Fossils: Taphonomic Studies in Honor of C.K. Brain." This, our third edited volume, is the result of the "Cutting Edge" conference on early lithic technology. We would like to extend our heartfelt thanks to all of the participants who contributed chapters and for their patience during the production of this volume. We would also like to acknowledge the support of our advisory board members and other donors, whose generosity made this conference and publication series possible. We would like to especially thank Mila Norman, Leslie Harlacker, Melanie Everett, August Costa, Charles Egeland, and Blair Hensley-Marschand for all their help during the conference, and to Amy Sutkowski, who did the graphic design and layout for this volume.

The Stone Age institute is a federally-approved non-profit research facility that focuses on the archaeology of human origins and science education. To learn more about our organization, visit our web site at [www.stoneageinstitute.org](http://www.stoneageinstitute.org).