

The Evolution of Hominin Diets

Integrating Approaches to the Study of Palaeolithic Subsistence

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Cover illustrations:

A three-dimensional photosimulation produced from a point cloud of an area of the occlusal surface of a human molar. The area was scanned at 100 times magnification using a Sensofar μ Confocal Imaging Profiler at the Paleoanthropology Laboratory, University of Arkansas at Fayetteville.

Microgravette point from the Gravettian site Grub/Kranawetberg (Austria) representing possible hafted tip of hunting weapon, illustration by: Walpurga Antl-Weiser (Naturhistorisches Museum, Vienna)

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Preface

Michael P. Richards and Jean-Jacques Hublin

The study of hominin diets, and especially how they have evolved throughout time, has long been a core research area in archaeology and paleoanthropology, but it is also becoming an important research area in other fields such as primatology, nutrition science, and evolutionary medicine. Although this is a fundamental research topic, much of the research continues to be undertaken by specialists and there is, with some notable exceptions (e.g., Stanford and Bunn, 2001; Ungar and Teaford, 2002; Ungar, 2007) relatively little interaction with other researchers in other fields. This is unfortunate, as recently it has appeared that different lines of evidence are causing similar conclusions about the major issues of hominid dietary evolution (i.e., the recognition of the important role of meat eating in brain evolution in early Homo, as well as the subsistence strategies of Neanderthals). However, multidisciplinary or integrated, approaches to the study of hominid diets remain rare. Therefore, we wanted to address this issue through a symposium we organized at the Department of Human Evolution in the Max-Planck Institute for Evolutionary Anthropology in Leipzig from May 17th to 21st 2006.

The symposium had two main goals. The first was to bring together key researchers to provide a current state-of-the-art report of their research area. The second and main goal of the symposium was to bring together researchers who may not normally meet, as they work in different regions, on time periods, and with different analytical tools. With this meeting we aimed to address three main issues of dietary evolution:

- (a) Meat eating: when did it start and how did it intensify?
- (b) Hunting technologies: What is the first evidence of hunting, and how did it develop over time?
- (c) Resource intensification: When did this first occur, and how do the species chosen for intensification differ over time and between regions (i.e., use of marine/aquatic resources, small mammals).

To do this, we invited participants from different fields who all had researched these topics, or some aspects of them. These four general research areas were (1) modern studies

(primates, modern humans), (2) faunal and plant studies, (3) archaeology and paleoanthropology, and (4) isotopic studies.

This volume therefore presents research articles by most of these participants that are mainly based on their presentations at the symposium. As can hopefully be seen in the volume, these papers provide important reviews of the current research in these areas, as well as often present new research on dietary evolution.

In the section on modern studies Hohmann provides a review of the diets of non-human primates, including an interesting discussion of the role of food-sharing amongst these primates. Snodgrass, Leonard, and Roberston provide a review of the evidence for the change in brain size of the earliest hominids and how this is linked with diet quality and body composition. Lucas presents an informative look at the mechanics of food processing in the mouth and how this may have changed over time related to differing foods used by different hominins. Finally, Lindeberg presents the evidence for hominin dietary evolution based on the studies of modern human nutrition and health, arguing that many modern diet-related diseases are linked with a mismatch between the diets we should have based on our dietary evolution (lean animal protein and simple carbohydrates) the diets most people have (fatty animal foods and complex carbohydrates).

In the faunal and floral research section, Villa and Lenoir provides a summary of the faunal evidence for diets in Lower and Middle Paleolithic Europe. Comparisons between Middle Paleolithic (or Middle Stone age) and Late Paleolithic (or Late Stone Age) assemblages are proposed for different geographical areas. Hoffercker explores Neanderthals and modern human diets in the Late Pleistocene environments of Eastern Europe. Gaudzinski-Windhauser and Niven provide a review of the faunal evidence for subsistence in the Middle Paleolithic and Upper Paleolithic of Europe, focusing on reindeer exploitation. Steele and Klein review the available zooarcheological data documenting the "transition" from the Middle to the Late Stone Age in South Africa. They examine how subsistence changes relate to demographic changes and models of modern human origin. Adler and Bar-Oz conduct a

comparison between Neanderthal and the first modern human game exploitation in Southern Caucasus and conclude they occupied the same ecological niche with clear consequences regarding mutual exclusion. Munro presents a synthesis of the evidence for changes in dietary adaptations towards smaller game and intensification in South-West Asia in the later Paleolithic, and Stiner and Kuhn move beyond discussion of the faunal evidence directly to discuss the implications of this work and especially division of labor between males and females in Paleolithic Mediterranean Eurasia. Jones provides a useful review of the (limited) evidence for the exploitation of plant foods in the European Paleolithic.

The archaeological and paleoanthropological data also contribute to a better understanding of food acquisition by ancient hominins. Alemseged and Bobe use a paleoenvironmental approach to infer possible dietary adaptation of two hominin genera: *Paranthropus* and *Homo*, particularly in the way they could exploit fallback resource. Shea analyzes the emergence of long range projectile technology likely in Africa at approximately 50–100 Ka and its subsequent spread into Eurasia. Churchill and Rhodes' review of the anatomical features related to the development throwing bring support to the claim that projectile weapons arose in the African later MSA and moved into Europe in the hands of modern humans. However Villa and Lenoir also provide possible evidence for the use of stone-tipped spears by Neanderthals in Western Europe. MacDonald, Roebroeks, and Verpoorte examine the Neanderthal archaeological record and how energetic issues in the use of space may in part explain it.

Finally, in the isotopic studies section Schoeninger provides a review of the small number of studies on the isotopic evidence for the diets of living non-human primates and critically relates it to the isotopic evidence for the diets of early hominins. Sponheimer and Dufour provide a critical assessment of the isotopic evidence for diets of early hominins with a focus on whether there is evidence for increasing dietary breadth in australopithecines and early *Homo*. Bocherens

presents a selection of the isotopic data for European Neanderthals, emphasizing the importance of large herbivores in Neanderthal diets. Finally, Richards provides a summary of the isotopic evidence for Upper Paleolithic humans in Eurasia that also shows the dietary importance of animal foods, including small game such as aquatic foods.

This wide range of papers will hopefully be of interest to researchers who work in dietary evolution to provide a current account of the field, and will provide an introduction into the research that is being undertaken into this topic in fields that are not the reader's own. The research on dietary evolution continues, and hopefully through further interdisciplinary forums such as this we can come closer to knowing how hominin diets changed and evolved over time, as well as learning how to use this knowledge to help us understand the origin and implications of the range of diets of modern humans living in different parts of the world today.

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