Human Evolution: New Questions

The Evolution of Human Hunting. MATTHEW H. NITECKI and DORIS V. NITECKI, Eds. Plenum, New York, 1987. viii, 464 pp., illus. $75. From a symposium, Chicago, IL, May 1986.

Many of our long-held ideas about the role of hunting in hominid origins and in the subsequent evolution of our species have come under increasingly close scrutiny in the past decade, and some of our most cherished scenarios and assumptions are disintegrating in the face of new data and innovative reassessment of older data. *The Evolution of Human Hunting* reflects this climate of reassessment, presenting valuable new syntheses and analyses by some of the field's leading figures.

Our fascination with human carnivory is certainly not a new one. Generations of scholars since Darwin have subscribed to the view that hunting of ever larger and more dangerous prey lay at the heart of the forces that transformed our essentially herbivorous primate ancestors into the brainy, bipedal, tool-wielding social beings that we are today. However, in the last few years, the underpinnings of this pervasive view have been roundly shaken, sparking what has become an exciting and challenging reevaluation of our evolutionary history. Not only are our ideas about how we came to be at stake, so too are the very methods by which we extract insights about the past.

Perhaps the most dramatic shift in perspective began about two decades ago, when taphonomic studies—studies that examine the many processes that influence and alter an assemblage of bones between the time an animal dies and the time its bones become part of the fossil record—were incorporated into the battery of analytical approaches regularly employed by archeologists. Taphonomic approaches, concisely summarized in the present volume by Behrensmeyer, have revealed the complexity of site formation processes and have clearly shown that the mere juxtaposition in a site of animal bones and humanly made stone artifacts does not demonstrate unequivocally that humans were the hunters. The animals may have died of natural causes or have been killed by predators such as hyenas or lions, with humans merely scavenging the remaining edible scraps of flesh or marrow.

Equally provocative and challenging has been the growing realization that animal bones may become associated with stone tools by a variety of mechanisms other than human hunting or scavenging (for example, redeposition of tools and bones together as "lag" deposits in stream channel or lakeshore settings or use of protective locations such as rock-shelters or shade trees at different times by both bone-transporting hyenas and tool-using humans).

Recent research increasingly supports the view that our earliest hominid ancestors, the Australopithecines, who lived about 1.5 to 2.0 or more million years ago, were anything but prodigious hunters, and in fact probably were limited to opportunistic scavenging of carcass remnants abandoned by carnivores. (Unfortunately, this fascinating and provocative issue, which more than any other has brought taphonomy to the fore in studies of human hunting, is not represented in this volume.)

Using the same new methods and arguments, many anthropologists now question even the predatory proclivities of hominid ancestors much closer to us in both time and physical appearance. For example, Binford and Klein, in two of the key papers in this volume, forcefully argue that the classic Spanish Acheulian sites of Torralba and Ambrona, roughly half-million-year-old localities where herds of elephants were once believed to have been driven into bogs by cooperating groups of *Homo erectus*, may be largely hydraulic palimpsests where human presence had little if anything to do with the elephants. Thus, *Homo erectus*, vividly pictured in introductory textbooks as the first true "big game" hunter, is now being relegated to much the same opportunistic scavenging niche as his Australopithecine forebears.

As is argued in the present volume by Klein and Straus on the basis of faunal data and by Trinkaus on the basis of anatomical considerations, even our immediate predecessors, the European Neanderthals and their contemporaries elsewhere in the Old World, with brains fully as large as our own and equipped with relatively sophisticated stone tool technologies, still may have lacked the cognitive skills and planning depth necessary to hunt large, dangerous prey in a regular and systematic fashion.

Even sites made by our own species, anatomically fully modern *Homo sapiens sapiens*, are coming under the taphonomic lens and scalpel, often with surprising results. For example, Morlan critically reassesses the artifactual and faunal evidence for the presence of hunters in Beringia (the region including Siberia, Alaska, and the Yukon) prior to the last glacial maximum, about 18,000 years ago. Though rejecting most of the claims for human presence prior to this date, Morlan notes that curiously fractured mammoth bones from Old Crow Basin in the Yukon, with breakage patterns unlike anything produced by known taphonomic processes, may point to humans in the region 25,000 years ago and perhaps as early as 40,000 years ago.

Even North American bison kills, perhaps the best-known kill sites in the world, are turning out to be far more complex and less easily interpreted than we expected. Todd, in an interesting contribution to the volume, shows that Late Prehistoric northern plains bison kills, which have always served as our frame of reference for interpreting Paleo-Indian (around 10,000 years ago) kill sites, actually may differ substantially from the latter. Animals in the younger kills often are intensively butchered and processed, with carcasses highly disarticulated and bones dispersed. Moreover, in these younger sites the various limb elements differ markedly in frequency, apparently a reflection of on-site culling and transport decisions made by the hunters. Todd is able to show, however, in at least some of the better-studied Paleo-Indian sites from the same region, that high degrees of carcass disarticulation and element dispersal are due largely to carnivore activity and postdepositional processes, not intensive on-site processing by the hunters, and that the frequency of different limb elements is much less variable, suggesting that whole anatomical units were removed with far less on-site selectivity than is displayed in the Late Prehistoric kills. Thus, Todd concludes that Paleo-Indian bison kills, despite their superficial similarity to more recent bison kills, actually reflect quite different procurement patterns for which we lack clear modern analogues.

Todd's conclusions are bolstered by Frison's observation that most Paleo-Indian bison kills occurred during the winter months, with meat surpluses perhaps being stored frozen, whereas most later kills took place earlier in the year, probably in late summer and autumn, with surpluses being preserved primarily by drying.

In the most elegant analysis in the volume, Fisher presents a series of carefully considered taphonomic arguments to build a convincing case for human hunting of mastodonts in the Great Lakes area of North America, despite the absence of stone tools in direct association with the carcasses. Using evidence ranging from the presence of cutmarks and burning on the bones to age

profiles, sex ratios, and season of death, he shows that Late Pleistocene mastodont remains separate out into two distinct death groups, a winter–spring group consisting of equal numbers of males and females and lacking evidence of butchering and an autumn group consisting of young to prime adult males that appear to have been butchered.

Fisher's paper is also exciting because of its methodological innovations, especially the recognition of daily, fortnightly, and annual incremental growth lines in the dentine of mastodont tusks, which permit accurate assessment of season of death. According to Fisher, the same approach can be applied to the tusks of other proboscideans, opening the way to unraveling the hunting strategies of Clovis (Paleo-Indian) mammoth hunters in western North America and Upper Paleolithic mammoth hunters in Eastern Europe and the Soviet Union.

Though *The Evolution of Human Hunting* is a valuable contribution to the growing debate about human predation, it is strikingly incomplete in some ways. I have already mentioned the absence of any discussion of hunting and scavenging by the earliest hominids—the Australopithecines. Other obvious omissions are comparative studies of hunting among extant hunter-gatherers and non-human higher primates, both topics that figure prominently in current discussions of human hunting.

But there are other, larger omissions as well. The volume really addresses only the methodological side of the debate—for example, how we can distinguish human from non-human agents involved in the formation of a site or how we can discriminate between hunting and scavenging. The theoretical issues that underlie these and other questions are not represented. For example, why do humans (and non-human primates) hunt, or scavenge, in the first place? Is protein the principal target? or fat? or total calories? or are these nutritional aspects secondary to social factors? The answers to these questions are not as simple or obvious as they might at first seem. Why do we really want to know whether hominids hunted or scavenged? What really is at stake in this issue?

This is perhaps also the time to inject a note of caution. Though there have been a number of provocative and convincing arguments, several clearly articulated in the present volume, that suggest we have overemphasized man's organized, technologically aided hunting prowess in the Pleistocene, there is now a stampede toward the opposite pole, to a view of pre-modern humans as essentially opportunistic scavengers who lacked "planning depth," sophisticated "cognitive" skills, and perhaps even language and who wandered "irregularly," almost dumbly, over the landscape in search of food. I fear that the pendulum is swinging much faster and much farther than either current theory or data justify, and we will find ourselves a decade or so down the line wondering how we could ever have been so naïve or blind. Though we have learned a great deal in the last few years, and our data and models are undoubtedly vastly improved over what they were before, we still have a long way to go to properly understand the role that hunting played in making us what we are today.

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Rationality and Risk

Classical Probability in the Enlightenment. LORRAINE DASTON. Princeton University Press, Princeton, NJ, 1988. xviii, 423 pp., illus. $49.50.

The ancient geometers were—by present standards—confused: they ran together the empirical problem of measuring the earth with the problem of the truth of axioms about points and lines. The errors of the ancients, however, were forgivable. They didn't distinguish between the validity of axioms and their application to their implicit model of space because they had only one model of space to think with. Similarly, the probabilists of the Enlightenment, who espoused what is now called the "classical" conception of probability, confused objective probability, a feature of the world, and probability as a subjective fact, a degree of judgment or certainty. Lorraine Daston in this volume argues that this failure on the part of the classical probabilists to grasp the difference is grounded in the cases they thought in terms of.

The strategy by which Daston develops her argument is illustrated by her treatment of the origins of the concept of equiprobability, a key theoretical idea for the classical probabilists. The idea actually derived from contemporary Continental legal thinking on "aleatory" contracts, that is, contracts involving risks, such as annuities or insurance policies. Contracts were made equitable by adjustments in the rate of return of the risk-bearer. The concern of the lawyers was to distinguish equitable, hence valid, contracts, from inequitable ones. Eighteenth-century probabilists simply took over this problem of equitability, indeed often followed the vocabulary of contractual law in their formulations. Huygens, for example, used the model of equitable exchange in his analyses of games. His reasoning inverted the modern way of thinking about the problem: for Huygens "expectations were equal when they could be fairly traded for one another," not, as one would say today, the game is "fair because the probabilities . . . are equal for all players" (p. 26). From a modern perspective, the difficulty with the classical formulation is this: how do we know a trade is fair? Today we would determine fairness from a determination of the numerical probabilities. A different kind of answer to this question was to be found in 18th-century legal practice: contracts were judged "by eye." The ability to make such judgments defined a mathematical task for the classical probabilists, but this task preserved the running together of subjective and objective probability. The classical probabilists understood their problem as one of formally describing the "implict and immutable calculations" (p. 52) of the minority of persons adept at judgments involving equity and risk, such as insurance men and gamblers. In the 18th century insurers and gamblers approached their tasks similarly, by intuitive assessments of good bets or risks.

The initial attempts to model reasonable judgment were failures, but interesting ones. The intuitions of risk-takers proved to be difficult to reconcile with any mathematical formulation, and it became apparent that the probabilistic rationality of the equity-seeking jurist and that of the prudent businessman were distinct. But the attempts had important consequences. Classifying problems together on mathematical grounds enabled the probabilists to distinguish the mathematical issues from the substantive problems of risk that had inspired earlier efforts and to extend the range of application of their mathematical ideas in new directions. New conceptual models of probability problems, such as the model of drawing black and white balls from an urn, replaced consideration of actual games of chance or risk situations, and the use of simple tables of rates redefined the practical domain of probability. Tables could be used as substitutes for the complicated internal weighing of numerous intuitive considerations that insurers of the older "betting" variety engaged in. But the new tabular methods were still crude, and probably not a genuine improvement. In any case, they had no effect on practice for some time. Annuities continued to be sold by governments without consideration of such basic risk factors as the age of the annuitant, and lotteries with absurd odds continued to flourish. "Luck" was treated, even by the rational, as a natural quality. Insurers con-