

CHAPTER 8

Weapons and the Acquisition of Meat

“The combined evidence suggests that behavioral changes associated with lithic technology and enhanced carnivory may have been coincident with the emergence of the Homo clade from Australopithecus afarensis in eastern Africa”
[de Heinzelin, et al., 1999, p. 625].

“Homo erectus in the Middle Pleistocene was fully capable of organising, coordinating and successfully executing the hunting of big game animals in a group using long distance weapons”
[Thieme, 2005, p. 129].

Introduction. Earlier chapters support the proposition that ancient hominins had access to weapons, used them, and were becoming adapted to their use by natural selection. This process had continued for at least four million years when it began to accelerate about two million years ago, associated with the abandonment of life in the trees. Within a relatively short period, the hominin lineage underwent a profound physical transformation with multiple new features which enhanced throwing and club-swinging prowess. A new life strategy began, based on bipedal use of weapons and dedication to living on the ground.

The metamorphosis included a significant increase in body size, which must have required some sort of nutritional augmentation to grow and maintain. Available evidence and current opinion concur that the new dietary staple was *meat* (animal tissue) (Chapter 7). Compared to most plant foods, the high nutritional value of meat indicates that increasing its content in the diet would have yielded reproductive benefits (Chapter 3). Other possible effects attributed to increased meat consumption are brain enlargement, dental reduction, gut modification, augmented cooperation, food-sharing, changes in growth and development, locomotion, habitat preferences, activity patterns, population size and structure, social behavior, predator avoidance, technology and cognition. Meat seems to be a pivotal part of the evolutionary transition to *Homo*. How did hominins *acquire* meat? This chapter addresses that question.

Evolution of meat-eating. Wild chimpanzees hunt small mammals without using weapons. This supplies less than 5% of their calories [Stanford, 2001]. In contrast, the median percentage of calories derived from meat in modern human foraging societies is about 35% [Lee, 1968; Eaton and Konner, 1985; Leonard and Robertson, 1994; Stanford, 1999]. This suggests that beginning with a mainly

vegetarian diet hominins progressively consumed increasing amounts of animal food [Zihlman, 1981; G. Isaac, 1984; Klein, 1987, 1999; Shipman and Walker, 1989; Leonard and Robertson, 1994; Walker and Shipman, 1997]. According to Bunn and Stanford [2001, p. 356], "...there is compelling evidence that meat-eating had a major, influential role in making us human."

Stone tool cut marks on fossilized bones show that *A. garhi* ate meat and marrow [de Heinzelin, et al., 1999] and *A./H. habilis* was processing animal parts to a degree previously unknown among primates [Potts, 1988; Klein, 1999]. Still more meat was eaten by *H. erectus* [G. Isaac, 1977]. Middle Paleolithic hominins in Europe consumed prime-aged large animals [Churchill, 1993; Roebroeks, 2001] and this trend continued after the emergence of modern humans [Klein, 1987, 1999].

Evolution of meat acquisition. It was long believed that hominins acquired meat by hunting [Darwin, 1871; Dart, 1949a, 1953; Washburn and Lancaster, 1968; Laughlin, 1968; Foley, 2001]. Hunting implies killing animals then eating them. However, scavenging was another option [Bartholomew and Birdsell, 1953] in which the killing was carried out by another carnivore after which hominins participated in the eating. *Confrontational* scavenging (also called power or aggressive scavenging) refers to displacing a predator from prey it has killed and is still eating. *Passive* scavenging denotes eating parts of carcasses abandoned by predators, or from animals that died of disease, accidents or other natural causes.

The scavenging hypothesis was tested by analysis of faunal body parts. By this method, Potts [1983] concluded that hominins at Olduvai Gorge (~1.9-1.8 Mya) probably engaged in both hunting and scavenging, whereas Binford [1981, 1985, 1987] maintained that hominins there and elsewhere were passive scavengers of bone marrow. Subsequent analyses of cut marks and tooth marks on bone surfaces [Bunn, et al., 1980; Bunn, 1981; Potts and Shipman, 1981; Shipman, 1986] led to renewed emphasis on hunting and confrontational scavenging as the main routes to meat acquisition. Cut marks on four fossil ungulate bones found at a site near Dikika, Ethiopia, dated at 3.4 Mya (~0.8 My *before* hominins began to *make* stone tools), suggest that *A. afarensis* was already harvesting meat from goat- to cow-sized animals [McPherron, et al., 2010], possibly obtained by some kind of scavenging [Braun, 2010]. No stone tools were found, and the nearest suitable raw materials were 6 km away [McPherron, et al., 2010]. The cut marks could have been made by tools taken from the site by hominins who had carried them in.

Scavenging from abandoned carcasses is generally thought to be unproductive because there is little left that is edible [Bunn, 2001; O'Connell, et al., 2002, Stanford, 2003]. Scavenging may have been an option after hominins became able to take meat away from carnivores [DeVore and Washburn, 1963], but it can be a useful strategy for obtaining meat only if it is confrontational [Domínguez-Rodrigo, 2002]. Clearly, both hunting and confrontational scavenging are dangerous pursuits.

Evidence of hunting and confrontational scavenging. There is substantial evidence for carnivory in *Australopithecus*. The earliest evidence has been associated with *A. afarensis*, as shown by marks on ungulate bones found at Dikika [McPherron, et al., 2010]; however, the identification of these marks as evidence of butchery has been questioned by Domínguez-Rodrigo, et al. [2010]. Sites at Gona and Bouri in Ethiopia have yielded verified cut-marked bones (2.6 to 2.1 Mya). It is at Gona that the earliest known flaked stone tools have been found (2.6 Mya). These might be the work of *A. garhi* [Asfaw, et al., 1999; de Heinzelin, et al., 1999]. According to Domínguez-Rodrigo and coworkers [2005], most of the cut marks at Gona are due to hominin butchery of a nature that indicates early access to large ungulate carcasses, which implies hunting and/or confrontational scavenging. The butchered bones show that hominins exploited a wide range of animals, including equids and medium-to-large sized bovids, which were disarticulated and defleshed.

Outside of Africa, at the Dmanisi site in the Caucasus (1.8 Mya), it seems that the “...hominins were involved in meat acquisition, and that they had early access to carcasses, which suggests hunting or power scavenging” [Lordkipanidze, et al., 2007, p. 305]. Cut marks were found on large bone specimens. Carnivores were still a factor at Dmanisi (five genera were documented) but evidence suggests that hominins had early access to carcasses. The hominins were small (australopithecine-size), and had a primitive tool kit (the Oldowan). They also brought manuports to the site [Lordkipanidze, et al., 2007, Supplementary material, S5]. The Dmanisi site, in an open, temperate habitat outside Africa, strengthens the view that carnivory was involved in the expansion of early *Homo* throughout Africa and into Asia [Pontzer, et al., 2010].

In Africa, during the transition to *Homo erectus* (1.9-1.7 Mya), cut marks were made on 200 bovid, suid, equid and giraffid bones at the Olduvai Bed I FLK Zinj site in Tanzania [Bunn and Kroll, 1986]. There was an abundance of meatier limb elements among these bones, indicating that hominins had priority of access to carcasses. The prevalence of adult animals probably rules out death from natural causes or passive scavenging. It seems that hunting or confrontational scavenging were the strategies Olduvai hominins used to gain access to meat [Bunn & Kroll, 1986]. (They might have been confrontational scavengers of large animals and hunters of smaller ones [Bunn, 2001]). At Koobi Fora in Kenya (1.6 Mya), where most faunal specimens were large mammals (115-910 kg), cut marks were found on more than 60 bones [Bunn, et al., 1980; Bunn, 1981; Bunn, 1994]. The presence of defleshing marks on small bovid limb bones may indicate hunting, because small bones can be consumed entirely by large carnivores in a matter of minutes [Bunn, 1997].
