

have been suicidal for the cat to continue to grip the baby, as the mother would then have time to crush or impale the cat.

A solution to this dilemma is suggested by William Akersten's anatomical studies³ of remains of *Smilodon* trapped in the famous La Brea tar pits of Los Angeles. Muscle scars on *Smilodon* bones show that the muscles for closing the jaws were not especially strong but that the muscles to depress the head by rotating it downwards around the joint with the first neck vertebra were massive (see figures). The chin was flanged, and the jaws opened to the enormous gape angle of 95° to permit the same clearance between the long upper and lower canines as does the 65° gape of modern cats. Akersten suggests the following sequence. A cat ambushes a baby mammoth straying from its mother and uses its powerful fore-limbs to pull down the baby, exposing the abdomen. The cat opens its jaws wide, catches a large fold of flesh between the upper and lower



Cranium and mandible of *Smilodon*.

canines, wedges the lower jaw firmly against the prey by the chin flanges, and then completes the bite by the head-depressing muscles. It then flees from the approaching mother mammoth and waits for the baby to haemorrhage, die, and be abandoned by its mother.

Yet one more predator has independently evolved a similar solution to the problem posed by a formidable victim. The most dangerous prey of all is an armed man, routinely hunted only by other armed men. Inexperienced soldiers aim for the head or heart, but these small targets are easily missed. "Always aim for the stomach when you shoot" was the advice of an experienced African bush fighter — "it is just as good, because no man can live long after his intestines have been shot away". Nor could an elephant seal or baby mammoth. □

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2. McCosker, J.E. *Calif. Acad. Sci. Mem.* no. 9, 123 (1985).
3. Akersten, W.A. *Los Ang. County Mus. nat. Hist. Contr. Sci.* no. 356 (1985).
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Anthropology

The longest human record

from John E. Yellen

THE recent conference* to honour J. Desmond Clark for his contributions to African pre-history provided a unique opportunity to review current ideas about the archaeological record of this continent. African palaeoanthropology is most clearly distinguished by its quest for the first uniquely hominid antecedent: the earliest known hominid fossils derive from the Eastern Rift Valley in Kenya. Evidence for the first million years of cultural development, in the form of stone tools, butchered animal remains and possibly the controlled use of fire, are also limited to the African continent. The first modern humans, *Homo sapiens sapiens*, were widely distributed in Africa well before their appearance in Europe and the near East and the development of complex societies, in relative independence from those in other parts of the Old World.

Excavations this past summer near Ishango, eastern Zaire, produced stone artefacts associated with faunal remains that are just over two million years old (Jack Harris, University of Wisconsin; Noel Boaz, Virginia Museum of Natural History). In conjunction with stone-tool assemblages from Ethiopia of about the same age, systematic lithic modification must have appeared more than two million years ago. Unfortunately, these artefacts cannot be assigned to specific species.

Arguments were presented that *Homo habilis* was capable of speech (Dean Falk, University of Puerto Rico; Philip Tobias, University of the Witwatersrand). This species had a larger brain than australopithecine forms with prominent enlargement of Broca's and Wernicke's areas, both associated with language in modern humans. These advances appeared at about the same time as the first stone tools.

Whereas most palaeoanthropologists agree that by the mid-Pleistocene *Homo erectus* had controlled use of fire, there has been no evidence for earlier occurrences. Because charcoal decomposes in tropical environments, African evidence is extremely difficult to obtain. Recently discovered patches of reddened earth in East African sites dates between 1.5 and 1.7 million years ago and which are associated with cultural remains were suggested to indicate much earlier human use of fire (Desmond Clark, University of California; Jack Harris, University of Wisconsin). But palaeomagnetic and thermoluminescent analyses failed to provide unequivocal evidence of sediment heating.

* The Longest Record: The Human Career in Africa. Berkeley, California, 12–16 April 1986.

The question of early hominid hunting reflects on cognitive ability and social organization. Although animal bones with stone-tool cutmarks provide evidence of carcass use by humans earlier than 1.5 million years ago, it is uncertain whether these remains were acquired by hunting or by scavenging from carnivore kills. If hominids were primarily scavengers, they would be left with the less-choice body parts, which would be reflected in the skeletal elements recovered and the way they were treated to remove remaining scraps of meat. Using such criteria, faunal remains from both Olduvai and Koobi Fora can be interpreted to indicate hunting as cutmarks appear on the primary meat-bearing bones of small bovids which would be unlikely to survive the attention of large carnivores (Henry Bunn, University of Wisconsin).

Also at issue was a large sample of excavated cattle and sheep bones from the Neolithic site of Ngamuriak in southern Kenya. In this butchered assemblage the larger and smaller species are processed differently and a similar pattern is evident in early hominid material (Fiona Marshall, University of California). On the other hand, analysis of the Olduvai Bed I fauna shows 13 cases of overlapping stone-tool and carnivore tooth marks. In eight of these the tool mark overrules that made by tooth, indicating human scavenging (Pat Shipman, Johns Hopkins University).

Recent work on the eastern margin of the Kalahari Desert shows a pattern of increasing complexity and hierarchical organization which, in effect, set the stage for the emergence of the Zimbabwe culture (James Denbow, National Museum of Botswana). The Venda, who are among the lineal descendants of Zimbabwe people, use variation in motifs on compound walls to denote status. Direct counterparts exist in Zimbabwe period stone-walled structures and, by application of Venda data, it has been possible to reconstruct a five-level hierarchy which extended from heads of individual households to the divine national leader (Thomas Huffman, University of the Witwatersrand). Because the gradual evolution of this system can be traced through time it is highly unlikely that the final structure was a direct result of outside stimulus (trade with Indian Ocean powers) but more probably derived from indigenous roots. □

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