shrubs and careful stalking it selects its prey, a 2-year old playing at a distance from his mother and her relatives. Following a blindingly swift rush alongside the calf (Figure 1), the cat jumps, bowling its prey over, its dewclaws piercing the left shoulder. Straddling the chest of the squealing calf, it slashes the exposed throat with its scimitars. Although the mother and the rest of the herd rush forward, trumpeting, the mammoth calf quickly bleeds to death, while the cat retreats to cover nearby. When the herd finally abandons the carcass, the cat cautiously approaches, dragging the body in its powerful jaws to the cave. There, it dismembers and eats its prey, shearing large chunks of flesh with its carnassials and gulps them down. Only the teeth of the young mammoth and its limb bone shafts with telltale scratches and depressions are left to commemorate the incident.

The American scimitar cat survived toward the end of the last glaciation at Friesenhahn Cave, Texas, where its remains are associated with scraper-like flints that may or may not be artifacts. Its extinction is probably linked to that of the mammoth, its favourite prey.

C.R. Harington
March, 1996

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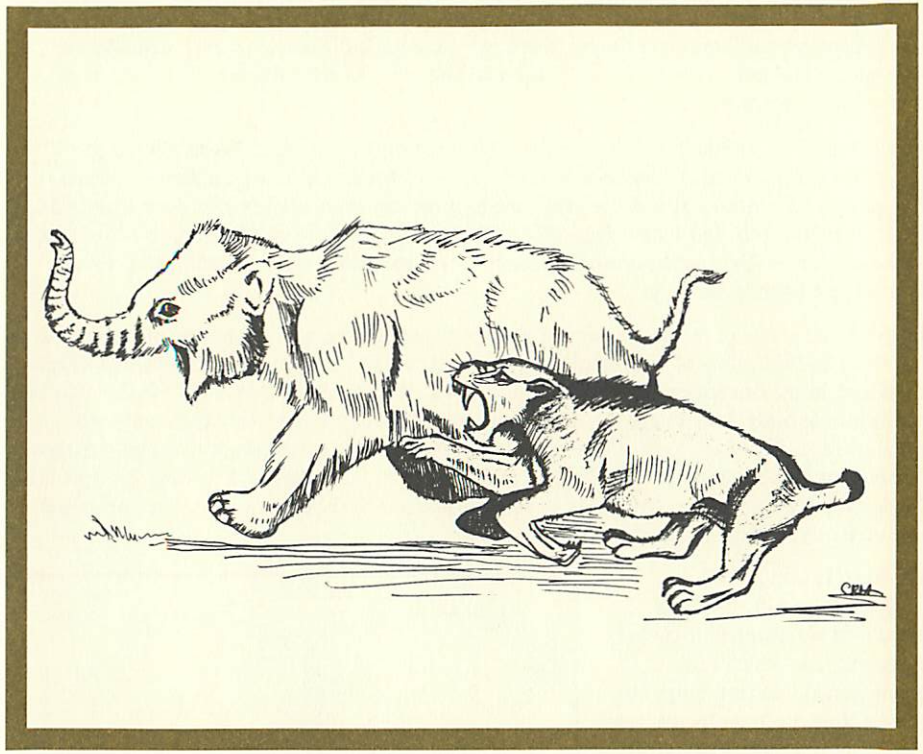

Sketch by C.R. Harington

American Scimitar Cat

The Pleistocene (2 million to 10,000 years ago) fauna of North America featured a wide variety of cats that were adapted to different environments and prey. Of these cats, none is more interesting than the scimitar cat (*Homotherium serum*). It was slender-limbed (with relatively long forelimbs and short, powerful hindlimbs) and short-tailed, with upper fangs like curving steak-knives. Although much rarer than the sabretooth cat (*Smilodon fatalis*) and the American lion (*Panthera leo atrox*), it seems to have been the only member of the Homotheriini (scimitar cats including *Machairodus* and *Homotherium*) and Smilodontini (related sabretooth cats including *Megantereon, Ischyrosmilus* and *Smilodon*) to have lived in Eastern Beringia (unglaciated Alaska, Yukon and adjacent Northwest Territories).

The famous French paleontologist Baron Cuvier, in 1824, was the first to describe the serrated teeth of *Homotherium* from deposits in France, thinking they belonged to a bear. Early British paleontologists referred such teeth to a carnivorous dinosaur, but Kaup in 1833 considered that the teeth belonged to a cat named *Machairodus* (later it was called *Homotherium*). The North American scimitar cat was first described by E.D. Cope in 1893 as *Dinobastis serus*; however by 1962 it was called *Homotherium serum.* Its remains, from deposits dating between about 1.5 million and 10,000 years old, are known from the Yukon to Florida.

There is little doubt that both the American scimitar cat (*Homotherium serum*) and the Asian scimitar cat (*Homotherium ultimum* from China) were derived from the Late Pliocene - Early Pleistocene (about 2 million or more years ago) scimitar cat *Homotherium crenatidens* a widespread Holarctic (northern part of the Old and New Worlds) species. It, in turn, was derived from *Machairodus*.

The scimitar cat, although much rarer than the sabretooth cat, ranged broadly throughout North America (Yukon, Idaho, California, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Tennessee and Florida). It is difficult for me to forget the cool, cloudy afternoon of July 28, 1968 when we collected a right mandible with shearing cheek teeth of this species on the banks of the Old Crow River in the northern Yukon. It was the first known record for the Yukon, Canada and Eastern Beringia.

The size and shape of the bones, size of muscle scars, and the way the bones articulate (fit together) are indicators of an animal's accustomed posture, gait, paleoenvironmental adaptations and, in the case of carnivores, hunting tactics. The scimitar cat is about the size of a lion, but lighter in body. It had large, slender upper canine teeth ("fangs" or "scimitars") with serrated edges like steak knives. Lack of wear on front and back edges of the scimitars show that *H. serum* used these to slash through flesh and skin, rather than for feeding. I suspect that the scimitars were sheathed in tough, protective pockets of tissue, otherwise the cats might inadvertently damage themselves or their young.

The skull is long with a well-developed crest where muscles were attached to power the lower jaw, which had down-turned forward flanges to protect the scimitars. Incisors and lower canines form a powerful puncturing and gripping device. Among living cats, only the tiger (*Panthera tigris*) has such large incisors, which aid in lifting and carrying prey. The unusually large, square nasal opening, like that of the cheetah (*Acinonyx jubatus*), presumably allows quicker oxygen intake aiding in rapid running and cooling the brain. As in the cheetah too, the brain's visual cortex is large and complex, emphasizing the scimitar cat's ability to see well and function in the day, rather than the night, as in most cats.

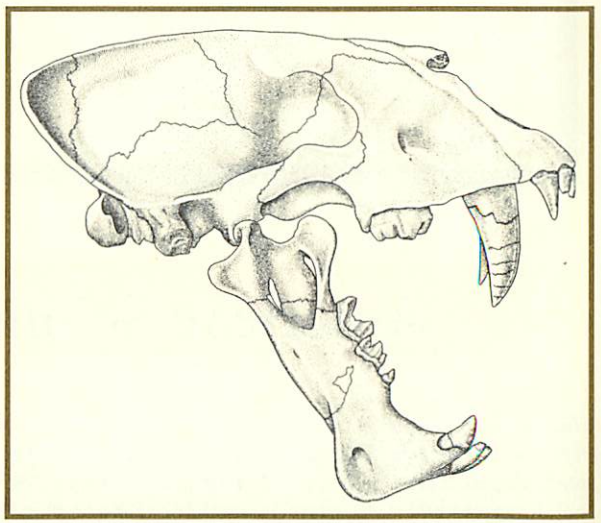

*Figure 2: Right side of skull of scimitar cat (*Homotherium serum*).*

The rest of the skeleton suggests that *H. serum* is built for short bursts of speed, as well as agility. The broad "wings" of the atlas (first neck vertebra) help to support the massive muscles used to depress the head to inflict a killing bite. The pelvic region, including the sacral vertebrae, are bear-like, as is the short tail composed of 13 vertebrae about half the number in long-tailed cats. Such features suggest ambushing of prey and short chases.

The forelimbs of this cat, which are similar in proportion to the cheetah, show the greatest modification for speed and an open environment, whereas the short cap of the ulna (olecranon fossa) reflects an animal adept at climbing. Its relatively slender bones indicates a lighter body with more flexibility in running than sabretooths and lions. Like the cheetah, *H. serum* sacrificed retractile claws for better running traction.

Features of the hindlimbs indicate that this cat was moderately capable of leaping. Hindlimbs are short relative to the forelimbs, and have bear-like heel and ankle bones. The hind feet are long and slender with non-retracting claws. Taken together, these features indicate a semiplantigrade stance, the hindlimbs being between that of a bear (plantigrade, or walking on the sole of the foot like humans) and that of a lion (digitigrade, or walking on the toes). Its stance at rest may have been slightly hyena-like with sloping hindquarters. Perhaps the top speed of the scimitar cat would have been greater than a bear and approaching a lion about 60 km/hour. According to relationships between thigh bone (femur) measurements and body weights of large carnivores, *H. serum* may have weighed about 230 kg in the lion range.

An apparent clue to the appearance of *Homotherium* may come from a 16 cm long Paleolithic stone carving of a cat, lacking the feet, found in the cave of Isturitz in southwestern France. Although the carving has often been referred to the cave lion *(Panthera leo spelaea*), the short tail (evidently purposely carved that way and not broken) and deep set of the lower jaw especially where the scimitar-protecting flange would have been indicate that it is best identified as *Homotherium latidens*, a species of scimitar cat that survived in Europe to the Late Pleistocene. An apparent difference between the stance of the carving and that postulated for *H. serum* is that the hindquarters do not slope down. Detailed markings on the surface of the specimen indicate that *Homotherium* may have had fine spots on the body, sheathed scimitars, and paler underparts.

Did the scimitar cat den? A partly disarticulated skeleton of a juvenile, found with two complete adult skeletons, from Gassaway Fissure, Tennessee, estimated to have been 2 to 4 months old at death, probably represents a cub born in a denning cave. At Friesenhahn Cave in Texas, remains of 13 cubs and 20 adults were collected. The young may have never left the cave for long, while the three very old scimitar cats probably died in seclusion in their den. The age structure of the animals preserved and the large number of specimens likewise provides evidence of denning over a long period of time.

Of great interest, because it sheds light on *Homotherium* prey, is that remains of between 300 and 400 juvenile mammoths were found in the cave. The majority were 2-year olds (a time when modern elephant calves begin to play and separate from the maternal herd): probably such calves became easy prey for scimitar cats. Indeed, the *worldwide* association of various species of *Homotherium* with proboscideans (elephants and mastodons) and rhino remains, mainly those of juveniles, reinforces the idea that *Homotherium* preyed selectively on these tough-skinned animals.

Based on our knowledge of behaviour patterns of living cats and elephants, as well as the implications of scimitar cat anatomy, let us attempt to reconstruct a typical hunt. It takes place in a grassy parkland environment where its mammoth prey are usually found. *Leaving its den, the cat approaches a small herd of Columbian mammoths from ambush. After crouching behind*