A gentle giant: Thomas Jefferson’s ground sloth

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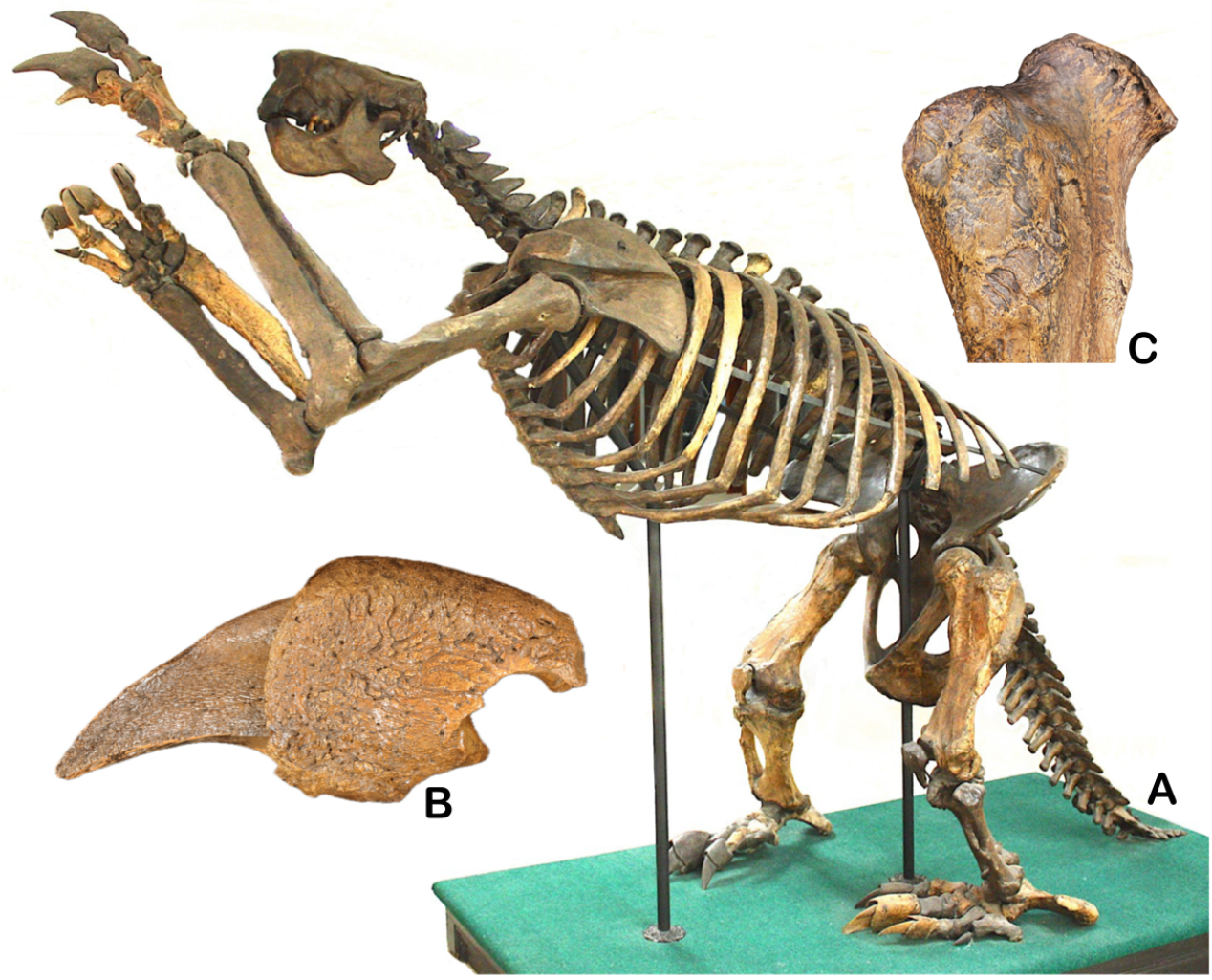

Reconstructed skeleton of a 2.1-m-tall giant ground sloth, Megalonyx jeffersonii from Holmes County, Ohio, US, mounted in 1896 (A); a 25-cm-long claw core from the right rear foot (B); and detail of the upper part of the right femur showing slices presumably made using a flint knife by a North American Palaeo-Indian approximately 13,100 years ago (C).

Professor Loren E. Babcock and Dr H. Gregory McDonald discuss the historical significance of palaeontology, focusing on key figures’ contributions to the field and their studies of the ground sloth, *Megalonyx*

Palaeontology occupies a rather unique place in the public imagination – usually the word conjures up visions of large, scary, extinct monsters. This makes for good entertainment, but the reality is much more nuanced and both technically and historically fascinating. The roots of palaeontology’s common perception were established in the late 1700s, soon after major political and social upheaval in France and North America. Study of ancient life forms shifted from mere cataloguing, similar to today’s biodiversity inventories, to a scientific endeavour with overtones of social messaging paralleling contemporary thinking

and events. More than two centuries later, we continue to witness changing perceptions of ancient life paralleling aspects of our social environment and our understanding of long-term climatic and environmental changes.

The emergence of palaeontology and the giant sloth

Historical figures that stand out at the time palaeontology emerged as a scientific discipline include Georges Cuvier (1768–1832), the ‘father of both comparative anatomy and vertebrate palaeontology’ in France, and Thomas Jefferson (1743–1826) in the United States. Both were influenced by the renowned French naturalist Georges- Louis LeClerc, the Comte de Buffon (1707–1788). Cuvier (1796, published 1800) solidified the concept of species’ extinction using the mammoth as an example. Also in 1796, he described the skeleton of a giant ground sloth, *Megatherium*, from Argentina. These two studies marked a turning point in the study of ancient life.

Within a year of Cuvier’s description of the sloth, in 1797 (published 1799), Jefferson proposed the name *Megalonyx* (Greek for ‘giant claw’) for the second known fossil sloth based on bones of a claw-bearing animal dug from a saltpeter mine in a West Virginia cavern. Initially, he interpreted the animal as a giant carnivore, comparing measurements of *Megalonyx* to a large African lion as a refutation of Buffon’s Theory of New World Degeneracy. Jefferson’s science reflected an opposition to some ideas rooted in colonialism. Just days before his lecture to the American Philosophical Society, Jefferson encountered Cuvier’s description of *Megatherium*, noting the similarity with his *Megalonyx*. The lecture was hastily and incompletely revised, and *Megalonyx* was reinterpreted as an ‘animal of the clawed kind,’ a possible herbivore rather than an apex predator. Nevertheless, the image of *Megalonyx* as a giant monster stuck. The paper was published two years later, accompanied by a more thorough description of the remains by Caspar Wistar. In 1822, Anton-Gaëtan Desmarest gave *Megalonyx* a species name, *M. jeffersonii*, in honour of Thomas Jefferson.

Prior to his description of the ground sloth, Jefferson’s interest in ancient animals, which he did not accept as extinct, included publishing brief notes on the ‘incognitum’ (now known to be the mastodon) remains from Virginia. His interest in *Megalonyx* and the mastodon, a proboscidean, ultimately would play a key role in the exploration of the North American continent. For much of his life, Jefferson considered neither *Megalonyx* nor mastodon to be extinct. As the Corps of Discovery Expedition set out to explore the Louisiana Territory in 1804, Meriwether Lewis and William Clark received instructions to bring back evidence that both animals were still living in the American West.

The first *Megalonyx* mount

Initially known from mostly isolated bones, the first relatively complete skeletal remains of *Megalonyx* were dug from a farmer’s field in Ohio, US, in 1890. These were used to reconstruct a complete skeleton, with the missing parts filled in from other fossils. The skull was a plaster cast from a much smaller individual, and the hips were reconstructed based on the much larger *Megatherium*. Additional bones were added to the tail,

lengthening it so the mount could stand like a tripod on its hind legs with its tail dragging on the ground. This mash-up, though anatomically incorrect, followed a pattern in use for other skeletons from at least the mid-1800s. Skeletal reconstructions of animals, including dinosaurs, were often mounted this way. The first *Megalonyx* mount, with its elongated, dragging tail, helped provide a stable engineering solution to mounting fragile ancient skeletons of large bipedal animals in an upright, formidable stance. The skeleton from Ohio was originally supported further at the front by a tree trunk, as if the animal were stripping leafy vegetation for food but still channeling the effect of a fearsome animal rearing on its hind legs.

Tracing the *Megalonyx's* lineage

Dinosaurs continued to be mounted and reconstructed as tail draggers well into the 20th century, and even today, bipedal 'tripod' dinosaur (and giant ground sloth) toys are ubiquitous. Jefferson's original interpretation of *Megalonyx* seems to have left an indelible impression on our view of large ancient animals, despite more recent research showing it to have been a rather gentle creature that normally walked on four legs instead of two.

Our current understanding of *Megalonyx* indicates that it is part of a lineage of ground sloths that originated in South America during the Oligocene Epoch, more than 33 million years ago. Its ancestors made their way to North America about nine million years ago. *Megalonyx jeffersonii*, which appeared in the Pleistocene Epoch and expanded across the North American continent, was the largest, most widespread, and last species in the genus. Why this highly successful large mammal became extinct 10,000 to 12,000 years ago is still uncertain. Environmental changes, associated with the retreat of glacial ice from the Northern Hemisphere and the arrival of humans and their dogs in the New World, may have contributed to their demise. *Megalonyx* remains, including those described by Jefferson, are sometimes found in caves, which were used as dens. Slice marks on the bones of some fossils suggest hunting and butchering by Palaeo-Indians. Disease and other factors that are difficult to test from fossil remains may also have taken a toll on *Megalonyx* populations.

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