

THE FOSSIL ELEPHANTS OF MANITOBA

Introduction

For decades, fishermen off the east coast of North America have dredged up elephant bones and teeth from the ocean floor in their nets. Elephant bones, teeth and tusks have also been found in gravel pits and eroding river banks across Manitoba for over 100 years. How did these specimens come to be in such unlikely locations?

With the exception of the most recent ten or twelve thousand years, the last 2,000,000 years of the earth's history was known as the Ice Age or Pleistocene Epoch. This period was actually a series of intensely cold spells with warmer intervals often lasting thousands of years. During the coldest periods, massive glaciers several kilometres thick and millions of square kilometres in area covered the polar caps. So much of the earth's water was frozen in these glaciers that the level of the oceans fell by an average of 123 metres. It is interesting to note that the elephant remains found on the eastern continental shelf never occur at depths greater than 120 metres. Several times over the last 2,000,000 years, the eastern shore of North America lay as far as 300 km east of its present position. The vegetation of the exposed shelf was dominated by spruce, pine and fir as well as grasses – foods favoured by mammoths and mastodons. Upon their death, the “elephant” remains were buried by natural means, later to be covered by rising ocean levels. These remarkably well-preserved fossils would later become a source of mystery for east coast fishermen.

The warm intervals between the peaks in the Pleistocene glaciation opened up, for occupation, vast areas previously covered by ice sheets. Many constituted ideal pastures for the various forms of Ice Age elephants, whose remains would later be covered by readvancing glaciers. These deeply-buried remains would stay hidden until natural processes such as river erosion, or human ones such as the digging of wells, road construction or quarrying, disinterred them. The migration of these animals to the Western Hemisphere, their physical evolution and role in the lives of Manitoba's first peoples constitute one of the most fascinating chapters in our province's early history.

Phylogeny and Evolution

As a biological order, the Proboscidea or “trunked” animals are comparatively recent. The earliest of the five known families of this order emerged in what is now central Africa approximately 38,000,000 years ago near the end of the Eocene Epoch (Figure 1). The Moertheriidae were small hog-like creatures with elephant-like legs and feet, an enlarged front teeth. *Moertherium* and related genera became extinct roughly 30,000,000 years ago in the Oligocene Epoch, after giving rise to two other families, the Deinotheriidae and Gomphotheriidae.

The Deinotheriidae are considered a “side branch” to the mainstream of elephant evolution. Unlike modern elephants, these animals had downward-pointing tusks extending from the lower rather than upper jaw. They and related genera, became extinct approximately 7,000,000 years ago during the Pliocene era in Asia but may have survived into the Ice Age in Africa.

The gomphotheres were contemporaries of the deinotheres, and their widespread distribution indicates they were more adaptively successful. Roughly 25,000,000 years ago, near the beginning of the Miocene Epoch, one genus, the *Stegomastodon*, became the first proboscoid to migrate to the Western Hemisphere. Gomphotheres were unusual in that they had tusks protruding from the lower and upper jaws.

The two remaining families of proboscids are the most recent and best known. Mammutidae, which includes mastodons, appeared 35,000,000 years ago in the early Oligocene in Africa. It subsequently migrated throughout Eurasia and the Americas, becoming extinct 11,000 years ago at the close of the Pleistocene Ice Age. The Family Elephantidae, which includes mammoths, appears in the fossil record more recently than Mammutidae, possibly evolving from a *Stegodon*-like ancestor (Figure 1) in the Siwalik Hills of northern India at the end of the Miocene. Like the mastodon, it migrated to the Americas and became extinct at the close of the last Ice Age.

Beringia

The mammoths and mastodons came to the Western Hemisphere across a land bridge, known as Beringia, that connected Alaska and Siberia. This broad expanse of sea bed was exposed, like the Atlantic coastal shelf, due to dramatically lowered ocean levels throughout much of the Ice Age. A number of other species now considered “native” to the Western Hemisphere: musk-ox, elk, moose, caribou, bear and wolf came with them.

Figure 1. The Elephant Family Tree.

Throughout the Ice Age animals migrated in both directions. Camels and horses originated in the Western Hemisphere and migrated to the Eastern, only to become extinct in their original homeland at the end of the Ice Age. This was also the route by which human beings first reached the Americas, perhaps 23,000 years ago.

The mammoths are among the largest proboscids ever to have existed. *Mammuthus imperator*, native to the southern half of North America, stood 4.76 m high at the shoulder. Included within this family are the modern African (*Loxodonta africana*) and Indian (*Elaphus indicus or maximus*) elephants – the only surviving members of the last existing family of the order.

Mammoths and mastodons are not true elephants in the strictest sense. Mammoths belong to the same family as true elephants, but mastodons are a family in their own right (Figure 2). Both genera are commonly referred to as fossil or extinct “elephants”. Mammoths and mastodons were common over much of North America, and the remains of both have been found in Manitoba.

Physical Characteristics

The Northern woolly (or Siberian) mammoth (*Mammuthus primigenius*) is the best-known of this extinct genus. Some have even been found perfectly preserved in frozen deposits which allowed scientists to determine the colouration and nature of the skin and hair. Note the largest of the mammoths, the Siberian mammoth was still larger than either variety of modern elephants. As an adaptation to a harsh climate, it had a thick coat of brown fur. The ears were quite small, the head high and short, and the tail tapered to a bristle-covered point. The skin was thicker and probably even tougher than that of modern elephants, and covered a layer of fat 10 cm thick to maintain body temperature in a cold environment. Their most outstanding characteristic was the pair of magnificent tusks which could attain lengths of 5 metres. So impressive (and numerous) were these tusks that ivory markets traded vast amounts of this fossil ivory. In fact, as recently as the turn of this century, most billiard balls and piano keys were made from the tusks of mammoths and mastodons.

As a separate family, mastodons were less similar to modern elephants than were the mammoths. About the same size as the modern elephant, mastodons had four powerful columnar legs supporting a stocky body covered with a dense coat of reddish fur – similar to modern elephants when kept outdoors in cold climates. The head was held horizontally rather than inclined downward as with other elephants. The oldest and most primitive mastodons had one pair of tusks protruding from each jaw, but late ones retained only the upper set.

Figure 2. Phylogeny of the Order Proboscidea.

Hair and skin samples of both mammoths and mastodons have been found, but normally only the hard tissue remains in the fossil record. Bone and tusk fragments, if large enough, can serve to distinguish the two genera, but the teeth are particularly useful in this regard. Teeth are more resistant to decomposition than bone and are highly distinctive, depending on the species. The name mastodon comes from the Greek *mastos* meaning “breast” or “nipple” and *odont* meaning “tooth”. The chewing surface of the mastodon’s cheek teeth is characterized by a series of bumps to aid in the crushing of plant food. Mammoths, on the other hand, have tooth surfaces covered by a series of ridges. This is essentially the same pattern found among the modern elephants to whom the mammoths are most closely related (Figure 3). This marked difference allows an archaeologist or palaeontologist to tell the difference between mastodons and mammoths when as little as a single partial tooth remains. For a single bone or tusk fragment, it may only be possible to identify it as belonging to the order Proboscidea.

Figure 3. Dentition of the Mastodon (above) and Mammoth (below). After Krause 1971.

Diet and Distribution

Differences between mammoths and mastodons are due in large part to their environments and food. Information on the diet of mastodons comes from an analysis of the stomach contents of frozen or otherwise preserved remains. The rib cages contained bushels of twigs and cones of conifers, leaves, coarse grasses, swamp plants and mosses. This indicates their preferred habitat was the open spruce woodlands and spruce forests that stretched from Iowa to coastal New York and from southern Ontario to Kentucky. Remains have also been found in Florida, Texas and the Great Plains where they probably lived in river valleys and lowlands which also provided the food they required.

Analysis of the stomach contents of mammoths found frozen in Alaska and Siberia show that this animal preferred a diet of

grasses and legumes with a heavier emphasis on leaves, bark and wigs in winter. The remains of mammoth are more commonly found in central North America, in and around those areas which are or were grasslands.

The mastodons entered the Western Hemisphere first, perhaps 15 or 20 million years ago during the Miocene Epoch, and spread throughout both North and South America. Mammoths arrived later, appearing in the fossil record of the early Pleistocene about 1.7 million years ago. Unlike the mastodons, their remains are found only in North and Central America. It is not clear why mammoths did not enter South America. Possibly they were unable to compete with the resident mastodons for those foods which they shared. More likely, parts of Central America and/or northern South America did not support the kinds of plants which mammoths required.

Elephant Hunting in the Americas

The precise date of entry of the first human beings to the Americas is unknown. According to one theory, the route would have involved a long, arduous journey across the Bering land bridge, across Alaska and south into what is now Canada and the United States. People were not adapted to such cold climates until more recent times and there is no evidence of humans in Siberia until 40,000 years ago. The weight of evidence for a human presence in the Americas becomes fairly convincing for the period after 25,000 years ago and by 10,000 B.C., it is undeniable.

The first well-defined archaeological culture in the Western Hemisphere is called "Clovis" after a town in New Mexico near where the distinctive artifacts of these people were first found. The hallmark of the culture is the "fluted" spear point, so-named because of the flute or channel chipped into the base to attach it to a wooden shaft or bone foreshaft.

Central North America would have been a hunter's paradise for the Western Hemisphere's first peoples. Unlike the Eastern Hemisphere in which hunters and their prey species had evolved side by side, the large mammals of North America had never seen humans before. Hunters could simply approach the unwitting animals and kill them without the stalking or concealment needed in Eurasia. Being the first people, there was no competition with others for limited resources. The numerous game animals were not yet depleted by hundreds of thousands of years of human predation as in Eurasia.

In such an ideal environment, Clovis people expanded in the eight centuries following 10,000 B.C. into those parts of North America not covered by glacial ice. Clovis spear points have been found from Alaska to Guatemala, over most of the United States and the southern portions of Canada. The distribution of the Clovis culture coincides very closely with that of the mammoth.

Typically, Clovis people were nomadic big game hunters whose preferred habitat was grassland. Most sites are located at what would have been marshes, lakeshores or riverbanks at the time, and since most bear evidence of mammoth kills and butchering, it is likely the animals were killed at their watering holes. Occasionally, small hearths have been found at "lookouts" on high ground downwind of the marsh where people could have waited for the approaching animals. They would kill the solitary animal with spears and rocks while it was partially mired in the mud, butchering it on the spot (Figure 4). This simple hunting technique was remarkably effective and used around the world for a variety of large game animals.

Figure 4. Precontact Mammoth Hunting in the Americas.

Other large animals such as camels, horses, bison, giant armadillos, giant ground sloth, dire wolves, four-horned antelope, tapirs and giant turtles were hunted by the Clovis people, but the mammoth was by far the game animal of choice.

The end of the Pleistocene Ice Age was a time of momentous environmental change all around the world. Various environments expanded, shrank or shifted with dramatic consequences for the animals which were adapted to them. At least 31 genera in North America became extinct. These widespread extinctions primarily occurred among the large land mammals, many of which were the preferred prey species of early human hunters. It is possible that human predation contributed to some animal extinctions, but the radically changing environment must have been much more important. Some environments changed in terms of size, location, composition and diversity. Previously varied environments which could provide all of the nutritional needs of a given species broke into several widely scattered zones, requiring greatly expanded grazing areas to support fewer animals. Faced with such environmental stress, fewer animals reproduced, offspring were less healthy and the species eventually disappeared. Mammoths and mastodons were extinct in North America as early as 10,800 years ago, and extinction of all species fated to disappear was complete by 10,000 years ago. The Clovis culture, dependent on the mammoth, gave rise to a series of other cultures whose economic focus was the now-extinct species of bison. Today, more than 10,000 years after the species became extinct, the mammoth lives on in the legends of the Cree of northwestern Quebec and the Anishinabe (Ojibwa) of Lac Seul, Ontario, where the people still speak

of the “e’iidawimakkwa”.

Elephant Remains in Manitoba

AS of 1990, elephant remains have been reported from fifteen separate locations in Manitoba (Figure 5). These comprise mammoth teeth from sites near Birds Hill, Dufresne, Rathwell, Rivers, Souris, St. Malo and Bird (near Gillam). Mammoth bone fragments have been found at Snake Creek (near Erikson) and tusk sections have come to light near Transcona, Benito, Boissevain and Birds Hill. Localities near Blumenort and Moosenose each produced single mastodon tooth.

Figure 5. Mammoth (____) and Mastodon (____) remains in Manitoba.

All of the above specimens consist of isolated skeletal fragments rather than entire skeletons. Typically, these pieces were smoothed and abraded which means that the animals did not die where their remains were found. It is probably that they are much older than the deposits in which they were found, having been washed in from their original burial place. For example, quite a number of the Manitoba finds came from deposits laid down in the basin of Lake Agassiz. The fossils were obviously carried into the lake in bits and pieces by the glacier which had dredged them up from elsewhere.

Two discoveries, reported in the last century, seem to represent complete or near-complete skeletons. The first was documented by the famous explorer Henry Youle Hind who learned of “great bones” while visiting Fort Ellice in 1857.

From Mr. McKay I received a particular account of the “Great Bones” on Shell Creek, which had long been a source of awe and wonder to the Indians hunting on the left bank of the Assiniboine, and whose magnificent descriptions led me to suppose that they might belong to a catacean, and were worth a day’s journey out of our track to visit and examine. They were seen many years ago protruding from the bank of Shell Creek, 20 feet below the prairie’s level. Mr. McKay instructed some of the hunters attached to the post to bring them to him, but no Indians would touch them, and the half-breeds only brought a tooth and collar bone, which were stated by a medical gentleman to whom they were shown to have formerly belonged to a mammoth. Mr. Christie, of Fort Pelly, we were told, went to Shell Creek, with a view to collect more specimens; he obtained some ribs, but in the state of crumbling decay; they were sent to Red River Settlement. The Indians had long regarded these ancient relics as the bones of a Manitou and worthy objects of veneration (Hind 1860: I:312-313).

These are the same bones referred to by Tyrrell as being recovered from the west bank of the Shell River, just opposite the entrance of its East Branch, on Duck Mountain.

The Indians allege that at this point, huge bones were found at the bottom of a land-slide and were brought to the officer in charge at Fort Pelly, by whom they were forwarded to England. Hon. W.J. Christie, of Brockville, Ontario, who was in charge of Fort Pelly at the time, informed me that the bones were shoulder blades, and that in 1853, some years after the first bones were brought it, he visited the place, “and examined the spot carefully where the blade was taken out of the river at low water. A land-slip had occurred from the bank and carried the bones into the river. I found from cross-questioning my guide, that the Indians had collected the bones, and burnt them on the bank, from superstition, and buried what would not burn. I examined the spot where they had buried the bones, but what remained crumbled to pieces when touched” (Tyrrell 1893:129-130).

Some bones were eventually sent to England and initially identified by Sir John Richardson as a newly recognized species of elephant, *Elaphas rupertianus*, but later reclassified as probably those of a mastodon, *Mastodon giganteus* (Tyrrell 1893:130).

The Shell River bones were not an isolated occurrence. Hind mentions a similar skeleton described to him by an old Ojibwa hunter who lived in the Lake Dauphin area.

Ta-wa-pit stayed during the greater part of the night by our camp-fire, talking with the half-breed, smoking and drinking tea. He pointed out the spot near to us, where he was accustomed to take salt from the edges of a spring during the summer months. He described also at great length the appearance and virtues of some gigantic bones exposed in the bank of Valley River near where it cuts through the old Lake Ridge. Ta-wa-pit calls these bones a great medicine, and contrary to the usual custom of the Indians, he now and then takes small fragments, bruises them to powder, and uses them as a medicinal preparation. From his description I infer that the bones are those of a mammoth; his rough drawing of the ribs and teeth in the sand corresponded, in point of dimensions, with those of that gigantic animal (Hind 1860: II: 60).

The awe which such unusual bones inspired is hardly peculiar to Native North Americans. The name “mammoth”, now

synonymous with “large”, is from the Russian *mammot* which means “earth burrower”. While plowing their fields, east European peasants found huge bones and assumed that they had come across an animal which had died in its burrow. The tusks were accordingly identified as the means by which these animals tunnelled beneath the earth.

Elephant Hunters in Manitoba?

In addition to the recovery of elephant remains in Manitoba, a number of Clovis culture artifacts have been found here (Figure 6). Elsewhere in North America, Clovis people hunted mammoths, but in Manitoba, the bones and the weapons have never been found together. This raises the question of whether elephants were ever actually hunted here. The answer lies in the evolving nature of Manitoba’s environments from the Pleistocene to more recent times.

Figure 6. Location of Clovis Sites in Manitoba

The last of the major North American glaciations, the Wisconsinan, was actually a series of glacial advances and retreats beginning approximately 90,000 years ago and ending roughly 11,000 years ago. At the height of the first or Burke Lake glaciation (Figure 7) about 80,000 years ago, all of Manitoba was covered by glacial ice, preventing occupation by the proboscideans living far to the south. With the onset of the “Watino Non-glacial Period” (Figure 7) approximately 62,000 years ago, parts of Manitoba became available for occupation by species of animals, including the mammoths and mastodons, that had been resident in the Western Hemisphere for more than a million years. Human beings would not arrive in this hemisphere for at least another 30,000 years, leaving the elephants free of these hunters which would later contribute to their ultimate extinction. Most, if not all, of the elephant remains found in Manitoba so far probably date to the Watino Non-glacial Period. The heavy striations or scratches that many of them bear suggest that they had been churned up in the gravels by subsequent glacial activity. With the return of a glacial climate around 23,000 years ago, and the onset of the “Loswood Glaciation” (Figure 7), Manitoba again became uninhabitable.

Figure 7. The Chronology of Glacial Environments in the Canadian Prairies

After 14,000 years ago, the ice sheet once again began its northward “retreat”, and its melting created enormous lakes of sterile fresh water. The largest, glacial Lake Agassiz, covered much of the province in more than 200 metres of water and persisted in various areas for 5000 years. The land which emerged from the ice and frigid waters supported first, a bon-and-fen plant community and, later, expanses of spruce, neither of which was attractive to the favoured prey of the Clovis people – the mammoth. Six Clovis spear points have been recovered from the high ground west of the Manitoba Escarpment, a number too few to suggest that these people found the area any more attractive than would the mammoth at this time. Nonetheless, the bones described to Hind by Ta-wa-pit over 100 years ago may have been those of an animal that frequented the uplands west of Lake Agassiz during Clovis times.

By 10,000 years ago, the climate had warmed sufficiently to support a grassland setting east of the rapidly draining Lake Agassiz. For the first time in nearly 15,000 years, Manitoba was capable of supporting a sizeable population of the grazing mammoths, but by then they were already extinct. The incoming human populations turned their attention to the giant bison. This was the beginnings of a new hunting tradition which was to last nearly 100 centuries.

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THE FOSSIL ELEPHANTS OF MANITOBA

Mammoths and mastodons were two of the most prominent species of megafauna (“big animals”) to inhabit Manitoba during the last Ice Age. Between 65,000 and 25,000 years ago, mammoths grazed on the lush grasses of Manitoba’s prairies, while mastodons browsed in the spruce swamps and woodlands.

About 25,000 years ago, the climate cooled, massive glaciers advanced from the north, and the animals were forced out of Manitoba. The southwestern portion of the province was repopulated by mammoths when the glaciers retreated some 12,000 years later. By 10,000 years ago, the climate warmed to the point where the habitat changed. This, perhaps with centuries of hunting, brought about the animals’ extinction.

Mammoth and mastodon bones, teeth, and fragments of ivory tusks have been found in over a dozen locations in Manitoba, mostly in gravel quarries in the southern half of the province. A number of such finds have been made in the Birds Hill area.

THE MANITOBA HERITAGE COUNCIL

PROVINCIAL COMMEMORATIVE PLAQUES PROGRAM

Manitoba’s Provincial Commemorative Plaques Program honours those people, places and events which have contributed to the province’s development. To date, more than 100 plaques have been erected.

Proposals to commemorate Manitoba’s heritage resources come from many sources, including interested groups and individuals. After careful research by the Historic Resources Branch, proposals are submitted for recommendation to an advisory board composed of historians, archaeologists, architects and others active in the heritage field. Those deemed to have provincial rather than local significance are forwarded to the Minister of Culture, Heritage and Recreation ????? for final decision.

Plaques are usually located at sites associated with the people, places or events being honoured.

Mammoth

Mastodon

From Harington 1978.