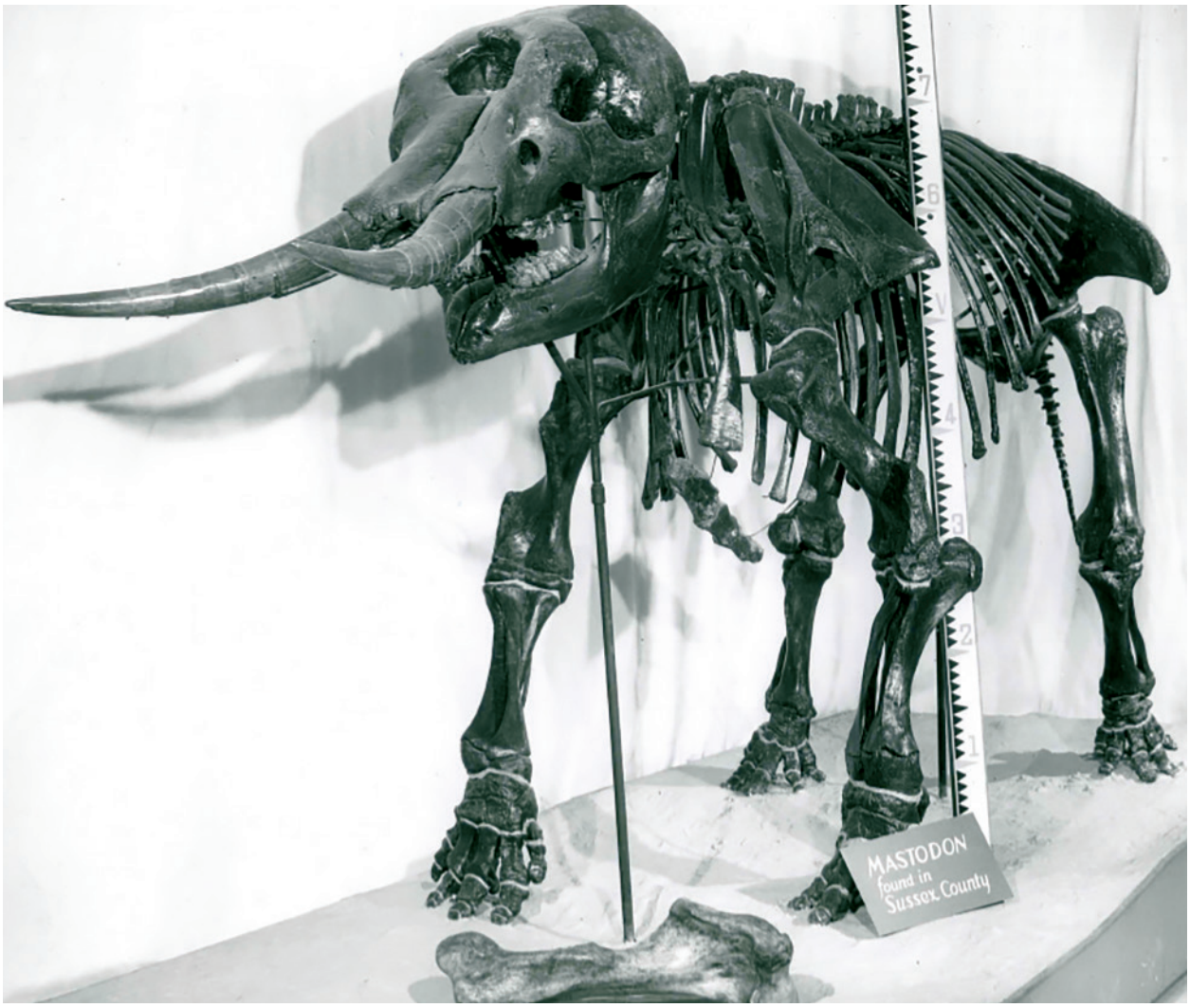
NEW JERSEY
GEOLOGICAL AND WATER SURVEY
Geological Survey Report 43

GARDEN STATE MASTODONS



New Jersey Department of Environmental Protection

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

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NEW JERSEY GEOLOGICAL AND WATER SURVEY

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Cover photo: Ohberg Mastodon skeleton reconstructed and on display in the New Jersey State Museum, circa late 1950s. *Photo courtesy New Jersey State Museum [NJSM 11907]*

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Garden State Mastodons

by

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INTRODUCTION

Mastodons are unquestionably the most famous of New Jersey's Wisconsinan Ice Age mammals, far more common in New Jersey than mammoths, their distant cousins among the elephants. Mastodons were browsers on the twigs, cones, and small branches of spruce forests which were widespread across the northeast through several thousand years of cool climate around the end of the Ice Age. Mammoths, by contrast, were grazers of grasses and low tundra vegetation and were more abundant in drier, open areas to the west of New Jersey.

Mastodon remains have been found throughout New Jersey and offshore on the continental shelf (fig. 1). Most of the more complete skeletons are from bogs in the glaciated northern tier of the state. The mastodons wallowed in the bogs and ate pond and bog vegetation as well as twigs and branches. They often became mired, drowned, and were preserved in the oxygen deficient sediment. Young males, apparently engaging in risky behaviors, are over-represented (Pecnerova and others, 2017).

South of the glaciated part of New Jersey, bogs were fewer, shallower, and less of a hazard to mastodons. When the animals living on this drier terrain died, their bones and teeth were scattered. Hundreds of teeth have been found in southern New Jersey's sands and gravels, but skeletons are rare. Teeth from mastodons as well mammoths have been found, but the two are easy to tell apart (fig. 2).

Mastodon teeth have cone-shaped cusps suited to crushing twigs and branches (the name mastodon actually means "breast-tooth"). Mammoths, like modern elephants, had ridged molars better adapted for grinding the grasses important in their diets. Most of the finds since the 1980s have been teeth brought up offshore in scallop dredges. Bones as well as teeth are no doubt brought up with the scallops, but they would usually be identified as whale bones and thrown back. The bones and teeth were not washed seaward and are not from mastodons swimming offshore. At the height of the Wisconsinan Ice Age, 20,000 years ago, over a million cubic miles of water from the oceans was locked up on land in glaciers. Sea level

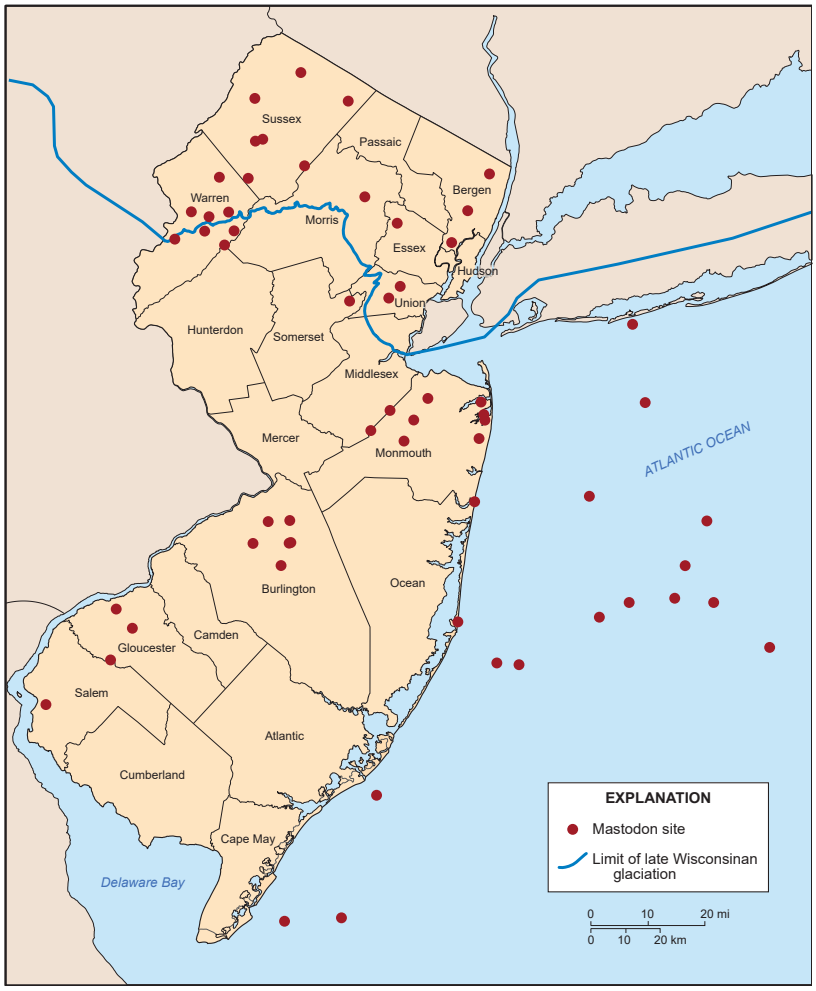

Figure 1. Map of mastodon discoveries in New Jersey and offshore. Offshore locations are approximate.

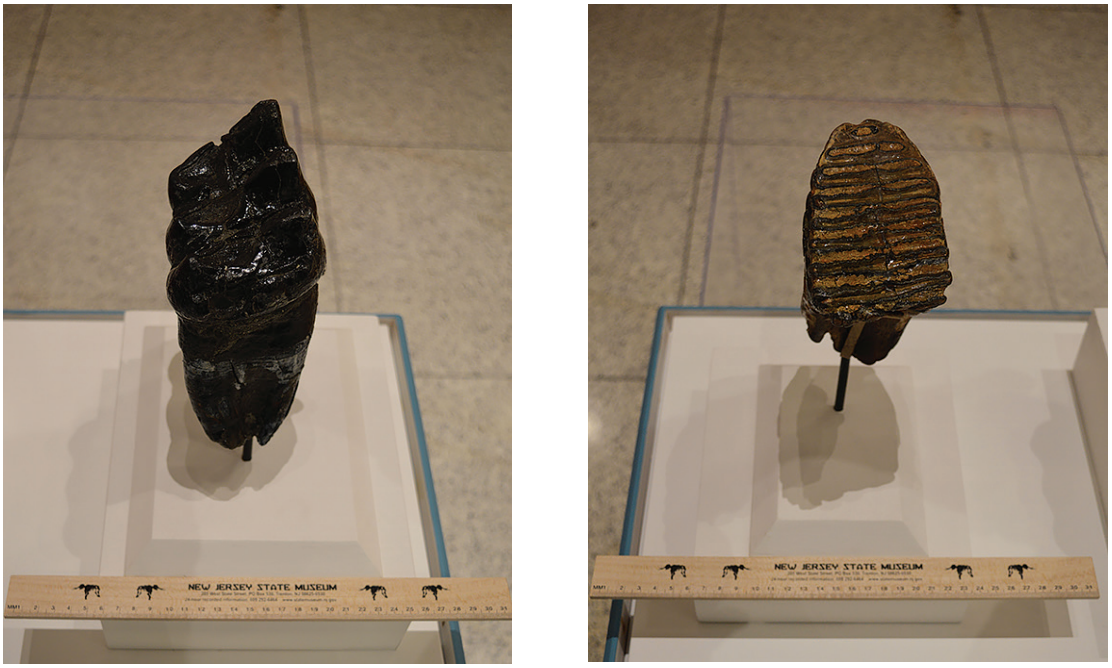

Figure 2. Mastodon tooth [NJSM 24312], *left*, and mammoth tooth [NJSM 12723], *right*, New Jersey State Museum. *Photos by C. Kosar*

was over 300 feet lower, and the shoreline off New Jersey was 75 miles east of where it now stands. The mastodons were living on land that is now submerged.

The mastodons were a large, long lived, and varied group which first appeared no earlier than about 30 million years ago, but "mastodon" usually refers only to three well known Ice Age species. The scientific name for the New Jersey mastodons is *Mammut americanum. Mammut*, from the Greek for "earth burrower", is after folklore of the Middle Ages which held that the immense bones dug up in fields were from huge burrowing creatures. *Americanum* distinguishes the species found in New Jersey from the other species. *Mammut americanum* was slightly smaller, bulkier, and flatter-headed than the mammoths and elephants, usually 12 to 15 feet long, with a shoulder width of about seven feet. *Mammut americanum* had a coat of reddish-brown fur while the other species did not have fur.

Proboscideans (animals with trunks) spread to all the continents except Australia and Antarctica. These elephant ancestors have been traced back 60 million years to *Eritherium*, an extinct proboscidean that lived about five million years after the extinction of the last dinosaurs. Early proboscideans lacked true tusks; however later proboscideans developed tusks from incisor teeth. This development can be traced to *Phosphatherium*, a small pig-like herbivore that lived in the swamps and woodlands of northern Africa. While it is not known if *Phosphatherium* had a trunk, the teeth identify it as ancestral to the elephants. Paleontologists know that mastodons last shared a common ancestor with elephants and mammoths sometime about 22 million years ago (fig. 3) (Khamsi, 2007).

Mastodons went extinct at the end of the Pleistocene epoch about 10,000 to 11,000 years ago. Mammoths lived from the Pliocene epoch (from around 6 million years ago) into the Holocene epoch when about 3,600 years ago the last known mammoth lived onWrangel Island, Russia.

It is widely thought that mastodons reached North America by way of Siberia and the Bering Strait land bridge in the Miocene epoch, about 23 million years ago. In America, when the mastodons

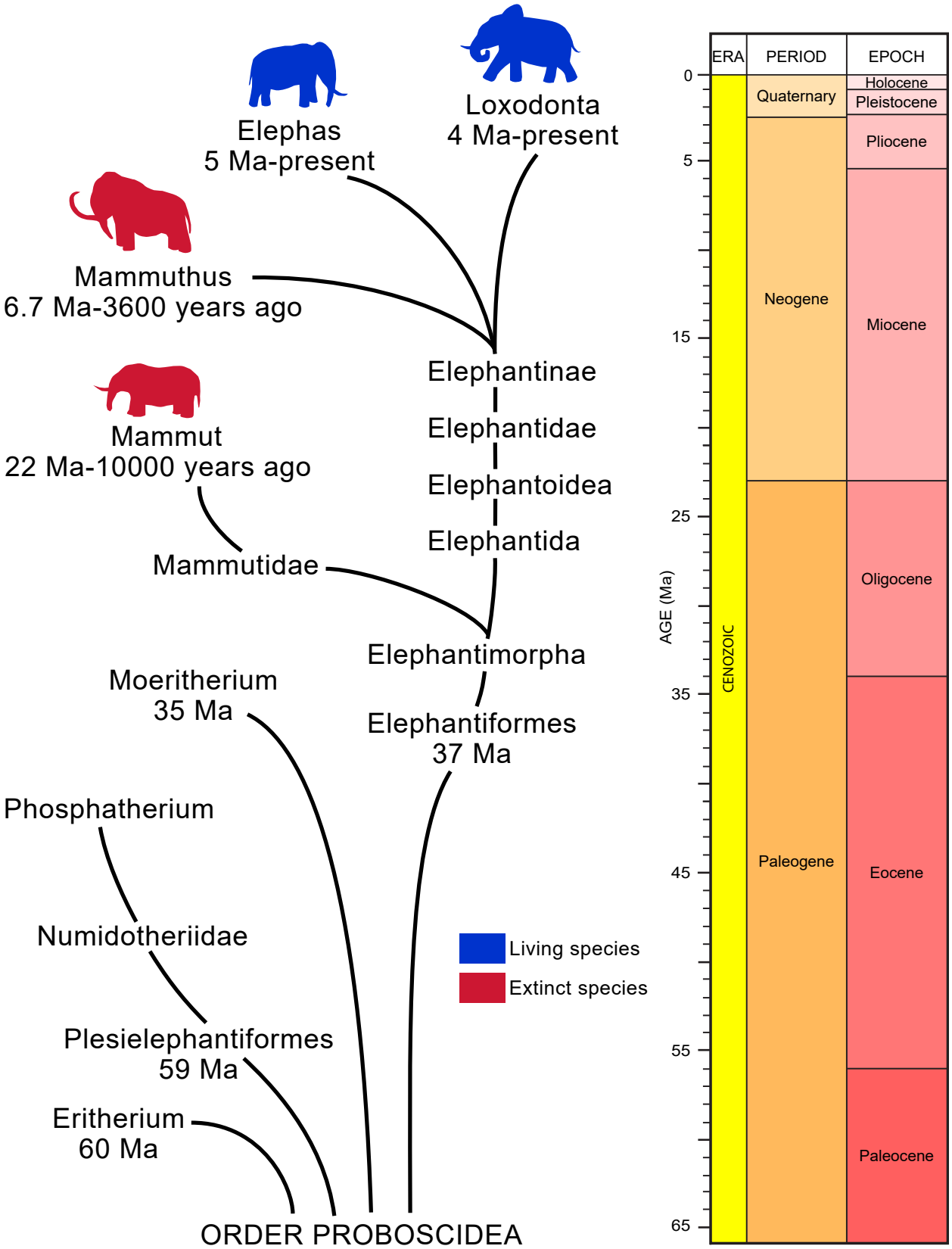

Figure 3. Family tree of proboscideans. *Illustration by C. Kosar*

evolved into several branches, some preferred warm, or even hot climates. Some had curious flat shovel-like tusks in the lower jaw. The North American elephants survived well past the Ice Age into Paleo-Indian times, as late as 10,000 years ago. Artifacts from as close by as Orange County, New York, prove that the Paleoindians hunted or scavenged the elephants for food, sinews, and ivory (Gramly, 2016). No one knows for sure what caused the demise of the mastodons. Rapid climatic swings and the accompanying habitat shifts, disease, increased competition for food, and hunting have been proposed. During the time span where Pleistocene mammals and Paleoindians cross paths here, mammals are already shown to be on the decline and humans could not have been the sole cause of their extinctions during that overlap. Spores and genetic material and paleoclimatic data show periods of climate change. Many things could have contributed to the decline of mastodons.

There were no mastodons when the Spaniards arrived in America, and the Native Americans had no lore of big, elephant-like animals. Some tribes believed that the large bones belonged to giants who lived in the earth and perished upon exposure to light and air. This explained why the bones were found below ground and the animals were never seen.

However much popularity the mastodons hold today, it cannot compare with their past prominence. The first known mastodon fossil was a tooth which, in 1705, rolled down a hill to the feet of a Claverack, New York, farmer. The farmer is said to have traded it for a glass of rum to a local politician. From there the tooth, another tooth, and a few additional bones from the site made their way to New York's colonial governor, Lord Cornbury. Cornbury sent the tooth to London labled "tooth of a giant," and preacher Cotton Mather wrote a series of letters to the Royal Society of London about the tooth. Along its travels, the tooth became famous among the Native Americans for confirming their legends of giants living in generations past and among Europeans for confirming the biblical account that "there were giants in the earth in those days" before Noah's flood. Bones and teeth continued to be found throughout the colonies, and were first identified as from elephants by slaves from South Carolina and Virginia. By the early 1800s, mastodons and mammoths, giant beasts that no longer walked the earth, held a place in imaginations now held by dinosaurs.

Both the absence of the creatures in the present and their size were important for reasons that have ceased to surprise. Their absence surprised in a time of belief in the perfection of God's creation which admitted no possibility of extinction. The size was surprising, at least to Europeans, because the idea of "American Degeneracy" was widely accepted, at least in Europe, at the time. The idea held that the cold, damp climate of the Americas was unsuited for superior beings: the lions, tiger, elephants, hippos, camels, and even the superior people of the Old World. Further, the idea held that migrants from the Old World, even people, would fall victim to degeneracy, becoming smaller, feebler, and less intelligent in succeeding generations. This was not simply academic theorizing. It was an insult to the founders of the new American republic. Implicit was the conviction that the American experiment in democracy was doomed to fail. The founders expected that the American elephants, no smaller or feebler than those of the Old World, would fully disprove American degeneracy. Both George Washington and Thomas Jefferson owned mastodon bones and teeth. Jefferson had them both at Monticello and the White House. Until the return of the Lewis and Clark expedition in 1806, Jefferson fully expected that herds of mammoths and mastodons would be found in the North American interior.

Before the Lewis and Clark expedition, in the first federally dispatched scientific expedition, Jefferson sent Charles Willson Peale, an artist and natural historian from Philadelphia, to the bogs

of Orange County, New York, in 1801 to investigate reports of mastodon bones. The bones were from the farm of John Masten in Montgomery, New York, 20 miles north of the New Jersey border. By the time Peale arrived many bones had already been lost to souvenir hunters. A large party of Masten's friends and neighbors was gathered to help excavate the discovery. The work proved to be a little too much fun. The crowd descended into alcohol-fueled chaos, and many of the fossils were destroyed. Peale took over the enterprise with a smaller crew, and within weeks, a sober excavation was under way.

While a tusk nearly eleven feet long was recovered, the pit on John Masten's farm did not turn out to be very productive. Interested locals pointed Peale to other bogs, one on the farm of Peter Millspaw a few miles away, where a nearly complete skeleton was recovered. From there and from a third bog, Peale and his workers collected the remains of three mastodons. The bones were shipped to Philadelphia where Peale and his son Rembrandt assembled the best of the bones together with missing bones carved from wood into a complete mounted skeleton. This was the first fossil skeleton to be mounted in America and probably the second in the world. Eventually the skeleton was taken apart, sold, and ended up re-assembled in a museum in Darmstadt, Germany, where it still stands today. The excavation was commemorated in Peale's famous painting "Exhumation of the Mastodon" (fig. 4). Similar to "Washington Crossing the Delaware", the painting was intended to convey the importance of the occasion rather than as a pictorially accurate record.

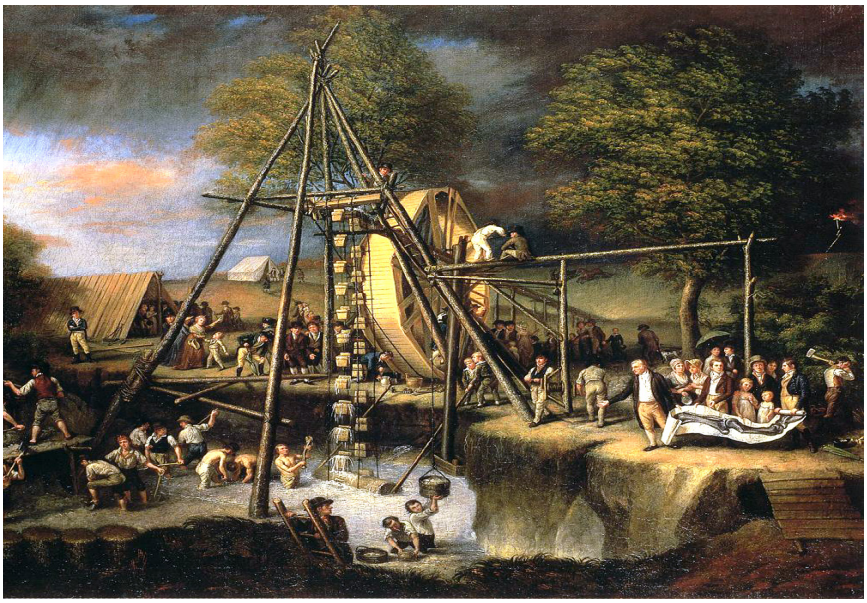

Figure 4. "Exhumation of the Mastodon." Oil on canvas by Charles Willson Peale. *circa* 1807, Maryland Historical Society (MHS). *Photo courtesy MHS*

NEW JERSEY DISCOVERIES

Most of the relatively complete New Jersey mastodons are from the glaciated northern part of the state, but both the earliest recorded discovery and one of the best-known skeletons are from the Coastal Plain of the southern part of the state. Dates on the New Jersey fossils range from 10,995 to 12,730 years ago (table 1). This spans the end of the Pleistocene or Ice Age Epoch from 11,700 years ago to the beginning of today's Holocene Epoch. By 12,750 years ago the ice age glaciers had melted well to the north of New Jersey. The earliest New Jersey discovery is mentioned in James Parkinson's book "Organic Remains of a Former World" published in London in 1811. The book states that mastodon bones had been found in New Jersey a few miles from Philadelphia, but the date of the find and the exact location were not given. Salem County was home to one of our best-known mastodons, the Mannington Mastodon at the Rutgers Geological Museum. In total, there have been at least 52 reported mastodon remains discovered in New Jersey and its coastal waters.

Table 1. Selected ages of mastodon remains including radiocarbon and organic matter from New Jersey.

Age (yrs. B.P.)	Common Name	Location	Date Found	Material Dated	NJSM Catalog #
10,995	Bojak	Warren Co. Liberty Twp.	1971	Skeleton	11267
11,000	Ohberg	Sussex Co. Vernon Twp.	1954	Pollen in peat surrounding mastodon skeleton	11907
11,680	Holmdel	Monmouth Co. Holmdel Twp.	2013	Skull	23439
10,000-12,000	Hackensack, Fanny	Bergen Co. Hackensack City	1962	Native American encampment remains	-----
12,000	Cranford	Union Co. Cranford Twp.	1936	Jawbone Age Inferred, No Radiocarbon date	10418
12,500± 180	Holmdel	Monmouth Co. Holmdel Twp.	1999	Pelvic bone	18773
12,730	Sparta Twp.	Sussex Co. Sparta Twp.	1972	Vertebrae and other bones	11268

DISCOVERIES BY COUNTY

ATLANTIC COUNTY

Offshore: Teeth and bones have been found offshore by shellfish dredgers. (Jepsen, 1964).

BERGEN COUNTY

Hackensack City, 1962 (Hackensack Mastodon): Also known as "Fanny", the Hackensack Mastodon was uncovered in Hackensack during construction for Interstate 80. He died along the banks of a creek that had been channelized and renamed Riser Ditch. There was a great deal of excavation related to the construction, and local kids found it exciting to explore the area. On January 17, 1962, James DiFranco and John Versace, ninth and eight grade students at the time, discovered three mastodon teeth near Polifly Road while looking for a good place to go ice skating on an excavation trench. James Di Franco's grandfather had operated a farm on the land for forty years. After informing their school science teacher about the find, they were taken with the teeth to see Dr. Edwin H. Colbert, Chairman of the Department of Vertebrate Paleontology and Curator of Fossil Reptiles at the American Museum of Natural History (AMNH) in New York City.

Teams of scientists descended upon the discovery site in late March after the ground had thawed. An excavation was led by scientists from the AMNH and the Bergen County Museum of Art and Science (BCMAS). When the pelvic bone was unearthed, it had been found upside down in an unnatural position. In honor of this first piece of skeleton to be found, the diggers christened the mastodon "Fanny" (Ensign, 1971). As well as the mastodon, they found remains of a Native American encampment and bones of forty species of Ice Age animals (Ensign, 1971). For a time it looked like humans killed the mighty beast, but it was later determined that the human encampment dated from 1740 B.C., according to radiocarbon dates. It was over 8,000 years younger than the mastodon bones and just happened to be located directly on top of them, which was determined to be approximately 10,000-12,000 years old (Ensign 1971). The bones were displayed for a time, unmounted, in the BCMAS which is now closed. While it was on display, because the leg bones were never found, it was decided not to piece together the rest of the skeleton. Instead, a new exhibit showed how it looked as it was found in the ground (Ensign, 1971). The Hackensack Mastodon fossils are now in storage in the basement of a Bergen County building (Strunsky, 1999).

Norwood Boro, 1974 (Dwarskill Mastodon): The greater part of a skeleton was found in the bed of the Dwarskill during excavations at the Oradell Reservoir. A portion of the leg bone was first unearthed February 7, 1974 by Robert C. Blumenberg, III of Park Ridge, a drag bucket operator working on the reservoir expansion project. On March 2, a portion of an embankment collapsed, disclosing additional parts of the skeleton. Throngs of people, having heard of the find, walked through the ooze of the swamp from the roadway to visit the site to watch experts dig for the mastodon (Johnston, 1974).

The dig was sponsored by the BCMAS with assistance from the New Jersey State Museum (NJSM). The fossil was such a showpiece that it served as the BCMAS logo and the namesake for its concert series, the Mastodon Music Society. David Parris, Curator of Natural History at the NJSM, said at the time that the Dwarskill fossil was especially valuable because it is unusually complete (about 75 percent of the bones were recovered), it was scientifically excavated, and it was immediately treated with chemical preservatives (Parris, 1983). Fossil experts estimated that the mastodon had stood 8 to 9 feet tall and had been at least 10 feet long. The tusks would be found

to measure between 5 and 7 feet.

Lodi Boro, Corona, southeast of Lodi, 1883: Tusks and teeth (Jepsen, 1964).

BURLINGTON COUNTY

Chesterfield Township, Plattsburg (now Sykesville), 1846: Part of skeleton (Jepsen, 1964).

Lumberton Township, 1951: Teeth (Jepsen, 1964).

Pemberton Township, 1832: Bones and teeth (Jepsen, 1964); 1840, Parts of skeleton (Jepsen, 1964); 1854, the skull of a mastodon was unearthed from a meadow, near Pemberton, owned by John Ewens (NJGS, 1856); 1887, Parts of skeleton (Jepsen, 1964); Before 1903, Skull. Found being used for a stepping stone in 1903. (Jepsen, 1964); Before 1923, Tooth (Jepsen, 1964); 1969, A sixth cervical vertebra was dredged from a depth of 11 feet along Catesville Road near Fort Dix. (Parris, 1983), [NJSM 11253].

CAMDEN COUNTY

No reports found for Camden County.

CAPE MAY COUNTY

Offshore: Teeth and bones have been found offshore by shellfish dredgers.

CUMBERLAND COUNTY

No reports found for Cumberland County.

ESSEX COUNTY

Verona Boro, before 1868: Tooth (Jepsen, 1964)

GLOUCESTER COUNTY

Harrison Township, before 1868: Remains (Jepsen, 1964); Mullica Hill, before 1868: Remains (Jepsen, 1964).

Woodbury City, before 1903: Remains found on Mantua Creek (Hay 1923; Jepsen, 1964).

HUDSON COUNTY

No records found for Hudson County.

HUNTERDON COUNTY

No records found for Hunterdon County.

MERCER COUNTY

No records found for Mercer County.

MIDDLESEX COUNTY

No records found for Middlesex County.

MONMOUTH COUNTY

Offshore: Teeth and bones have been found offshore by shellfish dredgers and in a number of creek beds better known for their shark teeth and fossil oysters.

Figure 5. Pelvic bone from the Borodin Mastodon, NJSM [18773]. *Photo by C. Kosar*

Figure 6. Juvenile mastodon skull, from the Homdel Mastodon, NJSM [23439]. *Photo by C. Kosar*

Englishtown Boro, before 1903: Remains (Jepsen, 1964).

Freehold Boro, 1882: Tooth (Jepsen, 1964).

Freehold Township, before 1868: Bones (Jepsen, 1964); before 1868: Milk tooth (Jepsen, 1964); 1882: Tusks, skull, and teeth (Jepsen, 1964).

Holmdel Township, 1999: Pelvic bones from a mastodon found in Holmdel by Paul Borodin, (fig. 5); Hop Brook area, 2013: A magnificently preserved skull of a juvenile mastodon was discovered by Glenn Harbour in 2013. The skull, about one year old, is 70 percent complete. It was radiocarbon dated as 11,680 years old. Pitting in the skull is consistent with pachyderm tuberculosis, and tuberculosis is the probable cause of death. The skull is now on display at the NJSM (fig. 6) (Grandstaff and others, 2015).

Long Branch City, Navesink Hills, before 1818: Part of tibia (leg bone) (Jepsen, 1964).

Manasquan Inlet, 1882: Tusk and bones (Jepsen, 1964).

Marlboro Township, before 1868: Portion of jaw (Jepsen, 1964); 1975: Tooth cusp found in the gravel of Big Brook by G. R. Case. The tooth fragment was donated to NJSM (Parris, 1983) [NJSM 11874].

Ocean Township, 1822: William Moore found a tooth sticking up from marsh on a farm owned by Jacob Croxson, Esq. Moore eventually dug up additional teeth, fragments of a skull, and bones including a humerus and vertebrae (Annals of the Lyceum of Natural History of New York, 1824; Jepsen, 1964).

MORRIS COUNTY

Boonton Township, before 1903: Remains (Jepsen, 1964)

OCEAN COUNTY

Offshore: Teeth and bones have been found offshore by shellfish dredgers.

Long Beach Township, Holgate, south of Beach Haven, about 1957: Part of leg bone, (Jepsen, 1964).

PASSAIC COUNTY

No records found for Passaic County.

SALEM COUNTY

Mannington Township, 1870s (Mannington Mastodon): Among the best-known of the New Jersey fossils is the Mannington Mastodon at the Rutgers University Geology Museum. The skeleton was excavated from a bed of gray marl, at a depth of from six to eight feet below the surface (Hay, 1923). It is a large specimen even for a mastodon. The lower jaw alone weighs 120 pounds. The tusks were found on the Joseph R. Hackett Farm in Mannington Township near Swedes Run on August 27, 1869. Men removing marl discovered some large bones and then, as they kept digging, found the skull and more bones. The skeleton soon became a money-making curiosity. It went on display at a spot near the Eastview Cemetery in Salem where a 10-cent admission was charged to enter a large tent to see the mastodon, according to newspaper accounts. The skeleton went to the Bridgeton Fair where the *Salem Sunbeam* reported 3,000 people paid to see it (Gallo, 2017). State Geologist George H. Cook, of the New Jersey Geological Survey (NJGS), purchased the skeleton in 1872 for $300 and it was mounted and put on display as the centerpiece of the Rutgers Geology Museum (Gallo, 2017) (fig. 7).

Figure 7. Mannington Mastodon skeleton, Rutgers Geology Museum. *Photo by T. Pallis*

The bones were preserved in linseed oil or paraffin to keep them from disintegrating, and for years Cook tried to find funding to have the bones mounted. They were not assembled until 1896, seven years after Cook's death. By this time, the bones had been so frequently patched and restored with plaster that very little of the original bone surface remained. The missing or decomposed bones were fashioned from wood, and the tusks were replaced. One of the tusks is from Ellenville, New York, the other from a southern New Jersey mastodon. (Jepsen, 1964; Sidar, 1976).

SOMERSET COUNTY

No records found for Somerset County.

SUSSEX COUNTY

Green Township, Greendell, September 20, 1851: Local newspapers reported that Timothy

H. Cooke was going about his business of burning bogs. While he raked through the ashes, he found what he believed to be an old tree stump. Upon closer inspection, it proved to be a huge skull somewhat damaged by the fire, but certainly unlike any skull he had ever seen. A further search within a 25-foot radius uncovered the lower jaw, two tusks, several vertebrae, about a dozen ribs, a thigh bone, and two leg bones. On October 4, it was reported that more bones had been exhumed. The legs were nine feet high, making the animal's total height about 15 feet. (Jepsen, 1964; Sweetman, 2015).

Hampton Township, April 27, 1962: Remains were unearthed during dredging of a bog about 200 yards from Old Swartswood Road. The bones were in muck at the bottom of a pond being enlarged to be a lake at Camp Auxillium, run by the Sisters of the Salesian Society of St. John Bosco. Wilbur Smith of Franklin was dredging with a dragline bucket and came up with two bones he knew were not from a domestic animal. Further dredging brought up eight ribs about 30 to 40 inches long. The bones were stored in the bed of a pickup truck owned by camp employee Bill Straight for a few days while experts were called. On Monday, April 30, the top of the skull, the first vertebrae, teeth, and two tusks were pulled from the muck. The mastodon was named "Moe" by the work crew (figs. 8, 9 and 10) (N. J. History Digital Archive, 2016).

Jules W. Marron of Lake Owassa, Director of Conservation Education and Public Relations for the New Jersey Fish and Game Commission, continued the excavation after having the AMNH confirm that the bones were, in fact, mastodon ribs. A full excavation was

Figure 8, *top*. Skull of "Moe", Sussex County Historical Society Museum (SCHSM). *Photo by T. Pallis.* Figure 9, *center*. Tusks of "Moe", SCHSM. *Photo by T. Pallis*. Figure 10, *bottom*. Helping with the unearthing of the mastodon bones of "Moe". *Left to right*: Jules Marron, William Strait, Albert Westra and Wilbur Smith. *Photo courtesy SCHSM*

not completed as funds were not available. The teeth, which had the polish of petrified wood, showed wear suggesting that the mastodon was an adult. The bones are exhibited at the Sussex County Historical Society Museum in Newton.

Sandyston Township, Shotwell Pond, Stokes State Forest, 1939: Teeth and bones (Jepsen, 1964; Sweetman, 2015)

Sparta Township, April 23, 1972 (Sparta Mastodon): Bones were found by 10-year-old Barry Douglas at a construction site for State Highway 15. The bones were uncovered during dredging of a small swampy area on the property of Charles Habbart on Woodport Road. Joseph Habbart, a son of the property owner, said "he thought he saw what looked like other large bones being dug up by a drag line" (figs. 11 and 12). Later, while construction was not in progress, Joseph recovered vertebrae and other bones. Radiocarbon dates from two different kinds of bone material gave ages of 12,320 and 12,730 years. The bones are at the New Jersey State Museum (Parris, 1983; Sweetman, 2015; New Jersey History Digital Archive, 2016).

Figure 11, *top*. Thigh bone from the Sparta Mastodon, NJSM [11268]. Figure 12, *bottom.* Teeth and bone from the Sparta Mastodon, NJSM [11268]. *Photos by C. Kosar*

Vernon Township, Hidden Valley, 1976: Jawbone (Sweetman, 2015); Ohberg Pond, 1954 (Ohberg Mastodon): Of the many New Jersey mastodons, the Ohberg Mastodon stands out as the most complete and best preserved. The remains were discovered February 19, 1954 in a swamp off Highland Lakes Road where Gus Ohberg was having a small pond enlarged using a dragline. The dragline pulled a large object from the marshy ground. Ohberg took it to be a tree stump until the dragline operator, Archibald McMurtry, noted, "Can't be a tree stump. It's got teeth." McMurtry thought he had turned up the skull of a water buffalo, but both knew they had something special - the skull of a very large and old animal. McMurtry continued hauling out boggy soil and uncovered skull, femur, and jaw (figs. 13 and 14).

Beginning the next day geologists, paleontologists, other specialists, and hordes of the curious began showing up at the site. Mr. Ohberg's hot dog stand and milk barn were overrun with sightseers, about 2,000 arriving at all hours. The first scientists, Dr. Kemble Widmer and Frank Markewicz of the New Jersey Geological Survey (NJGS), stopped at the police barracks in Morristown the day after the discovery and confirmed from photographs that the bones were from a mastodon and "in excellent condition". Soon after, Glenn Jepsen and John Clark of Princeton University and Paul Niemeyer, retired from the New Jersey State Museum (NJSM), came to the site. The bones were moved to Mr. Ohberg's garage where he washed and stored them while more bones were being dug up.

An ensuing excavation was conducted by scientists from the NJGS, the United States Geological

Figure 13, *top left.* Archibald McMurtry, *left,* and Gus Ohberg with mastodon bones. *Photo courtesy NJSM*. Figure 14, *top right*. View of Ohberg Pond. Mastodon skull, femur and jaw, removed from water by dragline, are to the right middle of photo. *Photo from NJGWS Archives*. Figure 15, *bottom right*. Digging for the Ohberg Mastodon bones. *From left*, Frank Nobori Goto (Princeton), unknown, Kemble Widmer (NJGS), unknown, Meredith Johnson (NJGS), Frank Markewicz (NJGS), Jim Minard (USGS), and Glenn Jepsen (Princeton). *Photo from NJGWS Archives*

Survey (USGS), the NJSM, and Rutgers and Princeton Universities. It was the most documented, reported, photographed, and celebrated mastodon find in New Jersey.

McMurtry completed draglining on April 9, and did not think any more bones remained in the bog. Meredith Johnson, Kemble Widmer, Frank Markewicz (NJGS), and Jim Minard (USGS), and Glenn Jepsen and Frank Nobori Goto (Princeton University) made a final search and found a few other small bones and a piece of a femur (fig. 15). After seven weeks of the intense field work, the most complete New Jersey mastodon had been exhumed. Only the toe bones, the two upper front leg bones, and a few tail vertebrae, about 70 bones in total, remain missing.

A historical marker on the shoreline of Mastodon Lake, formerly Ohberg Pond, memorializes Gus Ohberg as the discoverer. The skeleton is formally the Ohberg Mastodon, but also known as Matilda, dubbed "Miss Matilda Mastodon" by the many people who had a hand in her excavation. This was after Matilda Markewicz, the new bride of Frank Markewicz. Frank often brought his wife along to dig through the piles of muck.

Requests for donation of the skeleton came from institutions including two universities, the AMNH, and NJSM. Ohberg believed he had a treasure that might help pay for the dredging of his pond. He had indeed found a treasure of science but not one of significant monetary value. Mastodon

skeletons are not rare. The Ohberg Mastodon was, however, an almost complete skeleton, even including the tiny, seldom recovered hyoid bones from near the base of her tongue. Before Ohberg made a decision, there was soul searching. He felt an obligation to keep the bones in New Jersey. The State Museum made a small offer that did not please Mr. Ohberg, and he withheld a decision expecting the museum to come back with a better offer (Trenton [NJ] Times, 1954).

As of the fifth day, the best offer for the bones was $75 from a junk dealer. It was pointed out to Mr. Ohberg that the skeleton had been preserved in the muck, but would rapidly decompose with exposure to the air (fig. 16). Further, Mr. Ohberg longed for peace and privacy to return to his farm. With the additional incentive of having the mastodon named after him, he abandoned thoughts of financial reward and donated the skeleton to the State Museum. Also found among the bones was a six-inch molar that did not belong to Matilda. The rest of the second skeleton is presumed to still lie in muck below the pond. The tooth was presented to the Ohberg family for their generosity in allowing the dig and donating the finds.

After delivery to the State Museum, the bones needed to be preserved as soon as possible to forestall disintegration. There were multiple steps to the process. First, the bones were washed with alcohol and allowed to dry thoroughly. Next, the bones were coated with a mixture of shellac and alcohol, and the cracks were filled with papier-maché. Then a second coat of the shellac mixture was applied.

Along with the recovery of the bones, came further investigation and interpretation. The skeleton was small. The skull with its slightly protruding tusks was three feet long, two feet wide at the eye sockets and weighed 60 pounds, half the weight of the lower jaw of the Mannington Mastodon. It had 12 teeth, each three to six inches long. While the size suggested that the mastodon was not fully grown, the tusks provide a better measure of development. In Matilda's case, the tusks were three feet long and protruded slightly from the skull. In a fully-grown mastodon they are six to eight feet long and protrude much further. The jaw was X-rayed to see if any teeth had not yet emerged. The ends (epiphyses) of her long bone had not yet fused to the shafts and the disks of some of her vertebrae were still separate from the solid middle parts. Based on all the evidence, Matilda was determined to be a young female about eight feet high, adult but not fully grown.

Figure 16. Mr. and Mrs. Gus Ohberg with mastodon bones. *Photo by S. Novak*

Carbon-14 dating on peat surrounding the skeleton gave an age of roughly 11,000 years ago, well after the Ice Age glaciers began melting from New Jersey but still within the Ice Age. Selman Waksman of Rutgers had taken peat samples to deeper than 15 feet in undisturbed parts of the bog, but could

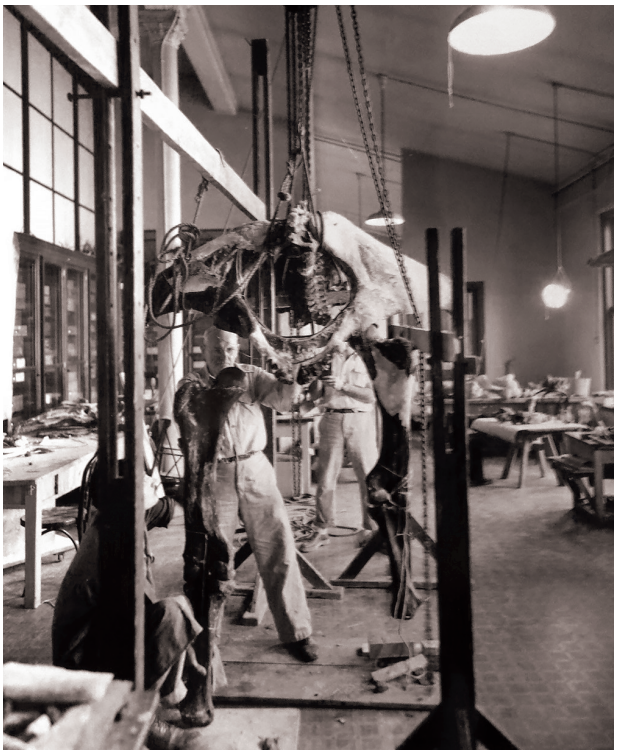

Figure 17. George Whittaker and Carl Sorensen fitting the Ohberg Mastodon left hind leg into place in the American Museum of Natural History laboratory. *Photo by A. Rota*

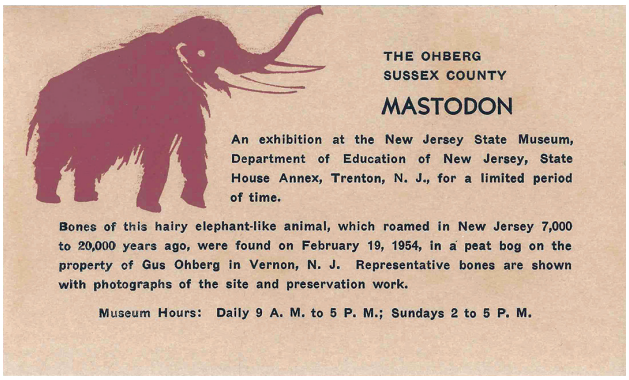

Figure 18. New Jersey State Museum advertisement for the Ohberg Mastodon exhibit [NJSM 11907], circa 1950s. *Photo from NJGWS Archives*

not reach the lowermost layers with the length of the rods of his sampling tool. Pollen in the samples provided new knowledge of the types of plants and climate of northern New Jersey when the glaciers were receding.

After the mastodon bones were cleaned, patched, and partially reconstructed at the State Museum, conservation was completed at the AMNH (fig. 17). Missing bones were cast in plaster and the skeleton was mounted with metal supports as though chewing a mouthful of leaves. The mount was then disassembled and trucked back to Trenton for reassembly, christening, and display as a proud addition to the State Museum (fig. 18). It stood from 1954 until 2004. After 50 years, it was badly in need of conservation, and was disassembled and placed in storage. (Asbury Park Press, 1954; DeHahn, 1955; Elk, 1954; Greywacz and others, 1954; Inside Mercer Hospital, 1954; Jepsen, 1964; Madden, 1954; Newark Sunday News, 1954; NY Journal American, 1954; NY Times, 1954; Schenectady Gazette, 1954; Trenton Evening Times, 1954; Trentonian, 1954; Trenton Times, 1954).

Wantage Township, 1978: A large breastbone tentatively identified as from a mastodon was found on the property of Fred DeHahn. (Parris, 1983)

UNION COUNTY

Cranford Township, May 1936, Cranford Mastodon: Workers digging a lake in Lenape County Park discovered a three-foot-long tusk and a jaw bone belonging to a mastodon. estimated to be 12,000 years old. The bones are at the New Jersey State Museum, but were exhibited at the county's Trailside Nature Center in Mountainside from 2012 to 2014. The mastodon stood about ten feet tall and is believed to have been a male (Terruso, 2012) (figs. 19 and 20).

Union Township, March 1930: Werner Beck dug up an eight-inch mastodon tooth four feet below ground in his back yard. It was identified as a lower molar of a mastodon by Dr. Walter Granger of the AMNH. After finding the tooth, Mr. Beck took the tooth to the Newark Museum. (Jepsen, 1964; The-Courier News, 1930).

Figure 19, *left*. Tusk from the Cranford Mastodon, NJSM [10418]. Figure 20, *right.* Teeth from the Cranford Mastodon, NJSM [10418]. *Photos by C. Kosar*

Westfield Town, 1940: Part of a skull (Jepsen, 1964)

WARREN COUNTY

Allamuchy Township, Quaker Church vicinity, 1941: Mastodon teeth were found in the farm field of William Kasper. The area where the teeth were found was thoroughly probed by New Jersey Geological Survey geologists, and no additional bones, tusks, or teeth were found. The site was not a bog, and it was likely that the skeleton had disintegrated, been scavenged or broken up after the mastodon died, leaving only the teeth (fig. 21) (NJGS Permanent Notes, 1941; Jepsen, 1964).

Blairstown Township, 1969: A major part of a skeleton was found on the property of Paul Nehr on Kerrs Corner Road about three miles north of the town of Blairstown. (Parris, 1983).

Hope Township, before 1868: Part of skeleton (Jepsen, 1964).

Independence Township, Vienna, 1844: Four adults and one calf were found under six feet of muck on the Ayers farm when a boggy depression was being drained. Three of the skeletons were "as if in a standing position" and one was on its back. This led to the conclusion that the creatures "had been overwhelmed in one of their native haunts by some sudden catastrophe". This was in line with "castrophist" beliefs prevalent among geologists of the time. These held that changes in the earth's plants and animals were mostly the result of violent, often worldwide events. Many of the violent events were immense floods, and it is likely that the sudden catastrophe envisioned here by the nineteenth century scientists was such a flood (Jepsen, 1964; Dalton, 1853). As with the Mannington Mastodon, the bones began to deteriorate after they were exposed to air. Four of the five skeletons were lost. The survivor has been on display at Harvard University in the Museum of Comparative Zoology since 1846 (Jepsen, 1964; Dalton, 1853).

Figure 21. Mastodon teeth from a farm one mile west of Quaker Church, Allamuchy Township. *Photo from NJGWS Permanent Notes*

Before 1868: Tooth (Jepsen, 1964); Hackettstown vicinity, 1965: Tusks and a few bone fragments were found on the property of William Hulse on Petersburg Road (The Star Gazette, 1973; Parris, 1983) [NJSM 12114].

Liberty Township, October 1971, (Bojak Mastodon): Mrs. Ludwig Wiederschein and


Figure 22, *left*. Raymond Stein (NJSM), *left*, and Stanley Bojak with the mandible of the Bojak Mastodon, Liberty Township. *Photo courtesy NJSM.* Figure 23, *right*. Lower jaw of the Bojak Mastodon, NJSM [11267]. *Photo by C. Kosar*

two of her grandchildren, Robert and Doreen Robeski, found some large, dark bones where a relative, Stanley Bojak, was constructing a pond. They notified Mr. Bojak, who saw that they were much too large to be cow bones and called the State Museum (fig. 22). Museum personnel immediately recognized them as mastodon bones and were given permission to investigate the area. The investigation lasted about two months, during which the pond was expanded from shallow and three feet in diameter to 40 feet wide and eight or more feet deep (Stein, 1975). Most of the digging was by pick and shovel, but bulldozers were used where bones were not expected. The pit was wet, dirty, cold, and had to be continually pumped to drain water. Bucket after bucket of wet dirt was moved. The bones were lifted out as they were uncovered, left to dry, and then soaked with preservative (Stein, 1975). The skeleton was an adult of modest size. All evidence suggested that it was a female. It was dated by Carbon 14 as 10,995 years old. It was mounted in 1973 and on display at the New Jersey State Museum until 2004 when it was placed in storage to prevent deterioration (Stein, 1975). The lower jaw (fig. 23) is still on exhibition.

Mansfield Township, Rockport, 1827: Jaw, teeth, vertebrae, leg bones (Jepsen, 1964).

WHERE TO FIND A MASTODON

People wanting to find mastodon fossils are not likely to be dredging ponds or working a fishing dredge in the Atlantic Ocean (fig. 1). Bones, and more often teeth, though, continue to be found in stream gravel, streambanks in marshy areas, and have even been found in various types of excavations.

However, mastodon fossils are readily available for viewing at a few locations throughout New Jersey. Those of us not lucky enough to find elephant fossils can see the Mannington Mastodon, dominating the Rutgers Geology Museum. This is the only full skeleton now on display in New Jersey. Elsewhere, the Sussex County Historical Society Museum in Newton displays the skull and tusks of "Moe", found in Hampton Township in 1962. Bones and teeth are also in the permanent science exhibit at the Newark Museum. The Newark Museum also has in its collection a 12,000-year-old mastodon skeleton from Warren County which has been on display since 2002 in the *Dynamic Earth: Revealing Nature's Secrets* exhibit.

The State Museum collections in Trenton include the skeletons of both the Ohberg and Bojak mastodons, but visitors will not find them on display. Both once stood together in the Natural History Hall. Sadly, they are now held in storage, awaiting an unknown future. Both were removed from display in 2004 because they needed substantial conservation. Conservation is vital for such historically significant and crowd-pleasing fossils, but the cost is immense and the work can take years – a genuine challenge for the museum. Hopefully these elephantine colossi will once again grace the halls. Until then State Museum visitors can see the lower jaw of the Bojak mastodon, a thigh bone of the Sparta mastodon, the skull of the young mastodon found in Holmdel in 2013, and the tooth of an adult. On occasion, small exhibits occur at local recreational, educational, and other various institutions.

If you do find bones or artifacts which may be old, you are urged to contact the New Jersey State Museum, the New Jersey Geological and Water Survey, or a nearby college or university. Please do not remove them; take photos of the objects in place and get a GPS location.

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