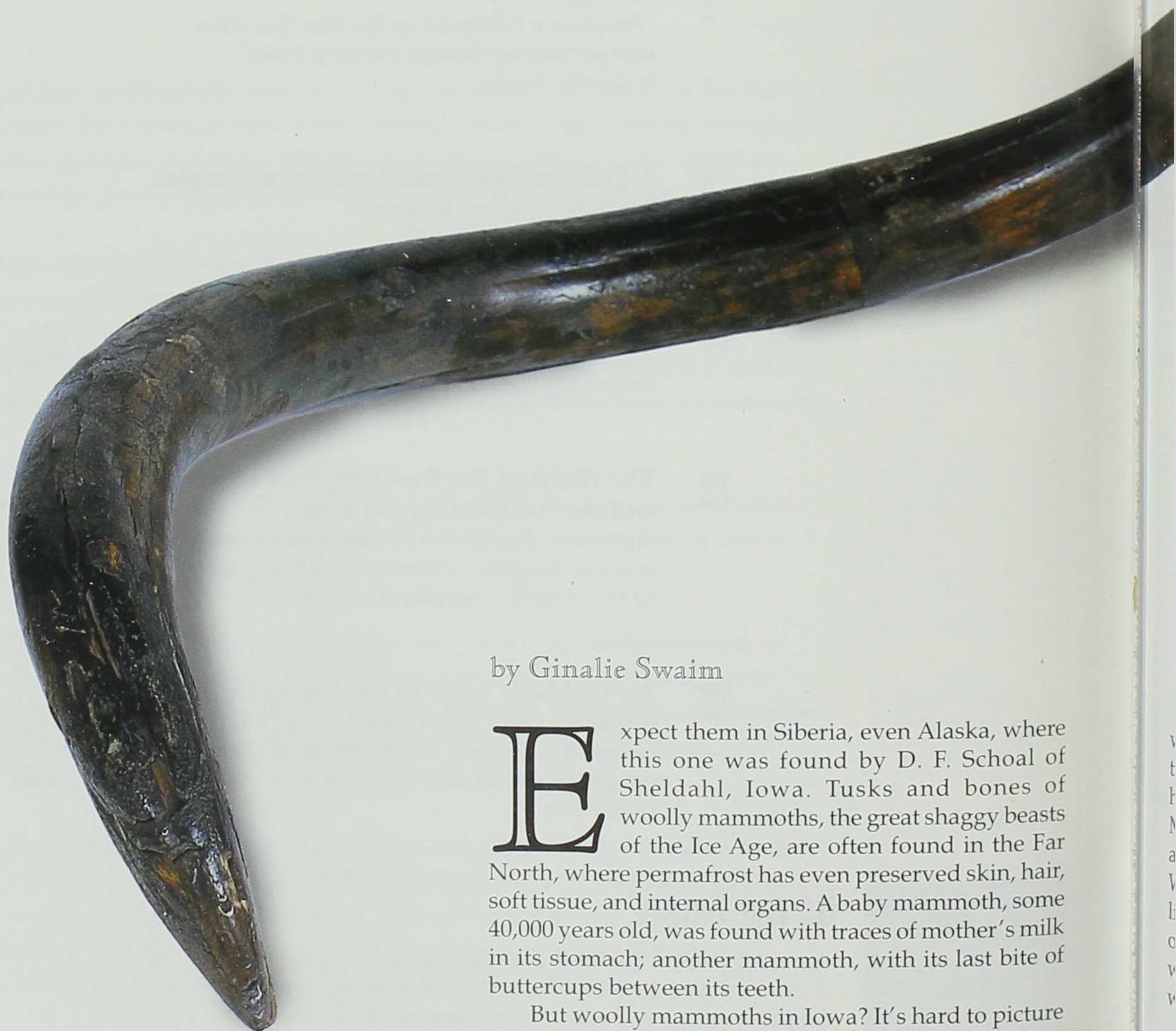


Ice Age Iowa




by Ginalie Swaim

Expect them in Siberia, even Alaska, where this one was found by D. F. Schoal of Sheldahl, Iowa. Tusks and bones of woolly mammoths, the great shaggy beasts of the Ice Age, are often found in the Far North, where permafrost has even preserved skin, hair, soft tissue, and internal organs. A baby mammoth, some 40,000 years old, was found with traces of mother's milk in its stomach; another mammoth, with its last bite of buttercups between its teeth.

But woolly mammoths in Iowa? It's hard to picture these beasts roaming our state—but then it's hard to picture glaciers pushing their way into Iowa more than two million years ago.

The Ice Age wasn't all ice, but rather long cycles of freezing and thawing, as the climate cooled and



Iowa at a time long before them, and by the fact that we're still finding evidence of woolly mammoths, that we find discoveries quite regularly. In the river valleys, the gravel pits, in farm fields, every few months there seems to be a discovery of a tooth or a tusk, a limb bone, all fragments of the animals that lived during the Pleistocene. Regularly here at the museum we get individuals who bring in bison skulls, mammoth teeth, and other assorted bones. Recently there's been a giant ground sloth found in the southwestern part of the state. Gravel pits, which were the backwaters and eddies of early rivers, produce numbers of mammoth teeth. This is especially true south of Des Moines. North of Des Moines, everything was covered over by recent deposits."

"Recent," of course, is relative. For geologists, recent can mean 15,000 years ago, when the last glacier of the Ice Age, called the Des Moines Lobe, shoved its way down into central Iowa like a giant thumb. For the next few thousand years, the lobe surged forward, then stagnated as the temperatures warmed enough for some of it to melt, then advanced again. Driving north on I-35, you'll see moraines marking the pauses in the glacier's advances and retreats, potholes created as isolated blocks of ice melted, gravel deposits dropped from churning meltwaters. Edged by the Raccoon River, the lobe's southern-most point was present-day Des Moines.

In August 2001, Allied Insurance in downtown Des Moines began excavation for the foundation of a new parking garage. From 55 feet below the surface, huge augers brought up a slurry of Pennsylvania shale (a sign they had hit bedrock)—and bone. Wisely, Allied called staff at the State Historical Society of Iowa, including Bill Johnson, who knew right away that bones that size could only have come from a mammoth or mastodon. A neck vertebra, scapula, ribs, and a portion of the front leg were all carefully removed from the construction site and donated to the museum by Allied Insurance.

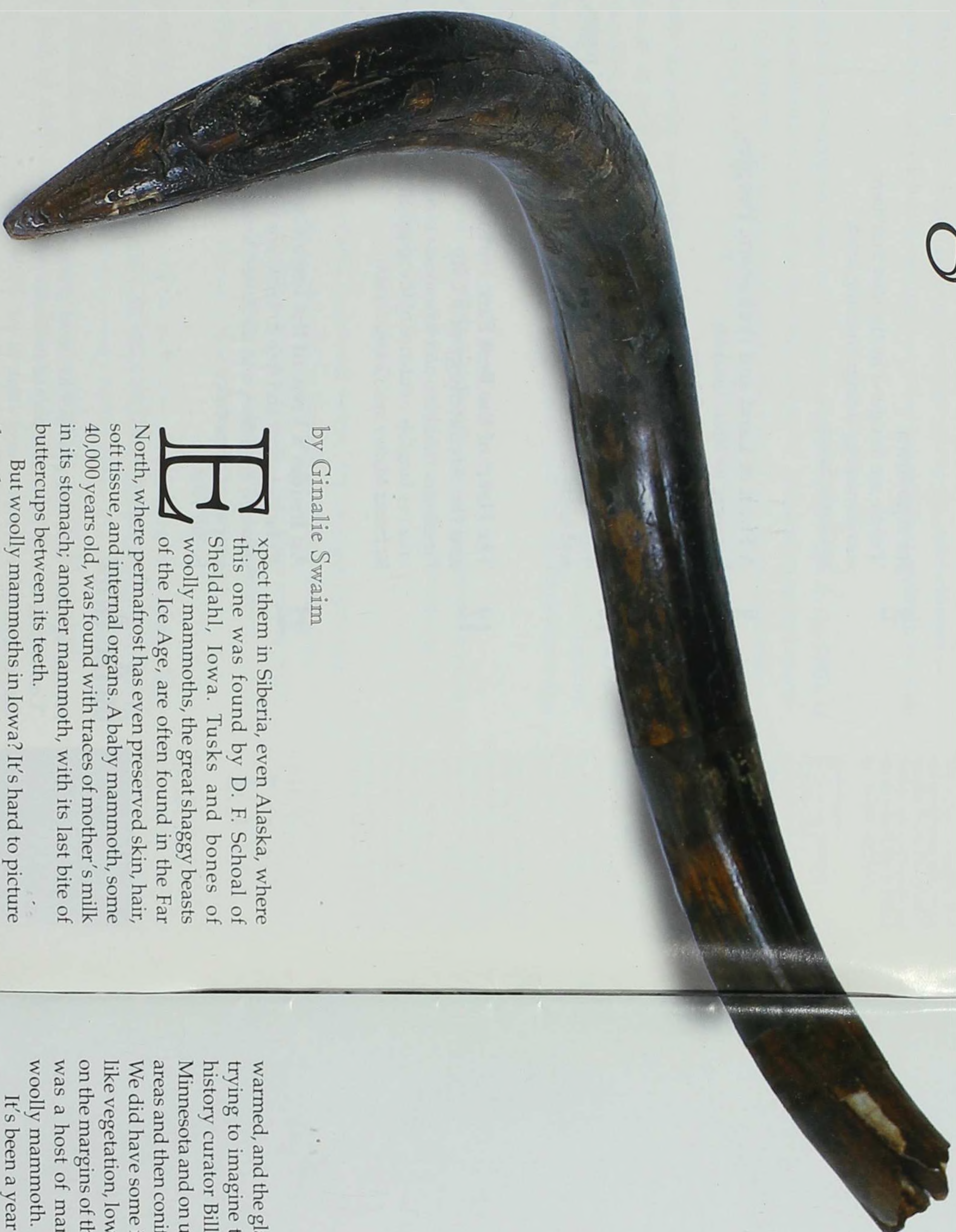
"One of our archaeologists on staff, Dan Higginbottom, contacted David Overstreet, a noted archaeologist who had done mammoth work up in Wisconsin," Johnson says. "He came down and took a look at the specimens and arranged for us to have carbon-14 dates taken. The Allied bones are still so fresh that they could get the organic information out of them. They almost feel oily when you work with them. Because they were rapidly covered and preserved by tens of feet of sediment, the decaying process is very slow.

"The carbon-14 tests came back at 15,000 years," Johnson says. "Those dates fall very close to what U.S. Geological Survey excavations had already determined to be the age of the Des Moines Lobe north of here at Saylorville. Saylorville is along the Des Moines River,

warmed, and the glaciers advanced and retreated. When trying to imagine the terrain of Ice Age Iowa, natural history curator Bill Johnson says to "think of northern Minnesota and on up into Canada, where you have open areas and then conifer forests and then open areas again. We did have some ice and snow, but also some tundra-like vegetation, low shrubs, and spotty woodland areas on the margins of the glaciers." Living in this landscape was a host of mammals now extinct, including the woolly mammoth.

It's been a year now since the State Historical Society of Iowa opened its museum exhibit "Mammoth: Witness to Change," curated by Johnson and designed by Jerry Brown. "We are still getting tremendous interest from the public," Johnson says. "People are intrigued by the idea that there was something strange roaming

Ice Age Iowa



by Ginalie Swaim

Expect them in Siberia, even Alaska, where this one was found by D. F. Schoal of Sheldahl, Iowa. Tusks and bones of woolly mammoths, the great shaggy beasts of the Ice Age, are often found in the Far North, where permafrost has even preserved skin, hair, soft tissue, and internal organs. A baby mammoth, some 40,000 years old, was found with traces of mother's milk in its stomach; another mammoth, with its last bite of buttercups between its teeth.

But woolly mammoths in Iowa? It's hard to picture these beasts roaming our state—but then it's hard to picture glaciers pushing their way into Iowa more than two million years ago.

The Ice Age wasn't all ice, but rather long cycles of freezing and thawing, as the climate cooled and

warmed, and the glaciers advanced and retreated. When trying to imagine the terrain of Ice Age Iowa, natural history curator Bill Johnson says to "think of northern Minnesota and on up into Canada, where you have open areas and then conifer forests and then open areas again. We did have some ice and snow, but also some tundra-like vegetation, low shrubs, and spotty woodland areas on the margins of the glaciers." Living in this landscape was a host of mammals now extinct, including the woolly mammoth.

It's been a year now since the State Historical Society of Iowa opened its museum exhibit "Mammoth: Witness to Change," curated by Johnson and designed by Jerry Brown. "We are still getting tremendous interest from the public," Johnson says. "People are intrigued by the idea that there was something strange roaming

Iowa at a time long before them, and by the fact that we're still finding evidence of woolly mammoths, that we find discoveries quite regularly. In the river valleys, the gravel pits, in farm fields, every few months there seems to be a discovery of a tooth or a tusk, a limb bone, all fragments of the animals that lived during the Pleistocene. Regularly here at the museum we get individuals who bring in bison skulls, mammoth teeth, and other assorted bones. Recently there's been a giant ground sloth found in the southwestern part of the state. Gravel pits, which were the backwaters and eddies of early rivers, produce numbers of mammoth teeth. This is especially true south of Des Moines. North of Des Moines, everything was covered over by recent deposits."

"Recent," of course, is relative. For geologists, recent can mean 15,000 years ago, when the last glacier of the Ice Age, called the Des Moines Lobe, shoved its way down into central Iowa like a giant thumb. For the next few thousand years, the lobe surged forward, then stagnated as the temperatures warmed enough for some of it to melt, then advanced again. Driving north on I-35, you'll see moraines marking the pauses in the glacier's advances and retreats, potholes created as isolated blocks of ice melted, gravel deposits dropped from churning meltwaters. Edged by the Raccoon River, the lobe's southern-most point was present-day Des Moines.

In August 2001, Allied Insurance in downtown Des Moines began excavation for the foundation of a new parking garage. From 55 feet below the surface, huge augers brought up a slurry of Pennsylvania shale (a sign they had hit bedrock)—and bone. Wisely, Allied called staff at the State Historical Society of Iowa, including Bill Johnson, who knew right away that bones that size could only have come from a mammoth or mastodon. A neck vertebra, scapula, ribs, and a portion of the front leg were all carefully removed from the construction site and donated to the museum by Allied Insurance.

"One of our archaeologists on staff, Dan Higginbottom, contacted David Overstreet, a noted archaeologist who had done mammoth work up in Wisconsin," Johnson says. "He came down and took a look at the specimens and arranged for us to have carbon-14 dates taken. The Allied bones are still so fresh that they could get the organic information out of them. They almost feel oily when you work with them. Because they were rapidly covered and preserved by tens of feet of sediment, the decaying process is very slow.

"The carbon-14 tests came back at 15,000 years," Johnson says. "Those dates fall very close to what U.S. Geological Survey excavations had already determined to be the age of the Des Moines Lobe north of here at Saylorville. Saylorville is along the Des Moines River,



which was carved out as the meltwaters of the glacier subsided." Johnson calls the Allied bones "a grand find."

The centerpiece of the museum exhibit is the 12-foot-high mammoth skeleton (*left*). A gift of Dickson Industries of Des Moines, the skeleton is a fiberglass and resin replica of an actual mammoth skeleton uncovered in 1994 when farmer John Hebior was digging a drainage ditch across an old pond in southeastern Wisconsin. The find as-tounded archaeologists: nearly 90 percent of the bones were still there, making the Hebior mammoth the most complete mammoth skeleton ever found in North America.

Scientists could tell that the Hebior mammoth was between 25 and 28 years old (by how many bones had fused) and that it was male (by the size of skull, tusks, and pelvis opening), but they couldn't determine how it had died (by disease, starvation, or predators). But more significant was the presence of stone tools and of butchering marks on some of the bones—making this one of the earliest butchering sites found in North America. Archaeologist David Overstreet, who oversaw the excavation of the Hebior mammoth, told visitors at the Des Moines exhibit opening a year ago, "Frankly, in my line of work, it doesn't get any better."

Mastering the technology of making stone tools and weapons allowed Paleo-Indians to hunt and butcher the big game (megafauna) of the Ice Age: giant bison, musk oxen, deer, elk, ground sloth, mastodon, and mammoth. With great skill and precision, they chipped and flaked chert and obsidian into long, narrow projectile points, as sharp as a surgeon's knife. Johnson has great admiration for the Paleo-Indian technology: "All you have to do," he explains, "is think about how sharp a piece of glass is, to figure out how sharp the edges of a stone tool are. Then put that on a shaft, whether it be a throwing shaft from an atlatl or a spear shaft, and you end up being able to project a lot of force," enough to penetrate the thick hide of a mammoth.

As the last ice sheet retreated, roughly



A mammoth that lived a full life of 80 years would have gone through six sets of molars, four to each set. Each ten-pound molar was the size of a shoebox, with vertical ridges designed to tear, grind, and chew some 300 pounds of shrubs, leaves, pinecones, grasses, and willow and spruce twigs every day. As the abrasive silica in the plants wore down the ridged, corrugated surface of the molars, new molars emerged, moved forward as if on a conveyor belt, and pushed the old ones out. Because each progressive set had larger molars with more ridges, scientists can estimate the age of a mammoth at time of death. Mammoth teeth and jaw fragments have been found in many Iowa counties. Perhaps the museum's finest example is this lower jaw with two molars, found in Dallas County in 1919 by Fred White.

Below: This neck vertebra the size of a dinner plate was one of the mammoth bones uncovered at the Allied Insurance building site in 2001.



PHOTO BY CHUCK GREINER



which was carved out as the meltwaters of the glacier subsided." Johnson calls the Allied bones "a grand find."

The centerpiece of the museum exhibit is the 12-foot-high mammoth skeleton (*left*). A gift of Dickson Industries of Des Moines, the skeleton is a fiberglass and resin replica of an actual mammoth skeleton uncovered in 1994 when farmer John Hebior was digging a drainage ditch across an old pond in southeastern Wisconsin. The find astounded archaeologists: nearly 90 percent of the bones were still there, making the Hebior mammoth the most complete mammoth skeleton ever found in North America.

Scientists could tell that the Hebior mammoth was between 25 and 28 years old (by how many bones had fused) and that it was male (by the size of skull, tusks, and pelvis opening), but they couldn't determine how it had died (by disease, starvation, or predators). But more significant was the presence of stone tools and of butchering marks on some of the bones—making this one of the earliest butchering sites found in North America. Archaeologist David Overstreet, who oversaw the excavation of the Hebior mammoth, told visitors at the Des Moines exhibit opening a year ago, "Frankly, in my line of work, it doesn't get any better."

Mastering the technology of making stone tools and weapons allowed Paleo-Indians to hunt and butcher the big game (megafauna) of the Ice Age: giant bison, musk oxen, deer, elk, ground sloth, mastodon, and mammoth. With great skill and precision, they chipped and flaked chert and obsidian into long, narrow projectile points, as sharp as a surgeon's knife. Johnson has great admiration for the Paleo-Indian technology. "All you have to do," he explains, "is think about how sharp a piece of glass is, to figure out how sharp the edges of a stone tool are. Then put that on a shaft, whether it be a throwing shaft from an atlatl or a spear shaft, and you end up being able to project a lot of force," enough to penetrate the thick hide of a mammoth.

As the last ice sheet retreated, roughly



A mammoth that lived a full life of 80 years would have gone through six sets of molars, four to each set. Each ten-pound molar was the size of a shoebox, with vertical ridges designed to tear, grind, and chew some 300 pounds of shrubs, leaves, pinecones, grasses, and willow and spruce twigs every day. As the abrasive silica in the plants wore down the ridged, corrugated surface of the molars, new molars emerged, moved forward as if on a conveyor belt, and pushed the old ones out. Because each progressive set had larger molars with more ridges, scientists can estimate the age of a mammoth at time of death. Mammoth teeth and jaw fragments have been found in many Iowa counties. Perhaps the museum's finest example is this lower jaw with two molars, found in Dallas County in 1919 by Fred White.

Below: This neck vertebra the size of a dinner plate was one of the mammoth bones uncovered at the Allied Insurance building site in 2001.



12,000 years ago, humans entered the Upper Mississippi River Valley. This intersection, in time and place, of human and mammoth is what most excites Bill Johnson. Megafauna were on the path to extinction; humans, to dominance. Both were witnesses to great change.

Exhibit designer Jerry Brown became well acquainted with the form of a mammoth while constructing a one-quarter scale model. "He really did a phenomenal job," Johnson says. "And he did it as a forensic scientist would have, by reading up on elephants, the cousins of mammoths, and figuring out the height and thickness of each area of the body. He carved the tusks from fiberglass. And then the hair was just a beautiful addition, and a masterful idea to use musk ox hair."

Brown's shaggy model is a popular feature of the exhibit for the thousands of schoolchildren who tour the museum each year. Museum educator Sarah Macht relates how the students are "just amazed that mammoths were in Iowa." Macht developed lesson plans on the Society's Web site (*see box*) so that teachers can use the mammoth exhibit to teach science, mathematics, social studies, and art, and meet national academic standards.

How do you convey the idea of the Ice Age to children? "Again, we look at the idea of change," Johnson explains. "This is the one thing that ties everything together. We talk first about the idea that there are changes

in seasons from year to year. Was this winter like last winter? Do you remember how much snow there was? Students notice that there are differences in winters. Then we go back to Grandpa's time, and then his grandfather's time, and you begin adding time back hundreds, then thousands of years. When you say 'years' to 7-year-olds, they understand that amount of time. They've already established the idea of a year as a certain amount of time. So when you say 15,000, even though that's a really long time, they can begin to understand that."

Still, it's a stretch of the imagination, for adults as well as children, to think of Iowa as a mosaic of conifer forests and tundra-like vegetation. And it's a stretch to imagine the great woolly mammoths plodding along, using their nine-foot tusks to scrape bark off trees, to plow through snow, to battle each other. But it's a valuable exercise in imagination, Johnson believes. "This is a beast that was here 15,000 years ago. We're only part of that continuum of time, and a very small part. A hundred years of that continuum will be a human life. And yet things were going on long before us, and will continue long after us. It puts life in perspective." ❖

Right: Exhibit designer Jerry Brown created this quarter-size model of a woolly mammoth. Mammoths weighed up to 12,000 pounds; the skull and tusks alone, perhaps 300 pounds. A thick layer of inner hair covered by long outer hairs insulated against the cold. Small ears limited heat loss.

More on Mammoths

- Visit "Mammoth: Witness to Change" and other exhibits at the State Historical Society of Iowa museum, 600 E. Locust, Monday–Saturday, 9-4:30; Sundays, noon to 4:30.
- To arrange school tours, contact museum educator Sarah Macht, at 515-242-5193, or by e-mail at sarah.macht@iowa.gov.
- Find online lesson plans at www.iowahistory.org/museum/exhibits/mammoth, then click on "Learn."
- The Society's Museum Store offers a variety of books and toys on mammoths. 515-283-1757, www.iowahistory.org, click on "Museum Store."

For further reading:

- *Mammoth: The Resurrection of an Ice Age Giant*, by Richard Stone
- *Mammoths: Ice-Age Giants*, by Dr. Larry D. Agenbroad and Lisa Nelson
- *Landforms of Iowa*, by Jean C. Prior, especially pages 36–47, on the Des Moines Lobe in Iowa

Special thanks to Allied Insurance and Dickson Industries for helping to fund the exhibit and educational programs. Additional thanks to Allied Insurance for preserving the mammoth bones for the people of Iowa.