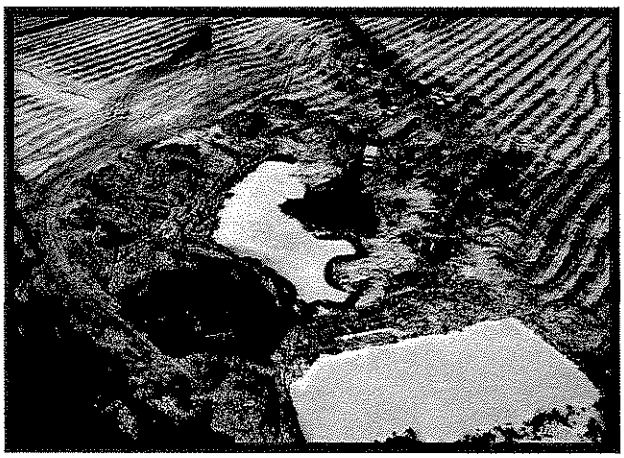
FORENSIC

The Burning Tree Mastodon

by Bradley T. Lepper



Burning Tree Golf Course is located about five miles southwest of Newark. In 1989 an excavator's dragline uncovered a mastodon skeleton in the black pit on the margin of the ice-covered pond.

On a bright, but bitterly cold December morning in Licking County, on a golf course of all places, a doorway in time opened before me. It was 1989, and, as I stood at the edge of a pit dug into a small fen by the bucket of a dragline, I looked down at the wonderfully preserved skull of a mastodon — a giant, elephant-like animal that lived in Ohio during the last Ice Age. A few other large bones were exposed, suggesting that much more might lie hidden beneath the rich peat. Although Warren K. Moorehead, the Ohio Historical Society's first curator of archaeology, once wrote that such fossils "are the keys that unlock the history of past ages," I could not then imagine just how important this discovery would prove to be.

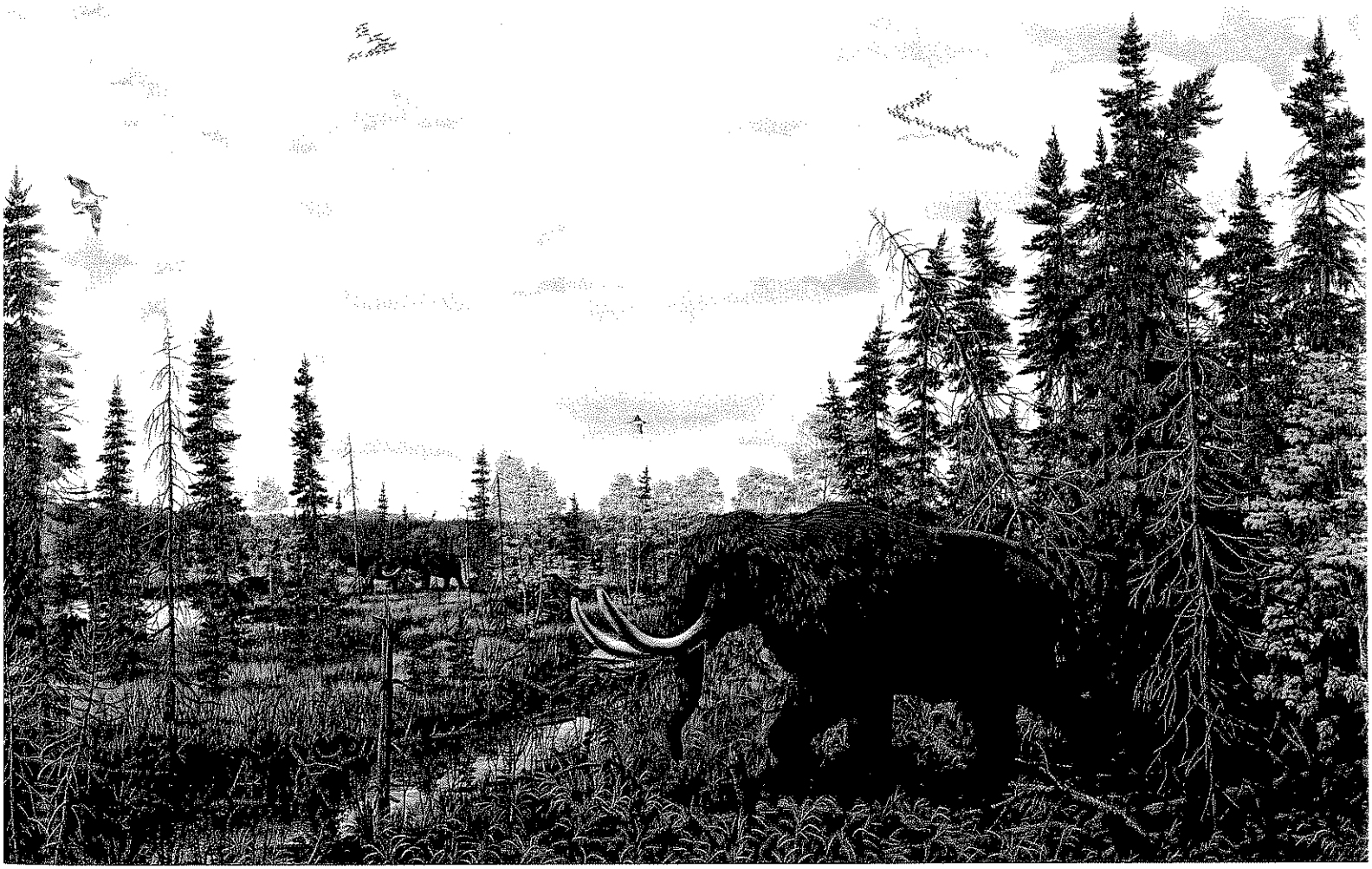
The bones of the Burning Tree mastodon, named for the golf course where it was discovered, and other materials from the site eventually would be studied by more than twenty scholars representing at least nine different scientific disciplines. Long before this interdisciplinary research team had concluded its studies, the popular science magazine *Discover* hailed the Burning Tree mastodon as one of the top fifty science discoveries of 1990.

This doorway to Ohio's Ice Age had been opened inadvertently by a dragline operator named Phil Flowers. The excavation had begun as part of the expansion of the golf course. The fen was the remnant of an ancient kettle lake, a depression where a chunk of glacier had melted, leaving an extra-large puddle of water. Over the millennia it slowly had filled in with vegetable matter, fallen trees, blown-in dirt, leaves, and other debris. The plan had been to dig out the material that had filled the depression and resurrect the old lake as a water hazard for the golf course. When the excavations revealed the peat, the decision was made to mine this rich organic material for use as fertilizer for the new golf greens. In the course of this work,

The top of the mastodon's skull, part of the pelvis, and one of the lower leg bones protrude from the muck.

Unless otherwise indicated, all images are from the author's collection.

MYSTERY



The Land of the Mastodons by R. G. Larson. Oil on board, 48 x 74 inches, undated
Illinois State Museum Society, Springfield, Illinois

Data recovered from the mastodon excavation suggests the Licking County environment twelve thousand years ago was very similar to this paleoecological reconstruction.

the dragline bucket hit the back of the large skull, wrenching it around and snapping off the two great tusks. At this point, Flowers could have just kept on digging, but he was curious about what he'd found, so he notified the owner of the golf course, Sherman Byers. Byers later told me that the first thing he did was to call his lawyer, to make sure this discovery would not interfere with the construction of his golf course. Then, having been reassured that, as the owner of the land, he could do as he saw fit with the bones, he called both the Ohio Historical Society and the local Licking County Archaeology and Landmarks Society (LCALS) to report the find.

So it was that on the following morning, Paul Hooge, then director of LCALS, and I arrived at the site to view the remarkably well-preserved cranium. Byers asked us to excavate the bones as quickly as possible and, in return, he would allow us to study the find. He had hoped we could finish in one day. We managed it in two arduous days and then only because we had the help of many volunteers.

The conditions were as challenging as any I have faced in an excavation. The temperature was 20°F with a wind-chill factor approaching zero. Since the bones were embedded in the muck of an ancient lake, Paul and I presumed we would be salvaging

As the bones were removed, volunteers, including Licking County Joint Vocational School students, wrapped them in burlap and loaded them on a truck for transport to a temporary lab. The underside of the mastodon's skull with its characteristic teeth can be seen in the left foreground.

the remains of a mastodon that had broken through thin ice and drowned. On that basis, we felt we could forgo the standard archaeological techniques of careful excavation and measurement in the necessarily quick-and-dirty recovery of this paleontological specimen. Our assumption would be called into question at nearly every stage of our investigation, but in our rush to remove the bones so the construction could move forward, we failed to integrate our observations and see where the accumulating evidence pointed. But the beauty of science is that facts stubbornly refuse to be governed solely by our expectations. If that were not the case, we would never be surprised.

As we exposed the bones with shovel and trowel, two things became apparent. First, there were a lot of bones. This indicated that we had made that rare paleontological discovery, a nearly complete specimen. Mastodon fossils are fairly common in Ohio, but usually they are isolated teeth or sometimes one or two big bones. Complete skeletons are relatively rare. As it turned out, the Burning Tree skeleton was missing only most of the right rear leg, the left kneecap, many of the tailbones, and most of the foot and toe bones.

Whatever Happened to the Burning Tree Mastodon?

Sherman Byers, owner of the Burning Tree Golf Course, made a cast of the mastodon bones from a lightweight resin. The original bones were sold on the international market.

After allowing scientists to study the mastodon skeleton for two years, the owner decided to sell it. In April of 1992, he took it to the world's largest fossil flea market, held every year in Tucson, Arizona. Eventually, he sold it to the Kanagawa Prefectural Museum of Natural History in Yokohama, Japan.

Many important fossils found in the United States have shared a similar fate. According to reporter Karen Benfield, who covered the Tucson extravaganza in the April 16, 1992, *Wall Street Journal*, there are two reasons for this. First, unlike most other countries in the world, "there are no laws to prevent fossils found stateside from being shipped out of the country." Second, funding for American museums has declined to the point where budgets cannot support large expenditures for new acquisitions. This makes it hard for them to compete with foreign institutions for rare specimens that bring high prices on the auction block. So, if you want to see the Burning Tree mastodon, you will need to travel to Japan. The Kanagawa Museum is a fine facility, and the fact that they were interested in owning it speaks to the world-class importance of this skeleton. Still, it would have been nice to have it displayed closer to its home.

There are, however, a number of places in Ohio where you can go to see wonderful mounted mastodon skeletons. The Conway mastodon is on display at the Ohio Historical Center in Columbus. The Danville mastodon, found in Stark County, can be viewed at the McKinley Museum's Science Center in Canton. The Johnstown mastodon is on display at the Cleveland Museum of Natural History. Like the Burning Tree mastodon, the Johnstown mastodon was found in Licking County. Some Johnstown residents still are bitter about "their" mastodon ending up in Cleveland. Perhaps we should all feel lucky that he's still in the state.

Bradley T. Lepper

The second thing we noticed was that the bones had become separated into three discrete concentrations. This should have been a tip-off that there was something special about this site, but under the extreme circumstances, we didn't have the time then to ponder what it might mean. Certainly, this was not what one would expect if the carcass had found its way into the lake under purely natural circumstances. Given the still waters of the lake and the thick, mucky peat into which the bones would have settled, we might have found the complete skeleton with all the bones in their proper anatomical arrangement. The bones might have become somewhat scattered by the trampling feet of other mastodons wading in the lake, but this would not have formed three neat piles.

The composition of the piles, that is, the kinds of bones that were clustered together, also was curious. The first pile of bones included the skull, the pelvis, the shoulder blades, and part of the left rear leg. The second pile, located eight or ten feet away from the first with no bones in the intervening space, included most of the ribs and the thoracic vertebrae (those segments of the spinal column to which the ribs attach). Large sections of the vertebral column still were articulated, still tightly linked, as they had been when ligaments and muscle masses had bound them together. This indicated that those soft tissues had been present when the bones were deposited in the lake. Finally, the third pile, ten to twelve feet away from both the first and second piles, consisted of the two front limbs and the cervical vertebrae of the neck.

On the second day of recovery efforts, steel rebar was used to probe the soft muck in search of hard objects. This technique led to the discovery of additional bones.

Near these ribs and vertebral segments, the mastodon's intestinal contents were found. Spruce-tree fragments visible here provided radiocarbon dates.

Weeks later, when the bones had been carefully cleaned, Dr. Daniel Fisher, a paleontologist from the University of Michigan and one of the world's foremost experts on mastodons, examined them and made a number of determinations about this beast. The Burning Tree mastodon was a young, but mature bull. We obtained several radiocarbon dates on the bones as well as botanical material associated with the skeleton. These dates indicate that the Burning Tree mastodon died in 11,300 BCE (give or take a few decades due to the statistical vagaries of radiocarbon dating). He had a few old injuries reflecting the normal rough-and-tumble life of a young bull, but these fractured bones had more or less completely healed by the time of his death. In addition, Fisher observed a number of marks on many of the bones that showed no sign of healing. He identified three distinct kinds of marks. There were regularly spaced gouges across several adjacent ribs, deep incisions in the underside of one of the few "finger" bones we found at the site, and scores of parallel striations across the surfaces of a few bones. When examined under the microscope, some of the marks appeared similar to those made experimentally with stone tools on fresh bone. Yet we did not find any stone tools among the bones of the mastodon.

Fisher interprets the parallel striations as drag marks and, indeed, particles of coarse sand and fine

The author holds one of the smaller bones of the mastodon, probably the heel or kneecap of a rear leg.

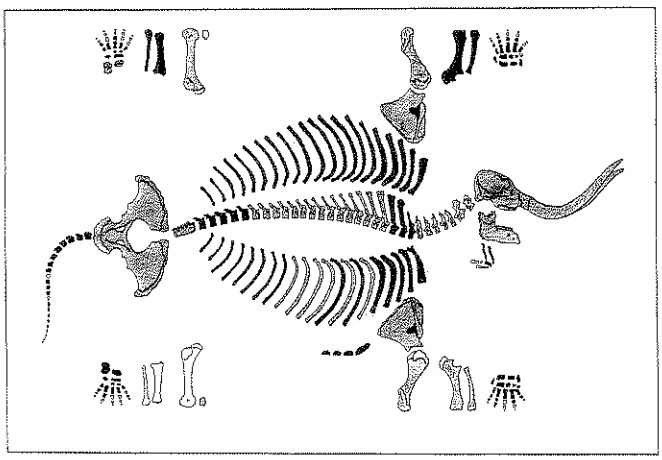
Biologist Jon Sanger from Ohio Wesleyan University and a team of students retrieved a sediment core from the vicinity of the mastodon remains. Changes in pollen and other environmental indicators found in successive layers revealed valuable information about climatic changes since the Ice Age.

gravel still adhere to nooks and crannies on a few bones. Sand and gravel are otherwise not found in the peat deposit. So, how did these particles become stuck to the bones?

These various lines of evidence suggested to Fisher that the Burning Tree mastodon was killed, or at least died, elsewhere. He has proposed the following scenario to account for our observations. Ice Age American Indian hunters killed the mastodon, or found it dead, somewhere not too far away. They butchered it and dragged the various parts of the carcass to the shallow lake where they placed them into three separate piles. Throughout the subsequent winter months, the frigid waters of the lake would have served as a prehistoric meat freezer. The grit we found sticking to a few bones and the drag marks we found on some of them are indications that the ground surface where the mastodon died and was butchered was open ground with exposed sand and gravel. The parallel scratches could have formed when the bones were dragged across this gritty surface.

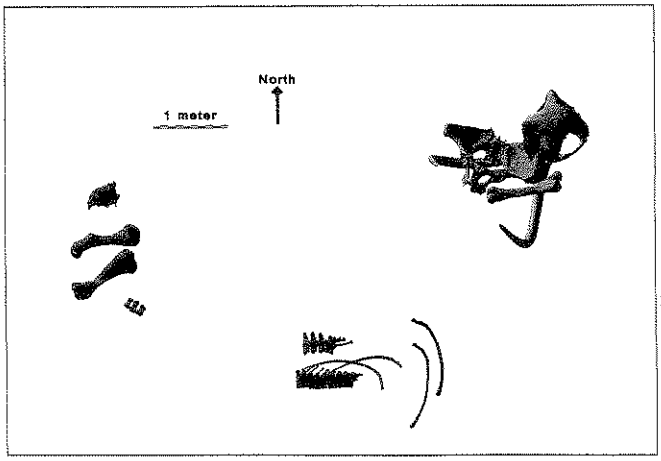
If this interpretation is correct, then why didn't we find any stone spear points or butchering tools, such as have been found at mammoth kill sites on the Plains? Fisher's explanation is that, unlike the famous Western mammoth kill sites, this was

University of Michigan paleontologist Dan Fisher diagrammed the Burning Tree mastodon skeleton, shading the bones according to the clusters where they were found. The darkest were recovered but cannot be located precisely. Bones shown in outline were not found, but their absence offered important clues as to how the remains came to be arranged in three groups.



Daniel C. Fisher Collection

This diagram shows the distribution of the bones as uncovered at the site.



Daniel C. Fisher Collection

Conway Mastodon

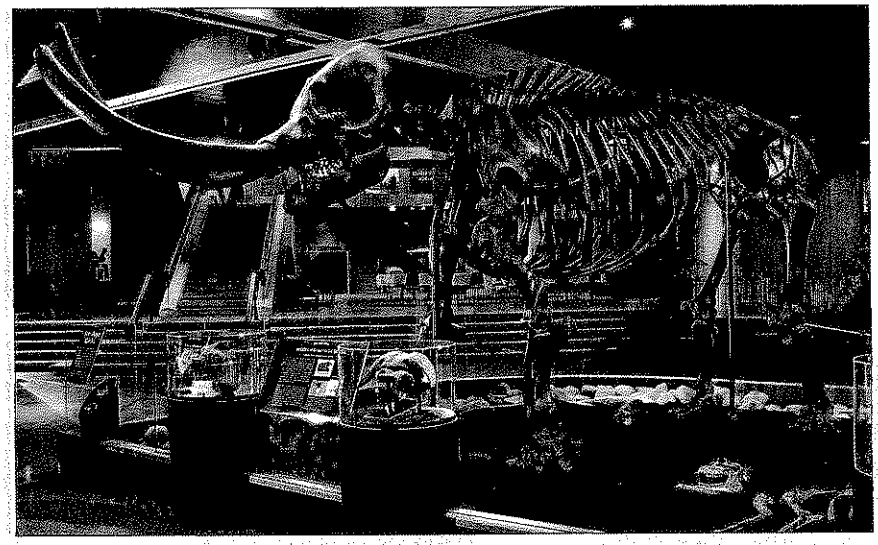
In the fall of 1887 laborers digging a ditch to drain a swamp on the farm of Newton S. Conway, about two miles north of Catawba near the Clark County–Champaign County line, discovered something exciting — the skeleton of a mastodon. Found at a depth of about four feet, approximately 70 percent of the skeleton was recovered.

At first the bones were mere curiosities, loaded on wagons and displayed at local county fairs, but in 1894 the skeleton was donated to Ohio State University. Before being put on display it was sent to Ward's Natural Science Establishment in Rochester, New York, to be repaired and mounted. Missing bones were replaced with replicas modeled after other mastodon skeletons, including bones at the colleges of Wooster and Wittenberg. For seventy-five years the Conway mastodon was the centerpiece of Ohio State University's Orton Geological Museum. Ten feet high at the shoulder with tusks nine-and-a-half feet long, it shared space with skeletons of two giant ground sloths, its Ice Age contemporaries.

In July of 1970, amid the click and flash of reporters' cameras, the mighty skeleton was dismantled by Arnie Lewis, chief bone man of Harvard's Museum of Comparative Zoology. He reassembled it at the new Ohio Historical Center, where it has been one of the Society's most spectacular and memorable exhibits for thirty-five years. The original tusks weigh over one hundred pounds each. They were too heavy (and too fragile) to re-hang on the skull, so they are exhibited nearby, replaced on the mounted skeleton by fiberglass replicas.

Also on exhibit are bones, teeth, and skulls of the kinds of animals the mastodon would have seen when alive: *Cervalces*, the stag moose; *Casteroiodes*, the giant beaver; *Bootherium*, the woodland muskox; the peccary *Platygonus*; and of course, the mammoth.

The Conway mastodon was a male of almost exactly the same size as the Burning Tree mastodon. According to Dr. Richard Laub, a mastodon expert at the Buffalo Museum of Science, the Conway mastodon died in his late twenties or early thirties, making him about the same age as well.



David R. Barker, Photographer

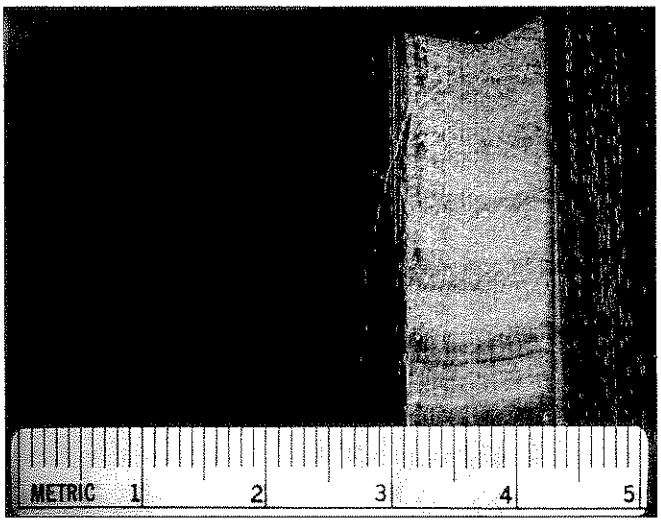
The Conway mastodon is the centerpiece of the Society's natural history mall at the Ohio Historical Center in Columbus.

There are no known notes or photographs of the excavations that might allow us to determine how the bones were arranged at the site, a possible indication of human involvement in the death or dismemberment of the Conway mastodon. There are no obvious butcher marks on the skeleton, but such things may be subtle and easily overlooked (or overprinted by modern damage or reconstruction). Its cause of death remains a mystery.

Dale M. Gnidovec
Orton Geological Museum
Ohio State University

neither a kill nor a butchering site, where one could expect to find a litter of broken or worn-out tools, or at least a scattering of small chips of flint struck from the edges of tools in the course of resharpening them. It was a meat cache, and there would be no reason to expect to find flint tools in such a context. Admittedly, the field methods we employed were hardly sufficient to ensure that we would have found flint chips even if they had been there.

During the course of the excavation, when we were working in the area of the rib cage, I carefully troweled through the peat looking for traces of the gut contents. At other mastodon sites, dense masses composed of small fragments of spruce twigs had been found in stomach cavities. Based on these discoveries, paleontologists had concluded that the mastodon diet consisted largely of spruce. I did not find the expected clumps of chewed spruce branches, but I did uncover a cylindrical mass of vegetation that differed from the surrounding black peat by its reddish-brown color, finer texture, and pungent odor. Suspecting that this material might represent the animal's intestinal remains, we collected several samples before returning to our main task of removing the skeleton from its mucky tomb and moving it to a temporary laboratory facility (actually the laundry room of the old Licking County Tuberculosis Sanitarium, which recently had



The Burning Tree mastodon's tusk was cross-sectioned and polished to show its growth rings. The thinner dark bands represent winters, when little food was available. The thicker, light-colored bands are the result of growth during springs and summers when forage was plentiful. The pulp cavity at the top of the picture represents the point at which the tusk stopped growing — at death — at the end of the summer. According to University of Michigan paleontologist Dan Fisher, the mastodon died in October. *Daniel C. Fisher Collection*

been acquired by the Newark Board of Education for offices). The samples of red-brown peat froze before we could transport them back to the lab, so we stored them in a freezer until such time as we could devote the necessary attention to them.

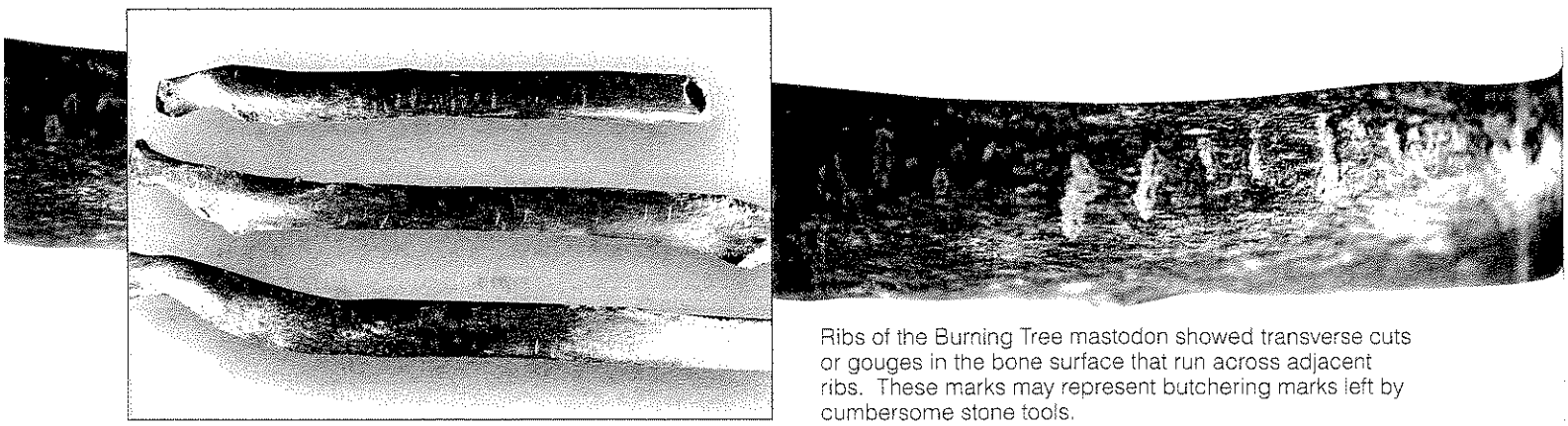
Some weeks later, Dr. Jon Sanger, a biologist from Ohio Wesleyan University, brought a group of students to the site in order to obtain a series of soil cores from the remnants of the peat deposit. He intended to study the pollen and other microscopic organisms preserved in the layers of peat in order to develop a picture of the changing environment from the end of the Ice Age to the present. Dr. Gerald Goldstein, a microbiologist from Ohio Wesleyan University, came along with the team and, when we told them about the putative gut contents, indicated that bacteria theoretically might be recoverable from the samples. The fact that the samples had been frozen, he said, might allow him to culture living survivors. Although we were skeptical that it was possible to resurrect an organism, even a bacterium, from deposits thirteen thousand years old, the possibility was so exciting that we unhesitatingly provided Goldstein with a sample.

And, amazingly, he succeeded in isolating a species of bacteria that occurs only in animal intestines, *Enterobacter cloacae*. A subsequent analysis conducted by the prestigious Center for Microbial Ecology at Michigan State University found a host of different species of intestinal bacteria in the putative gut samples, but not in the surrounding peat.

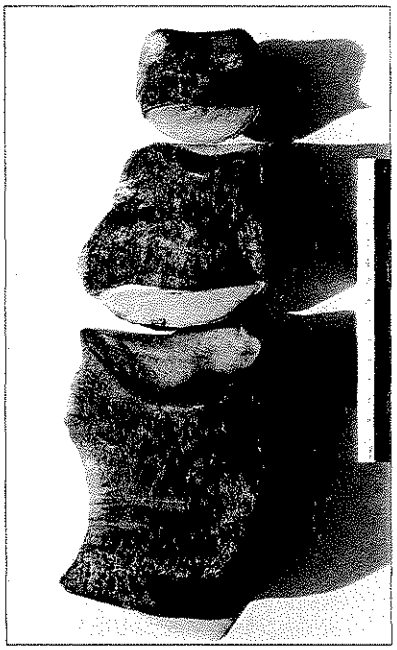
These results established that the cylindrical mass of fetid, red-brown peat was, indeed, the remains of the Burning Tree mastodon's last meal. But what had it been eating?

Dr. Dee Anne Wymer, an archaeologist with Bloomsburg University in Pennsylvania and a specialist in identifying ancient plant remains, studied samples of the peat as well as the gut contents. She determined that this mastodon had not dined exclusively on spruce. The plants in the Burning Tree mastodon's guts included naiad leaflets, moss, sedge, grass, pondweed, water lily, and some small, woody, deciduous shrub. This diversity of plants is very different from the dense mass of chewed-up spruce twigs I had expected, based on previous discoveries of mastodon gut contents. Evidently, mastodons had a more eclectic diet than had been appreciated, or the mastodons with stomachs full of spruce were animals who died from starvation during winter and had been eating the nutritionally poor spruce twigs just to have something to put in their empty bellies.

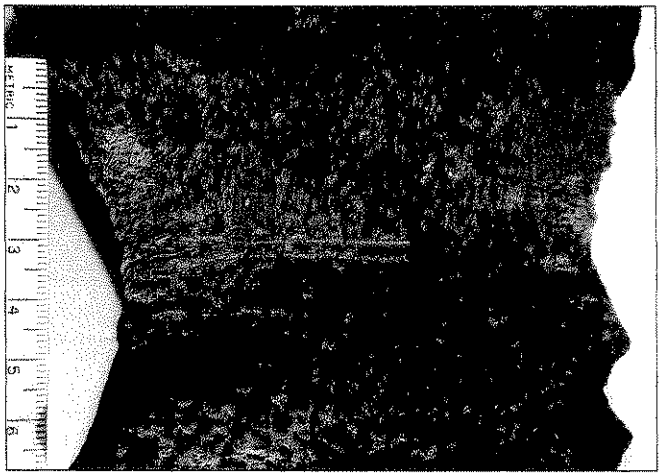
The seeds in the Burning Tree mastodon's gut indicated he ate his last meal in the late autumn. This time of death was confirmed by the seasonal, actually fortnightly, growth rings of his tusks. The last rings,



Ribs of the Burning Tree mastodon showed transverse cuts or gouges in the bone surface that run across adjacent ribs. These marks may represent butchering marks left by cumbersome stone tools.



Marks, such as those on one of the toes, are sharper, more deeply incised striations, probably made by sharp flint knives used to sever tendons.



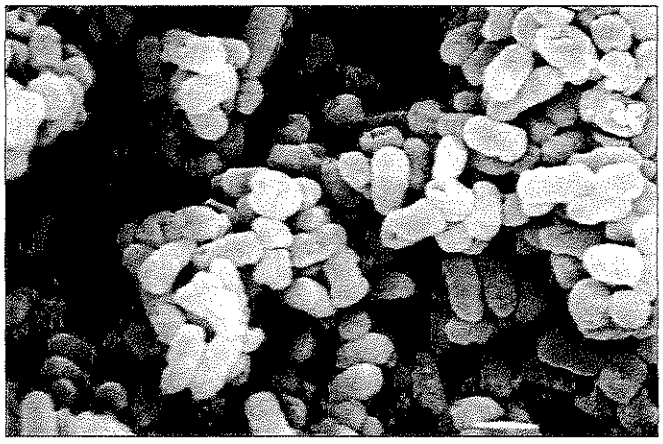
a wide band of lighter color, indicated the spring and summer months of abundant food and rapid growth. The lean winter months were marked by narrower bands of darker, more densely packed rings.

We have no direct evidence for how the Burning Tree mastodon died. Predation is implicated, however, by the following facts: he was a big male, in the prime of life, who died with a full belly at a time of year when food was relatively plentiful and temperatures were not extreme. It is likely, therefore, that human hunters killed the animal.

Some scientists have suggested that humans hunted mastodons and other super-sized mammals of the Ice Age to extinction. Others attribute the disappearance of the so-called "megafauna" to the drastic climate changes that marked the turbulent ending of the Pleistocene Epoch. There is no consensus, but it seems unlikely that ancient hunters could have extirpated the big game animals using only sharpened flint points fastened to the ends of wooden shafts. On the other hand, mastodons, mammoths, and other giant mammal species survived many earlier episodes of climate change that were equally severe. What was different about this one, if not the appearance of a new and deadly predator — Clovis point-wielding human hunters?

It is most likely that some combination of environmental change and human hunting added up to the catastrophic loss of biodiversity at this critical period. Some species, such as the modern bison, were able to adapt and even thrive. Others, such as the mastodon, dwindled into eventual extinction. For whatever reason, by ten thousand years ago, the trumpeting of mastodons and mammoths was stilled forever in Ohio's forests and glades. And the elimination of such species from the animal community would have had far-reaching consequences for many other creatures. Some would have become extinct due to the loss of the habitat created and maintained by mastodon foraging, while others would have thrived in the ecological void created by the mastodon's disappearance.

The Burning Tree mastodon was an incredible discovery. In addition to the hauntingly well-preserved bones of the creature himself, we found evidence that Ohio's Ice Age people sometimes hunted mastodons. Such hunts may have been undertaken in the late autumn so the group could store the meat in shallow, icy lakes. This kept the meat edible throughout the long Ice Age winters. Winter can be a difficult time of year for hunting and gathering people in northern latitudes. Most plant foods are



Gerald Goldstein, a microbiologist at Ohio Wesleyan University, discovered bacteria in the mastodon's intestines. A graduate student working at Michigan State University specifically identified *Enterobacter cloacae*, a type of bacteria found only in the intestinal tracts of animals and one that contrasted with those found in the surrounding peat deposits. No other living bacteria of this antiquity had previously been identified. Subsequently, the same set of bacteria species was identified in the gut contents of a Michigan mastodon.
Licking County Archaeology and Landmarks Society

Mammoth or Mastodon?

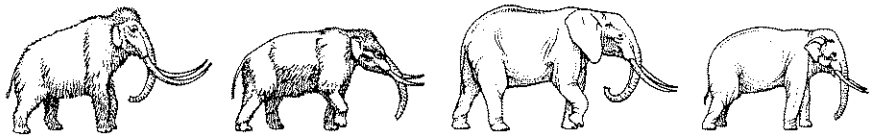
Two kinds of prehistoric "elephants" lived in Ohio during the Ice Age. By far the most common was the mastodon, whose remains (usually isolated teeth and bones, but about half a dozen fairly complete skeletons) have been recovered from approximately 140 places around the state. Mastodons were the size of a modern Asian elephant. Their teeth were similar to ours — bumpy, like our molars, and covered with a layer of hard white enamel. Such teeth were well-suited for what the mastodons ate, mainly leaves and twigs.

Similar to the mastodon was the mammoth. Slightly larger, about the size of a modern African elephant, mammoths had teeth that were very different. Their teeth were different because mammoths were mainly grass eaters.

Grass is very gritty — if you tried to live on a diet of grass with human or mastodon teeth, they'd wear out quickly. Instead of having just a thin covering of hard enamel, mammoth teeth have vertical plates of enamel all through the tooth, so no matter how far down the tooth was worn, it was still grinding with tough enamel.

On exhibit at the Columbus Zoo is the skull of a modern elephant. A look at its teeth shows they are like those of a mammoth. Mammoths were just a kind of elephant, whereas the mastodon was more like the elephant's second cousin twice removed.

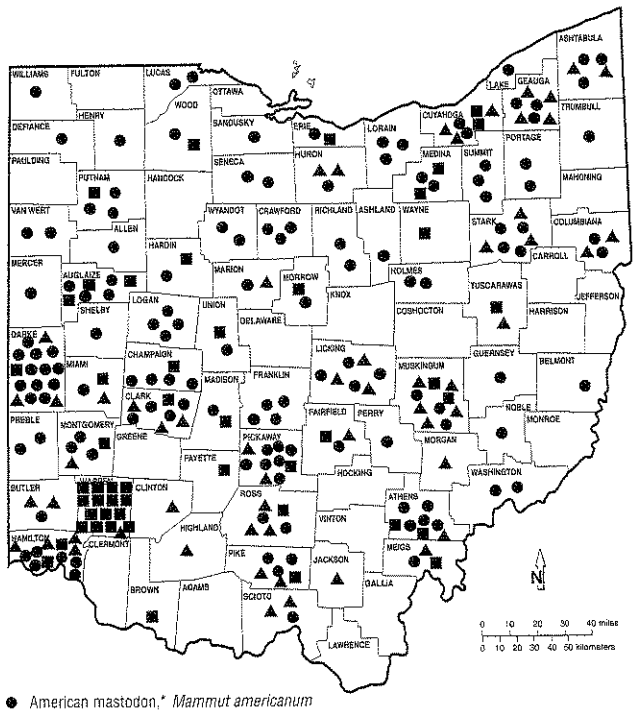
Dale M. Gnidovec
Orton Geological Museum
Ohio State University



	Wooly mammoth *Mammuthus primigenius*	American mastodon *Mammut americanum*	African elephant *Loxodonta africana*	Asian elephant *Elphas maximus*
Height	9–11 ft.	8–10 ft.	10–11 ft.	8–10 ft.
Weight	4–6 tons	4–5 tons	4–6 tons	3–5 tons
Back Shape	sloping	straight	saddle-shaped	humped
Fur	dense	probably dense	very sparse	sparse
Head	high single dome	low single dome	low single dome	double dome
Ear	very small	unknown	large	medium

From Adrian Lister and Paul Bahn, *Mammoths*, Marshall Editions, 1994. Used with permission.

A mastodon typically stood about the same height as a modern Asian elephant.
Ohio State University Libraries



- American mastodon,* *Mammut americanum*
- Wooly mammoth,* *Mammuthus primigenius*
- Indeterminate proboscidean remains

(* extinct)

Three other mastodon skeletons have been found in Licking County, and both mastodon and mammoth remains have been discovered throughout the state.
Ohio Department of Natural Resources

unavailable and animals have migrated out of the region, are hibernating, or are just hard to hunt in winter conditions. A big cache of meat could be a key to survival for Ice Age hunters.

We also found definitive evidence that the mastodon diet was much richer than suggested by previous discoveries. And we succeeded in resurrecting some of the bacteria that lived in this mastodon's intestinal tract. This was the first time living bacteria had been recovered from the gut of an extinct species. For a time, the bacteria from the Burning Tree mastodon were listed in the *Guinness Book of World Records* as the oldest living organisms on the planet. Even older bacteria have since been revived from the gut of a bee preserved in amber.

Finally, the mastodon bones and the other animal and plant remains preserved in this nondescript wetland have given us a more detailed

A diorama prepared for the Ohio Historical Society portrays prehistoric Native Americans butchering a mastodon.

understanding of the changing environments at the end of the last Ice Age. These data can provide valuable insights into the changing climate of our modern world. How will our contemporary ecological mosaic shift? Will we be able to adapt, or will we follow the mastodon into oblivion? Discoveries such as the Burning Tree mastodon are the keys not only to lost worlds but also, perhaps, to worlds yet-to-be.

Those of us involved in the actual excavation of the mastodon were amazed by the Ice Age world that lay before us in the steaming, jagged scar opened by the dragline's bucket. We knelt among twigs from spruce trees that had grown along the shores of a lake more than thirteen thousand years ago. Some of these branches bore teeth marks from Ice Age beavers. There were perfectly preserved spruce cones, spruce needles, and even delicate leaves, some of which were still green when first uncovered. In spite of the nearly miraculous nature of what was all around us, we could not have guessed how much more we would discover about this magnificent creature and the world he inhabited. My principal regret is that we did not have more time to undertake our excavation. We could only accomplish so much in two hectic days, and I sometimes wonder what else we might have found if we had been given more time to explore this lost world that suddenly appeared, like the fabled Brigadoon, only to vanish again into the metal jaws of the dragline.

To test the interpretation that the scattered Burning Tree mastodon remains were the result of prehistoric butchering, Dan Fisher experimented with butchering using stone tools. *Daniel C. Fisher Collection*

Fisher deposited bones and meat in cold Michigan lakes to further test the idea that hunters had placed the Burning Tree mastodon's carcass in a shallow, Ice Age lake, using it as a prehistoric meat freezer. In Fisher's experiment, the meat was still in good condition in the spring. *Daniel C. Fisher Collection*

The Authors

Don Bedwell ("Lunken Airport") is a veteran journalist who has published in *American Heritage of Invention & Technology* and *Leatherneck* and is a contributing editor to *Airways*, the journal of international aviation. Bedwell previously served as aviation editor for the *Miami Herald* and business writer for the *Charlotte Observer* in North Carolina before joining American Airlines Corporate Communications. He is now retired in Cincinnati.

Bob Carson ("A Burning Passion") did his graduate and undergraduate work at Kent State University. A teacher and coach in the Brunswick schools for twenty-seven years, he now writes humor columns for *Hoof Beats Magazine* and *Trot Magazine*. Carson, a native of Strongsville, Ohio, has published *Minor Trips*, a newsletter and guidebook for minor league baseball travelers, since 1992 and has produced a documentary film on baseball in Ohio, *Touching Home, Baseball in the Bushes*.

Glenn Harper ("The National Road: Helping Build America") holds a master's degree from Ball State University and manages the certified local government program for the historic preservation office at the Ohio Historical Society. An adjunct member of the history and urban studies faculty at Wright State University, he was a contributing author to *The National Road* and *Barns of the Midwest*. Harper is a cofounder of the National Road Alliance and the Ohio National Road Association.

Bradley T. Lepper ("Forensic Mystery: The Burning Tree Mastodon"), who holds a doctorate in anthropology from Ohio State University, is a curator of archaeology at the Ohio Historical Society. He has written widely on a variety of subjects, including the Ice Age prehistory of America, Ohio's Hopewell culture, and the history of archaeology. Lepper is an occasional visiting professor at Denison University and writes a regular column for the *Columbus Dispatch*.

John Vacha ("The Master Carver of Dover: Mooney Warther and the History of Steam") is a frequent TIMELINE contributor. Since retiring from teaching history and journalism in the Cleveland Public Schools and at Cuyahoga Community College, he has been associate editor of the *Encyclopedia of Cleveland History–Dictionary of Cleveland Biography*, coordinator of District Four History Day, and the author of *Showtime in Cleveland* and *The Music Went 'Round and Around: The Story of Musicarnival*.

In Past Issues

Volume 23

JANUARY•MARCH 2006
Volume 23/Number 1

OHIO'S PRIDE
The Art and Architecture of the Ohio State Office Building
by Barbara Powers

OHIO HISTORICAL SOCIETY ALBUM
ARMSTRONG AIR & SPACE MUSEUM

TIMELINE ALBUM
MYERS CONFECTIONARY
by David A. Simmons

OHIO'S STRUGGLE FOR EQUALITY BEFORE THE CIVIL WAR
by Paul Finkelman

LET US CROSS OVER THE RIVER
Cincinnati's Ferryboats
by John H. White Jr.

IN THIS CORNER
The Davey-Hopkins Bout of 1935
by Richard and Fran Compton

APRIL•JUNE 2006
Volume 23/Number 2

RUSTIC REPOSE
Spring Grove and the Rural Cemetery Movement
by Stephen C. Gordon

OHIO HISTORICAL SOCIETY ALBUM
THE LAND OF GRANT

IMP
Ohio's Queen of the Turf
by Bob Carson

ONE LUCKY BUCKEYE OVER GERMANY
by Louis Keefer

THE PHOTOGRAPHY OF DAYTON'S ALBERT KERN
by Claudia Watson

A SALTWATER BUCKEYE
John J. Cornwell, USN
by Timothy R. Brookes

JULY•SEPTEMBER 2006
Volume 23/Number 3

A MAGNIFICENT OBSESSION
The Novels of Lloyd C. Douglas
by Donald L. Huber

OHIO HISTORICAL SOCIETY ALBUM
"PRINTING IN THE CORRECT STYLE"
The Champlin Press
by Betsy Butler

JOHNSON'S ISLAND
by Roger Pickenpaugh

CHARLIE PIERCE
A Johnson's Island Rebel
by Kimberly Brownlee

DUEL IN THE SUN
The Amusement Park Battle in Cleveland
by David W. Francis

AND BLOOD RAINED DOWN
A Darke County Balloon Tragedy
by Gretchen L. Price

OCTOBER•DECEMBER 2006
Volume 23/Number 4

THE NATIONAL ROAD
Helping Build America
by Glenn Harper

OHIO HISTORICAL SOCIETY ALBUM
NATIONAL ROAD/ZANE GREY MUSEUM

FORENSIC MYSTERY
The Burning Tree Mastodon
by Bradley T. Lepper

LUNKEN AIRPORT
by Don Bedwell

THE MASTER CARVER OF DOVER
Mooney Warther and the History of Steam
by John Vacha

A BURNING PASSION
by Bob Carson

self-addressed, stamped envelope to TIMELINE, 1982 Velma Avenue, Columbus, Ohio 43211.

Copies of many back issues of TIMELINE are available. To check availability or to order, please call or write TIMELINE, 1982 Velma Avenue, Columbus, Ohio 43211; 614-297-2415. You may also order back issues online by linking onto the Ohio History Store at www.ohiohistory.org.

Additional Reading

The National Road: Helping Build America

The National Road by Philip D. Jordan, Bobbs-Merrill Company, 1942.

The National Road: Main Street of America by Norris F. Schneider, Ohio Historical Society, 1975.

The Old Pike: A History of the National Road, With Incidents, Accidents and Anecdotes Thereon by Thomas B. Searight, author, 1894.

U.S. 40 by George R. Stewart, Houghton Mifflin Company, 1953.

U.S. 40: A Roadscape of the American Experience by Thomas J. Schlereth, Indiana Historical Society, 1985.

Traveling The National Road by Merritt Ierley, Overlook Press, 1990.

The National Road and A Guide to the National Road (2 volumes) edited by Karl Raitz, Johns Hopkins University Press, 1996.

http://www.route40.net

http://www.springfield-clarkcountyohio.info/historic_national_road.htm

Forensic Mystery: The Burning Tree Mastodon

Fossils of Ohio edited by Rodney M. Feldmann and Merrianne Hackathorn, Ohio Division of Geological Survey (Bulletin 70), 1996.

"Evidence for Butchery of the Burning Tree Mastodon" by Daniel C. Fisher, Bradley T. Lepper, and Paul E. Hooge in *The First Discovery of America: Archaeological Evidence of the Early Inhabitants of the Ohio Area*, edited by William S. Dancey, Ohio Archaeological Council, 1994.

"Intestinal Contents of a Late Pleistocene Mastodon in Midcontinental North America" by Bradley T. Lepper, Tod A. Frolking, Daniel C. Fisher, Gerald Goldstein, Jon E. Sanger, Dee Anne Wymer, J. Gordon Ogden III, and Paul E. Hooge in *Quaternary Research*, Volume 36, 1991.

Journey to the Ice Age: Discovering an Ancient World by Peter L. Storck, University of British Columbia Press, 2004.

In Quest of Great Lakes Ice Age Vertebrates by J. Alan Holman, Michigan State University Press, 2001.

Ice Age Mammals of North America: A Guide to the Big, the Hairy, and the Bizarre by Ian M. Lange, Mountain Press, 2002.

Lunken Airport

Eagle: The Story of American Airlines by Robert J. Serling, St. Martin's Press, 1985.

Silverbird: The American Airlines Story by Don Bedwell, Airways International Inc., 1999.

The Sky Is Home by John McCollister and Diann Davis, Jonathan David Publishers Inc., 1996.

An Airman's Odyssey: Walt Braznell and the Pilots He Led into the Jet Age by William Braznell, University of Missouri Press, 2001.

The Sky's the Limit by Arch Whitehouse, MacMillan Company, 1971.

The Challenging Skies: The Colorful Story of Aviation's Most Exciting Years, 1919–1939 by C. R. Roseberry, Doubleday & Company Inc., 1966.

The Master Carver of Dover: Mooney Warther and the History of Steam

"A Master Ohio Carver and His Locomotive Miniatures" by John A. Rice, *Cleveland Plain Dealer*, Sunday Magazine Section, January 13, 1935.

Warther Carvings in Dover, Ohio, published by E. Warther & Son, Inc., n.d.

"Whittling Locomotives is Ohioan's Hobby," *Cleveland Plain Dealer*, Sunday Magazine Section, February 25, 1923.

A Burning Passion

Yesterday's Pastimes: Ross County, Ohio by John R. Skinner, JTR Publishing, 1997.

Baseball in Chillicothe by Mike Shannon, Arcadia Publishing, 2005.

Everything Happens in Chillicothe: A Summer in the Frontier League with Max McLeary, the One-Eyed Umpire by Mike Shannon, McFarland & Company, 2003.

Middle Innings, A Documentary History of Baseball, 1900–1948, compiled and edited by Dean A. Sullivan, University of Nebraska Press, 1998.

TIMELINE

A Publication of the Ohio Historical Society
October • December 2006 • Volume 23/Number 4