



A Time Machine Tour, *Volume II*

Ohio's geologic history unfolded in the last issue of Field Notes. Travel with us to where left off, 14,000 years ago as humans enter stage left

When last we boarded the time machine, Late Pleistocene Ohio was showing signs of thawing out and the wildlife viewing was the best it would be for... well... the best it would be ever again. All of the fish and reptiles we know today were there as were our familiar birds and the vast majority of mammals. They frolic about, blissful in their pre-human innocence, splashing, collecting nuts, soaring over wetlands, prairies and spruce forests- entirely forgettable in the shadows of Ohio's last megafauna.

As the first humans trudge across North America from Asia, the final act of a Japanese monster movie is playing out across the continent. Giant mammoths tower over the landscape and their smaller relatives, the mastodons. The antlers of a stag moose stretch to improbable distances as it grazes around the edge of a bog.

Like running into a person you knew in high school and haven't seen in the fifteen years of their weightlifting and steroid use, many of these animals are familiar yet unfamiliar: Beavers the size of a bear, bison as big as a minivan, ground sloths pulling small trees over to browse. Horses, peccaries, tapirs, lions with

cutlasses growing out of their mouths, wolves and bears from someone's swollen nightmare... The Late Pleistocene was pretty great and that's where we ended our last trip...

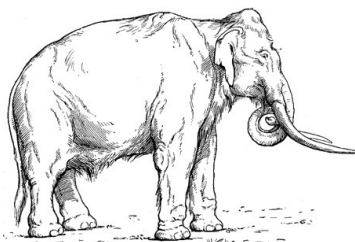
Now please try to tear your gaze away from the mega mammals and take note of the small newcomers on the horizon; standing on two hide-covered feet, gibbering and pointing at all of the gigantic meats. The object of their excitement won't be staying much longer though.

Whether due to rapid and erratic climate change, the added pressure of hairless monkey creatures with spears,

or both, over thirty genera, most of them awesome, would not survive the Pleistocene. Other plants and animals shifted their range, grew smaller (less awesome) or simply adapted, but the age of the mega-mammal is about to end.

Let's not get ahead of ourselves though - make the best of the situation and learn something about these newcomers. They'll probably enter what is now Ohio at the very end of the Pleistocene 'Ice Age'; in the neighborhood of 12,000 to 13,000 years before our time. They have likely traveled up the Ohio River valley following the long trek their ancestors made through the interior of North America. If we were to travel back further in time and west a ways we might see those folks cross the land bridge from Asia that was formed when glaciers got greedy with the world's water.

The Ohio that greets these first small bands is a mosaic of habitats ranging



"Living in such close proximity to their natural world, it is hard to imagine the extent to which early Ohioans became familiar with the vast array of plant and animal species, their characteristics, behaviors and seasonal patterns."

One example: making tools from the stone available in the neighborhood. Native Americans used Ohio's flint deposits to make "clovis" points, the earliest style of stone tool found in North America, and probably the tool of choice for hunting Ice Age megafauna like mammoth.

from grassland to evergreen forest to wetland and bog. In addition to all of the delicious and giant animals, many familiar plants would provide food and medicine. Our fruit and nut trees would be welcome indeed for these traveled hunters and gatherers.

Already well-versed in chipping stone for tools, these early groups discover a real treasure in Ohio's rich flint outcroppings. More than anything else, this unique resource is a through-line among Ohio's diverse archaeological periods.

Flint was perhaps the most important of all the natural resources Ohio had to offer. It allowed groups to hunt, to process their kills and to manipulate hides, bones and sinew into clothing and shelter.

Living in such close proximity to their natural world, it is hard to imagine the extent to which early Ohioans became familiar with the vast array of plant and animal species, their characteristics, behaviors and seasonal patterns. Let's set the time machine for a slow crawl forward to see how these folks

grow with Ohio's post-ice age landscape.

New continent, new tradition

Our first stop is the Paleoindian Period and the earliest human forays into the Ohio region. These people follow the traditions of their ancestors who followed herds of game and harvested wild plants as the seasons allowed. They are small bands that do not stay in any one place for very long. They perpetuate a lingual tradition brought from the west (though no record of it exists in our time) and fashion a variety of tools from the dark flint of what will become Coshocton County (Knox County's neighbor to the east).

Some of these tools are of a unique type known in our time as 'Clovis' points (named after an archaeological site in New Mexico). They feature a fluted end or groove that allows for an easy and secure attachment to a shaft. This technology is not found in Asia- it is truly a North American concept and one that proliferates rapidly as different nomadic bands come into contact with one another and share their sto-

ries and innovations.

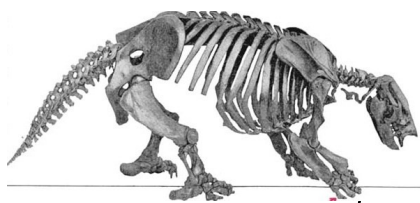
Creeping forward to the Archaic Period (10,000-3,000 years ago) we might notice a number of changes to the landscape and ways of life. With the end of the ice age, hunter/gatherers flourish and eventually begin to settle down in established communities.

Goodbye glaciers

During the early Archaic we can wave to the glaciers as they retreat for good into Canada. Due to climate change, over-harvest, disease or a combination of these factors, we must also wave goodbye to most of the animals that would make today more awesome. Gone with the glaciers are the days of the mammoth, giant beaver, ground sloth. Jefferson *and* Harlan's ground sloths. Even still, with the yoke of the glaciers lifted, the land begins to grow fat and diversify into the habitats found by Europeans thousands of years later.

The people who live in this time period seem to do so fairly comfortably. The quality and diversity of stone tools has

An (unofficial) timeline of Ohio's pre-historic people



MEGAFAUNA: the earliest humans in North America lived among giant mammals like Harlan's ground sloths, which were 10 feet long and weighed up to 3,000 pounds.



GARDENING: little barley (*Hordeum pusillum*) is one of the earliest plants cultivated by Native Americans.

Source: http://arts.wustl.edu/~gjfriz/Hordeum_pusillum_Nutt.html

	Paleoindian Period 14,000 - 10,000 years ago	Archaic Period 10,000 - 3,000 years ago		
		Early (10,000 - 8,000)	Middle (8,000 - 5,000)	Late (5,000 - 3,000)
Ohio	Wisconsinan Glacier retreats. Paleoindians arrive. Megamammals sigh.	Climate fickle. Last of awesome animals goes extinct. People rock the flint.	Hot flashes effect climate's mood, everyone else's'. People forced to find new digs. Seasonal camps the norm.	Cooling off period. Lake Erie joins other Great Lakes. People get fat, die. First gardens and cemeteries.
World	Japanese make pottery. Russians domesticate dogs. French paint cave walls.	Egyptians start to get their cultural groove on. Chinese start rice cultivation.	People in the UK stick odd rocks in a circle. Egyptians discover graffiti can be useful. Corn is grown in Mexico.	World gets all full of itself. Middle Kingdom, Egypt. Zhou Dynasties, China. Height of Persian Empire.

exploded and new tools such as grinding stones, drills and specialty scrapers can be seen in use.

During the middle Archaic period, a heat wave washes in and Ohio becomes warmer and dryer with prairies moving into the western reaches of the state. Groups adjust to this climatic shift by redistributing themselves from their early Archaic sites. Larger seasonal camps become more common. These camps are used by groups as headquarters for a variety of hunting and foraging escapades and suggest the groundwork for more permanent settlements down the line.

In the late Archaic period, the climate eases its way into the cooler, wetter one we recall from our time. A rich diversity of habitats comes into its own; Ohio's population explodes on two legs, four legs, fin and feather. Human groups grow larger and there seem to be more of them in both number and individual custom. They have taken an interest in a variety of ceremonies, trade further afield and adopt increasingly complex burial practices- the first 'cemeteries' are consecrated in Ohio.

Throughout the Archaic period, we see people treating nuts as a valuable food source but we can also detect that they are unreliable from year to year. In lean times, these larger groups of the late Archaic begin to experiment with different foods - among them seeds. Over time, certain varieties find favor and are carried more often. As a group returns to a camp they'd used the previous fall, they discover that some seeds scattered in a midden (or refuse pile) are now favored food plants. The word quickly spreads as early gardening takes root in Ohio.

Hello Farming

The Early Woodland Period represents the first period in which Ohio sees the widespread cultivation of food crops, use of pottery and the construction of earth works. The Adena type mounds (named after the first site identified to feature such a mound) and customs originate during this time but are not necessarily embraced by everyone living in Ohio. Early woodland people still lived spread out in isolated groups but group sizes continue to grow, as does the size of their dwellings.

Speaking of size, the burial mounds and other earthworks constructed by these bands are no small feat and speak of major landscape alterations for the first time in the region's history. Many of the earthworks appear to be cemeteries but many circular or oval enclosures are also being constructed across the state. These seem to serve primarily ceremonial purposes although some are constructed as defensive structures as well. Fighting between groups is not common but not unheard of either.

Amongst the burial mounds, people develop an increasingly complex set of beliefs about social distinctions and life after death. Individuals are buried in many different ways, varying greatly from mound to mound. Some are buried with precious valuables such as beads, pipes, flint points or blades. Others are buried with nothing at all. For some: log tombs; others: cremation. Regardless of how and with what they are buried, it is clear that not all of the deceased are granted a place in the cemetery. It seems that this honor is reserved for those held in high esteem amongst their peers.



EARTHWORKS: Thousands of earthworks from the Woodland Period once dotted the state of Ohio. Knox County is still home to a handful, like this one located at Mound View Cemetery in Mount Vernon. An untold number have been destroyed to make room for modern homes, farm fields, and roads.



ART: The Hopewell Culture of the Middle Woodland period were known for carving ceremonial effigy pipes featuring animals.

Woodland Period 2,800 - 1,100 years ago			Late Prehistoric 1,100 - 500 years ago
Early (2,800-2,000)	Middle (2,100 -1,500)	Late (1,500 - 1,100)	
Adena earthworks begin game of endless one-upmanship. Birth of community gardens in Ohio.	A good time to be alive. Art, ritual, trade and really big funforts. Hopewell Renaissance. Colorful Flint Ridge flint makes hunting sassy.	Things get real. People make funforts into real forts. Get all practical. Agriculture, suspicion of neighbors intensifies.	Corn is the norm. Medieval warming gives way to little ice age. Europeans enter the picture... People say "Really??!" a lot.
Athens perks up. Greece lays groundwork for western civilization. Chinese start on Great Wall. Rest of world sees both as fads.	Roman Empire spreads goodwill or doom. Birth of Christ. Huns invade China. Huns invade Europe. Huns invade nightmares.	Fall of Rome. Birth of Muhammad. Maori settle New Zealand, create world's best rugby pregame ritual. Vikings burn, rape.	Gunpowder starts as something fun, quickly deviates. Similarly: the Crusades. Vikings land in North America. End Nigh.

The Golden Age

During the Middle Woodland Period, we witness the apex of prehistoric civilization in Ohio and perhaps all of eastern North America. The practices of art (see ornaments below), ritual, agriculture, and architecture rooted in the previous era blossom across the region. Evolving from and co-existing for some time with the



Adena type cultures, the Hopewell people (again named after the site that typifies the family of artifacts) represent a profound cultural revolution. Every aspect of life, from the practical to the ritual, becomes refined. From high above, we can see the extent of Hopewell cultural exchange range from Florida to Ontario and the Atlantic to the Rockies. Even still, its truest expression occurs in the central Ohio Valley.

Here, villages grow in size and permanence and most cluster around waterways, particularly in southwestern Ohio. Textiles, pottery, sculpture and stone tool work here are complex and specialized and the Hopewell earthworks reflect an understanding of geometry (and perhaps astronomy) on a colossal scale. Near present day Newark, a ceremonial complex rises that will one day be considered one of only three North American 'ancient wonders' (though it is now covered by a golf course). Four Roman Coliseums would fit into just one of the site's massive earthworks. People travel from villages across the region to meet at the site, exchange goods and information and engage in a number of rituals and ceremonies.

As impressive as the things the Hopewell people create is the extent to which they travel and trade with far away groups. A remarkable number of exotic goods and materials flow into Ohio and Flint Ridge flint, originating about 60 miles southeast of Knox County, is carried and traded across the eastern United States.

Despite their exploration, local popula-

tions maintain an identity of their own. No matter how far they travel for ceremonies or trade they almost always return home at journey's end. For several centuries, we can observe the Hopewell culture grow and flourish. Massive earthworks rise across the state; art, ritual and cultural exchange bind distant villages together and ensure access to resources and peaceful coexistence.

Such periods are fleeting in history. Slowly, cracks begin to form in the foundations of this prehistoric renaissance. As populations grow and grow, the increased need for resources becomes difficult to manage, alliances become harder to maintain and rifts in relationships between groups follow. Larger populations become ever more dependent on agriculture and grow protective of their hunting grounds. The importance of cooperative agreements with neighbors shifts towards competition for resources. The far-flung framework of villages and ceremonial sites that bound so many people together begins to crumble. By the end of the Middle Woodland Period, art, grand ritual and massive earthworks are abandoned as Ohioans move away from what many archeologists might call the golden age of Ohio's prehistory.

Suspicious Minds

The Late Woodland Period allows us a window into adaptation and survival as people respond to a profound cultural collapse and a tightening of boundaries. No more do groups travel and share extensively. No more do they spend time crafting art or constructing massive earthworks. Villages continue to grow but their surrounding territories shrink and the villages themselves become heavily fortified stockades. This period is one of a village-centered lifestyle.

Intense agricultural practices and land-clearing around villages leads to more widely spread and permanent settlements but competition for land and hunting grounds intensifies, further escalating the trend of isolation and suspicion of other groups. Practicality is king. Groups simplify and refine

their tools and pottery. A new, thin-walled design allows people to better boil foods in liquid and maximize the amount of nutrients they get from each meal. This eventually leads to more and healthier people and the need for even more resources to feed them.

To meet this increased need, agriculture intensifies and crops like maize replace earlier domesticated plants. Stone tools become a simple, practical means to an end with quick to produce and easy to discard designs being widely favored. The beautiful and colorful Flint Ridge flint favored by the Hopewell people is seldom sought out and hunters tend to fashion their tools with whatever chert or flint is close at hand. For the first time, bows and arrows appear in the hands of Ohio hunters and quickly replace the traditional spear and atlatl. This new technology revolutionizes people's ability to hunt and the white-tailed deer becomes the game of choice. As these animals are stalked, groups of hunters from different villages begin to come into contact more and more frequently and these encounters do not always end in exchanges of good will. Not only has the bow allowed people to better hunt game, but it made dealing death upon the competition that much easier... and less personal.

Did that guy just lob an arrow at the time machine? Maybe a good occasion to return home. While a cultural exchange program from the Mississippi valley is about to bring more changes to Ohio in the Late Prehistoric (1,100 to 400) period those are stories for another day. Lots to see between the tenth century and the Greenville Treaty of 1798 which effectively ended any appreciable Native use of the BFEC...

Learn More:

Ohio's Native Americans

Wednesday, Feb. 20th
See page 6 for details.



IF YOU WANT A STORY-TELLER, FIND YOURSELF A ROCK.

Every rock has a tale and most of them are as fascinating as they are old and softly spoken. One rock in particular has helped shape the human story in our neck of the woods: flint.

During the carboniferous period (300 to 350 million years ago), Ohio was hanging out around the equator, relaxing at the boundary of swamp and shallow sea and generally enjoying its time in the tropics. Out to sea, limestone deposits were forming and within them, nodules of flint.

The exact origin of flint is debated but it may lay with the decay of marine sponges into substrate cavities. With great pressure, chemical changes could have occurred leading to flint formation.

Regardless of where it came from, ancient people discovered that this hard, brittle stone could be adapted into a dizzying array of points and tools for hunting, warfare or daily life. Millions of objects have been crafted from flint over many thousands of years. These objects, these rocks, all tell a share of the human story; of adventure, conflict and innovation, and how a small, soft creature was able to conquer the globe from pole to pole.



Flint found in in Knox County. The brachiopod fossil in the middle of the large chunk is evidence of its oceanic origins.



Bird Irruption

Though it would make interesting news, we are not aware of volcanoes that spew birds. But for bird watchers, a winter bird *irruption* is almost as good, and we're happy to report that one is under way.

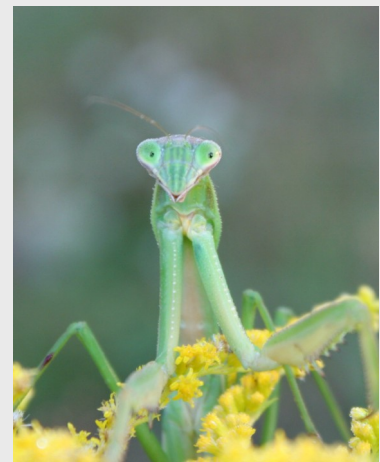
Some finch family species survive Canadian winters by feasting on the cones of conifer trees. The Red Crossbill (pictured below right) has a unique, overlapping bill that allows it to extract seeds from pinecones. But when cone production is low, as is the case this winter,

the Red Crossbill and others such as the Pine Grosbeak, Purple Finch and Pine Siskin "irrupt" into southern states in large numbers.

The **Red-breasted Nuthatch** (left) is also on this list. Though in normal years a few of these birds turn up in Knox County, they are much more numerous this year. At the BFEC, look for them at our feeders or on the Pine Overlook Trail as it cuts through the pine forest.



Congratulations Photo Contest Winners!



Pictured here is the winning photo, submitted by Marissa Davis, of the Children's Division of the BFEC's annual Knox County Nature Photography Contest. Ms. Davis took first and second place, followed by Olivia LaBenne in third. Adult Division winners were: first place - Noreen Dye; second place - Kathy Lore; third place - Shanna Hart. Thank you to all who participated in sharing their appreciation our beautiful Knox County.

Calendar of Events

All events are free, open to the public, and start from the BFEC Resource Center at 9781 Laymon Road unless stated otherwise. For additional information, contact us at 740-427-5050, dohertyh@kenyon.edu, or visit <http://bfec.kenyon.edu>

Family Adventure Day: Snakes Alive! Saturday, Jan. 5th, 1-5pm. Hang out with the BFEC's resident animals, including our six-foot black ratsnake, box turtle, skink (an Ohio lizard), and Kokosing River fish. While snakes are popularly thought to be slimy, we disagree; touch one to find out for yourself.

Meet the Owls - Saturday, Feb. 2nd, 3pm

Join the folks from Ohio Nature Education as they present three LIVE OWL species that you may have heard or seen in your own backyard. Doors open at 1pm for *Family Adventure Day* early birds to make an owl craft or determine what owls eat by pulling apart balls of fur and bone (pellets) that they leave behind after meals.



Family Adventure Days

First Saturdays, 1-5 pm

Drop in for an exhibit, scavenger hunt, craft, and live animals, or borrow pond nets to create your own adventure.

Ohio's Native Americans - Wednesday, Feb. 20th, 7pm

What can we learn about the way Native Americans survived from the artifacts that they left behind? The Kokosing Chapter of the Ohio Archeological Society will present an overview of Ohio Native American cultures through the ages and the tools that they used. Doors open at 6:30 for an artifact display. If you've found arrowheads, bring them in to ask questions about their origins.

Family Adventure Day: Signs of Spring - Saturday, March 2nd, 1-5pm

Is spring here? Take a **guided walk at 2pm** to look for signs. Believe it or not, our first spring migrating birds usually arrive at this time, and sometimes frogs journey forth to sing at the ponds. Look for evidence of sap moving in the trees, and see the peculiar bloom of Ohio's earliest flower.

Wild Food & the Full Moon - Tuesday, March 26th, 6:30pm

Celebrate the Spring Equinox in two ways: Starting at 6:30, hunt for and taste-test wild edible greens, which are at their best as they first emerge in early spring. At 7:30 hike to an overlook of the full moon rising (should skies cooperate) over the Kokosing River valley. Join us for just one or both adventures.

Miller Observatory Open House - Last Fridays, 8pm

Experience planetary views with Kenyon Physics Professor Paula Turner. Open houses are cancelling in cloudy weather. Please dress warmly for our unheated observatory. Email questions to turnerp@kenyon.edu. From downtown Mt. Vernon, follow S.R. 229/Gambier St. east 4 miles. Turn left at observatory sign onto an access road (prior to S.R. 308 intersection).

Save-the-Date: Sunday, April 21st

Kenyon Athletic Center

Earth Day Challenge Half Marathon & 4 Mile Run/Walk

Celebrate Earth Day with your feet! This year we've added four-mile race in addition to a half marathon. Participants of all abilities are invited to walk, run or a little of both. As long as you're out there having fun and challenging yourself, we don't care if you're setting a new world record or crawling across the finish line! Race begins at 8am, then stay to enjoy post-race amenities and the Earth Day Festival. Info at hofferberthj@kenyon.edu, register at www.premierraces.com.

**New
Distance!**

Earth Day Festival: Health People ~ Healthy World

Keep yourself and the planet healthy - two goals that go hand-in-hand! Enjoy this FREE event with exhibits, vendors, kids' activities, farm marketers, live music & more. The Earth Day Festival uniquely brings together the best in local resources. Celebrate Earth Day by shopping green, enjoying entertainment, and connecting with groups that support healthy living for ourselves and our world.

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Our Volunteers

In the office, classroom, gardens and on the trails: Steph Harman, Orsolya Schreiner

Harvest Festival: Veronica Depascuale, Bob Hallinan, Steph Harman, Drew Kerkhoff, Sarah Krumholz, Denny Wiegman; MVHS NHS

members: Willa Kerkhoff, Stephanie Songheiser, Walker Griggs; Kenyon Chapter of Theta Delta Phi.

Mudman Triple Trail Race Series: Kenyon Men's Soccer Team

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a member?**

Now is the time to join for the New Year!

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Brown Family Environmental Center at Kenyon College

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Our Mission

The BFEC at Kenyon College exists to engage Central Ohioans of all ages with nature, and to support the goals of Kenyon College by conserving the natural diversity of the Kokosing River valley and providing opportunities for education and research.

Facility Manager

David Heithaus

Program Manager

Heather Doherty

Facility & Program Assistant

Jill Kerkhoff

Upcoming Events

Saturday	Feb. 2	Meet the Owls
Wed.	Feb. 20	Ohio's Native Americans
Saturday	March 2	Family Adventure Day: Signs of Spring
Tuesday	March 26	Wild Food & the Full Moon

Save the date!

Sunday	April 21	Earth Day Challenge Half Marathon & 4 Mile Run / Walk
		Earth Day Festival: Healthy People ~ Healthy World

Details inside!

**Live Owls
at the BFEC!**
Saturday, Feb. 2nd
See details inside.



DATE MAILED: January 2013
CONTAINS DATED MATERIAL

**Brown Family Environmental Center
at Kenyon College**
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