OHIO GEOLOGY

GEOFACTS No. 17

OHIO DEPARTMENT OF NATURAL RESOURCES • DIVISION OF GEOLOGICAL SURVEY

FOSSIL COLLECTING IN OHIO

Hobbyists have long known about Ohio's great abundance and diversity of fossils. Many world-famous paleontologists—geologists who study fossils—began their careers as youngsters collecting fossils in their native Ohio. Fossils from Ohio are important constituents of museum collections throughout the United States and Europe.

WHY OHIO HAS FOSSILS

The area that is now Ohio was not always dry land as it is today. Approximately 510 million years ago (m.y.a.), Ohio was south of the Equator. As the North American Plate moved to its current position through the process of plate tectonics, tropical to subtropical seas repeatedly transgressed over the plate. It is because of those warm seas that Ohio has the abundant fossils that people collect today. The seas that covered Ohio during the Ordovician, Silurian, and most of the Devonian Periods of the Paleozoic Era were the site of abundant limestone deposition. Sediments that form limestone are generally only deposited under shallow, open-marine conditions, much like the seas around Caribbean islands today.

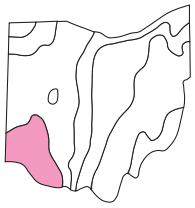
Near the end of the Devonian Period, conditions in the seas covering Ohio changed, so that the sediments deposited were primarily muds and sands that would become shale and sandstone. The oldest exposed major shale unit is the Ohio Shale; outcrops of this shale are present from Ashtabula westward along Lake Erie to Milan and southward to Portsmouth. These same conditions continued into the early Mississippian Period, when the Bedford and Sunbury Shales were deposited. After deposition of the Sunbury Shale ceased, long intervals of extensive open-marine conditions infrequently returned to Ohio.

During most of Mississippian time and the rest of the Paleozoic Era, what is now Ohio may have been dry land in the west (Cincinnati to Toledo), and the Appalachian Mountains were continuing to rise to the east of Ohio; between these two areas was the Appalachian Basin. The eastern coastline of the basin was dominated by numerous deltas deposited by rivers carrying sediments eroded from the ancestral Appalachian Mountains. These deltas were sites of vast swamps and marshes, particularly during the Pennsylvanian Period. In fact, Ohio's Pennsylvanian rocks probably are better known for their coal deposits, formed from the plant material deposited in these wetlands, rather than for their fossils. However, because coal is composed of compressed plant material, it is a type of fossil, hence the term "fossil fuel." The marine units in the Pennsylvanian rocks of Ohio are fossiliferous, containing pelecypods, gastropods, trilobites, echinoderms, and others. Nonmarine units of Pennsylvanian and Permian age contain plant and insect fossils and remains of fish, amphibians, and reptiles.

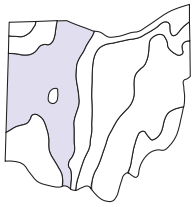
Dinosaurs roamed Earth during the Mesozoic Era (245–65 m.y.a.). Undoubtedly, dinosaurs lived in Ohio, so why haven't dinosaur skeletons been found here? The answer is that Ohio does not have any rocks dating to that time. Therefore, no dinosaur remains can be collected in Ohio. Why doesn't Ohio have any Mesozoic-age rocks? Two possibilities may explain this quandary: Ohio may have been above sea level and no sediments were deposited, or any sediments that were deposited during this time were eroded away.

During the Pleistocene Epoch (2 m.y.a–10,000 y.a.), about two-thirds of Ohio was covered periodically by ice that flowed south from Canada. Remains of animals and plants that lived during Pleistocene time have been collected in Ohio from deposits representing lakes and ponds, caves, and streams. Some of these remains include the elephantlike mastodons and mammoths, giant beaver, elk, and muskoxen.

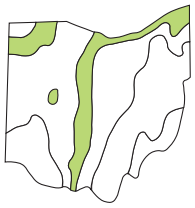
WHERE FOSSILS ARE FOUND IN OHIO



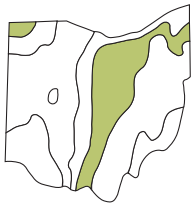
ORDOVICIAN
508–438 m.y.a.



SILURIAN
438–408 m.y.a.



DEVONIAN
408–360 m.y.a.



MISSISSIPPIAN
360–320 m.y.a.

Ordovician rocks in Ohio are world famous for the abundance, variety, and excellent preservation of the fossils they contain. The limestones and shales exposed in almost every road cut or stream bed in southwestern Ohio, southeastern Indiana, and north-central Kentucky provide the opportunity to collect a bonanza of fossils. Among the more abundant types of fossils collected from Ordovician rocks are brachiopods, bryozoans, gastropods, and trilobites.

Silurian rocks of western Ohio are not known for their fossils. When the limestones and shales were first deposited they were quite fossiliferous. Unfortunately, most of the fossils were destroyed when the limestones containing the fossils were altered to dolostones. One Silurian rock unit that still retains well-preserved fossils is the Brassfield Formation. The Brassfield is composed almost entirely of fragments of crinoids. Even the dolomitized formations contain molds and casts of fossils, in particular brachiopods and trilobites. Quarry operations in western Ohio have exposed several reefs preserved in Silurian rocks. Reefs are indicative that warm, open-marine conditions existed in Ohio at this time. Colonial corals are the most prominent fossil type composing reefs. Silurian rocks are well exposed in an arc from west of Dayton to near Portsmouth.

Devonian rocks in Ohio are as famous for their fossil abundance and diversity as are Ohio's Ordovician rocks. There are two main areas of exposure of Devonian rocks in Ohio: a north–south belt through the center of the state then east along Lake Erie and in the northwest corner. The shales of the Silica Formation near Sylvania, in northwestern Ohio, contain abundant trilobites and brachiopods. The Columbus and Delaware Limestones, exposed from central Ohio to the Lake Erie islands, are quite fossiliferous. Fossils in the Columbus Limestone are notable for their large size. Perhaps the most spectacular fossils from Ohio's Devonian rocks come from the Ohio Shale near Cleveland. Construction projects in and around Cleveland have uncovered the bony armored plates and jaws of fossil fishes known as arthrodires.

Mississippian rocks in Ohio were deposited as deltas by rivers that flowed westward from the ancestral Appalachian Mountains into the Appalachian Basin. A similar process is taking place today where the Mississippi River flows into the Gulf of Mexico. Some of Ohio's Mississippian rocks are quite fossiliferous, containing abundant limonite-stained molds and casts of brachiopods, pelecypods, and echinoderm fragments. Mississippian rocks are exposed from near Portsmouth northward to Lorain and eastward to Ashtabula.

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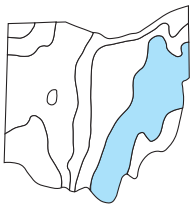
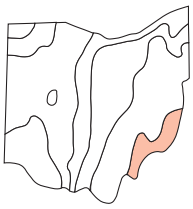


PENNSYLVANIAN
320–286 m.y.a.



PERMIAN
286–245 m.y.a.

Pennsylvanian rocks are well exposed in eastern Ohio and were deposited primarily in swampy conditions associated with deltas along the Appalachian Basin coastline. These rocks are noted for well-preserved fossil plants and rare fossils of insects and amphibians. Marine fossils such as pelecypods, gastropods, and brachiopods are abundant in thin beds of limestone and shale deposited when the sea periodically flooded the coastal coal swamps.

Permian rocks of Ohio are not very fossiliferous. However, bones of amphibians and reptiles and plant and insect fossils have been collected from rocks of this age. Permian rocks are exposed in southeastern Ohio near Marietta.

Pleistocene glaciers left a mantle of unconsolidated material across northern and western Ohio. Bones of Pleistocene mammals, particularly mastodons and mammoths, have been collected from deposits of this time. Even forests buried by the advancing glaciers have been unearthed. Deposits from this period are easy to see because they cover most of Ohio.

WHERE TO COLLECT FOSSILS IN OHIO

Even though Ohio is well known for its fossils, publicly accessible collecting localities are actually scarce. Most sites are located in southwestern Ohio: Caesar Creek (Warren and Clinton Counties), Cowan Lake (Clinton County), East Fork (Clermont County), Hueston Woods (Preble and Butler Counties), and Stonelick (Clermont County) State Parks allow fossil collecting; check at the ranger stations for designated collecting areas. Caesar Creek State Park requires a collecting permit (available free from the U.S. Army Corps of Engineers Visitor Center). Oakes Quarry Park (Fairborn) also allows collecting. In northwestern Ohio, fossils can be collected at Fossil Park (Sylvania). Many of Ohio's state parks, nature preserves, and memorials have prominent geologic features (e.g., Hocking Hills, Clifton Gorge, Glacial Grooves, Nelson-Kennedy Ledges) but do not allow collecting. Local, city, and county parks, as well as private camping areas, may have access to fossil-collecting areas. Contacting the operators of these areas may prove beneficial.

RULES FOR COLLECTING FOSSILS

Most land in Ohio is private property. **Always obtain permission** before collecting. Most public lands (local, state, or federal) do not permit fossil collecting, except in designated areas.

Leave the property the way you found it: no littering; leave gates the way you found them or were asked to leave them; do not throw rocks onto roadways, sidewalks, driveways, or into streams. In short, practice the "Golden Rule" and treat a collection site the way you would want someone to treat a site on your land.

Always exercise caution. No fossil is worth risking life or limb.

Each fossil or group of similar fossils from a given rock unit or locality should have a label that provides the locality, collector, and date of collection. Lacking this information, a fossil is just an interesting rock, with little scientific value.

Keep fossils from different collecting sites separate. Even fossils collected from the same locality but from different spots or different rock units should be kept separate.

There are many ways to clean fossils. Some fossils can be cleaned with water. Others may require advanced cleaning equipment, such as an air-abrasive machine. When in doubt about how to clean a fossil, leave it alone rather than risk damaging the fossil.

If you have collected what you think is a unique or exceptionally well-preserved fossil, let an expert examine it. Contact the Division of Geological Survey or the geology department of a nearby university.

Identification number: _____
Phylum: _____
Genus: _____
Species: _____
Location: _____
_____
Formation: _____
Date collected: _____
Collector: _____
Identifier: _____
NOTES:

A label card such as this one should accompany fossil specimens.

FURTHER READING

There are many publications related to Ohio paleontology. A few are listed below. Out-of-print publications can be consulted at many Ohio libraries. A book worth special mention is *Fossils of Ohio* (Feldmann and Hackathorn, 1996), which explains how to collect fossils, where to find them, how to prepare and care for them, and how to identify them. Its numerous photographic plates and line drawings will speed fossil identification. The book also contains an extensive reference list, glossary, and indexes of generic and specific names of fossils.

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Feldmann, R.M., and Hackathorn, Merrianne, eds., 1996, Fossils of Ohio: Ohio Department of Natural Resources, Division of Geological Survey Bulletin 70, 577 p. [Reprinted with minor revision 2005.]

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La Rocque, Aurèle, and Marple, M.F., 1955, Ohio fossils: Ohio Department of Natural Resources, Division of Geological Survey Bulletin 54, 152 p.

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Morningstar, Helen, 1922, Pottsville fauna of Ohio: Geological Survey of Ohio, Fourth Series, Bulletin 25, 312 p.

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Stewart, G.A., 1927, Fauna of the Silica shale of Lucas County: Geological Survey of Ohio, Fourth Series, Bulletin 32, 76 p.

Sturgeon, M.T., and Hoare, R.D., 1968, Pennsylvanian brachiopods of Ohio: Ohio Department of Natural Resources, Division of Geological Survey Bulletin 63, 95 p.

Sturgeon, M.T., Windle, D.L., Mapes, R.H., and Hoare, R.D., 1997, Pennsylvanian cephalopods of Ohio: Ohio Department of Natural Resources, Division of Geological Survey Bulletin 71, 95 p.

• This GeoFacts compiled by Douglas L. Shrake • Updated June 2014 •

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