

## 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, Ohio was south of the Equator. As the North American Plate moved to its current position, by 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 and shale deposition. Sediments that form limestone are generally only deposited under shallow, open-marine conditions, much like the seas around Caribbean islands today.

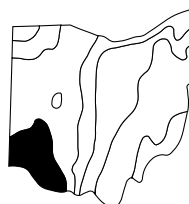
Near the end of the Devonian Period, conditions in the seas covering Ohio changed, so that the sediments deposited were primarily muds and sands that would become shale and sandstone. The oldest exposed major shale unit is the Ohio Shale; outcrops of this shale are present from Ashtabula westward along 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-age rocks of Ohio are fossiliferous, containing pelecypods, gastropods, trilobites, echinoderms, etc. Nonmarine units of Pennsylvanian and Permian age contain plant and insect fossils and remains of fish, amphibians, and reptiles.

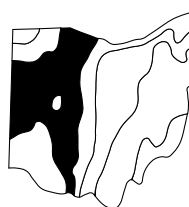
Dinosaurs roamed the Earth during the Mesozoic Era, between 245 and 65 million years ago. Undoubtedly, dinosaurs lived in Ohio, so why haven't dinosaur skeletons been found here? The answer is that Ohio does not have any rocks dating to that time. Therefore, no dinosaur remains can be collected in Ohio. Why doesn't Ohio have any Mesozoic 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.

From the beginning of the Pleistocene Epoch approximately 2 million years ago to its end about 10,000 years ago, about two-thirds of Ohio periodically was covered 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



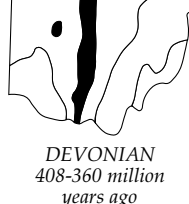
ORDOVICIAN  
508-438 million  
years ago



SILURIAN  
438-408 million  
years ago



DEVONIAN  
408-360 million  
years ago



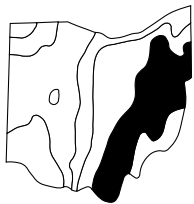
MISSISSIPPIAN  
360-320 million  
years ago

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.

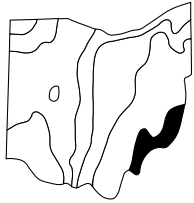
Silurian rocks of western Ohio are not known for their fossils. When the limestones and shales were first deposited they were quite fossiliferous. Unfortunately, most of the fossils were destroyed when the limestones containing the fossils were altered to dolostones. One Silurian rock unit that still 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-age 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-age 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-age rocks. There are two main areas of exposure of Devonian rocks in Ohio: northwestern Ohio and a north-south belt through the center of the state and along Lake Erie. 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-age rocks come from the Ohio Shale near Cleveland. Construction projects in and around Cleveland have produced 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.



PENNSYLVANIAN  
320-286 million  
years ago



PERMIAN  
286-245 million  
years ago

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.

The 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 time 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), Hueston Woods (Preble and Butler Counties), Cowan Lake (Clinton County), and Stonelick (Clermont County) State Parks allow fossil collecting; check at the ranger station for designated areas. Caesar Creek State Park requires a collecting permit (available free from the Visitors Center). Many of Ohio's state parks, nature preserves, and memorials have prominent geologic features (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 for—either your own or someone else's.

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.

A label card such as the one that follows should accompany fossil specimens.

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

### FURTHER READING

There are many publications related to Ohio paleontology. A few are listed below. Out-of-print publications can be consulted at many libraries in Ohio. One publication worth special mention is *Fossils of Ohio* (Feldmann and Hackathorn, eds., 1996). This book clearly 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 identification of fossils. The book also contains an extensive reference list, glossary, and indexes of generic and specific names of fossils.

Brezinski, D. K., Sturgeon, M. T., and Hoare, R. D., 1989, Pennsylvanian trilobites of Ohio: Ohio Division of Geological Survey Report of Investigations 142, 18 p. (Out of print.)  
Davis, R. A., ed., 1985, Cincinnati fossils, an elementary guide to the Ordovician rocks and fossils of the Cincinnati, Ohio, region: Cincinnati Museum of Natural History, 61 p.  
Feldmann, R. M., and Hackathorn, Merriane, eds., 1996, Fossils of Ohio: Ohio Division of Geological Survey Bulletin 70, 577 p.  
Hoare, R. D., Sturgeon, M. T., and Kindt, E. A., 1979, Pennsylvanian marine Bivalvia and Rostroconchia of Ohio: Ohio Division of Geological Survey Bulletin 67, 79 p.  
La Rocque, Aurèle, and Marple, M. F., 1955, Ohio fossils: Ohio Division of Geological Survey Bulletin 54, 152 p. (Out of print.)  
\_\_\_\_\_, 1966, Pleistocene Mollusca of Ohio, Introduction, geologic setting, and paleoecology: Ohio Division of Geological Survey Bulletin 62, Part 1, 111 p.  
\_\_\_\_\_, 1967, Pleistocene Mollusca of Ohio, Naiades and Sphaeriidae: Ohio Division of Geological Survey Bulletin 62, Part 2, 243 p.  
\_\_\_\_\_, 1968, Pleistocene Mollusca of Ohio, freshwater Gastropoda: Ohio Division of Geological Survey Bulletin 62, Part 3, 196 p.  
\_\_\_\_\_, 1970, Pleistocene Mollusca of Ohio, terrestrial Gastropoda: Ohio Division of Geological Survey Bulletin 62, Part 4, 246 p.  
Merrill, G. K., 1974, Pennsylvanian conodont localities in northeastern Ohio: Ohio Division of Geological Survey Guidebook 3, 25 p.  
Morningstar, Helen, 1922, Pottsville fauna of Ohio: Ohio Division of Geological Survey Bulletin 25, 312 p.  
Ohio Division of Parks and Recreation, 1967, Fossils of Hueston Woods: 16 p.  
Shrake, D. L., 1992, Excursion to Caesar Creek State Park in Warren County, Ohio: a classic Upper Ordovician fossil-collecting locality: Ohio Division of Geological Survey Guidebook 12, 18 p.  
\_\_\_\_\_, 1994, Ohio trilobites: Ohio Division of Geological Survey GeoFacts 4.  
\_\_\_\_\_, 1995, *Isotelus*: Ohio's State Fossil: Ohio Division of Geological Survey GeoFacts 5.  
Stewart, G. A., 1927, Fauna of the Silica shale of Lucas County: Ohio Division of Geological Survey Bulletin 32, 76 p. (Out of print.)  
Sturgeon, M. T., and Hoare, R. D., 1968, Pennsylvanian brachiopods of Ohio: Ohio Division of Geological Survey Bulletin 63, 95 p.

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