



Isotelus—Ohio's State Invertebrate Fossil

In 1985, Ohio House Bill 145 designated the trilobite genus *Isotelus* as the official Invertebrate Fossil of Ohio. With the signing of this bill, *Isotelus* became the first of Ohio's state fossils and the second of its geologic symbols—the first being flint, as State Gemstone, in 1965. In 2021, the giant extinct placoderm *Dunkleosteus terrelli* was named the State Fossil Fish.

How *Isotelus* was chosen as the State Invertebrate Fossil

Ohio has long been known for its abundant and well-preserved fossils, and both professional and amateur geologists desired for Ohio to have an official state fossil. This wish was fulfilled largely through the efforts of two Dayton-area school classes: Doris Swabb's third graders at Beavertown Elementary School in Kettering and Virginia Evers' fourth graders at St. Anthony School in Dayton.

After visiting the Dayton Museum of Natural History (now the Boonshoft Museum of Discovery) and viewing a cast of the famous Huffman Dam specimen of *Isotelus* (fig. 1), the students and teachers were inspired to have the Huffman Dam trilobite designated as the official State Fossil of Ohio. Students wrote letters to Representatives Robert L. Corbin and Robert E. Hickey of Dayton, who agreed to sponsor legislation in the Ohio House of Representatives. Senator Charles Horn of Dayton was a sponsor in the Ohio Senate.

The proposal for a state fossil received widespread publicity with local newspaper and television coverage and support from geologic interest groups throughout the state. Rather than naming a particular specimen as the state fossil, the final version of the bill, drafted with technical assistance from the ODNR Division of Geological Survey, designated the trilobite genus *Isotelus* as the official State Invertebrate (an animal lacking a backbone) Fossil. *Isotelus* was considered a most suitable selection because not only were specimens (especially fragments) abundant in the rocks exposed in southwestern Ohio, but *Isotelus* was also represented by the Huffman Dam specimen, one of the largest complete trilobites collected up to that time. Ultimately, the bill passed both legislative chambers with little opposition and was signed into law by Ohio governor Richard F. Celeste.

What is a trilobite?

Trilobites ("three-lobed animals") comprise an extinct class of the phylum Arthropoda. Currently living arthropods include crabs, lobsters, shrimps, horseshoe crabs, scorpions, spiders, millipedes, centipedes, and insects, among others. The fossil record of trilobites dates from about 521 million years ago (mya), during the Cambrian Period, to about 252 mya, the end of the Permian Period.

Trilobites lived in marine environments, where they burrowed in sediments, walked on the seafloor, or were free-swimming. Many trilobites probably scavenged organic material from seafloor sediments, whereas some filtered food directly from the seawater. Others—as was likely the case for *Isotelus*—preyed on smaller invertebrates.

Predators of trilobites included eurypterids (sea scorpions) and other arthropods, jawed fishes, and cephalopods (tentacled



Figure 1. Specimen of an *Isotelus* trilobite collected during construction of the Huffman Dam, near Dayton, in 1919. This large specimen measures 14.5 inches (37 centimeters) long. Photo courtesy of the Smithsonian Institution, National Museum of Natural History.

mollusks related to and including modern nautilus, squids, octopuses, and cuttlefishes). A trilobite's primary defense against predators was its hard dorsal (top) exoskeleton, or outer shell, which incorporated the mineral calcite (CaCO_3) for strength and rigidity. Some trilobite exoskeletons were covered with spines. *Isotelus*, with its smooth dorsal surface, may have hidden from visual predators by partially burying itself within seafloor sediments. Trilobites could enroll, much like the modern pill bug, or "roly poly," enclosing the legs and vulnerable undersides within the hard exoskeleton (fig. 2).

Trilobites periodically molted their exoskeletons as they grew. One trilobite could leave numerous body fossils representing either molts or a carcass. Exoskeletons typically separated into *sclerites* (individual elements) soon after molting or death, so a single exoskeleton could produce many fossils (fig. 3). Trilobites also left trace fossils in the form of shallow burrows and walking trackways.

Isotelus and its history in Ohio

Isotelus is known from rocks of Middle and Late Ordovician age. In southwestern Ohio, rocks of Late Ordovician age (roughly 450 mya) are exposed. These rocks consist of about 820 feet of comparatively thin, alternating layers of limestones and shales. The layers were deposited as limy muds on the floor of a warm, shallow, subtropical sea that covered ancient Ohio.

Studies of *Isotelus* in Ohio have a long history. The first serious study of Ohio's Ordovician rocks was undertaken by the first Geological Survey of Ohio in 1837–1838. At that time, John Locke mapped portions of the southwestern corner of the state. Among Locke's many discoveries were the partial remains of a large specimen of *Isotelus*. The genus name *Isotelus* derives from Greek, *isos* ("equal") and *telos* ("end") and refers to the fact that the tail shield is approximately equal in size to the head shield. Because of its large size, Locke named the trilobite *Isotelus maximus*. He later called the same trilobite *Isotelus megistos*, but the earlier name *I. maximus* has priority and is the accepted species name. From an isolated large pygidium (tail shield), Locke estimated that the complete trilobite would have been about 22 inches (in) or 56 centimeters (cm) long.

The most famous Ohio *Isotelus* specimen, the inspiration for the state symbol, was discovered in 1919 by workmen digging an outlet tunnel during the construction of Huffman Dam on the Mad River, northeast of Dayton. This large specimen (fig. 1) measures 14.5 in (37 cm) long. Through the efforts of Arthur E. Morgan, chief engineer of the Miami Conservancy District, the trilobite came into the custody of August F. Foerste, a Dayton-area high school teacher and one of Ohio's most renowned early paleontologists. Owing to Foerste's research association with the Smithsonian Institution, National Museum of Natural History, in Washington, D.C., the specimen was transferred to that museum, where it has resided and been on display for more than 100 years.

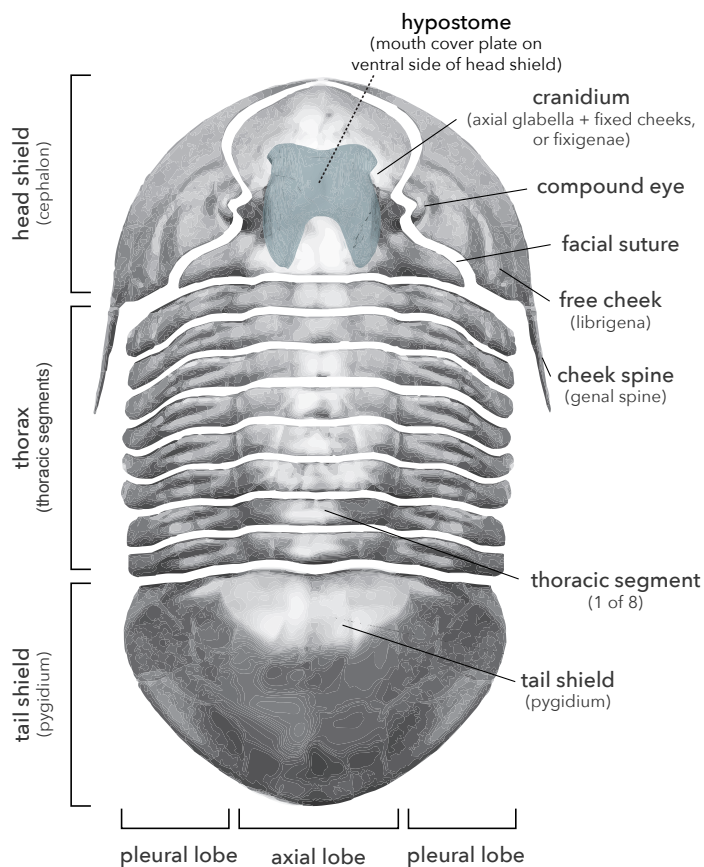


Figure 3. Body regions and sclerites of the mineralized exoskeleton of an *Isotelus* trilobite.



Figure 2. Enrolled, immature specimens of two species of *Isotelus*. Left: *I. maximus*; Right: *I. gigas*. Note the more triangular outline of *I. gigas*. Both are from Warren County, Ohio. Photo credit: Mark E. Peter.

References & Further Reading

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