



Megalograptus ohioensis—Ohio's Giant Sea Scorpion

by Mark E. Peter

One of Ohio's most impressive fossil animals is *Megalograptus ohioensis*, a species of eurypterid (pronounced, "yuh-RIP-tuh-rid"), or "sea scorpion." At up to 75 centimeters (30 inches) in length, this eurypterid was among the largest marine predators living 445 million years ago, during Late Ordovician time.

During this time period, land that is now Ohio was located in a low latitude, south of Earth's equator, and was covered by a warm and shallow inland sea. This sea was inhabited by a variety of invertebrate animals. Some, such as sea stars, bivalves, and colonial corals, would have closely resembled forms living today. Other groups, such as the extinct eurypterids and trilobites, would have been recognizable as relatives of living forms.

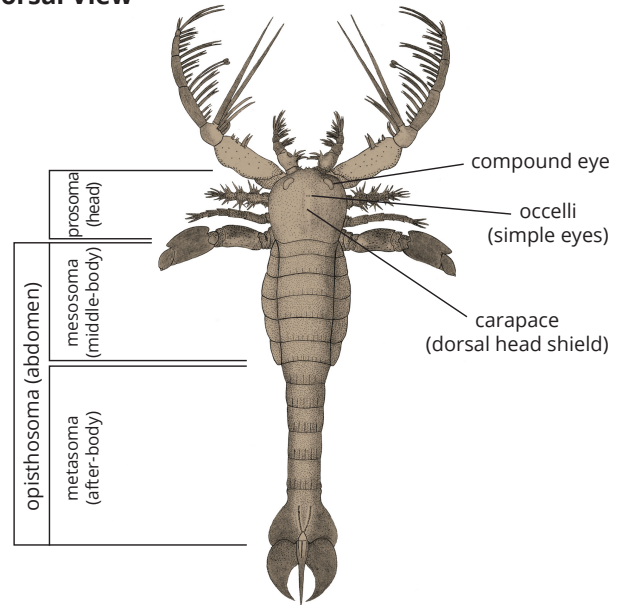
Discovery

The initial discovery of *M. ohioensis* was made in the summer of 1938, when Charles D. Cox, a University of Cincinnati student, was working for a state highway crew near Manchester in Adams County, Ohio. The crew was excavating Upper Ordovician marine limestones and shales of the Elkhorn Formation. Mr. Cox noticed a large fossil in the bucket of a steam shovel and rescued it from reburial. He brought the fossil to the attention of geology professor Kenneth E. Caster, who later described it as a new species of eurypterid based on this specimen and others from the same locality (fig. 1).

Further excavations at the discovery site by the University of Cincinnati and the Dry Dredgers, a society of amateur paleontologists, yielded hundreds of partial specimens. Together, these fossils allowed for a reconstruction of the animal's entire exoskeleton (fig. 2), making *M. ohioensis* one of the most completely described eurypterids.

Beyond the discovery site, *Megalograptus* fossils are rare. Eurypterid exoskeletons were made primarily of chitin and proteins, which are less likely to be preserved under typical conditions than mineralized exoskeletons, like those of trilobites. Rapid burial, perhaps by a storm deposit, in fine clay sediments may have contributed to the exceptional preservation of the eurypterids at the discovery site.

Dorsal View



Ventral View

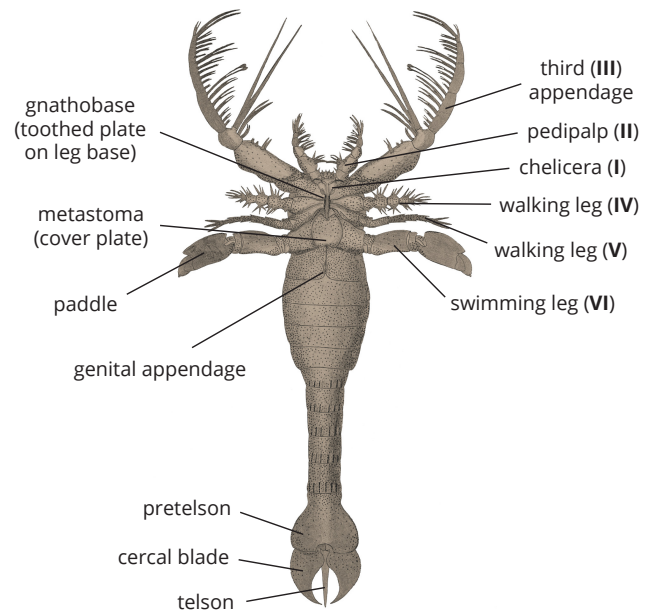


Figure 1. *M. ohioensis* discovery specimen (UC 24119A), with preserved parts labeled (compare with fig. 2). The impression of the dorsal (top) side of the carapace is rotated to the right; the metasoma is the ventral (under) side. The complete eurypterid would have been about 75 centimeters (30 inches) long.

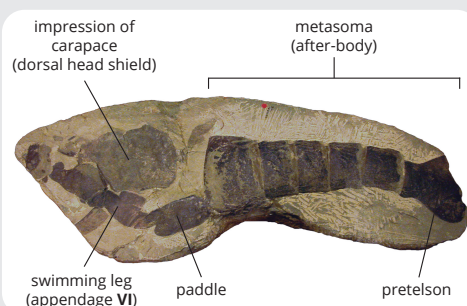


Figure 2. *M. ohioensis*, reconstruction of exoskeleton (external skeleton, or "shell"). Modified from Caster and Kjellesvig-Waering (1964). Above: Dorsal (top) view with major body divisions and dorsal features. Below: Ventral (underside) view with numbered paired appendages and ventral features.

What is a eurypterid?

Now extinct, eurypterids survived for more than 200 million years, from the Middle Ordovician to the end of the Permian Period. Eurypterids were predatory, aquatic, arthropod animals. They possessed chelicerae (small claws in front of the mouth, fig. 2, I) and were related to other chelicerate arthropods, such as horseshoe crabs, sea spiders, and arachnids (which include the familiar spiders and scorpions).

Commonly called “sea scorpions,” eurypterids resembled their terrestrial relatives, scorpions. The word “eurypterid” is from Ancient Greek words meaning “broad” and “wing” and refers to the sixth pair of prosomal (head) appendages. In many eurypterids, these appendages bear oar-like “paddles” thought to have been used for swimming (fig. 2, VI).

Sizes of eurypterids ranged from a few centimeters to a few meters. The largest arthropod that ever lived was the Devonian eurypterid *Jaekelopterus rhenaniae*, discovered in Germany, with an estimated length of up to 2.5 meters (about 8 feet).

Genus *Megalograptus*

The Late Ordovician eurypterid *Megalograptus* is one of the earliest known. Unlike many later eurypterids that were adapted to nearshore hypersaline, brackish, and freshwater environments, early eurypterids like *Megalograptus* occupied fully marine environments.

A distinctive trait of *Megalograptus* was the third pair of prosomal (head) appendages, which were greatly enlarged and equipped with long, paired spines (fig. 2, III). Some spines probably contained sensory organs. *Megalograptus*

may have used these specialized appendages to rake seafloor sediments in search of prey, which likely included invertebrates such as trilobites and other eurypterids. A coprolite (fossil dung specimen) attributed to *M. ohioensis* contained fragments of *Megalograptus*, suggesting these eurypterids may have been cannibalistic. Like some arachnid relatives, such as certain spiders, it is possible that female *Megalograptus* consumed the males after mating. The coprolite also contained remains of the large trilobite *Isotelus*, Ohio's State Invertebrate Fossil (see Shrake, 1995).

Another body feature, thus far unique to *Megalograptus*, was the presence of curved cercal blades on either side of the telson, or terminal segment (fig. 2, Ventral View). Caster and Kjellesvig-Waering (1964) considered these appendages to be opposable and hypothesized that they might have been used as graspers for mating or for defense. Other researchers have suggested that the cercal blades functioned as steering rudders for swimming.

In addition to *M. ohioensis*, several other species of *Megalograptus* have been named from Upper Ordovician rocks in Ohio. These were based on only partial fossil remains and none are known as completely as *M. ohioensis*. S. A. Miller described the first species of genus *Megalograptus* in 1874. That species, *M. welchi*, was based in part on a compressed black appendage (fig. 3A). Miller erroneously identified the fossil as a graptolite, hence the name, *Megalograptus*, which means “giant graptolite.” This mistaken identity is explained in part by the fact that graptolites, an ancient group of colonial animals, are typically preserved as flattened black fossils (fig. 3B). Subsequent researchers recognized *Megalograptus* as a eurypterid.

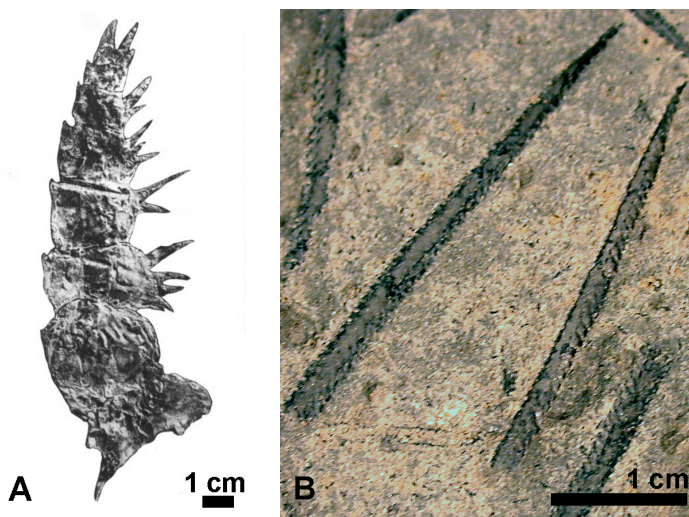


Figure 3. (A) Walking leg of *Megalograptus welchi*, type species of *Megalograptus*, initially identified as a giant graptolite. Modified from Clarke and Ruedemann (1912). (B) Graptolites preserved in an Upper Ordovician shale. The word “graptolite” is derived from Greek words for “written” and “rock” because the fossils, variously oriented on the surface of the rock, resemble cuneiform or hieroglyphic writing.

References & Further Reading

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