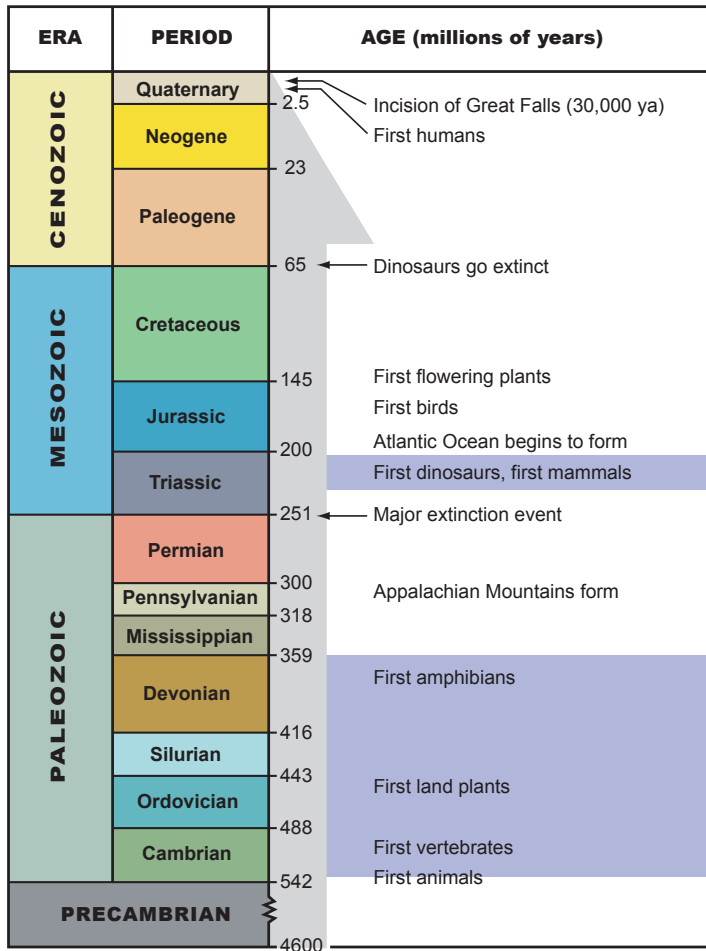




Stories in the Stones: Fossils of the C&O Canal



Geologic time scale with major geologic and evolutionary events

Rocks exposed in the C&O Canal NHP range in age from about 200 million to over 1 billion years old. The oldest rocks in the park started as **igneous** or volcanic rocks. They were changed into **metamorphic** rocks by intense heat and pressure as continents collided and separated several times; these rocks do not contain fossils. When the Appalachian Mountains were formed about 290 million years ago, the collision of continents on the east coast produced the many examples of folded rock layers that are evident along the C&O Canal.

During the early part of the Paleozoic Era (542 to 251 million years ago) however, much of what is now the mid-Atlantic region of the United States was covered by shallow seas. This area was similar to the modern Caribbean Sea, filled with rich marine and reef communities. Fossils of animals that lived in those seas are preserved in limestone and sandstone in and around the C&O Canal. **Sedimentary** rocks like these were formed by layers of sediment, sand and plant and animal material that hardened over many years. They have not endured heat and pressure so we can still see the fossils within them.

Since limestone and sandstone are good building materials, they were quarried from areas near the canal to construct its locks and aqueducts. Stones used in building the C&O Canal contain fossils that can be seen in numerous historic structures in the park. While you are hiking along the towpath keep your eyes open for some of these stones and formations and consider the ancient story they tell.

You might know the Chesapeake and Ohio Canal National Historical Park (NHP) as a Park that preserves and protects structures of the nation's historical and cultural past. But did you know the Park also has a geologic past that preserves evidence of life on earth from hundreds of millions of years ago? Fossils found near the Canal help scientists understand how the earth has changed and how animals and plants have changed over time.

Shells: Brachiopods, Bivalves and Gastropods

Animals with hard shells are more easily preserved than those made of soft materials. For that reason, paleontologists know that gastropods (snails), brachiopods (lamp shells), and bivalves (e.g., clams) have been around for over 500 million years.

During the Paleozoic Era, gastropods and bivalves were a small part of marine communities, which were then dominated by brachiopods, corals and other marine animals. It wasn't until after major extinctions reduced the number of these species that gastropods and bivalves went on to dominate marine

environments. Although the heyday of the brachiopods has passed, a few orders still live in modern oceans.

Brachiopods and bivalves may look similar, but they are only distantly related. They both have two hinged external shells which are opened to feed and closed to protect themselves from predators. Most brachiopods have a small stalk which they use to anchor themselves to the substrate, though some forms burrow like modern clams. These are the most common fossils found in the Park and are found in sedimentary rocks along the upper portions of the canal.



Crinoids and Bryozoans

Also known as “sea lilies,” crinoids resemble flowers with their long stems and wispy “petals.” In fact, crinoids are animals that use their feathery arms to strain food from the water. There are very few living crinoids today, but 450 million years ago, crinoid gardens were common features of shallow marine environments.

Bryozoans are tiny animals that live in communal structures that can take on a variety of shapes. Each bryozoan in the community has its own “window” in the structure through which it emerges to filter food from passing water currents. You can see parts of bryozoans and crinoid stems in some of the canal’s locks.

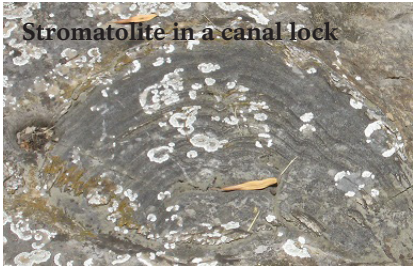


Crinoid and bryozoan fragments

Look for these fossils in the stone used for Locks 73, 74 and 75 as well as the Evitts Creek Aqueduct.

Stromatolites

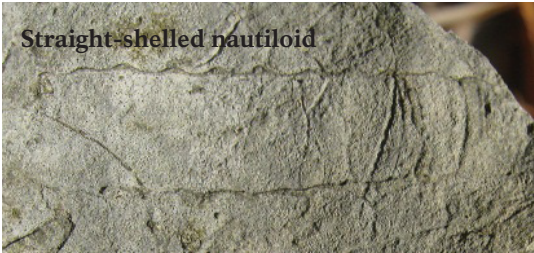
The oldest known fossils on earth belong to microscopic cyanobacteria (also known as blue-green algae) and are as much as 3 billion years old. No fossils in the C&O Canal NHP are that old, but the traces of cyanobacteria can be seen in the park as stromatolites. The fossils seen in the lock



Stromatolite in a canal lock

stones of locks 73, 74 and 75 are between 420-400 million years old. Stromatolites were important reef builders of the early Paleozoic but are today restricted to only a handful of localities on the planet. The Cyanobacteria that form stromatolites live in shallow water and need sunlight to photosynthesize and grow. Stromatolites form when sediment is trapped by the sticky cyanobacteria; the cyanobacteria then grow upwards through the sediment cover to get sunlight. The newly exposed cyanobacteria are again covered with sediment, and the process repeats. The result is a wavy, thin-layered structure that can be many feet thick.

Shelled Cephalopods



Straight-shelled nautilus

The chambered nautilus is the only living cephalopod with a shell, but during the Paleozoic Era, there were many different kinds. The first shelled cephalopods appeared in the Cambrian Period,

and by the Ordovician, they had become the top predators in the oceans. Some were up to 30 ft long!

As the shelled cephalopods evolved, the shells took on a variety of shapes, including corkscrews and coils, during the Cretaceous. The earliest forms, however, were straight-shelled such as the one pictured.

Trace Fossils

Mineralized hard parts like bones or shells aren’t the only evidence of ancient life. Animals and plants also leave traces that reveal how they lived and grew or moved through their environments. Foot prints and burrows are two examples of trace fossils that paleontologists use to learn about extinct animals. There are many different kinds of burrows in the C&O Canal NHP made by different trace makers; most were made by worms that moved through the sediment in search of food. Visit the bridge over the canal at White’s Ferry to view some fossil burrows.



Fossil Worm Burrow

Fossil Stewardship

Fossils are part of our natural heritage and are non-renewable resources. For that reason, it is important to protect them so future generations can enjoy them and learn from them. Help the National Park Service protect fossil resources by practicing good stewardship. As you visit and enjoy the C&O Canal NHP, remember that it is illegal to remove any natural resource from a national park, including rocks and fossils.

For more information on paleontology in the National Park Service, visit the National Park Service Paleontology Program website: www.nature.nps.gov/geology/paleontology

