CONCRETIONS

The treasure chests of geology at Highbanks

Beth Renner

While wading through one of the streams at Highbanks, I looked up at my surroundings and began to notice what was all around me. I had been staring at my feet as I waded through the water, making every attempt not to slip and get soaked.

It was only when I stopped caring about slipping into the creek that I started learning. A large lump protruding from the water first sparked my interest.

"Is that cannonball thing a concretion?" I remember asking myself.

As I walked around a slight bend in the stream, more concretions appeared and I became quite curious. They seemed to be everywhere.

I saw some partially submerged in the creek bed, others along the banks of the water and even some embedded in the rock walls that created the ravine around me.

A number of the concretions were so large that they had begun to crack and erode and now resembled low-lying round stools conveniently placed along the creekside like sculptures. I couldn't believe that I had never seen this before and better yet it is all-natural.

Skull of Dunkleosteus

I wondered how I would be able to describe these ancient masses of mineral matter and let others know how cool they are to come upon when creeking at Highbanks.

They're essentially balls of geologic history, with their core contents a mystery and they are right here in Ohio.

To uncover the mystery, one must imagine the area during the Devonian Period some 350 million years ago. Back then Ohio was covered by a muddy, shallow ocean.

As time went on, mud from the waters would settle on the ocean floor forming Ohio's sedimentary bedrock of limestone and shale.

Concretions developed at the same time as the shale, creating geologic treasure chests. Fish or plants living in the ancient ocean would die and sink to the bottom of the sea. As they decayed, they became the center, or nucleus, of the concretion.

In many cases, the nucleus consists of an ancient life form which can be in the form of a fossil, like that of a fish, or some form of prehistoric vegetation. Over many hundreds of thousands of years, the par-

ticles and sediment bond together and the concretion develops.

Through slow chemical changes, minerals such as iron are extracted from the forming mass, causing its remnants to cement together, building the concretion. Often, they are harder than the material they came from.

The process of erosion is responsible for revealing the concretions in the sedimentary rock. The power of water and wind, over time, has gradually deteriorated the soft shale rock, exposing the much more solid concretions buried within it.

This is especially true in the case of Highbanks' concretions, as shale is easily eroded and breakable.

Ohio shale is visibly distinguished from other rocks by its appearance. It is typically dark gray in color and is easily breakable, frequently weathering into small brown colored chips or flakes.

Shale is a fine-grained sedimentary rock. This means that it forms from the compaction and gradual collection of more sediment and particles layer upon layer. It is a laminated rock, which simply means it is composed of many thin layers.

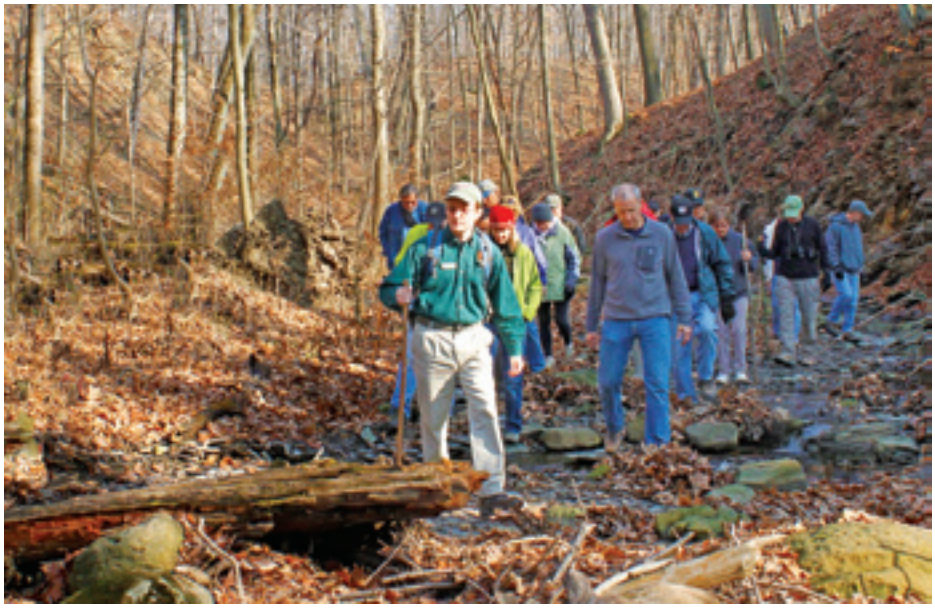
The ravine I was wading through was exactly like this. The horizontal shale layers were abundantly clear, so much so that they resembled towering stacks of disorganized, layered paper.

As I continued wading through the creek I touched the thick shale walls and pieces of shale crumbled under the pressure of my fingertips. It was neat to witness rocks so delicate when exposed out in the open.

I couldn't help but admire the beautiful shale that composed the creek bed and lined the walls of the ravine. As I walked on the dryer portions of the creek bed, consisting almost exclusively of crumbled shale, I could hear it crunching and cracking beneath my feet, like walking on potato chips.

After experiencing a beautiful creek featuring concretions, I decided to learn more about them. The composition of Ohio concretions typically includes other minerals like calcite, dolomite, silica and pyrite.

In some cases, the center or nucleus of the concretion is still present within it and it may even contain an intact fossil.



Cheryl Blair

A naturalist-led hike through the Highbanks ravines is the best way to see concretions.

Otherwise, the nucleus has dissolved over time leaving a void in the center of the concretion.

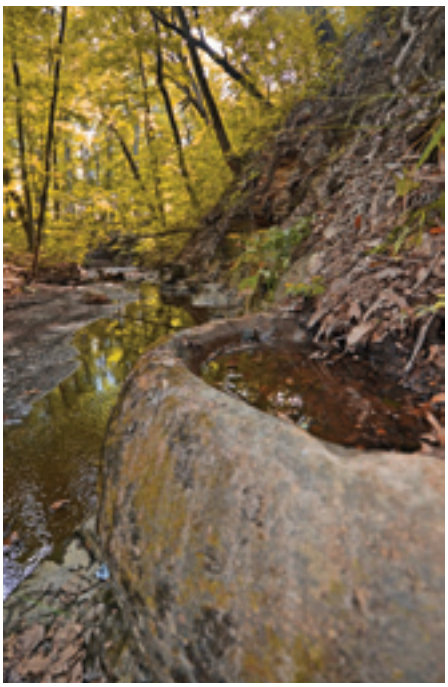
Concretions are often orange and brown in color due to the high iron content and can vary widely in size and in shape.

They may be very small and manageable, like a bowling ball, or they could be the size of a truck. As far as shape goes, concretions are typically round or tubular in shape, however some may be flat, or, my favorite, near perfect spheres.

A remarkable discovery took place at Highbanks in the late 1980s. The jawbone of a prehistoric fish called a Dinichthys was uncovered in the center of an eroding concretion that had split in half.

The next time you're at the park stop by the nature center and check the Dinichthys display. The ancient fish could reach 18 feet in length and weigh up to four tons. In the Nature Center, you will see replica jaw bones of the armor-plated ancient predatory fish, as well as its equally ferocious cousin the Dunkleosteus.

Concretions are interesting and mysterious and winter is a great time to hike Highbanks' Dripping Rock Trail and look for them in the ravine below. If concretions are ever discovered in your explorations please treat them with care.



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Water erosion can cause a depression or void in the center of a concretion.

Be sure to leave them where they were and avoid damaging them or splitting them open. It is important to leave them so future park visitors can experience their beauty and mystery for years to come. ■

Beth Renner
Highbanks Nature Center Attendant

OFF-TRAIL RAVINE HIKE: Sun Jan 12, 2014 – 1pm
Explore the Highbanks ravines and see the concretions on a 3-mile off-trail hike.