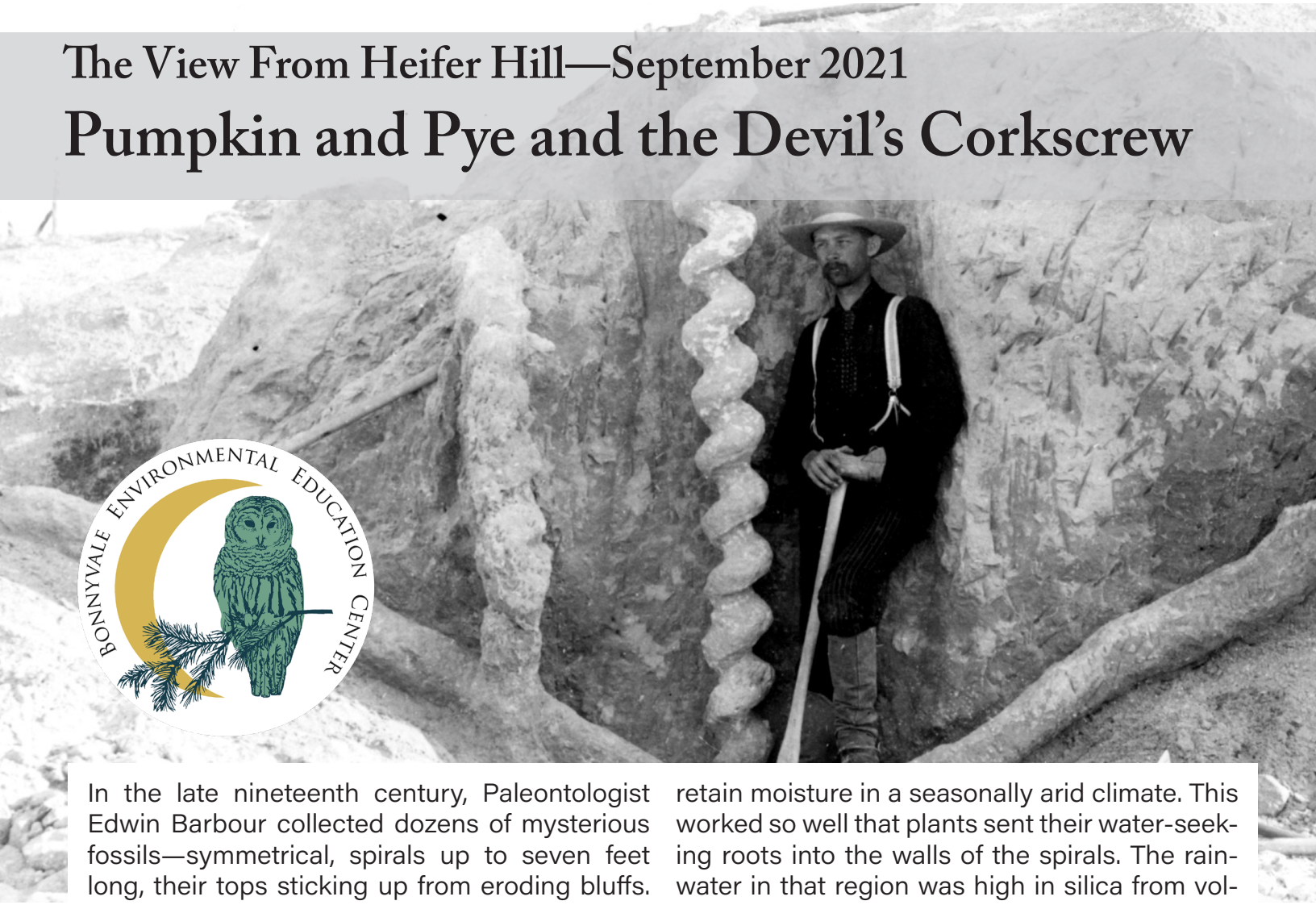
# The View From Heifer Hill—September 2021

# Pumpkin and Pye and the Devil's Corkscrew



In the late nineteenth century, Paleontologist Edwin Barbour collected dozens of mysterious fossils—symmetrical, spirals up to seven feet long, their tops sticking up from eroding bluffs. He called them *Daimonelix*, Greek for devil's corkscrew. Because he found plant fibers in the fossils, Barbour hypothesized that they were botanical in origin, perhaps the remains of giant freshwater sponges. These mysterious objects provoked a lively battle, with other paleontologists arguing that they were the tunnels of some type of pocket gopher. In his scoffing dismissal, Barbour stated, "If this is in truth the work of a gopher then it must stand as a lasting monument to the genius of that creature which laid the lines of his complex abode with such invariable precision and constancy."

It wasn't until 1977 that a research team from the University of Kansas solved the mystery. The giant corkscrews were, indeed, created by rodents but not pocket gophers. They were created by beavers, an extinct species in the genus *Palaeocastor*. The researchers believed that the corkscrew burrow design helped the beavers retain moisture in a seasonally arid climate. This worked so well that plants sent their water-seeking roots into the walls of the spirals. The rainwater in that region was high in silica from volcanic glass. The plants absorbed the silica, and the root-lined walls became mineralized. Voilá, Devil's Corkscrews. Over the eons, these corkscrews filled with sand, often burying the bones of the inhabitants.

This week I have been updating my appreciation for the modern-day and ever-so-aquatic beavers in my care. I hoped I would now be telling you about their release into a new pond enclosure, a habitat where they would spend the next six months. Instead, I am still scratching my head and calculating. The challenge is that, like *Palaeocastor*, Pumpkin and Pye are prodigious diggers.

Beavers use mud as a building material. They excavate it from the bottom of their ponds to seal their dams and lodges. In the process, they deepen the water, ensuring they can still get out of their dens and to their food stores when

ice forms. Deeper ponds also hold more water during droughts.

Beavers also dig canals from their ponds to food sources. These waterways help them float branches and logs back to the pond and maximize the time spent in the water—the element in which beavers are truly invincible.

Like *Palaeocastor, Castor canadensis* digs burrows. Every colony will have several bank lodges—tunnels into the shore with an underwater entrance and a resting cavity above the waterline. In some cases, such bank lodges will be the beavers' primary residence. In others, they provide emergency shelter should their main lodge be flooded or exposed when a dam fails.

Pumpkin, the orphan I have been raising for the past fifteen months, is an avid digger. He has spent countless hours attempting to deepen his stock tank pool. Pye, a yearling recuperating from a predator attack, grew up in the wild and is determined to return. I intercepted her recently as she was trying to escape beneath a temporary fence around her tank. With her toes gripping the earth and her front legs locked, she was an immovable object.

Young beavers stay with their parents for at least two years. That is when they are old enough to find a mate and defend a territory. My hope is to get them settled into an enclosed pond where they can spend the next six months swimming, building a lodge, and, yes, digging. But how to make a beaver-proof fence?

I called a wildlife rehabilitation facility in Ontario to see how they contain beavers in ponds. Ruth told me that they bury their wire panel fences four feet deep, with six-foot deep sections at the areas that interest beavers the most—the inflow and the outflow. They have a seventy-five percent success rate at keeping beavers contained.

Curious about beaver adaptations as digging machines, I read a bit about biomechanics—in particular the musculoskeletal components that shape how animals move. This is a study of force (muscles) applied to levers (bones). Diggers, it turns out, need to exert a lot of force at the tips of their forepaws. The muscles responsible attach to the olecranon process, an extension of the ulna at the elbow. Force increases by lengthening this in-lever, shortening the out-lever (the long bones in the lower arm), or increasing the strength of the muscles. When I compared photos of the forelimb bones of beavers to those of other quadrupeds, they were proportioned similarly to those of burrowers. Most notably, beavers have an exceptionally long olecranon process.

When I watch Pumpkin and Pye on land now, I no longer see ungainly creatures, helpless outside a buoying water-world. I now see their wide-chested gait as the strut of a linebacker.

I have a plan for a fence. Maybe. I hope you will read about how well it is working in my next column. Unlike Edwin Barbour, however, I know better than to underestimate rodents. The fence may become a lasting monument to the genius of a pair of chubby, earth-moving beavers.