VIRGINIA CAVE OWNERS' NEWSLETTER

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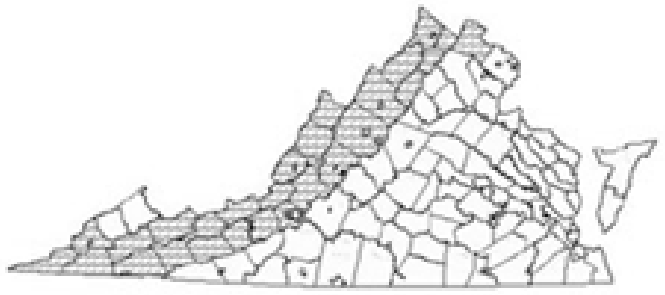
Thanks to contributors: C. Stuart Daw, Charles E.A. Finney, and Wil Orndorff



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Due to the generous grants from both the Cave Conservancy of the Virginias and the Virginia Region of the National Speleological Society, the Virginia Cave Board will be able to continue offering you a printed version of the *Virginia Cave Owners' Newsletter*.

Chairman's Column
by Meredith Hall Weberg

(The small graphic next to this article title is the cave map symbol for columns, speleothems that are formed when a stalactite grows down and a stalagmite grows up, and they meet in the middle.)

Greetings, Virginia Cave Owners!

I am pleased to tell you that the website for the Virginia Cave and Karst Trail (VCKT) is now live at http://www.dcr.virginia.gov/natural_heritage/vacavetrail.shtml. Please take a look and see what part of this educational driving/walking trail is near you.

Virginia's annual celebration of Cave Week this year is April 19 to 25. Last year's celebration was a great success with educational activities in different parts of the state. The Front Royal Grotto, a local cave club, hosted its first Cave and Karst Festival in conjunction with Virginia Cave Week. Lots of folks learned about caves and karst, which is the main focus of the special week.

The Virginia Cave Board is an advisory group. Last year we advised a landowner on water rights on springs that went through his land. We advised a show cave on its geology. We have plans to help a show cave with an interpretive exhibit, thus educating even more people about the delicate ecosystem comprising caves and karst. We advised people in two other states on how they might possibly become the second and third such advisory board in their states; right now, our Cave Board is unique in the USA.

I want to extend my thanks to the Cave Conservancy of the Virginias for the grant it recently afforded the Cave Board in order to continue printing the *Virginia Cave Owners' Newsletter*. This generous group also granted the Cave Board money several years back for the printing and mailing of this newsletter. The Cave Board is very grateful to be able to continue bringing items of interest to our trusted land stewards.

Thanks also go to the Virginia Region of the National Speleological Society for its recent grant to the Cave Board for the newsletter.

If you as a cave owner have questions or needs, please contact any of us on the Cave Board. We are here to help! You may reach us through Larry Smith, our advisor at the Virginia Department of Conservation and Recreation, Larry.Smith@dcr.virginia.gov.

Thanks, as always, for taking good care of the caves of the Commonwealth!

We're on the Web! Visit us at:
http://www.dcr.virginia.gov/natural_heritage/cavehome.shtml

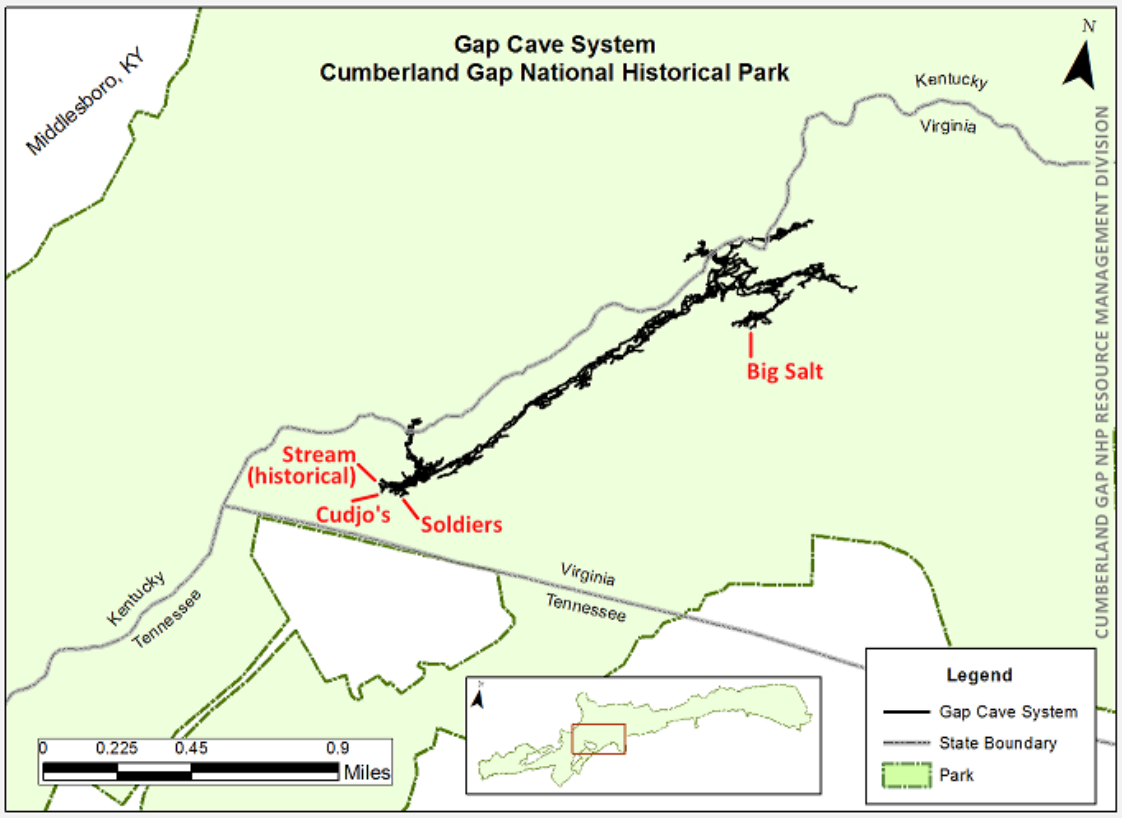
Cumberland Gap Cultural Resources Project of the Cave Research Foundation (Part 2)

By C. Stuart Daw and Charles E.A. Finney

As described in our previous article, the Cumberland Gap National Historical Park (CGNHP) covers 24,000 acres of mountainous terrain at the intersection of Virginia, Kentucky, and Tennessee. The Gap Cave system, depicted in the figure below, is the largest cave in the park and lies mostly within the boundaries of Virginia. The Gap, Soldier's, and Gap Stream entrances at the system's western end are immediately proximate to Cumberland Gap itself, through which thousands of European settlers passed during the late 18th and early 19th centuries westward into Kentucky. Before the influx of European settlers, Native Americans also passed close by this end of the cave system as they traveled the Warriors Path. During the Civil War, the western entrance area was surrounded with fortifications and camp sites, and the cave was heavily visited by both Union and Confederate soldiers. In the late 19th and most of the 20th century, the western end of the Gap Cave system was operated commercially under a series of names, including King Solomon's Cave and Cudjo's Cave.

The main entrance at the eastern end of the Gap Cave system is referred to historically as Big Saltpeter Cave or Big Salt for short. While not as prominent as the western entrances because of its remoteness, the Big Salt entrance was already commercially exploited as a source of saltpeter for manufacturing gunpowder during the War of 1812. During this period, an elaborate nitre-leaching system along with wooden scaffolding and ladders were employed to dig, process, and haul nitre-containing earth up the vertical entrance drop of almost 100 feet. Remnants of these structures and graffiti left by the miners still exist and are being investigated by the Cultural Resources Project (CRP) of the Cave Research Foundation (CRF).

In addition to documenting physical artifacts left by the mining activities in the eastern end of the Gap Cave system, the CRP relies heavily on locating historical accounts left by early visitors to that part of the cave. One such report was by Charles Fenno Hoffman, a prominent writer and magazine editor, who visited the Cumberland Gap area in 1834. In his travel account titled "A Winter in the West" [New York: Harper & Brothers, 1835; digitized by Google Books], Hoffman recounted a story he heard from a local guide about the guide's earlier attempt to explore the Big Saltpeter entrance with a hunting companion after the mining operations had ceased: "*Entering the cavern, they first, by light of a pine-torch, carefully examined the wooden ladders which had been now for sixteen years exposed to the damps of the place. They had been made of cedar and still appeared sound. The cautious hunters ... both descended ... and, as expected, they found several neglected tools still remaining there; and selecting a pickaxe and a spade, they commenced their ascent upon the ladders. The first flight was soon accomplished; but their steps became slower as they got farther from the bottom ... as ... they ... [were] compelled to move more and more carefully. Patience and steadiness ... brought them near the summit ... when the foremost man taking hold of one [rung] more decayed than the rest, it broke ... and he fell backward ... upon the chest of his companion ... [who] kept his one-handed hold upon the ladder. The iron tools went clanging to the bottom. There was a moment of intense anxiety ... But the falling man clutched the ladder instantly, and lay-*



ing a frantic grip, with both hands ... they gained the top, at last, together. 'Stranger,' concluded the man, while his voice faltered at the end of the tale, 'we knelt to God at the mouth of that cave, and swore to never enter it more.' " [Winter in the West, II, pp. 259–60].

Charles Hoffman also described his own trip into the western stream entrance to Gap Cave. Based on records like this, we have attempted to reconstruct the actual route that visitors in Hoffman's time followed in this part of the cave. Hoffman's description of the original Gap Stream entrance (where the main cave stream still exits the mountain) was as follows: "*It is a ragged aperture, about six feet in diameter, sloping downward ... about fifteen feet ... and after lighting [the torches] at the entrance ... we entered the mouth of the cave. A few steps in the shallow water at the bottom led to a sudden turn, where the daylight was at once excluded; and ... we discovered a deep pool about breast-high, which lay clear as crystal before us. In the middle of this pool a detached crag hung from above ... near the water's edge ... ; and before entering the water I sent one of the party ahead to ascertain whether there was any dry footing beyond. He shrunk at first from the icy water; but ... soon disappeared behind the curtain; and listening to his splashes ... we were glad at last to hear his call to 'come on'.*" [Winter in the West, II, pp. 212–18]. Cumberland Gap Mountain Spring Water, which is widely sold in stores today, comes from the same stream that Hoffman and his fellows waded through 180 years ago.

THE POEMS OF CHARLES FENNO HOFFMAN VIA GOOGLE BOOKS

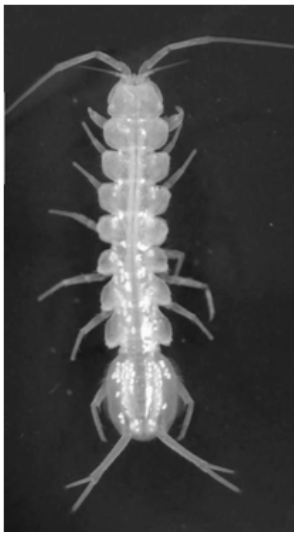
Charles Fenno Hoffman

Acknowledgements: The CRP is indebted to the National Park Service, especially Biologist Jenny Beeler, Historian Martha Wiley, and Superintendents Mark Woods and Sula Jacobs. We are also very much indebted to Mike Crockett and Dave West, who have been instrumental in organizing the NPS-CRF collaboration at the Gap.

Biodiversity Spotlight—The Lee County Cave Isopod

By Wil Orndorff, Virginia Natural Heritage Program

For centuries, people have known that there are animals dwelling in caves that lack many of the characteristics and features possessed by their cousins on the surface. Most cave-adapted animals lack both eyes to see and pigment to protect them from solar radiation. The majority of these animals are invertebrates, including insects, crustaceans, spiders, and snails. Most cave-adapted invertebrates have other characteristics that their surface relatives lack, which allow them to thrive underground. These include elongated antennae, bristles over their bodies so they can feel their way around, and modified reproductive strategies—for example, fewer and larger eggs—that reflect the different nature of food available to them in the cave environment. A recent study by several former Virginia Cave Board members lists over 160 species in Virginia that are known only from caves! While many are widespread, most occur in only a handful of caves.



Caecidotea, 10 mm long (photo 1)

An example of widespread cave animals are isopods—crustaceans related to crabs and shrimp. The isopod most people are familiar with is the pillbug or "roly-poly" commonly seen beneath rocks. However, the majority of isopods are aquatic, and this is true for cave isopods as well. For over 150 years, isopods of the genus *Caecidotea* (photo 1) have been known from caves throughout western Virginia and were believed to be the only aquatic isopod genus in the Appalachians. So imagine the surprise when long-term Cave Board member Dr. John Holsinger and caver Bill Mauck discovered a new kind of aquatic isopod—genus *Lirceus*—in a cave in Lee County! The species was named *Lirceus usdagalun*, after the Cherokee word for cave, but it's commonly known as the Lee County cave isopod. A second species of *Lirceus* was subsequently discovered in the Rye Cove area of Scott County and named *Lirceus culveri* after a budding young scientist, David Culver (later a Virginia Cave Board member).

Lirceus, 5 mm long, half the size as *Caecidotea* (photo 2)

Unlike the geographically widespread species of *Caecidotea*, both the Lee County and Rye Cove cave isopods are restricted to tiny areas, about 20 square miles each. These areas are unusual in that they both

VCON Thanks CCV!

The Virginia Cave Board's mission coincides with that of the Cave Conservancy of the Virginias (CCV) quite nicely. Both groups endeavor to protect Virginia's precious resources, our caves and karst. To that end, CCV offers grants. CCV has generously granted the Cave Board money in years past for the production of the *Virginia Cave Owners' Newsletter* (VCON). CCV has recently granted another sum of money to continue producing and mailing the VCON. The Virginia Cave Board wants to thank CCV for its generosity throughout the years.

THANK YOU, CCV!!!

contain caves formed in the middle of a syncline (bowl-shaped pattern of rock) that receives runoff from ridges on all sides. The result is caves very prone to flooding. The body shape of the *Lirceus* isopods (photo 2) is designed for this environment. While the elongate *Caecidotea* are easily washed away, *Lirceus* is pressed against the rock and can ride out the flood, much like a water penny. In fact, Dave Culver actually brought some of each species into an artificial cave stream that he built in his lab, and determined experimentally that *Caecidotea* were twice as likely to get washed away in a flood than were *Lirceus*! Interestingly, this advantage allows *Lirceus* to outcompete *Caecidotea* only in areas with frequent, extreme flooding, like the Cedars and Rye Cove.

The Lee County cave isopod was once at risk for extinction due to human activity. During the 1980s, contaminated water formed by percolation of rainwater through giant sawdust piles at a Lee County lumber mill poisoned Thompson Cedar Cave, one of only two caves where the isopod was known. For over a decade, no isopods were observed in that cave, and the water was filled with the stringy bacteria one typically finds at sewage treatment plants. Because of this, the Lee County cave isopod was listed for protection under the Endangered Species Act. The US Fish and Wildlife Service (FWS), the Virginia Cave Board, The Nature Conservancy, the Daniel Boone Soil and Water Conservation District, Virginia state agencies, and the lumber mill owner worked together to address the sawdust issue by stopping the dumping of sawdust on site and transporting it for use as a fuel to a nearby paper plant. The Tennessee Valley Authority and the Cave Conservancy of the Virginias worked with Virginia Tech to make possible additional sawdust removal and transport for use in the reclamation of land mined for coal. These efforts made a difference. In 2001, scientists from the Virginia Natural Heritage Program and FWS discovered that *Lirceus* had returned to Thompson Cedar Cave. These same scientists have monitored the species since its return, and both the cave and isopod appear on the road to recovery. However, isopods from Thompson Cedar still exhibit a yellow discoloration (seen in photo 2) from the "compost tea" that continues to seep into their home, although at much lower rates than during the 1980s. Lee county cave isopods are usually white, like the *Caecidotea* in photo 1.

Over the years, Lee County cave isopod populations have been discovered in a handful of other caves in the Cedars. The Nature Conservancy and the Virginia Natural Heritage Program have worked for nearly 30 years to protect more than a thousand acres comprising the Cedars Natural Area Preserve, including most of these caves. In addition to the Lee County cave isopod, the Cedars supports several other globally rare cave adapted animals and plant species, as well as the federally endangered Gray bat. For more information on the Cedars, visit http://www.dcr.virginia.gov/natural_heritage/natural_area_preserves/thecedars.shtml.

For more information please contact the Virginia Department of Conservation and Recreation, Division of Natural Heritage, 600 East Main Street, 16th Floor, Richmond, VA 23219 or one of the members of the Virginia Cave Board: Ms. Michele Baird, Mr. Robert Denton, Dr. Daniel H. Doctor, Mr. David Ek, Mr. John Graves, Dr. John Haynes, Mr. Richard Lambert, Mr. Steve Lindeman, Ms. Marian McConnell, Ms. Janet Tinkham, and Ms. Meredith Weberg.

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