
St. Paul Underground

History and Geology at Carver's Cave

Greg A. Brick

Carver made a great fuss about this cave; and it used to be described in the old geographies, as one of *the* natural curiosities of North America.”

—James Goodhue (1851)

Native Americans have always referred to Carver's Cave as *Wakan Tibi*, the Dwelling of the Great Spirit. Jonathan Carver (1710–1780) visited what he called the “Great Cave” in 1766 and again in 1767, and it became the earliest Minnesota cave in the published literature when the first edition of Carver's best-selling *Travels Through the Interior Parts of North America* appeared in 1778.¹ Many more accounts of visits to the cave subsequently appeared in the historical travel literature. While it will be shown here that the cave has changed little over long stretches of time, the overall impression readers get from some of these accounts is exactly the opposite.²

Carver's description of the cave, crude though it is, is recognizable even today. His account gives modern readers a sense of the site's geology, especially the nature of the rock in which the cave is situated. In what is perhaps the most heavily quoted passage from his *Travels*, Carver writes that:

About thirty miles below the Falls of St. Anthony, at which I arrived the tenth day after I left Lake Pepin, is a remarkable cave of an amazing depth. The Indians term it *Wakonteebe*, that is, the Dwelling of the Great Spirit. The entrance into it is about ten feet wide, the height of it five feet. The arch within is near fifteen feet high and about thirty feet broad. The bottom of it consists of fine clear sand. About twenty feet from the entrance begins a lake, the water of which is transparent, and extends to an unsearchable distance; for the darkness of the cave prevents all attempts to

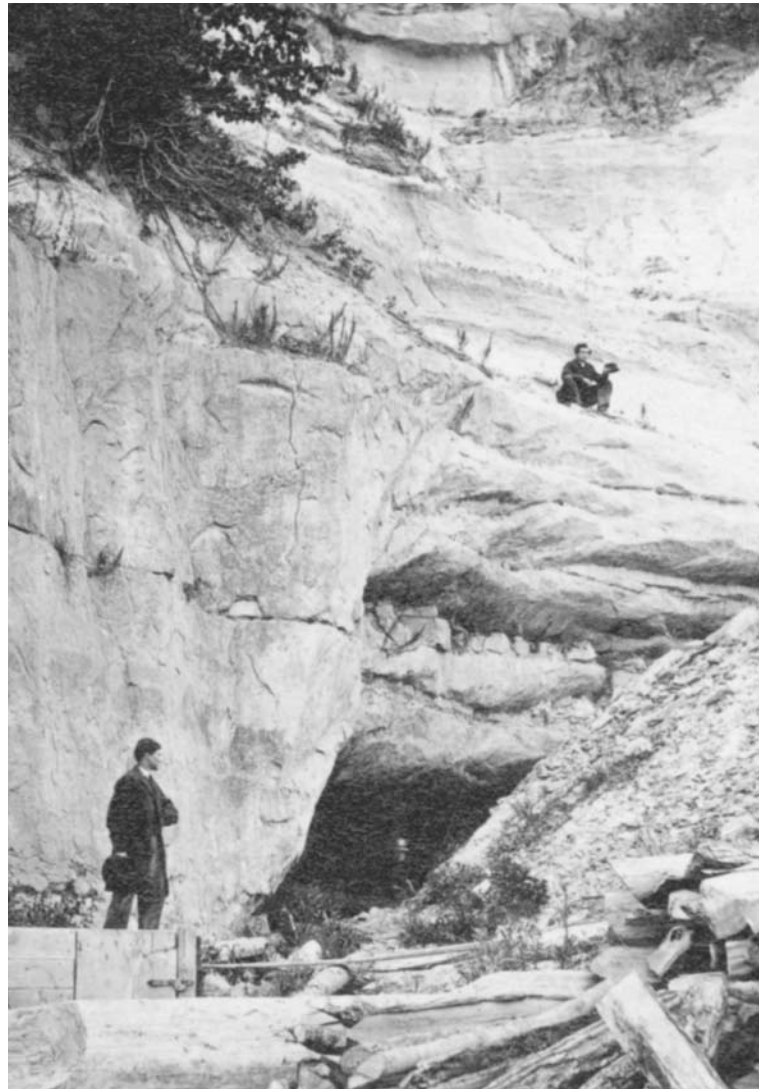


Figure 1. Carver's Cave circa 1875, showing how much roomier the cave was in the past. The prominent horizontal line in the sandstone above the man on the left is today located at waist height. Photo courtesy of the Minnesota Historical Society.

acquire a knowledge of it. I threw a small pebble towards the interior parts of it with my utmost strength: I could hear that it fell into the water, and notwithstanding it was of so small a size, it caused an astonishing and horrible noise that reverberated through all those gloomy regions. I found in this cave many Indian hieroglyphicks [*sic*], which appeared very ancient, for time had nearly covered

them with moss, so that it was with difficulty I could trace them. They were cut in a rude manner upon the inside of the walls, which were composed of a stone so extremely soft that it might be easily penetrated with a knife: a stone every where to be found near the Mississippi. The cave is only accessible by ascending a narrow, steep passage that lies near the brink of the river.³

In 1852 pioneer Midwestern geologist David Dale Owen (1807–1860) coined the widely publicized name “St. Peter Sandstone” for the rock layer in which the cave is found, based on outcrops along the St. Peter’s (now Minnesota) River at Fort Snelling.⁴ In modern times, geologists have determined that this sandstone dates from the Ordovician Period (505 to 438 million years ago).

The Cave’s Changing Interior

Carver’s Cave is a spring-cut cave, formed by the eroding away of sand grains by flowing water, a process that engineers and geologists call “piping.”⁵ In form, it belongs to the tubular variety of St. Peter cave.⁶ Throughout the time it has been known, the cave has undergone repeated episodes of naturally sealing itself with debris from the cliffs above and being dug open again by some enterprising individual, about once each generation. The lake level inside the cave has fluctuated considerably over the years depending on whether this cliff debris has dammed back the spring water. Because the prominent bedding plane in the sandstone that forms the ceiling of the cave is readily visible in old photographs, it serves as a distinct marker line that indicates the fluctuation of the water level over the years. Consequently these photos provide an easy way to gauge where things stood at the time the photos were taken in relation to the water level in the cave today. From the examination of such photos, it is apparent that the cave was much roomier at various times during the nineteenth century (**Figure 1**).

The early Minnesota geologist Newton Horace Winchell (1839–1914) wrote that “Carver’s cave, date[s] back to pre-Cretaceous age,”⁷ which is much too old, according to our present understanding of the regional geology. Rather than belonging to the Age of the Dinosaurs, as Winchell’s statement might suggest, the cave most likely formed more recently, when the Mississippi River gorge to which it drains was carved in pre- or interglacial times. Once the gorge had formed, it provided a lower level to which groundwater in the sandstone of the bluffs could drain, allowing the piping process to occur.⁸

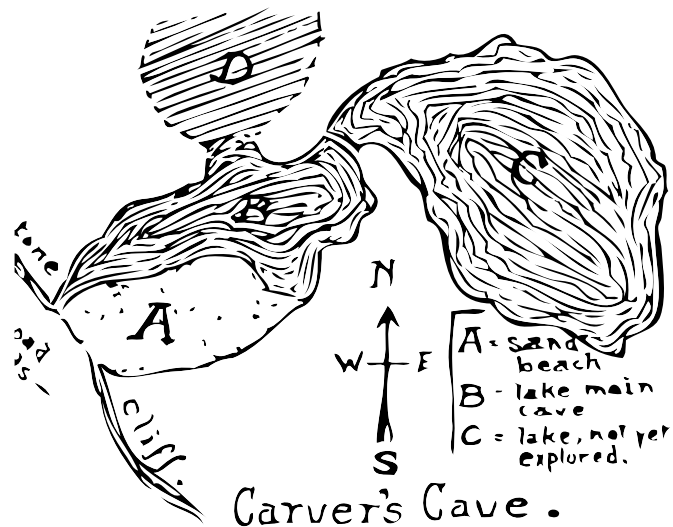


Figure 2. Burnley’s map of Carver’s Cave, 1913, showing conjectured rooms at the back end of the cave. Map courtesy of the Ramsey County Historical Society.

Nineteenth-century travelers’ accounts of the cave yield considerable insight to its history. When Major Stephen H. Long, (1784–1864) U.S. Corps of Topographical Engineers, visited and first named “Carver’s Cave” on July 16, 1817, he had this to say:

Two miles above the village [Kaposia] on the same side of the [Mississippi] river is Carvers Cave, at which we stopped to breakfast. However interesting it may have been, it does not possess that character in a very high degree at present. We descended it with lighted candles to its lower extremity. The entrance is very low & about 8 feet broad, so that a man in order to enter it must be completely prostrate. The angle of descent within the cave is about 25°. . . . In shape it resembles a Baker’s oven. The cavern was once probably much more extensive. My interpreter informed me that since his remembrance the entrance was not less than 10 feet high, & its length far greater than at present.⁹

Another account, by the explorer Henry R. Schoolcraft (1793–1864), dates from 1820, not long after Long’s first visit:

The cave itself, appears to have undergone a considerable alteration since that [Carver’s] period. . . . As the rock is of a very friable nature, and easily acted upon by running water, it is probable that the lake has been discharged, thus enlarging the boundaries of the cave.¹⁰

These early perceptions of change at Carver’s Cave were illusory, however, because both travelers had almost certainly confused the cave with other, nearby caves. In Long’s case, it has been alleged¹¹ that he confused Carver’s with Dayton’s Cave—a much smaller cave—while it is known with more certainty that Schoolcraft confused Carver’s with Fountain Cave, a much larger cave. Either way, the cave appeared to the bewildered traveler to have undergone a veritable metamorphosis in the half century since Carver’s original visit.

Even more bizarre, however, was the account of the eccentric Italian traveler Giacomo C. Beltrami (1779–1855), in 1823. He confounded Carver’s and Fountain caves in his memoirs.¹² By doing this, he produced a hybrid cave, which he called the “Cave of Trophonius,” referring to a famous Greek cave that contained an underground river where an oracle was consulted.¹³ The physical description of Beltrami’s cave undeniably belongs to Fountain Cave; yet he attributed to it Native American ceremonies and the “hieroglyphics” associated with Carver’s Cave, even using the name “Whakoon-Thiiby,” which pertains to the latter cave.¹⁴

Nonetheless, Carver’s Cave was undeniably undergoing a small amount of physical change over time. The French émigré scientist Joseph N. Nicollet (1786–1843), assisted by others, dug the cave open in



Figure 3. Interior of Carver's Cave circa 1870. Photo by W.H. Illingworth. Notice the dome in the ceiling, which no longer exists. Photo courtesy of the Minnesota Historical Society.

1837, and in his account we see hints of the natural process of cliff retreat. Nicollet reported that "Its entrance has been, for more than thirty years, closed by the disintegrated debris of the limestone capping the sandstone in which it is located. . . . I saw enough to satisfy myself of the accuracy of Carver's description."¹⁵

Changes at the Cave's Entrance

Here also we see a change of emphasis from internal changes at Carver's Cave to those affecting its entrance. In 1851 historian and founder of Macalester College, Edward D. Neill (1823–1893) wrote, "The cave has since then been materially altered by the tools of time, frost, air, and water. Many years ago, the roof of the cave fell in, thus exposing to the light the side walls."¹⁶ Writing in 1852, Daniel S. Curtiss, a journalist, was more emphatic:

Among the most singular or attractive curiosities in Minnesota, beside the great Falls, are

the caves, or subterranean lakes and creeks. *Carver's Cave* is one of some note; but it can rarely ever be explored, as the entrance to it is constantly changing and being obstructed by sliding rocks and earth, which frequently fill up the orifice, so that there is no access for several days, till the little stream issuing from it bursts out again, leaving a passage, sometimes, through which a man can enter and explore, though it is a hazardous experiment, not often attempted; yet, within the cave there is a beautiful crystal lake, with shining rock walls and inclosures [*sic*].¹⁷

By 1867, the centenary of Carver's purported treaty with the Sioux Indians at the cave, there is another change of emphasis. St. Paul historian J. Fletcher Williams reported that "The cave remained unchanged in appearance for over a century." He goes on to say: "Within the past two years, however, sad changes have taken place. The St. Paul & Chicago Railroad, having condemned for their use the strip of land along the river bank, including the 'bluff,' or cliff

in which is the cave, have dug it down and nearly destroyed it."¹⁸ At this point in history, natural changes were overtaken by human alterations.

The most famous reopening of Carver's Cave, which generated by far the most publicity, was that by John H. Colwell, on November 5, 1913.¹⁹ Since the cave entrance was concealed by sand deposits that had fallen from the cliff over the years, one of the methods used by Colwell to relocate the cave was to trace the spring water leaking from the deposits at the foot of the bluff.²⁰

On November 20, W.H. Emmons, head of the geology department at the University of Minnesota, visited the cave along with other university men. "Prof. Emmons," it was reported, "ventured the theory that the cave was worked out in the limestone [*sic*] formation in prehistoric times by underground waters and that the lake may extend a considerable distance."²¹

In the wake of Colwell's activity, journalist Charles T. Burnley produced a conjectural map of the cave that resembled the gut chambers of a cow, showing several rooms beyond the present back end of the cave (**Figure 2**).²² Most mysterious of all, and not even depicted on Burnley's imaginative map, was an alleged "fourth chamber" at the remotest part of the cave, with "a ceiling nearly fifty feet high. . . . A small stream of water gushes out of one wall about twenty feet above the floor."²³ In order for us to evaluate these claims for a fourth chamber nowadays, the lake inside Carver's Cave would need to be entirely drained, something not easily accomplished.²⁴ It appears likely that these discovery claims were part of the so-called "War for Fame" that engulfed Colwell and his rival discoverers in 1913.²⁵ Consequently they have no real bearing on the geology of Carver's Cave.

Amid the perceptions of larger change at Carver's Cave, however, what's the reality? The best summary is given by the local antiquarian and archeologist, Theodore H. Lewis, in 1898. Lewis began with his own length measurements: "About the year 1857 Dr. Edward D. Neill had a survey made of the cave . . . total length of the cave, 117 feet. . . . My own measurements, made October 27, 1878, are as follows . . . total length inside, 113 feet."²⁶

This throws doubt on the claim that about 22 feet of the cave entrance was removed by the railroads in 1869.²⁷ Unfortunately, when the railroad expanded its roadbed, most of what was carved away held the cave's petroglyphs.

"According to Dr. Neill," Lewis continued, "a portion of the roof had fallen in many years previous to the date of his survey, and the cavity thus formed was called the 'dome.'" This dome can easily be seen near the entrance in classic photographs taken by William H. Illingworth, circa 1870 (**Figure 3**). The dome no longer exists, as the present writer can attest from personal observation, so the cave definitely has been shortened by this much at least. St. Paul druggist Robert O. Sweeny drafted a map of the cave, presumably about the time of the 1867 centenary, and with certain exceptions it differs little from today's measurements and passage configuration (**Figure 4**).²⁸ In conclusion, the overall changes at Carver's Cave (even adding the results of human interference) appear to have been fairly small.

The Cave Today

The present writer, who began making regular visits to Carver's Cave in 1988, can affirm that the entrance has definitely been slowly eroding backward, primarily due to a combination of natural erosion (accelerated by root wedging) and human activities—perhaps local cave seekers trying to dig past

the steel doors that were used to seal the entrance in 1977. Much of the interior surface of the cave has been scored over with chisel marks, perhaps dating to the occupation of the cave by homeless men during the Great Depression.²⁹ Owing to the funnel-shaped morphology of the cliff face above the cave, which channels cascading debris, an alluvial cone formed in front of the steel doors over time. While the outer half of this cone—outside the cave—was scooped away several years ago during landscaping for the newly established Bruce Vento Nature Sanctuary, the other half—inside the cave—remains. As you proceed farther into the lake inside the cave, you come to a drop-off into deeper water, marking the edge of the debris cone.

The spring water, which flows from Carver's Cave at 25 gallons per minute, reflects the average, year-round temperature of the groundwater at the latitude of St. Paul, a chilly 52° Fahrenheit.³⁰ While a full biological survey of the cave has never been conducted, the author has regularly observed amphipods, a sort of crustacean more commonly known as a scud, or freshwater shrimp, in the lake that fills the cave, along with white planarians (flatworms), snails, minnows, and frogs. Indeed, a garbled report of these amphipods, common in cold spring waters in Minnesota, may have led to the report of "blind crayfish" in the cave in

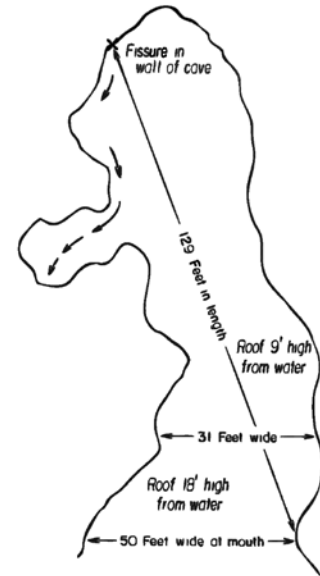


Figure 4. Sweeny's map of Carver's Cave, circa 1867. This is very similar to a map of the cave that was drafted in 1981. Map courtesy of the Minnesota Historical Society.

1913.³¹ The Carver's Cave ecosystem, lacking photosynthetic inputs, is based on organic detritus, chiefly decaying leaves that have blown in through the cave entrance, providing food for the amphipods, which in turn serve as prey for fishes that happen to enter the cave.³²

The most unusual creature observed in Carver's Cave, however, was a beaver, in 1999, which had assembled a cache of sticks on the beach just inside the entrance (**Figure 5**). The present writer has often wondered whether the beaver's presence in the cave actually strengthens the argument for the existence of the mysterious inner rooms beyond the sump at the back end of the cave, as that is the sort of situation where beavers prefer to maintain their lodges, when they do inhabit caves. Sometimes beavers will even construct artificial sumps in caves, where none previously existed, just for the protection it affords them.³³

Greg A. Brick has contributed several articles on caves for "St. Paul Underground" over the years. He is a college geology instructor and editor of the *Journal of Spelean History*. His latest book, *Subterranean Twin Cities*, published by the University of Minnesota Press in 2009, contains an extended account of the history of Carver's Cave.



Figure 5. Interior of Carver's Cave, 1999, showing cache of sticks left by beaver on beach inside cave entrance. Photo courtesy of the author.

NOTES

1. Alan R. Woolworth and Nancy L. Woolworth, "Carver's Cave: *An Enduring Landmark on the Upper Mississippi River*," in E. Calvin Alexander, Jr., ed., *An Introduction to Caves of Minnesota, Iowa, and Wisconsin. Guidebook for the 1980 National Speleological Society Convention* (Huntsville, Ala: National Speleological Society), 50–58.
2. Greg A. Brick, "Historical Perceptions of the Rate of Geological Change at Carver's Cave," *Minnesota Speleology Monthly* 38 (November–December 2006): 110–12.
3. Jonathan Carver, *Travels Through the Interior Parts of North America* (Minneapolis: Ross & Haines, Inc., 1956), pp. 63–65 (facsimile reprint of the third London edition, 1781).
4. David D. Owen, *Report of a Geological Survey of Wisconsin, Iowa, and Minnesota* (Philadelphia: Lippincott, Grambo & Co., 1852), 69. The name "St. Peter" was first used by Owen in an 1847 Congressional report.
5. Greg A. Brick, "A Piping Voice: Theories of Cave Genesis in Minnesota Prior to 1880," *Journal of Spelean History* 38 (January–June 2004): 22–23.
6. Greg A. Brick, "Classification and Morphology of St. Peter Sandstone Piping Caves in Minnesota," *Journal of Cave and Karst Studies* 59 (December 1997): 168.
7. Newton H. Winchell, "The Geology of Ramsey County," in *The Geology of Minnesota, Final Report*, v. 2 (St. Paul: Pioneer Press Company, 1888), 374.
8. R.K. Hogberg and T.N. Bayer, *Guide to the Caves of Minnesota* (St. Paul: Minnesota Geological Survey, 1967), 12–14, 20–21.
9. Stephen H. Long, "Voyage in a Six-Oared Skiff to the Falls of Saint Anthony in 1817," *Minnesota Historical Society Collections* 2 (1889): 7–88.
10. Henry R. Schoolcraft, *Narrative Journal of Travels through the Northwestern Regions of the United States* (Albany, N.Y.: E. & E. Hosford, 1821), 208.
11. Elliott Coues, *The Expeditions of Zebulon Montgomery Pike* (Minneapolis: Ross & Haines, 1965), v. 1: 198–201, fn. 30. Even many years later, other nearby caves were still being confused with Carver's Cave; for an example, see "Carver's Cave and Its Black, Bottomless Abyss," *St. Paul Globe*, May 24, 1903.
12. Giacomo C. Beltrami, *A Pilgrimage in America* (Chicago: Quadrangle Books, Inc., 1962), pp. 191–93 (reprint of the 1828 edition).
13. A.S. Mercatante, *The Facts on File Encyclopedia of World Mythology and Legend*, 2nd ed., revised by J.R. Dow (Facts on File, Inc., 2004), see "Trophonius."
14. Despite the confusion between Carver's and Fountain caves among explorers, it is fairly easy to tell them apart in the literature even when they have been misnamed. Carver's Cave is the short cave below town containing a lake, whereas Fountain Cave is the long cave above town containing a stream. Stratigraphically, the two caves differ in that Carver's Cave is located near the middle of the sandstone layer, whereas Fountain Cave is located near its top. There are subtle differences in the character of the sandstone itself at both locations, as was perceptively noted by Long, who visited both caves on the same day in 1817.
15. Joseph N. Nicollet, *Report Intended to Illustrate a Map of the Hydrographical Basin of the Upper Mississippi River*, 26th Cong., 2d sess., Doc. 52 (Washington: Blair and Rives, 1845), 72.
16. Edward D. Neill, "Wakon Teepee. Grant of Land at the Cave in Dayton's Bluff," *Annals of the Minnesota Historical Society* (1851): 61 ff.
17. Daniel S. Curtiss, *Western Portraiture, and Emigrant's Guide: A Description of Wisconsin, Illinois, and Iowa; with Remarks on Minnesota, and Other Territories* (New York: J.H. Colton, 1852), 125.
18. J. Fletcher Williams, "Capt. Jonathan Carver, and His Explorations," *Collections of the Minnesota Historical Society* I (1872): 348–67.
19. Greg A. Brick, "'Charon Trimmed His Lamp': Carver's Cave and the Definition of a Show Cave," *Journal of Spelean History* 41 (January–June 2007): 23–26.
20. "Think They Are Near Cave," *St. Paul Pioneer Press*, January 26, 1913.
21. "University Men at Carver's Cave," *St. Paul Pioneer Press*, November 21, 1913.
22. Charles T. Burnley, "Case of the Vanishing Historic Site, Or What Happened to Carver's Cave?" *Ramsey County History* 4 (Fall 1967): 8–12.
23. "Discover Fourth Chamber," *St. Paul Pioneer Press*, December 15, 1913.
24. Greg A. Brick, "Beyond the Sump: The Burnley Map of Carver's Cave," *Journal of Cave and Karst Studies* 62 (April 2000): 40. In 1991 a scuba diver unsuccessfully attempted to dive through the lake into potential passages beyond; see Don Boxmeyer, "The Mysteries of Carver's Cave," *St. Paul Pioneer Press*, July 29, 1991.
25. "War for Fame on at Carver's Cave," *St. Paul Daily News*, January 6, 1914.
26. Theodore H. Lewis, "Sculptures in Carver's Cave, St. Paul, Minn.," *The Macalester Monthly* I (November 1898): 37–42. By "sculptures," Lewis is referring to petroglyphs, among which that of the rattlesnake predominated.
27. Woolworth and Woolworth, "Carver's Cave." Another account asserted that "The mouth [of the cave] was first cut by the grading of the St. Paul road, and afterwards fifty to seventy-five feet was again taken off about the year 1887, by the Burlington road" ("Pioneer Tells of Old Carver's Cave," *St. Paul Pioneer Press*, January 26, 1913). Even more extreme, some "old settlers of Ramsey county" told Colwell that "Carver's cave has been hauled away" ("Facetious Critic Daunts Him Not," unidentified clipping).
28. A copy of Sweeney's map was published in Woolworth and Woolworth. This 1867 (?) map, which closely matches the cave now known as Carver's, is important in establishing the true identity of the cave, as there are similar caves nearby, such as Dayton's Cave, which have been confused with it over the years.
29. "Carver's Famed Cave Now Houses Colony of Homeless, Jobless Men," *St. Paul Daily News*, April 11, 1934.
30. Temperature and flow measurements were made at Carver's Cave on several occasions by the author in the late 1990s. Other values measured include pH, electrical conductivity, and the amount of dissolved oxygen in the cave lake. While it is uncertain how extensive the subterranean spring-shed is for Carver's Cave, it is known that in 1913, when the lake inside the cave was drained, the water level in Dayton's Cave, located about 400 feet upriver, was affected; see "Blind Crayfish in Carver's Cave," *St. Paul Pioneer Press*, November 13, 1913.
31. "Blind Crayfish in Carver's Cave," *St. Paul Pioneer Press*, November 13, 1913. Another unusual report was that "There is a curious vegetable growth in the water. Several bunches were taken out yesterday and Mr. Colwell will find out what it is" ("Mouth of Carver's Cave is Reached by Workmen," *St. Paul Pioneer Press*, November 6, 1913). It is likely that these were simply tangled masses of tree roots, which invade the cave along fissures in the sandstone.
32. Greg A. Brick, "Amphipods in Minnesota Caves," *Journal of Cave and Karst Studies* 62 (April 2000): 31.
33. Greg A. Brick, "Beaver into Cave History," *Minnesota Speleology Monthly* 39 (September 2007): 108.