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The Journal of Spelean History (JSH) is the Association's publication and is mailed to all members. JSH includes articles covering a wide variety of topics relating to man's use of caves, including historical cave explorations, saltpeter and other mineral extraction, and show cave development. Members are invited to contribute material and to comment on published material. ASHA assumes no responsibility for statements made by contributors.

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Front Cover: English astronomer Edmond Halley in 1736, holding a diagram showing his hollow Earth conception. See the article by Greg Brick in this issue.

WORLD PSEUDOKARST IN 1684

Greg Brick

The English translation of Thomas Burnet's *Sacred Theory of the Earth* was published in 1684 (the original Latin edition had been published in 1681). Inspired by the account of the Earth in Descartes' *Principia Philosophiae* (1644) Burnet sought to reconcile the new mechanical philosophy with Biblical narrative but as with many such efforts it was controversial. Instead of choosing the six days of Creation to model his account of Earth history upon, Burnet chose the Biblical deluge. The uniform paradisiacal globe, according to Burnet, was a smooth sphere without mountains or oceans, and cave explorers will be horrified to learn that there were no caves in this Eden! The smooth crust was underlain, not by the mantle, as taught today, but by a layer of water, below which the core of the Earth was located. Burnet called this buried layer of water the Abyss (Fig. 1).

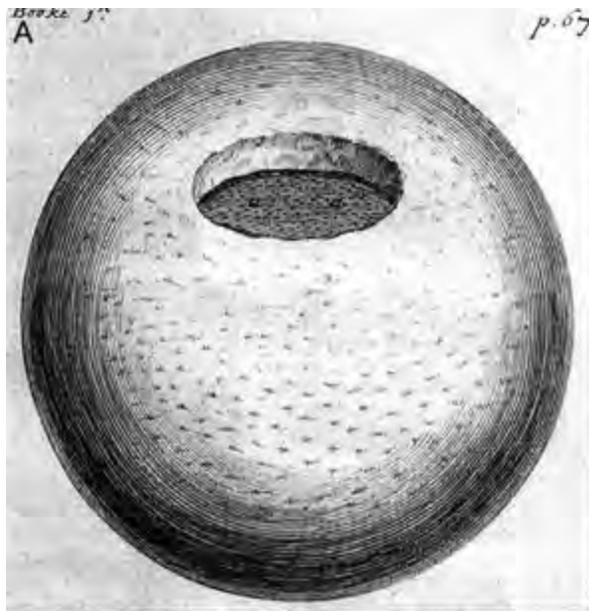


Figure 1. Burnet's Earth, showing the Abyss.

Over time, the outer crust dried and cracked, and according to Burnet the Biblical deluge involved the collapse of the crust into the Abyss, splashing the water and causing Noah's Flood. The collapse of the outer shell left not only the mountains and oceans we see today but also countless voids between the fallen crustal fragments and so, in Burnet's vision, the entire world was underlain by a sort of pseudokarst, like the interconnected boulder caves of a universal blockfield. Occasional rearrangements and settling of the fragments caused earthquakes and if there were combustibles in the interstices, volcanoes. Chapter Nine of Book One of Burnet's *Sacred Theory* is devoted to the caves. Here are a few excerpts about this pseudokarstic world, which Burnet seemed somewhat ambivalent about:

How many Holes and Caverns, and strange Subterraneous passages do we see in many Countries; and how many more may we easily imagine, that are unknown and unaccessible to us?... upon the dissolution of the first Earth, and its fall into the Abyesse... And according as the fragments fell... the Earth would generally be full of Caverns and hollownesses... 'Tis pleasant also to see a River in the middle of its course throw itself into the mouth of a Cave, or an opening of the Earth, and run under ground sometimes many miles; still pursuing its way through the dark pipes of the Earth, till at last it find an out-let... if we could see into the ground, as we ride or walk, we should be affrighted to see so often Waters or Caverns under us.... The Ancients I remember used to represent these hollow Caves and Subterraneous Regions in the nature of a World under-ground, and supposed it inhabited by the Nymphs,...

Burnet's early attempt at reconciling religion and science would inspire the whole genre of English physico-theology, most notably the

subsequent books by Woodward in 1695 and Whiston in 1696, as described by Poole (2010). Subsequently, more than 200 writers offered various theories of the Earth (Magruder, 2006).

But an even more remarkable descendant of Burnet's theory was the Hollow Earth genre started by the English astronomer Edmond Halley in 1692. Although Halley's sophisticated argument for the hollow Earth was based on the Newtonian values for lunar density, and will not be elaborated here, the germ of the notion was provided by his having read Burnet, according to Kollerstrom (1992). A famous 1736 painting of the elderly Halley depicts him holding a sketch of the hollow Earth (see cover of this issue). The subsequent history of the Hollow Earth theory, including its rebirth as Symmes Hole in the early nineteenth century, is described by Zirkle (1947) and others.

While none of Burnet's followers would present such a vision of universal pseudokarst, we must realize that speleogenesis involving chemical solution was not properly understood at least until 1830, with the publication of Lyell's *Principles of Geology* (Shaw, 1992, p. 154). Thus, early modern understanding of cave formation was primarily what we would today call pseudokarstic, although the term *pseudokarst*

itself would not be used in print until at least 1906 (Halliday, 2007).

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EARLY OBSERVATIONS ON THE CAVES OF THE ISLAND OF HAWAII

Donald B. Ball and Marcia E. Hemming

The Island of Hawaii—the largest and southeastern-most of the chain of eight major islands comprising the Hawaiian Islands—has frequently been termed a “paradise.” However, even paradise has a price, and the geological forces which created the Hawaiian Islands were awesome powers which produced countless billions of cubic yards of molten lava, vast deserts of sterile landscape, numerous extinct and active volcanic craters, and an intricate network of resulting caves and lava tubes¹(cf. Macdonald et al. 1983). These lava tubes formed across the island and are to be found at elevations ranging from below sea level to the slopes of the highest snow capped mountains.

The presence of several active vents (notably including—but not limited to—Kilauea; see **Fig. 1**) along the East Rift zone located near the southeastern coast of the Island of Hawaii has long attracted the attention of missionaries, scientific observers, and curious travelers alike. In turn, this visitation resulted in a rich and diverse literature about the “Big Island” dating to the late eighteenth century. In addition to extensive comments about the landscape, people, culture, history² and geology of the island, a number of early visitors also recorded invaluable descriptive and historical information regarding the island’s numerous caves and lava tubes. During the pre-contact era, caves on the Island of Hawaii served three distinct purposes: (1) places of refuge during times of incessant tribal warfare; (2) burial³, and (3) sacred places used for the worship of Hawaiian deities. Few—if any—were used as places of permanent or long term habitation.



Figure 1. “Crater of Kilauea” (reproduced from Nordhoff 1873:398).

But a brief sampling of these early accounts may be presented here⁴. One of the earliest descriptions of the caves on the island was recorded in 1823 by missionary William Ellis (2004:244-245) who observed in the vicinity of the Kilauea crater that:

We...entered several covered channels, or tunnels, down which the lava flowed into the large abyss. They had been formed by the cooling of the lava on the sides and surface of the stream, while it had continued to flow on underneath. As the size of the current diminished, it had left a hard crust of lava of unequal thickness over the [pg. 245] top, supported by walls of the same material on each side. Their interior was beautiful beyond description.

In many places they [i.e., lava caves] were ten or twelve feet high, and as many wide at the bottom. The roofs formed a regular arch, hung with red and brown stalactitic lava, in every imaginable shape, while the floor appeared like one continued glassy stream. The winding of the current and the ripple of its surface were so entire, that it seemed as if, while in rapid motion, the stream of lava had suddenly stopped, and become indurated, even before the undulations of the surface had subsided.

Ellis (2004:363-364) further remarked upon the use of caves as a repository for the deceased:

The common people ...preferred natural graves whenever available, and selected for this purpose caves in the sides of their steep rocks, or large subterranean caverns.

Sometimes the inhabitants of a village deposited their dead in one large cavern, but in general each family had [pg. 364] a distinct sepulchral cave.

Another very early account (Anonymous 1826) was extracted from an 1825 report entitled *Journal of a Tour around Hawaii, the Largest of the Sandwich Islands (1825) by a Deputation from the Mission on those Island*, subsequently reprinted in the pages of the April 1826 issue of *North American Review*:

[pg. 344] 'About sunset Mr Goodrich ascended a neighboring height, and visited the spot [on the Island of Hawaii] where the body of the unfortunate Captain Cook was cut to pieces, and the flesh, separated from the bones, was burnt. It is a small inclosure [sic] about fifteen feet square, surrounded by a wall five feet high. Within is a kind of hearth about eighteen inches high, encircled by a row of rude stones. Here the fire was kindled on the above mentioned occasion. The place is still strewn with charcoal.'

[pg. 345] '*Some of us* climbed the rocks, and *visited the cave where the body of Captain Cook was deposited*, on being first taken from the beach' (emphasis added).

[pg. 347] 'After the investigation, that has been made, we have no doubt, but that *part of Captain Cook's bones* were preserved by the priests, and were considered sacred by the people, probably till the abolition of idolatry in 1819. At that period, *most likely they were committed to the secret care of some chief, or deposited by the priests, who had charge of them, in some cave unknown to all besides themselves...*' (emphasis added).

Among the many early scientifically oriented expeditions to the Pacific region, one was commanded by Capt. Charles Wilkes⁵ of the United States Navy during the years 1838-1842. During the course of his travels, he landed on the Island of Hawaii and reported (Anonymous 1846:436):

On the 3d of December, the Vincennes sailed from Honolulu... and on the 9th she anchored in Hilo Bay. The principal object of her visit to Hawaii, was to

survey a large volcanic mountain named Maumi [sic] Loa, whose summit is nearly 14,000 feet above the level of the sea. The party employed in this duty was commanded by Captain Wilkes himself, and consisted of several officers and scientific gentlemen, ten seamen, and about two hundred natives, who acted as guides and porters. They left the ship on the 14th... On the 18th the ascent of Manna Loa was commenced; and on the evening of the 19th the exploring party encamped at the height of 6000 feet above the level of the sea. Here they were joined by fifty officers and men from the Vincennes, whose assistance it had been found necessary to procure... so that the party now consisted of nearly three hundred men. The 20th, being Sunday, was passed in repose; but *on the 21st the ascent was resumed, and they reached a large cave, which was subsequently very useful as a depot for stores; and a shelter for those who became disabled by the mountain sickness—from this circumstance called, the Recruiting Station. A lieutenant and a party of men were left at this place...* (emphasis added).

During the course of his visit to the island, Henry T. Cleever (1856) offered several insightful remarks concerning both the use and appearance of various caves:

[pg. 194] Near the house of Mr. [Asa] Thurston⁶ [a missionary] is the entrance of a cave, called Laniakea, which once formed a valuable appendage, a kind of donjon-keep to an old fort hard by, whose walls have been the inexhaustible quarry for all [of] Mr. Thurston's building and fencing. In times of war, the wives, children, and infirm used to be put there, in case of assault or sally from the fort. Mrs. Thurston used it for a while as her dairy-house, until the shock of an earthquake one day, just after she had come out of it, made the idea of being buried alive there so appalling, or being struck by some loosened fragment from the roof, that she has since deserted it.

I have explored it to the distance of nearly a quarter of a mile, until stopped by a wide and deep pool of brackish water, which, it is said, rises and falls with the tide. The native guide who was with me left his torch on a rock and boldly plunged into the [pg. 195] subterranean pool, whose waters splashed more at his odd capers than ever Stygian Lake at the skiff and paddle of old Charon.

The bottom of the cave is about twenty feet wide, exceedingly rough with fragments that have dropped from above, and the various shapes in which the lava cooled below. The roof is in some places thirty feet high; in others so low, and the passage so narrow, as to oblige one to stoop in passing. The sides are in many places white with an effervescence like magnesia or

nitre. The roof is stalactical black lava, and was once evidently dropping with fused earth and minerals, while the fiery fluid ran as in a sluice-way to the sea. A little way in, the walls are damp and the air close; and there is a stillness and gloom in these bowels of the earth that may be felt by more of the senses than one.

[pg. 255] We visited the other day a large and deep subterranean gallery, about six miles from Waiohinu, which was once a sluice-way to the sea from some pent-stock of liquid lava further inland. The way to it was a novel one, over rough, unworn lava, and for a while through a dense growth of the *wilimili* and *ohi* [sic; ohia] trees...

The gallery we went to see opens at a deep pit, made by the falling in of its roof in that part. It is about fifty feet high at the entrance, and the descent is steep for several yards. We found within a woman washing *kapas*, with her child, by fresh water that drops from the vault into calabashes. Proceeding further, we found a fort, consisting of a wall thrown up [pg. 256] across the way where it went between steep rocks. Behind it were places leveled off and built up for sleeping. It was resorted to by the natives in time of war.

We lighted a lantern, and explored for some rods, finding here and there, in the crevices, shells and sea eggs, and pieces of bone, left, probably, by natives living there in time of siege. Rocks have from time to time been dropped from the roof in earthquakes, and the bottom is the most jagged and irregular possible. How far underground it goes, rock-ribbed and vast, it is impossible to say—probably several miles, up to the place whence issued the last eruption. A quarter of a mile nearer to the ocean the same cave opens again, and, descending to about a level with the sea, there is found a pool of water, as at the cave in Kailua, in which one of our natives soon waded beyond his depth.

There is nothing beautiful, but much that is titanic and sublime, in the silence, and gloom, and vastness of such a place, where you stand, seemingly, in the bowels of the earth, along where liquid fire has flowed ages ago, and where earthquakes have dislodged vast fragments of rock from the ragged roof...

In the mid-1860s, Mary E. Anderson (1865:119) traveled along the southwestern coast of the island and noted:

About half a mile beyond the City of Refuge⁷ is a high bluff, over which are solid lava falls, looking just like a waterfall, only black. They are hundreds of feet broad and more than a hundred feet high. You can walk between the bluff and the fall, and look up a hundred

feet. We went into a cave, which is an eighth of a mile deep, leading to the sea. It probably was once a channel through which a lava stream flowed into the ocean.

In a final tourist account, William T. Brigham (1868) described in some detail various caves on the eastern side of the island:

[pg. 376] The Anuenúe, or Rainbow Falls⁸ [on the Wailuku River], are about a mile from the sea [and Hilo Bay], and beneath the sheet of water which falls more than a hundred feet is seen another result of the sudden chilling of heated — not melted — basalt. The columns at the point of contact with the water are at right angles to the surface, but curve regularly below, and the surface is much harder than the lower portions, so that while quite perfect near the top where the wearing action of the water is considerable, they are completely washed away below, forming a cave of some depth beneath...

[pg. 426] Saturday it was rainy... so I went into Kilauéa [the crater of an active volcano] to explore the caves. The Halemaúmau was not in a very lively condition, and passing beyond that, I went into a cave of considerable extent, where the curious siliceous tubes had formed on the rock roof, and obtained many of these fragile specimens some of which were coated with beautiful white crystals. This cave was more than fifty feet below the level of the melted lava in the lake, and the walls did not seem very secure. A lava stream had recently poured into the mouth of the cave, but there were no vapors, nor any uncomfortable heat. Taking advantage of a change of wind, I passed around the lake, and ascended a cone with two peaks formed by lava spatters, but completely closed on the top, as nearly all the others in the crater were, and found steam hissing from many apertures. On breaking off the crust beautiful crystals of various salts were found thickly coating the under surface, and in one place we found much nitrate of potassa [sic]. I went from cave to cave, from cone to cone, collecting various kinds of lava and several salts, and finished by a bath in a steam cave, where the steam issued from the floor at an agreeable temperature, and condensed on the roof, falling in rain. The water was quite sweet, and no smell of sulphur was noticeable in the cave. On the roof the little tube stalactites were constantly forming by the solution of the silica in the rock above, and I broke off the brittle, twisted tubes sometimes a foot long. On the floor the drops have made stalagmites of various forms. This steam bath was most delightful after the smoking I had just experienced in a cave where the end was red-hot, and into which my natives did not dare to go.

[pg. 428] Tuesday I went with my boy Ioane to explore

the woods. As I followed a path made by the pulupickers through the dense forest, *I came upon a large hole on the edge of the path which proved to be the entrance to a cave of great depth. The path had been turned to one side to avoid it, and in the dark it would be exceedingly dangerous. Such holes are common in this part of Puna [a district on the Island of Hawaii], and natives occasionally disappear mysteriously...* (emphasis added).

Brief mention of two underwater caves appeared in a report prepared by the Royal Commission on the Development of the Resources of the Kingdom (1877) and submitted to then-reigning King Kalakaua regarding suggested internal improvements intended to facilitate commerce:

[pg. 3] DISTRICT OF KOHALA [northern end of the island]. ...The Commission carefully examined the landing at Honoipu. The boat landing is on the side of a point of lava rock which makes out for some 300 feet or more from the shore, over which the surf breaks at times with great force, so as to render any structure of reasonable cost impracticable. The anchorage is good, and vessels can lay safely, even at times when with present facilities a boat could not safely lay to land cargo. The Commission recommended that a boat dock be blasted out of the lava rock, say 40 feet long by 15 feet wide, with a depth of five feet at lowest water where the present landing stage is. Examination shows that a cave exists under the rock, which lessens by a great deal the amount of rock to be removed. It is believed that such a dock would often enable the shipping and landing of merchandise on occasions when with present facilities the landing would be useless, and thus promote the welfare of the district. The cost of such a dock is estimated from such data as was obtained at \$1500.

[pg. 8] DISTRICT OF HILO [eastern side of the island]. The first point examined in this district was the proposed landing at Ookala. A gulch runs down to the shore, where it ends in a cliff some 200 feet high. To the eastward of the gulch a small point of land makes out into the sea with a projecting reef of rocks, making a small cave which is smooth in ordinary weather and affording an opportunity for a derrick. The cliff is very precipitous and overhangs the sea in places.

For the modern visitor to the “Big Island,” several caves can be seen or visited. These include (but are by no means limited to):

1. Waiūohina Lava Tube, part of the

Pu'uhonua o Hōnaunau National Historic Park (James 1995:92), located in the Kona District on the southwestern coast of the island;

2. A shelter cave at Kalāhuipua'a (James 1995:128) located in the Kohala District on the northwestern coast of the island;

3. Kalalea Heiau, Ka'ū (Crowe and Crowe 2001:38-41), a show cave consisting of several miles of lava tubes, located at appropriately named South Point at the southernmost tip of the island; and

4. Thurston Lava Tube in Volcanoes National Park (cf. Hazlett and Hyndman 1996:77-78); several hundred feet of this tube are furnished with electric lighting but a further stretch is accessible only to those who have the foresight to bring their own flashlight.

It should be remembered that many caves are located on private property and a number are considered strictly off limits by virtue of having been used as burial caves (all such caves are protected by state law).

It may be noted that many miles of lava tubes underlie the Puna district on the eastern side of the Big Island. With some notable exceptions, they are largely unmapped and unexplored except by a select group of dedicated lava tube cavers. Most of Puna is privately held land as are the lava tube systems beneath. Securing permission to explore these can be difficult due to contending with both overseas ownership and the high price of liability insurance.

An unfortunate reality of development across the island is that many caves have become polluted with vast quantities of modern waste and trash⁹. For some residents, they are no more than a convenient place to dump household debris, disposable diapers, syringes, and colostomy bags. Others have opted to cut holes in the roofs of some caves and literally

use the passageways beneath as cesspools while a few have thoughtlessly persisted in using them as impromptu repositories for chemical wastes little caring about the long-term adverse environmental consequences. Despite the recent passage of state laws making such activities illegal, it will be a long and slow process to undo the extensive damage which has taken place. Paradise, it seems, has become an unwitting victim of its own success.

NOTES

1. Much of the pioneering study of the island's caves was undertaken by vulcanologist Thomas A. Jagger, Jr. (cf. Halliday 1997).

2. The literature concerning the culture, history, and archaeology of the native Hawaiians is voluminous. Useful points of departure include (but are not limited to) the following sources: Cordy (2000); Crowe and Crowe (2001); Ellis (2004); Fornander (1996); James (1995); Kalakaua (1990); Kāne (1997); Kirch (1985), Lee and Stasack (2000); Malo (1951); Midkiff et al. (1999); and Stokes (1991). The role of caves in pre-contact Hawaii cannot be separated from the society of which they were an integral part.

3. Likely the best known usage of caves as a place of burial is the unknown cave associated with the resting place of the bones of King Kamehameha the Great (cf. Halliday 1991).

4. For example, Halliday (2004) discusses descriptions of caves on the island made by the Rev. Titus Coan.

5. Halliday (2003) briefly inventories other instances of the mention of Hawaiian caves appearing in Wilkes' extended report.

6. The well-known Thurston Lava Tube (cf. Hazlett and Hyndman 1996:77) near the Kilauea Iki ("Little Kilauea") pit crater was named for publisher Mr. Lorrin Thurston, a descendant of this early missionary. This lava tube is of relatively recent origin and is estimated to have been formed AD 1500-1650.

7. The City (or Place) of Refuge (*Pu'uhonua o Hōnaunau*) was sacred to the ancient Hawaiians and served as a place to be ritually cleansed by priests after committing any crime or violating any of a number of social *kapu* (taboos). Even the king—who maintained an immediately adjacent retreat—could not enter this

sanctuary without the permission of the priests but should an individual leave before completing the prescribed ceremonies he (or she) could be killed on the spot (cf. Crowe and Crowe 2001:34-37; James 1995:89-93). Because of the area's inordinately rugged terrain, it was no small feat to reach this site and often required swimming a not infrequently shark infested bay to reach it. This site is now preserved as a National Historic Site administered by the National Park Service.

8. This yet unspoiled waterfall and the rather sizable cave discussed by Brigham are presently preserved in an easily accessible state park on Rainbow Drive off Waiānuenu Avenue in Hilo. There is no admission charge. Entry to the cave is prohibited for fear of rock falling from the ceiling. Visitors should be forewarned that there is no safe or convenient way to access the cave although a walkway adjacent to the public parking area affords a spectacular elevated view of both the waterfall and cave.

9. See website entitled "Hawaiian Island Journal—Last Issue Stories" accessible at: hawaiiislandjournal.com/2003/5a03a.html (accessed April 23, 2006).

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EXPLORATION OF A PACIFIC CAVERN

Donald B. Ball

Recognizing that caves have long been a source of abject fear, unresolved mystery, and unabated curiosity, it seems appropriate to present an account of overcoming such needless trepidations. The experiences of the sailors recounted here are certainly reminiscent of the description of an early 1860s tour of Howe's Cave in New York in which it was remarked (Anonymous 1862:426) that, "The deathlike silence of the solitude that surrounded us impressed us with a vague feeling of fear..." or similar observations (Anonymous 1859:609) regarding explorations in a cave in Honduras which recalled that, "No one, it was said, had ever reached its inner recesses, and the few who had made the attempt not only encountered fearful sights and sounds, but were fortunate in escaping with life." Beyond any reasonable doubt, a thorough search of the spelean literature would likely bring to light scores of comparable observations.

Although the location of the subject cave is unknown—and, indeed, it may well be apocryphal—the moral of the story is clear. As recorded by Anonymous (1858:187-189) in an article entitled "The Superstitions of Sailors" originally published in the January 1858 issue of *Harper's New Monthly Magazine*:

Whenever we are at a loss to assign to an object presented to our notice for the first time its proper class, or to trace a cause to its effect, we exercise the faculty of wonder, differing in intensity in proportion to the power of the exciting cause; and in elucidation of this theory, a circumstance which occurred to some English sailors, while investigating an island in the Pacific is introduced here.

The shore-going party had left the ship, and were proceeding toward the land, which the morning sun had revealed to them rather unexpect- [pg. 188] tedly. They had two boats, the jolly-boat and a cutter. On nearing the shore they were much surprised to find the sea covered with branches of the most beautiful coral,

in places rising level with the surface of the sea, forming beautiful little bays and creeks, the margins of which were of the most dazzling hues; in one of them was a bed of coral a few feet below the surface; and as the boats skimmed over it the varying shades caused by the gentle rippling of the water afforded one of the most delightful sights that nature ever presented. It appeared to grow from the shore in a lateral direction, and branched out in surprising luxuriance, but its extensive ramifications prevented its root being seen; it had, therefore, the appearance of hanging in the water. The smooth sea, the bland air, and the bright sun illumined the different kinds of coral, and exposed them, in all their brilliancy, to the delighted gaze of the party. Bright as the coral was, it was dullness itself when compared with the myriads of fishes which glided about at their leisure in these coral basins; the intensity of their hues baffles all description, and the enchanting harmony of the whole was completed by the variety of their size and form.

After passing over this singular place the water suddenly deepened, and pulling direct for the shore, distant about half musket shot, they perceived the mouth of a cavern [Fig. 1] into which the sea flowed. At the entrance the water was about six fathoms deep, which gradually became shallower as they advanced into the interior; at a distance of about three hundred yards from its mouth the cavern branched off in two directions almost at right angles—the main channel, however, continuing in a straightforward course, the branch to the right having an opening which communicated with the sea, though at a considerable distance. After a little delay, spent in examining the glittering sides of the cavern, the boats separated, the one taking the opening to the right, and the other the opening to the left, which was but obscurely lighted. We will follow the fortunes of the first boat. After passing some distance down the new-found opening they came to others, branching off in various directions, in most of which there was water sufficient to float the boat; they continued to gently grope their way toward the light, leaving the side channels unexplored, fearing to lose themselves in the labyrinths of the grotto.



Figure 1. “The cave” (reproduced from Anonymous 1858:187).

Pulling gently along, and constantly sounding the bottom with a boat-hook, they ultimately arrived at the other entrance of the cavern; but before coming to it they entered one of the most stupendous and magnificent-looking halls the mind can contemplate, placed at such a distance from the mouth of the cave as to exclude the too scrutinizing effects of the daylight, and yet obtaining sufficient light to indistinctly show the outlines of the place [Fig. 2].

It was impossible to ascertain the height of the roof, as it was totally concealed from view in impenetrable gloom; on rowing round it, the circumference was considered at least a quarter of a mile. In different places broad, lofty aisles, flying buttresses, Gothic pillars—all on the [pg. 189] grandest scale—were presented to the imagination; and the effect of the whole was singularly heightened by the flashes of phosphorescent light emitted from the water as the boat passed through it; living streams of pale blue fire seemed to cling to the blades of the oars, and the boat’s wake shone with the brilliancy of melted silver.

Admiration and astonishment are but poor terms to express the emotions of the mind in visiting this extraordinary place. If a mermaid or a siren, or any other fabled creation of the brain, had sprung out of the water, she would have been considered in her proper place; in short, it seemed the fitted abode for such beings. After lingering about, loth to leave the spot containing such singular beauty, and regretting that a natural curiosity so stupendously elegant should be so far removed from the civilized world, the boat’s crew retraced their course, in order to join their companions.

They were doomed to be terrified as well as delighted ere they reached the open day again, as, by the time

they had gained the spot where the boats separated, they found their shipmates waiting their return in the greatest impatience.

It appeared, after their separation, the boat’s crew investigating the opening in the cavern to the left, after penetrating a little distance, found their further progress impeded by some object which nearly reached across the channel of the cave, and which appeared to move itself up and down as if endowed with life. The indistinctness of the light prevented an accurate examination, and as mystery



Figure 2. “Exploding [sic] a monster (reproduced from Anonymous 1858:188).

always magnifies danger, they concluded it was some huge marine monster entangled in the mazes of the cavern; and not knowing what to make of it, they paused at a respectful distance, to examine more closely. One roll of the mass, however, completely disconcerted their nerves; and the sighing of the wind through the vaulted roofs and arches of the cave gave a moaning and indistinct sound, which had a powerful effect upon their imagination. After waiting a single instant they pulled the boat’s head round, and rowed with all their might toward their companions, who arrived just in time to witness their excitement. Now these very men, who, in all probability, would have faced the battery of a ninety-gun ship, hour after hour, without flinching, fled from an indistinct and unknown danger acting upon their superstitious fears.

After quieting their apprehensions, the boats united and returning to the charge with increased numbers, they set about in right earnest to unriddle the cause of their dismay. Upon close examination it proved to be an old palm, which, having been blown from the land into the sea, had floated into the cavern, where the set of the tide had placed it in the position found by the party. One end was poised upon a shelving rock, and

time had covered the whole with a mass of long seaweed. The rising and falling of the waters, caused by the swell of the sea from the outside, gave it that motion which the excited imagination of the sailors converted into the agonizing throes of some dying sea-monster. How many of our superstitious fears might be calmed if a similar investigation into cause and effect were instituted!

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NATURAL CAVE AT THE BONIN ISLANDS, WESTERN PACIFIC OCEAN

Donald B. Ball

While it is perhaps easy enough to recall Commodore Matthew Perry's (1794-1858) historic trip to the nation of Japan in 1853 (cf. Hawks 1856), modern readers may not realize that it was an inordinately long journey from his point of departure on the east coast of the United States to his ultimate port of call. Along the way, the Commodore stopped at many places for food, fresh water, and fuel including Madeira, St. Helena, the Cape of Good Hope, Mauritius, Ceylon, Singapore, Macao, Hong Kong, and Canton (Anonymous 1856a:442). One of the lesser known places visited by Perry during his epic voyage was the Bonin Islands (now known as the Ogasawara Islands), an archipelago of thirty small islands covering in excess of 40 square miles in the western Pacific Ocean approximately 620 miles south of Tokyo, Japan, and about the same distance north of the island of Guam. This chain of islands was first brought to the attention of the United States in 1823 by Captain James Coffin of the *Transit*, a New England whaler (Anonymous 1856b:237). Only two of these islands—now called Chichi Jima and Haha Jima—are presently occupied. The highest point on the islands stands 1,500 feet above sea level. Iwo Jima, an island situated about 150 miles south of this chain, would later attain lasting notoriety during World War II. Ironically, this cluster of islands had been claimed on behalf of the United States by Perry at the time of his June 1853 visit but this claim was not pursued by President Franklin Pierce's administration (cf. Cholmondeley 1915). The islands were formally annexed by Japan in 1862 (cf. Head and Gaws 1968). Despite the lack of official United States interest in acquiring the island, the occupants—most of whom were descendants of American seamen and claimed American citizenship—continued to supplement their meager living by selling or bartering produce to passing whalers and

other ships throughout much of the nineteenth century (cf. Anonymous 1861:240, 305, 308; Collinson 1852; Head and Gaws 1968; Robertson 1876; Quin 1856). Following World War II, the chain was administered by the US Navy and for a period served as a depot for the storage of US nuclear weapons (Head and Gaws 1968). The islands reverted to Japanese control on June 26, 1968.

Aside from surveying the Bonin Islands with the intent of establishing a coaling and provisioning station there in support of future naval and merchant marine activities, several sites of spelean interest were visited by the Perry expedition. As noted in one account (Anonymous 1856a:458):

The Bonin Islands are of volcanic origin, and show, by their irregular outlines, their bold, abrupt cliffs, their broken headlands, their heaped-up rocks, their steep gorges, and the generally confused surface of the land, that Nature has been struggling at some time in one of her wildest convulsions. The imaginative eye, as it looks upon the scene, can picture the varied forms of castle and tower, and the most grotesque shapes of animals monstrous in size and hideous in form. Though the irregular upheaving of the rocky foundations of the islands, and the spasmodic struggling of the volcanic force, finding issue in cavernous vents and jagged fissures through which it has poured torrents of lava, have given the shore generally the grandeur of wild confusion, yet by some strange chance a certain order and regularity of form have been preserved here and there amidst the universal convulsion. Many passages pass like canals through the base of the hills, and have a smoothness and regularity as if they had been executed by the most skillful art. There is one which passes through a headland bounding the harbor of Port Lloyd, which is constantly traversed by the canoes of the inhabitants, and there is another, with a width of fifteen feet and a height within of fifty, the roof of which rises in an arch, which spans the canal with all the regularity of an architectural structure. (Fig. 1)

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Figure 1. "Natural Cave, Bonin Islands" (reproduced from Anonymous 1856a:459).

EARLY REPORTS OF AN ALUM CAVE IN NEW ZEALAND

Donald B. Ball

Undoubtedly attributable to their general lack of visitation by travelers from the United States, the caves of New Zealand are poorly known to most American students of spelean history. In common with Hawaii and the Bonin Islands, New Zealand's formation by volcanic action created numerous places of spelean interest. The present remarks record but a few of the early observation of the nation's caves.

With a regrettable economy of words, one early visitor (Anonymous 1871:584) succinctly observed, "The only object of interest on this road, before getting into the suburbs of Christchurch, is Cave Rock [Fig. 1], near Sumner."

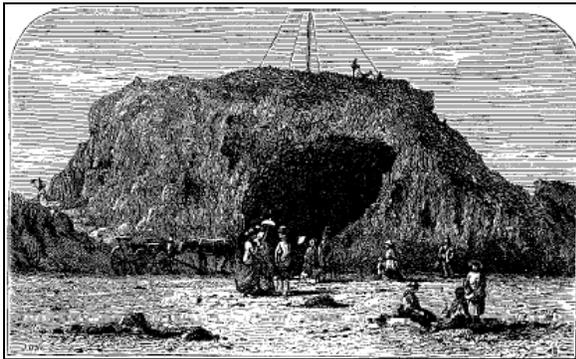


Figure 1. "Cave Rock" (reproduced from Anonymous 1871:586).

After visiting the well-known Tutanekai (Tewakaturou) geyser, Clement Bunbury (1879:817) describes the course of events surrounding a trip to see a cave of note:

My friend and I ...started the next morning with the guide Fraser to visit the more southern limits of the hot-spring country. A ride of about thirty-five miles brought us to the Waikato, a large, swift-flowing river... The canoe that we had expected to cross in was not forthcoming, so that we had to camp where we were; luckily the night was fine, and we had plenty of provisions...

After crossing the river at daybreak we soon came to a native settlement of Ora-kei-karako, and there got a native to guide us to the alum cave for which the place is famous. The entrance to the cave is completely hidden by creepers and magnificent tree ferns with heavily silvered fronds fully twelve feet in length. Descending the cave some eighty or ninety feet by almost regularly formed steep steps, we found a beautiful pool of clear blue water at the bottom. Of course we bathed in the pool; it was warm, strongly impregnated with alum, and when we were swimming with our backs to the entrance it had, curiously enough, exactly the appearance of getting its light from below. The Maori name for it is "the looking-glass," so called, probably, from its power of reflecting light. The floor and walls of the cave were thickly covered with deposits of pure alum, and the roof was colored in parts with pretty variegated patches resembling marble frescoes.

A second narrative of travel in the Waikato River region of Auckland recorded in some detail both the alum cave and its surrounding vegetation. As observed by Anonymous (1884:239):

One of the principal geysers, which has a temperature of about 202°, and is in constant ebullition, has formed a silicious terrace—or rather a series of terraces—extending right down to the river's brink. Thus the [nearby] village is provided with exquisite white marble baths, all fringed with deep stalactites. One of these forms a most delightful natural armchair, nature polished to a degree of smoothness which must be felt to be realized; and so rapid is the deposit of silica that the luxurious bather, who has reposed for half an hour in this delicious pool, acquires a thin coating of this transparent glaze which makes the skin feel so enchantingly smooth and soft as to be rather suggestive of the silky plumage of a water-bird (and what can I suggest smoother and pleasanter to the touch than the soft breast-feathers of a wild duck in good condition?)

One of the attractions of this place is an alum cave, where a warm pool of the loveliest light-blue water is cradled in a cavern all encrusted with crystals of pure white alum. The rock around is of a dead-red hue, but it is veiled by a profusion of tall, silvery tree-ferns, growing in rank luxuriance; and nowhere are these graceful darlings of the vegetable kingdom to be seen in

greater perfection than in such parts of New Zealand's primeval forests as have escaped the too "improving" hand of the settlers. I have seen some which carried their exquisite crown of lacelike foliage on a stem fully forty feet in height, forming a fairy-like canopy for a whole fern kingdom of humbler growths. Fairy-like indeed is the scene when at night the innumerable glowworms light their tiny lanterns, and thousands of pale-green rays glitter on every hand.

The daintiest ferns seem specially to rejoice in the warm, steaming atmosphere of the hot springs, on whose very brink they flourish, therein finding conditions of well-nigh tropical existence. They clothe the margin of every crevice and fissure from which rise heated air and steam, so that oftentimes deluded cattle and horses, attracted by the lovely green, venture too close to dangerous ground, and suddenly disappear, to be no more seen.

Very beautiful is the soft verdure of the ferns and lycopodiums which so delicately tapestry even the steepest cliffs of the Waikato River that it is sometimes

difficult to discern where the clear, bright green of the water blends with that of the vegetation...

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HISTORY OF BAKER CAVERNS

Charles E. Miller, Jr.

Introduction

The Chambersburg, Pennsylvania, area of the Cumberland Valley is rich in caves with at least 50 within 30 miles, described in the literature. Most are small and poorly decorated, even by Pennsylvania standards. However, one of them, Baker Caverns at Williamson, was commercialized for 22 years. This cave has 3000 feet of surveyed passages, is Franklin County's longest cave, and one of Pennsylvania's longest.

History

Baker Caverns was discovered in 1830 either when a sinkhole collapsed beneath a horse belonging to Samuel Myers, farm tenant (Martin Burgan, pers. comm.; Anonymous, 1932) or when John Coffey, land-owner, blasted rocks (undated Baker Caverns press release). The cave was known variously as John Coffey Cave, Coffey Cave, and Williamson Cave (Anonymous, 1930). The original cave opening, located 30 feet from Route 995, was 2 to 2.5 feet wide (**Fig. 1**). Dates cavers left behind indicate earliest, documented exploration was in 1836. Between 1836 and formal opening in 1932, Mercersburg Academy students explored the caverns. Early explorations vandalized speleothems, particularly sodastraws, while cave walls were marked with carbon soot from candles (M. R. Burgan, Jr., pers. comm.).



Figure 1. Discovery opening of Baker Caverns.

In 1931, M.L. Burgan came to Franklin County in search of caverns to develop and operate. Previously, he was tour guide in other caves, including Crystal Grottoes at Boonesboro, Maryland (M.R. Burgan, Jr., pers. comm.). Burgan learned of Williamson caves and in 1932, leased rights from the J. Baker Limestone Company of York that quarried on site. The lease was for 99 years to all caves in a 1500-acre tract (Anonymous, 1954c). Work on exploring and opening the caverns began at the beginning of the year and on July 3 Burgan and O.G. Edwards held the formal opening (Anonymous, 1932). At this time, the name became Baker Caverns. A small two-story building was erected over the cave opening (**Fig. 2**). Later additions transformed the building into the one seen today (**Fig. 3**). In 1942 and 1943, Burgan bought the 155-acre farm on which Baker Caverns is located for \$6,200. He then canceled the lease previously held.



Figure 2. Original building over entrance to Baker Caverns.

Preparing the cave for tourists included constructing walkways, stairs, and installing lighting. Walkways were initially crushed stone (Stone, 1932, p. 77) and later covered with cement. Because cement was carried in five-gallon buckets, progress was slow with only 20 feet or so cemented per day (Martin Burgan, Jr., pers. comm.). Cave lighting used daylight globes that gave a bluish tint designed to illuminate like natural light. No colored lights were used (Anonymous, 1932).



Figure 3. Building over entrance to Baker Caverns after additions.

Common to most commercial caves are exaggerated claims and Baker Caverns was no different. Tours were said to be about 5000 feet when, actually, they were significantly

less. A 1942 Baker Caverns tour was advertised as “one hour, one mile” (Petrie, 1942, pp. 61-62). The “5000 feet” and “one mile” claims are surprising because the cave’s total length of surveyed passages is 3000 feet and that total was not determined until after the cave had closed. Even if claims included retracing part of the route, Stone (1953) reports: “the route traversed, including steps retraced, is about 250 yards (750 feet or 0.14 miles) and is easily covered in 40 minutes. Smeltzer (1964) reports a tour length of 1160 feet (0.22 miles). *The Record Herald* (date unknown) reported that an average tour was an hour and fifteen minutes.

Baker Caverns advertising used billboards, some as far away as Bedford and Gettysburg (M.R. Burgan, Jr., pers. comm.) and brochures. In those years Pennsylvania’s commercial cave owners reciprocally displayed brochures of each other’s caves.

During the opening summer (1932), admission was 50 cents for adults. In 1942 it was 55 cents for adults and 25 cents for children (Petrie, 1942, pp. 61-62). To facilitate tourists, soft drinks set in tubs of cracked ice were sold. A gift shop, hotel, parking area, and picnic grounds were provided. The picnic area was on the other side of Route 995, directly across from the gift shop. A small metal gate provides access to the former picnic grounds, now overgrown. There, picnic tables, trees, and rose bushes provided a relaxing setting for tourists. One picnic table was an old grist mill wheel now located on the Williamson Community Center grounds (Joseph A. Budd, pers. comm.). Gift shop souvenirs ranged from postcards, salt and pepper shakers, to pennants—emblazoned with the “Baker Caverns” logo. Some

souvenirs were made in the gift shop, such as the piano/flower pot planters and ashtrays. These were made from local cedar trees. Today, most cedar trees near Baker Caverns are secondary growth. Other souvenirs included coin/pocket purses as well as turquoise bracelets and other jewelry. While most souvenirs were of local origin, one—Roseville Pottery—was imported from Gainesville, Ohio. Joseph A. Budd, Sr. of Williamson and Martin Burgan (grandson of the original Baker Caverns operator) of Chambersburg, both former tour guides at the caverns, have excellent collections of historical postcards and other memorabilia. When the caverns closed in 1954, Mr. and Mrs. Burgan dumped souvenirs, brochures, and bumper stickers into the nearby limestone quarry located on the opposite side of Route 995 (M. Burgan, Jr., pers. Comm.). Today, those would be collectors' items. At the same time, the gift shop was converted to living quarters.

During early years of operation, Martin Burgan, Jr. (grandson of M.L. Burgan) was too young to be tour guide. Instead he was a trailer—one whose job it was to trail at the end of a tour group, to keep the group generally bunched together, and to switch off lights behind them. The goal was to turn off one string of lights between groups. When not serving as a trailer, during tours Burgan put “Baker Caverns” bumper stickers on cars in the parking lot (pers. comm.). One day in 1951 or 1952, Martin Burgan's parents asked him to skip school (James Buchanan High School) because he was needed to lead cave tours. One tour group to arrive that day included Martin's classmates (Mrs. Martin Burgan, Jr., pers. comm.).

From 1952 until 1959 Bethlehem Steel Company purchased 35 land parcels in the Williamson area to increase its limestone reserves, despite denials it had plans to quarry in the area (Anonymous, 1955). When the caverns closed in 1954, acreage that included the caverns became part of 3,185.18 acres Bethlehem purchased. The caverns, along with 155 acres of land, were sold to the steel company for \$65,000 (Anonymous, 1954b). The January 21, 1953 edition of *Public Opinion* gives a chronology of the Williamson land purchases. From its closing until end of 1988, Baker Caverns were generally off limits to spelunkers. Only on a limited basis, requiring special permission, were groups permitted to tour the caverns. In 1988 the steel company sold all of its acquired acreage to a consortium of 10 farmers and Valley Quarries, Inc. (Hector Arechiga, Bethlehem Steel Company, pers. comm.). The sale is recorded in Franklin County, PA. Deed Book, Volume 288-D. The pages are stamped Volume 1037, pages 246 to 249 (Roman Barvinchack, pers. comm.). Since the sale, Lee and Dean Meyers of Williamson own Baker Caverns.

Baker Caverns were closed on Labor Day, 1954. Cessation of operations was due to two factors: (1) M.L. Burgan was having health problems, and (2) Bethlehem Steel's massive land purchases isolated Burgan property. Years of speculation about secret drilling and land purchasing in the Williamson area preceded the closing. Speculation included possible underground storage, quarrying high-grade limestone for fluxing steel, mining cobalt, mining magnetite, and government construction of a second underground Pentagon. The theories of possible cobalt and magnetite mining are interesting. No deposits of either mineral are known in the local area.

A potentially scientifically valuable discovery in Baker Caverns occurred when charcoal was found embedded under 2.5 inches of travertine (*Mercersburg Journal*, date unknown). The significance of charcoal is that it can be age dated using the radioactive isotope carbon-14. It is not known if this discovery was authentic or an advertising gimmick. The disposition of the charcoal is unknown.

Baker Caverns' history draws from many sources, including newspapers. These provide information not always reported in other sources. However, they can also include inaccurate information, particularly when explaining geology. For example, one article described the effort to develop Baker Caverns in the following way: "Only those who visited the caverns in the first stage of their development can appreciate the scope of the undertaking. It meant tunnels through solid rock, paths hewn in walls of granite, detours around insurmountable barriers of stone" (*The Record Herald*, undated). There is no granite in the Cumberland Valley. In addition, newspaper articles sometimes describe cave formations in ways of little or no interest to a geologist. For example, they reference formations resembling common objects, animals, or people. In referring to Baker Caverns: "Canopies, tents, the head of an elephant with circus trappings, an old bake oven, faces, the huge jaw of an alligator, shields, leather hangings with fringes, water falls, flowers, etc. can all be seen" (*The Record Herald*, undated).

Geology

Smeltzer (1964) gives the most complete description of Baker Caverns, including a revised cave map. That map shows 3000 feet of surveyed passages whereas Stone's (1932) map shows 675 feet of passage. Smeltzer (1964) also gives speleothem descriptions, room and passage dimensions, and general geologic observations.

Formation of Baker Caverns is related to its geomorphic history and geomorphic setting. Cumberland Valley caves are age correlative with the Harrisburg Peneplain or erosion surface. At Baker Caverns, that surface forms the upland of the Conococheague Creek's west bank (Smeltzer, 1964). Cosmogenic isotope dating indicates dissection of the Harrisburg erosion surface began 3.5 million years ago. Caves in the Great Valley all presumably formed over the past three million years—Pliocene to Pleistocene (White, 2007; White, 2009; White, pers. comm.).

Conococheague Creek is a major Cumberland Valley stream, flowing south to the Potomac River. It displays incised or entrenched meanders along part of its course. Such meanders indicate change in stream dynamics. Where lateral erosion dominates, meander belts form in stream segments. In contrast, incised or entrenched meanders, as at Williamson, reflect stream rejuvenation. A rejuvenated stream erodes its channel deeper and transports its bed load. Conococheague Creek was incised during and after a change in the base level of the Potomac River during the Pleistocene (Wallace, 1980).

At Williamson, Conococheague Creek is within 250 feet of the northeastern end of Baker Caverns. As the creek erodes deeper, it

lowers the local water table, controlling cave development. Initial cave development is in the phreatic zone along bedding planes and joints. After rejuvenation, the creek erodes deeper, causing the local water table to lower. Cave development continues in the vadose zone with speleothem deposition being the major activity.

Additional Baker Caverns images can be found in the Mid-Atlantic Karst Conservancy library.

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HORSESHOE BAY CAVE: OLDEST DOCUMENTED HISTORY FOUND

Gary K. Soule

A unique series of events has resulted in the discovery of the oldest documented history ever found on Tecumseh Cave or Horseshoe Bay Cave. This cave is located at Horseshoe Bay, about 2½ miles south of Egg Harbor in Door County, Wisconsin. With 3,103 feet of mapped passages, cavers have yet to find the end of the cave. Cave divers have found an air-filled passage that continues on after going through a short submerged section at the end of the cave. It is the longest wild cave in all of Wisconsin.

Ladis and Paul Nonn, two early Door County cavers, reported to me that verbal indications passed on through the years indicated that Horseshoe Bay Cave, located in the Niagara Escarpment, was discovered in 1879. Two local hunters noticed water emerging from the bluff that at the time was part of Horseshoe Bay Farms. They investigated, and found the cave, perhaps after moving breakdown from its hidden opening. The Nonn's said the cave had been "rediscovered" a number of times in the years since. But documentation was lacking.

I did a very detailed search on the history of the cave, and my oldest documented evidence came in the form of a Sunday, July 30, 1933, *Chicago Tribune* newspaper clipping. It reported a "NEW CAVE FOUND NEAR EGG HARBOR." It also showed the cave interior. My grandmother had the actual newspaper clipping, which I now proudly own. It was known as Alpine Cave at that time. The article claimed that the cave was "newly discovered."

A hard bound book, *Old Peninsula Days*, had a picture and a detailed history of how Indian Chief Tecumseh had reportedly hidden in the cave at one time to escape capture by another Indian tribe that was chasing him. The first room in the cave, today known as the Cloak Room, was also shown in a photo. Early visitors standing in the room used candles for light. The later editions of this book did not carry all this history.

On July 18, 2001, Don Spude, a caving friend and longtime fellow Wisconsin Speleological Society and NSS member from Asheville, North Carolina, visited me. He gave me a number of cave related articles and brochures. At the very bottom of the envelope was a very tiny newspaper clipping that seemed rather insignificant at that time. His mother, Mabel Spude of Sturgeon Bay, had cut it out of the *Door County Advocate*, from Sturgeon Bay, Wisconsin, nearly five years earlier on Friday, August 16, 1996. It was in a column called "Traveling Back." As a cave historian, I could hardly contain my excitement when for the very first time I found a clue to documented evidence going back into the 1800's. This would place the cave discovery date at 37 years, or almost four decades, earlier than any other documented evidence I have ever found on the cave.

The column had a tiny paragraph that told about exploring a cave at Horseshoe Bay in "News from a 100 years ago," or August 22, 1896. Yes, it was another report on the "discovery" of Horseshoe Bay Cave again.

Not only did I manage to find the article, but further research has since produced an even more detailed account in a rival newspaper of that same time period. It was the *Door County Democrat*. Both newspaper accounts are now over 117 years old. This is simply amazing for Wisconsin. I figured an actual cave discovery date, based upon the articles, likely is Sunday, August 16, 1896.

For the sake of more modern recorded history, here are both articles reproduced in their entirety.

Vol. 35., No. 20., *Door County Advocate*, Sturgeon Bay, Wisconsin; Saturday, August 22, 1896; Page 5, Column 2, 3rd full paragraph:

A party of young men went down to Horseshoe Bay on their wheels last Sunday to inspect the cave recently discovered on the premises of Louis Columb. Some of the boys worked their way into the opening for a distance of half a mile or so, and they found chambers and apartments so high that the ceilings could not be seen, though the mode of illumination was somewhat imperfect, being nothing more than lanterns carried by cyclists. Geo. A. Mowry, one of the party, says it will rival the famous Mammoth Cave, and another more extensive examination is to be made as soon as the boys can find the necessary time.

(I corrected two spelling errors in the original text—Gary K. Soule.)

Vol. 4, No. 31, *Door County Democrat*, Sturgeon Bay, Wisconsin; Saturday, August 22, 1896; Page 1, Column 5, 4th paragraph:

A Great Opening

A great opening, a cave, as it were, has recently been discovered in the big Horseshoe Bay bluff. There has been numerous discoveries of “caves” in the rocks along the east shore of the bay in Door County, but this one bids fair to a genuine one, and of an extensive nature. It is situated on the north side of the bluff at

Horseshoe Bay. The opening is right near the roadway that passes along the bluff and is about 20 feet above the same. It is only a small entrance, barely large enough for a man to crawl into upon his hands and knees, and was first discovered by water being noticed oozing there from. A party of young men from this city visited the cave last Sunday, and instituted quite an extensive examination, some of the braver ones going far in and inspecting for a couple of hours. For about 100 feet the entrance is not more than two feet high and five feet wide, beyond that the cave becomes abruptly broad and high chambers, with ceiling beyond the reach of sight with the aid of ordinary lanterns and bicycle lamps which were used by the visitors last Sunday. The floor is sandy in the first chambers, but has a rocky bottom further back, and some water. A quarter of a mile or so back of the first high chamber there are three passages leading away in different directions. From one of these the air appears to be foul, from another it is fresh and there seems to be a draft, indicating an opening at the other end. All three are uninviting and so far as we have heard have not yet been explored. There is in the large chambers some very fine specimens of stalactite and stalagmite, samples of which were brought to the city, and are as fine as anything of the kind we have ever seen. Another expedition will soon visit the place with the intention of investigating thoroughly that the exact extent of the cave may be ascertained.

The Door County Historical Museum in Sturgeon Bay, Wisconsin, does have some cave formations, particularly stalagmites, that most likely came from Horseshoe Bay Cave.

Historic Inspection of Horseshoe Bay Cave

After tedious long hours of researching newspaper microfilm in the Laurie History Room at the Door County Library in Sturgeon Bay, I finally hit the jackpot. I was looking for articles on the history of Horseshoe Bay Cave near Egg Harbor in Door County, Wisconsin. A series of five different newspaper articles from 91 years ago were finally discovered. They involved an

evaluation of the cave by the early Door County Chamber of Commerce in terms of its show cave tourist potential. I reproduce these five old articles below.

Vol. IX., No. 3, *Door County News*, Sturgeon Bay, Wisconsin; Thursday, July 20, 1922; Page 5, Column 2:

WILL EXPLORE BIG CAVE

State Geologist To Arrive Here On Friday

To Investigate Horseshoe Bay Cave

Comparatively few people in the county are aware of the fact that on the Murphy property at Horseshoe Bay, in the town of Egg Harbor there is a cave of unusual proportions.

Some of the inhabitants have visited the place in years gone by and many young people more venturesome have explored the cavity to a more or less extent.

Considerable speculation has been made of the extent of this cave and what it really contains. Not until recently has the matter been given serious thought, however. Finally a number of men who became interested in the curiosity, got in touch with Prof. Winchell, state geologist of the University of Wisconsin, and requested him to have an investigation made of the cave.

At the invitation of the Chamber of Commerce, Prof. Winchell has consented to make an investigation and exploration of the cave to ascertain its size and contents.

Prof. Winchell and assistants will arrive here on Friday at which time the exploration will be made.

The outcome of this investigation will be of interest to a large number of people who have paid the place a visit, there being considerable mystery concerning the depths to which the cave extends.

At the Brown County Library in Green Bay, Wisconsin, I found the next newspaper to cover the early expedition. It was the *Green Bay Press-Gazette*, Green Bay, Wisconsin; of

Thursday, July 20, 1922; Page 4, columns 7, 8. The newspaper said it was the 5 O'Clock, Evening Last Edition, and it stated the cost was 3 cents for paper. The news article follows:

Geologists to Explore Caves in Door County

(Special to *Press-Gazette*.)

STURGEON BAY, Wis.—Door county people and summer visitors will soon learn the secrets of the big cave near Horse Shoe Bay, for a party of geologists is now en route here to explore the place, which is part of the Murphy holdings near Egg Harbor.

Professor Winchell eminent geologist of Madison, heads the party, which was induced to come here by the Chamber of Commerce. Little or nothing is known of the formation, depth or interior of the big place which runs back from Green Bay into the limestone formation of the shore line.

Few if any residents of that section of the county have attempted to explore it, and as far as known there have been no recent explorations. The results of the explorations by the Madison group and their findings will add another drawing card to the numerous things that attract thousands of visitors to "Wisconsin's Wonderland.

Vol. 61, No. 18, *Door County Advocate*, Sturgeon Bay, Wisconsin; Friday, July 21, 1922; Front Page, Column 4:

STATE GEOLOGIST EXPLORES CAVE

Horse Shoe Bay Cave May Become Well Known

Novelty--

Writer to Give Feature Article:

This large cave located on the Murphy property at Horse Shoe Bay, for years known only to a few of the county's people, will be inspected today by Professor Winchell, of the University of Wisconsin Department of Geology, and his assistants. The professor has answered the invitation of the Chamber of Commerce to investigate the cave and report on the feasibility of advertising it as a curiosity for tourists.

All that is known of the cave thus far by persons who have gone into it as far as they could crawl is that it is estimated to be about three-quarters of a mile long with a few stalactites and stalagmites and large circular chambers. The investigation may open up places that have never before been opened, and it will be interesting to hear what the state geologists have to say concerning it.

I received special permission to go through the early 1920's records of the Door County Chamber of Commerce in Sturgeon Bay, Wisconsin. No personal reference letters to the cave exploring invitation, or results were found, despite a time consuming search. But two more newspaper articles were found, and they included the published cave trip results.

Vol. IX., No. 4, *Door County News*, Sturgeon Bay, Wisconsin; Thursday, July 27, 1922; Page 5, Column 2:

Explore the Big Cave

Journal Man Tells of Experience In Exploring "Cave" At Horseshoe Bay Cave on Friday

The following interesting account of the exploration of the cave in the town of Egg Harbor on Friday of last week is told by the special correspondent of the Milwaukee Journal, who was a member of the party.

It went on and described the trip. Since this article is an abbreviated one of *The Milwaukee Journal* article, I am just going to reproduce the journal newspaper article here. It is very amusing, especially for the present day cavers who know what the cave is really like.

Market Edition, *Milwaukee Journal*, Milwaukee, Wisconsin; Monday, July 24, 1922; Page 7, Columns 2, 3:

Guide Rubs Kinks in Back;

Cave Man's Life Too Rough

BY SPECIAL CORRESPONDENT OF THE JOURNAL

Sturgeon Bay—The stiffest man in Door county this week is Frank Caffee, secretary of the Door county Chamber of commerce. His ailment is not the result of overwork in a cherry orchard but savors more of the physical exertion exacted for the mushroom growers who toil far down in the catacombs of Paris.

Friday there arrived here a group of noted personages who made up a sort of self-styled "exploration" party. The adventurers, headed by Prof. A. N. Winchell of the department of mineralogy and geology of the University of Wisconsin, included W. T. Cuddy, of *The Milwaukee Journal*, better known as The Poor Cuss; W. D. O'Neil, Chicago, motion picture man; and Jim Martin, Milwaukee. They called on Mr. Caffee, explained they were here in the interest of science, and asked that he, as a guide de luxe of Door county, show them the way to a little known cave on the estate of Don Murphy near Egg Harbor.

This Mr. Caffee obligingly did. Arrived at the cave, they invited him to join the "exploration" party. He did.

Off Caveman Stuff

On his return to Sturgeon Bay, Mr. Caffee told several business men that it was doubtful if he would ever again regain his rightful posture. "I crawled 5,000 miles on my stomach," he said, "through ice cold water, over rocks that would have made a lizard wince and through the slimiest mud I ever hope to see. I couldn't quit once we started. It was my first and last attempt to emulate a caveman. No wonder they were rough with their women if they lived in a place like that.

I would like to nominate Prof. Winchell for a place in the hall of fame as Wisconsin's ablest crawler with Jim Martin for second and the Poor Cuss an able third. I also serve notice to any further exploration parties that would like to visit Door county that I am not at home to any more such adventures to be made in the interest of science.

I am thankful that I am not a geologist, a newspaperman or a camera man, and that the cave narrowed down so that even a professor couldn't squeeze through it. This cave will never find a resting spot on my map as one of Door county's scenic spots

if I have my way and even Brownie of The Journal had better not send any more of his reporters up here to have me aid in getting them a story. I'm through."

First Time Explored

The party returned to Sturgeon Bay looking more like a part of the First Battalion just escaped from the trenches than a group of scientists. Mr. Caffee is wearing a golf club these days, not in the interest of the game, but in lieu of a cane.

This was the first time that Murphy cave was thoroughly explored, its origin is of distinct geological interest.

A Modern Day Footnote

These historic explorers in my estimation, based upon their account, only explored about a third of the known cave today. Cavers have even pushed through as low as four inches of airspace above water in a slow moving river in the back of the cave. They even found a huge room with a 40 foot high, intermittent underground waterfall far back in the rear of the cave.

In August, 1986, at the request of the private cave owners at that time, the Wisconsin Speleological Society gated the cave.

I approached the Door County Parks Director in the spring of 2008, presenting plans and pushed him to try and get the cave incorporated into the nearby Murphy County Park. It was threatened by imminent, major

residential development. He was extremely impressed with the cave map and information that I presented to him. He immediately jumped on the idea, and sought out grants to put my plan for the cave into action.

I am happy to report that the 14 acre field in front of the cave, as well as the bluff with the cave entrance, is now permanently preserved as part of the Door County Park System. Further efforts for underground rights are still pending, and the ultimate outcome is still in the cave management planning stages.

As of 2012, a new bat friendly gate has been put on the cave by the county, based upon plans provided by the Wisconsin Department of Natural Resources.

Hopefully, my proposed detailed development plan to turn the cave back into its original pristine condition, will be followed. The cave is presently filled with relatively recent in-washed glacial sediments from the last glacier of 10,000 to 12,000 years ago. A nice 370 foot long, walking height, cave passage would permit visitors and students alike, to be able to tour the larger front part of the cave in the years ahead. Only this time they will be on a guided, educational tour, covering all aspects of the cave such as geological, hydrological, biological, historical, and the scenic aspects of this great Wisconsin cave.

CAVE CLIPPINGS

“Cavern in Tahiti Haunted by Wizard”

Natives Believe His Spirit Still
Broods Over Cave in
Mountain Side.

About 27 kilometers from Papeete, Society Islands, at the beginning of the District of Pūpara on Tahiti—is a cave called the Cave of Māraa. It is a large opening in the side of the mountain; its floor a pool of clear icy cold water. There is nothing remarkable about it in appearance.

Its interest lies in its being the reputed burial place of a powerful wizard of old the spell of whose enchantments still broods over the cavern. The particular manifestation which interests passers-by is the impossibility of striking the opposite wall of the cave with a stone, although to the eye the feat seems the easiest of undertakings. Most newcomers laugh at the legend and start out with an easy throw only to see the missile drop in the water apparently but a few feet away.

Then they warm to the work and exert all the force that is in them, and, at last, making slings, strive with all their might to overcome the power of the old warlord, but to no avail. The stones drop ignominiously in the water as if some unseen hand had caught them in mid air and cast them down in the center of the cavern. The reason has never been explained satisfactorily.

From the *Minneapolis Tribune*, May 8, 1921.

REPRINTS

The Latomiae (Quarries) of Syracuse

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SYRACUSAN LATOMIAE.

called *La Banditaccia*, about 1829; but the most remarkable tombs were not opened until 1836, 1845, and 1846. They are named *Grotta della Sedia*, Tomb of the Tarquins, *Grotta delle Sedie e Seudi*, *Grotta del Triclinio*, *Grotta dei Filastri*, *La Grotta delle Urne*, and *Grotta Torlonia*. Their characteristics do not differ from those of the tombs of Corneto, but the relics discovered in them have proved of far higher value.

THE LATOMIAE OF SYRACUSE.

The quarries of Syracuse, its *Latomiae* or *Lautumiae*, are mentioned by Cicero, in his superb oration against Verres, as among the most remarkable objects in the city. There can be no doubt, says Bunbury, that they were originally designed merely as quarries for the extraction of the soft limestone of which the whole table-land consists, and which makes an excellent building stone; but from the manner in which they were worked, being sunk to a considerable depth, without any outlet on a level, they were found places of such security, that from an early period they were employed as prisons. Thus, after the Athenian expedition, continues our authority, the whole number of Athenian captives, more than seven thousand in number, were imprisoned in these quarries; and they were used for the same purpose under successive despots and tyrants. Not only captives, but criminals, and the unfortunate victims of his hatred and vengeance, were imprisoned here by Dionysius the tyrant; and one of them preserves the name of the celebrated poet Philomenes, who was condemned to captivity for the double crime of having criticised the monarch's verses and pleased

THE EAR OF DIONYSIUS.

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his mistress. And the story runs, that after his release he was again summoned by the tyrant to pronounce his opinion on a fresh effort of the royal muse. Rather than do violence to his conscience, or profane his dignity as a poet, he exclaimed, "Carry me back to the quarries!"

Like the catacombs, these immense excavations are of very ancient date, but no longer inspire either fear or horror. The ravages of Time have but rendered them more picturesque. The pillars formerly carved out of the living rock to support the roof have assumed the form of immense stalactites.

The *Latomiae* are ten or twelve in number, and vary greatly in importance. One of the most interesting, dominated over by a Capuchin convent, of which it forms the singular garden, owes its transformation not only to Time, but to the prolonged patience of the devout and peaceful hermits who, year after year, did not cease with assiduous labour to invoke the riches and fresh vegetation of Nature from the barren rock. The waters conveyed thither by the aqueducts of old for the use of prisoners still filter through the fissures of the calcareous rock, and encourage the growth of flowers and verdure.

The most celebrated and the largest *Latomia*, and the most interesting next to that of the Capuchins', of which we have just spoken, now bears the various names of "Paradise," the "*Latomia* of the Rope-makers," and the "*Ear of Dionysius*." It is situated between the quarters of *Tyche* and *Achradina*, and hollowed out of the escarpment which separates *Neapolis* from the district along the port of *Tyche*. The name of "*Paradise*" which is sometimes given to it refers to the gardens formerly planted

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A GROUNDLESS TRADITION.

in it: these were not less carefully tended than the gardens of the Capuchins, though not equalling them in variety and freshness. It is called the "*Latomia* of the Rope-makers" because some rope-works have been opened beneath its gloomy roof. And lastly, it is called, or rather



THE LATOMIAE OF SYRACUSE.

one of its recesses is called, the "*Ear of Dionysius*," in reference to a groundless tradition, originating in the sixteenth century, and suggested by a remarkable peculiarity in its natural conformation.

The recess, seventy feet high at the mouth, and one

A CURIOUS EXCAVATION.

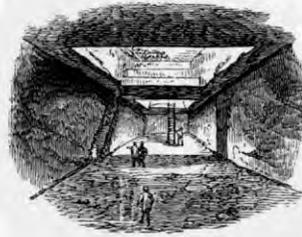
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EAR OF DIONYSIUS—SYRACUSE.

hundred feet deep, is so fashioned that as it penetrates into the earth it sinks lower and lower, and describes a double curve or S. This arrangement, like that of an

auricular duct, gives rise to astonishing acoustic effects : words whispered in a low voice at the bottom of the grotto are repeated very distinctly at its mouth ; a piece of paper shaken to and fro produces a sound like that of a hurricane ; and the report of a pistol reverberates like a deafening peal of thunder. Now, toward the top of the external opening,—which terminates in a vaulted roof,—



INTERIOR OF CAVE OF DIONYSIUS—
SYRACUSE.

you will find a square aperture and a kind of little cell, as well as a small louvre, or dormer-window, communicating with the interior of the grotto. It is pretended that Dionysius, by some secret staircase, descended from his palace into this little chamber, and, owing to the

acoustic properties of the cavern, overheard the conversations and surprised the secrets of his prisoners.

Some travellers, in their curiosity to verify a fact whose historical truth is not sufficiently established by the mere configuration of the cavern, have caused themselves to be hauled up with ropes to the supposed retirement of the tyrant ; and, by so doing, have become witnesses to the curious acoustic phenomena, which they could have heard just as clearly in the depths of the grotto.

From *Famous Caves and Catacombs*. W.H. Davenport Adams. London: T. Nelson and Sons, 1886.

BOOKS OF INTEREST TO CAVE HISTORIANS

CAVERNS, RITUALS AND RELIGION (2011). 440 pages. Published by Santa Cruz University, Brazil. This illustrated book is a collection of 23 chapters (in Portuguese and some in Spanish) written by various researchers which deals with the cultural and historical use of caves and karst. Edited by Luiz Eduardo Panisset Travassos, Edgard Magalhaes, and Elvis Barbosa. Worldwide in scope, this book covers the role of ritual and religion in caverns from around the world, from the Americas (North, Central and South), Europe, and Tibet.

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