The Association

The American Spelean History Association (ASHA) is an Internal Organization of the National Speleological Society and exists for the study, dissemination, and interpretation of spelean history, and related purposes. All persons who are interested in these goals are cordially invited to become members. Dues are $2 per issue of the Journal of Spelean History mailed to U.S. addresses. The rate for foreign members is U.S.$5.00 per issue for printed copies or $2.00 per issue for electronic (PDF) copies sent as email attachments. Checks should be made payable to “ASHA” and mailed to the treasurer. Checks must be payable in U.S. dollars and drawn on a U.S. bank.

The Journal

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.

Authors are strongly encouraged to submit electronic copies in Microsoft Word, with minimal formatting, by email. Images should be saved as jpg. Photos and illustrations will be returned upon request. ASHA cannot publish copyrighted material without permission. Contributors are responsible for determining whether material is copyrighted and securing the appropriate permissions.

Back Issues

JSH began publication in 1968 and copies of all back issues are available, although many early issues are reprints. The cost (postage included) is $2.50 per copy for a single copy, $2 per copy for 2-3 copies, $1.50 per copy for 4-7 copies, or $1 per copy for 8 or more copies. Order back issues from the Treasurer.

Scanned digital copies of all issues over five years old may be viewed and downloaded at no cost on the ASHA website at www.cavehistory.org/back.html.

A complete index to JSH is available at the ASHA website at www.cavehistory.org/cum-index.html.

Officers

President: Dean Snyder, 3213 Fairland Drive, Schnecksville, PA 18078

Vice-President: Carolyn E. Cronk, 1595 Blueberry Hills Road, Monument, CO 80132

Secretary-Treasurer: Bob Hoke, 6304 Kaybro Street, Laurel, MD 20707 bob @ rhoke.net

Editor: Greg Brick, 1001 Front Avenue, St Paul, MN, 55103 bric0004 @ umn.edu

Trustees: Larry E. Matthews, Marion O. Smith, Gary K. Soule, Jack Speece
CONTENTS

“Well-Known Subterranean Passages”: The Prehistory of Mystery Cave, Minnesota
Greg Brick.................................................................4

The Cave Dwellers  Philip S. Taylor.........................................................6

Early Notes on the Caves of the Azores Islands Donald B. Ball...................12

Nineteenth Century Notes on the Caves of Bermuda Donald B. Ball.............15

A Nineteenth Century Visit to a Cave in Cuba’s Yumuri Valley Donald B. Ball...18

A Mathematical Model to Predict the Length of the Lost Brewery Caves of St. Louis, Missouri Joe Light.................................................................20

Subatomic Circus under the City of St. Louis, Missouri Joe Light....................23

New Natural Bridge Virginia Postmark Thomas Lera..................................25

Selected Abstracts from the 17th International Congress of Speleology...........26

Clippings......................................................................................31

Book Reviews..............................................................................32

In Memoriam..............................................................................36

Front Cover: Inset from Winchell’s map of Fillmore County, Minnesota, showing an “Underground Passage” with a dashed line. From Fourth Annual Report of the Minnesota Geological and Natural History Survey, 1876. Much of the area shown is now part of Forestville State Park. See the article by Greg Brick in this issue.
With more than 13 miles of surveyed passages, Mystery Cave is the longest known cave in the State of Minnesota, and a well-known tourist attraction, with tours operated by the Minnesota Department of Natural Resources. The grave digger Joe Petty, as the story goes, discovered this cave in February 1937. But its existence had already been surmised more than sixty years earlier by Newton Horace Winchell (1839-1914), Minnesota’s third and most prominent state geologist (Fig. 1).

Winchell conducted the first geological survey of Fillmore County, the heart of Minnesota cave country, in the 1870s. I have always found it strange that Winchell, who wrote about the caves of the Minneapolis-St. Paul area, never once used the word “cave” or “cavern” with regard to Fillmore County—neither in the Fourth Annual Report of the Geological and Natural History Survey of Minnesota, published in 1876, nor in the slightly revised Final Report of 1884. He certainly did not neglect other local karst features. Describing the town of Fountain, for example, he states that “A great many 'sink holes' also are found in this town,” and he mentions “the ‘Big Spring,’ a few miles northwest of Fountain, where the water rushes out in a great volume near the base of the bluff, and probably on a level with the top of the Green Shale.” Winchell thus recognized the Fountain Sinkhole Plain and the Decorah spring-line of our modern hydrologists. He also described the Tunnel Mill on Bear Creek—a man-made excavation that short-circuited a meander loop on the stream. Unsatisfied with looking at the two published Fillmore County reports, however, I dug through the Winchell Papers at the Minnesota Historical Society. Among the 20 boxes are his original leather-bound fieldbooks. Unfortunately, there are no fieldbooks covering his Fillmore period.

While some of Fillmore County’s best-known caves had not yet been discovered and were thus unknown to Winchell, others almost

---

1 The pioneer Midwestern geologist David Dale Owen (1807-1860) includes the Hokah (Root) River in his list of 91 principal streams explored “in bark canoes” during his geological survey of Wisconsin, Iowa, and Minnesota in the late 1840s. But Owen’s massive 1852 Report provides no further details, and it is not clear whether the Root River was ascended as far as what is now Fillmore County.
certainly were. For example, he gives a good description of Weisbach’s Mill (spelled “Weisbeck’s” in the Annual Report). He was clearly captivated with the picturesque qualities of the spot, mentioning that “the face of the bluff, which rises perpendicularly about a hundred feet, is wrought into a series of majestic pilasters,” even including a nice engraving of it (Fig. 2). Fillmore County was wheat country back then, and the wheat was taken to such local flouring mills, usually situated at points where the Root River or its tributaries descended from one rock layer to another. The site of Weisbach’s Mill, on Deer Creek, is now Masonic Park, near the town of Spring Valley, and it seems likely, from the situation of the well-known cave in that park (Masonic Park Cave), that the cave was open when he wrote about the mill—yet he does not mention the cave.

There are several well-known subterranean passages in the county. Lost creek, in Jordan township, and the Brook Kedron, in Sumner, both have underground passages for several miles. Canfield creek, south of Forestville, runs underground about twelve miles, and, finally, the south branch of Root river sinks in the N. E. ¼ sec. 19, Forestville, and runs underground, except in high water, to about the center of section 21, where it reappears. These underground passages are in the area of the Galena.

Where Winchell describes the South Branch of the Root River sinking we infer Mystery Cave, and where it reappears, Seven Springs. On the map accompanying his 1876 Annual Report, the subterranean course of Canfield Creek is marked by a dashed line and the words “Underground Passage” (see cover of this issue) but on the map accompanying his 1884 Final Report the words have been changed to “flowing underground.” Unfortunately, there is no similar dashed line for Mystery Cave on either map!

Perhaps, in the new millennium, we can look forward to the discovery and exploration of the York cave system, an “underground passage” not suggested by Winchell, but with 10 miles from the York Blind Valley to Odessa Spring on the Upper Iowa River, a worthy goal of future cave explorers.

A previous version of this article appeared in the Minnesota Speleology Monthly, December 2004.
The Cave Dwellers

PHILIP S. TAYLOR

The cave was discovered and dug as an archeological site in 1953 by a party from The Science Museum of St. Paul. Up to that time the view of the front entrance was obscured from the river level by a fall of limestone rock from above. The cave itself is situated about 80 feet up on the side of the bluff. This limestone bluff has been shattered, forming an intimate series of openings in the rock. Therefore the front of the bluff has in the past, and is today, continually weathering away, so that a steep talus slope has formed beneath the mouth of the cave. Because of the weathering the cave was probably much larger at one time than it is today. The front of the existing cave is approximately 14 feet across and the height with the fill removed is about 11 feet. The entrance faces north and the largest part extends back about 15 feet. A smaller tunnel opens off the southeast corner and extends back about 20 feet more. Recently after the original excavations had been performed, a new unexplored room was found opening off of the right side of the tunnel. Although this room has not been officially dug, preliminary investigations showed evidence of human habitation in the form of animal bone, charcoal, and pottery.

Over the long period of years, probably after spring thaws or after

PHILIP S. TAYLOR is curator of zoology The Science Museum, St. Paul, Minnesota.
torrential rains, water seeped into the cave from the rear through fissures in the limestone rock. This water carried with it fine sand and sediments and deposited them over the floor of the cave. These fine sediments acted as a blanket and covered up and preserved in an orderly fashion the cultural remains of each of the successive inhabitants of the cave throughout its long history. The wash was so slow and so gradual that even the ancient fire pits were covered up with the ash and charcoal still in place.

The cave was dug in levels and the soil from each level was carefully sifted so that all of the small pieces of pottery, stone tools, and bone fragments could be recovered. The cultural remains of the oldest inhabitants were found at the bottom level and those of each of the succeeding inhabitants were piled on top with the most recent at the surface level. In studying the types of pottery and stone tools found there, we were able to identify at least two very distinctly different cultures of peoples inhabiting the cave with the possibility of additional short term occupations by other groups.

The early people that inhabited this area were not very good housekeepers and after they finished a meal the refuse was left scattered in the vicinity of their fire pits. There was a large quantity of bone material removed from the cave but unfortunately the

Indians split many of the bones up into fine pieces to obtain the much sought-after marrow. Therefore a large number of the bones were too fragmentary to allow identification.

Out of all the animal bones identified from the cave, the raccoon was the most abundant. Whether this animal was the easiest to capture or whether it was the most sought-after is not known; but it seemed to supply the bulk of the meat diet at all but the very deepest level in the cave. There were a total of 757 raccoon bones that were identifiable. These bones represented almost all parts of the animal including the head, feet, and tail. Many of the bones were charred.

The red men exhibited an undecipherable pattern in the treatment of the leg bones of all of the small animals found, including the raccoon. All of the long bones were broken and each one in exactly the same place. They were not crushed, but appeared as though they had been snapped off at particular points. The strange feature of this was that one half of each of the bones was always missing, and it was always the same half of each particular bone. Although certain fragments of the leg bones were missing, bones from both the front and hind feet were present. This is one of the mysteries that has no answer at the present time.

Several skull fragments of the raccoon were found. Some of them were charred. The few fairly complete skulls were broken toward the back, apparently to extract the brains which were used by the Indians for various purposes. Most of the skulls had been broken up quite thoroughly.

The woodchuck was the second most important source of food for these people. Although the remains of the woodchuck were less abundant than those of the raccoon, it, too, was identified from all levels in the cave except the very deepest. Both the raccoon and woodchuck accumulate a tremendous amount of fat during the fall just before hibernation. A raccoon is just about able to double his normal weight with the accumulation of fat in the fall. The Indians are recorded as utilizing fat and storing it in their pottery vessels; both the raccoon and woodchuck would be desirable from this standpoint.

At first the cave was assumed to be only a winter shelter. But the abundance of raccoon and woodchuck, both of which hibernate during the cold weather and therefore are relatively unavailable to the hunters indicates that the cave was also used during other seasons.

Fish bones in total number (over 1000) exceeded any of those of the mammals; but the majority of the fish bones (over 90%) were located in a very small area. The other fish remains (less than 10%) were scattered at various places in the cave and side tunnel. The area containing almost all of the fish bones was at the deepest point in the cave. This level contained no other bones. There was a fire pit in association with the fish remains, but no pottery was found. These findings might indicate a pre-pottery, archaic occupation of the cave.
At the present time we can not determine if this was a distinct fishing culture existing before the time of the discovery of the technique of pottery making, but pieces of the charcoal from the fire pit have been saved for a Carbon 14 analysis. All living material has a certain definite ratio of radioactive carbon to normal carbon. After a living organism dies, whether it be a tree or a piece of bone, this radioactive carbon breaks down at a definite rate. A physicist using a specially modified type of instrument similar to a Geiger counter is able to determine the age of objects by measuring the ratio of radioactive to normal carbon. This has been done with objects from old Egyptian tombs and it has been done with objects from other archeological sites in the United States. We hope to eventually be able to place a date for the earliest inhabitants of our cave through this technique.

The Indians were able to obtain several species of fish. Among those that could be identified, the sheepshead and catfish were the most prominent. There were 111 otoliths from the sheepshead. These are little semicircular bones associated with the ear and aid in the function of balance. These distinctive little bones have a groove on the surface shaped like the letter L and are often referred to as lucky stones. From the sheepshead there were also many pharyngeal
teeth which are bony plate-like structures that contain broad circular teeth. These are located in the back of the fish’s mouth and serve to crush the shells of mollusks upon which it feeds.

Otoliths show a pattern of growth rings much like trees and they are a good indication of the age and rate of growth of the fish itself. All of the otoliths that were found in the cave were of a uniform size. They all came from fish weighing between 2 and 4 pounds. This indicates that the aborigines that caught these fish used some sort of selective fishing techniques, some type of nets or traps. As far as is known the sheepshead has no peculiar habits or behavior pattern that would make the 2 to 4 pound size group any easier to catch than the smaller or larger sizes. There have been reported weights to 50 or 60 pounds in this particular species.

Other fish used by the red men were identified as the redhorse, sucker, dogfish, and possibly the moomyec.

The only large animals whose bones could be identified in the cave were the elk and the deer. Some of these fragments came from very young animals. There were no bones that could be identified as belonging to the bison, although the Spring Lake area today lies very close to a prairie fringe. None of the bones coming out of the cave could be identified as bear, either. Many of the large bones were charred and split in pieces, apparently to obtain the marrow.

Clams and snails provided another source of food for these early people. Pockets of some of our common land snails and clams were found at various levels throughout the cave. The clams seemed to be cooked, because several of the shells were charred.

The remains of other animals were found at scattered places in the cave, but none were abundant. Fragments of turtle shell were found at several depths. Bones of the beaver, although not numerous, were identified from almost all depths. The porcupine, of which there is no modern record in Dakota County, was identified in the bone refuse from the cave. Bones of the cat (either bobcat or lynx) were found at several places near the surface. The muskrat was also identified from several places near the surface as well as down deep. Other animals found less frequently were: the Mississippi valley pocket gopher, the striped ground squirrel, the eastern chipmunk, the big brown bat, the deer mouse, and the red squirrel.

Bones from the rabbit, which we usually consider as a good, easily obtained source of meat for the hunter and trapper, were very scarce. There were only two lower jaws and a fragment of the skull found near the surface.

Bird bones were very scarce. There was one partial skull that was tentatively identified as belonging to a grebe.

Human remains were found chiefly in the form of teeth; but there was also a fragment of a human lower jaw and a portion of a scapula (shoulder blade). The incisors showed the typical shovel back shape of the Mongoloid or Indian. The human remains were found at various levels but all of
the finds were out in the main large room and not back in the tunnel. There were no pottery finds back in the tunnel either and this would indicate that the tunnel was used chiefly to throw debris left over from their meals because of the quantity of bone material found there.

The only important article of plant food uncovered was the butternut. There were several large deposits of shells of butternuts in side pockets in the cave proper. One black walnut shell was found although there is an extensive grove in the immediate vicinity at the present time.

Although prehistoric man in Minnesota had different tastes from ours in the choice of the articles used as food he evidently lived quite well as indicated by the long period over which he inhabited this particular area. This period lasted well over 1,000 years and was many times longer than the white man has been here.

The archeological work is being continued at Spring Lake and each season’s investigations help to unravel more of the mysteries about the various ways of life of the early prehistoric people that inhabited our State. We can see the beginning of pottery making, probably starting when the people changed from being wandering hunters and fishers to a life in one place and the practice of agriculture. The pottery vessels then became necessary for storing their grain. We can also see gradual changes and improvements in the way they made their pottery vessels and as we accumulate more and more of these cultural remains we are able to observe changes in shapes and surface designs.

The stone tools also exhibit striking changes. In the beginning, before the bow and arrow was invented, we only find the large stone spearpoints. Later on, in the upper levels, we begin to see where the bow and arrow came in and we find the smaller arrow points. Even the style and shape of the arrow points change as we come up through history to the more modern Indians such as the white man found at the time our great grandfathers settled here.

Reprinted from THE CONSERVATION VOLUNTEER, September-October 1955, published by the Minnesota Conservation Department. While Taylor does not explicitly name the cave, it has long been known as Lee Mill Cave, and still exists. Unfortunately, the “Carbon 14 analysis” promised in this article was never performed.
EARLY NOTES ON THE CAVES OF THE AZORES ISLANDS

Donald B. Ball

Created by volcanic action (cf. Fig. 1) and located in the east-central portion of the Atlantic Ocean, the Azores consist of nine islands situated approximately 972 miles due west of Lisbon, Portugal. Reflecting the nature of their geological origin, it comes as little surprise that modern speleologists have reported numerous substantial lava tubes throughout this chain. Prior to such modern day attention, travelers in the nineteenth century were also attracted to these passageways. In its April 1838 issue, an extended review (Anonymous 1838) appeared in The North American Review of a recently published volume entitled Resumo de Observações Geológicas feitas em uma Viagem às Ilhas da Madeira, Porto Santo, e Açores, nos Anos de 1835 e 1836 (Summary of Geological Observations made in a Voyage to the Islands of Madeira, Porto Santo, and Azores, in the Years 1835 and 1836) by Conde [Count] Vargas de Bedemar (1837) in which it was critically noted:

These are not the only remarkable objects, of which the Count has taken only the most hasty notice. Thus he merely mentions the occurrence of caves in some one of the [Azores] islands, but has omitted to notice the very extensive caverns in the lava of Fayal and St. Michael’s, some of which, particularly in the latter island, were explored and are minutely described by Dr. Webster in his work on the Azores, published in 1822 [sic; should read 1821], and which exhibited not only many singular forms of stalactical lava, but afforded other valuable geological information.

Fig. 1. “Chasm worn through by the sea, Azores” (reproduced from Shaler 1887: 461).
The referenced volume by John W. Webster (1821) had been well received in its day and would later be cited by both Alexander von Humboldt and Charles Darwin. As summarized in a review (Anonymous 1822:48) of Webster’s book published in the January 1822 issue of *The North American Review*:

Deep caverns, we know, are often found in volcanic mountains; the isle of Vulcano, one of the Liparis, according to Dolomieu, is a cone completely excavated, in which a second cone has risen, leaving a sort of corridor an hundred paces wide between the outer and the inner, and Dr Webster explored very spacious caverns in St Michael [Sao Miguel], the bottoms of which seemed to him to be the roofs of others still lower. Were it possible to get nearer the bottom of these dark, unfathomed caves, one might find perhaps some of the rocks in which they are formed, in all the various stages of their passage from the primitive into the volcanic.

Aside from his early speleological observations, it may be noted that John White Webster (1793-1850) was born in Boston and educated as a medical doctor at Harvard University. Following his graduation in 1815, he continued his studies in England and later lived in the Azores where he practiced medicine. Returning to Boston by 1821, he accepted a position as a lecturer at Harvard about 1824. His tastes for extravagance combined with his professor’s pay and lack of money management skills prompted him to borrow heavily, circumstances which would ultimately prove to be his undoing. In late 1849, he murdered fellow professor Dr. George Parker, one of but a number of people to whom he was indebted. He was subsequently tried and convicted and was hung in August 1850.¹

In passing, a summer tourist identified only as “Miss Dabney” (1873:866) would later remark in a short piece notably lacking in insightful detail aspects of the landscape of Sao Miguel Island:

Would that we had time, space, and pencil to delineate... Best and most wonderful of all, the boat excursions to the caves in the black volcanic rock, where the surf of the Atlantic rolls in unceasing thunder, and which can only be entered at rare intervals.

A contemporary description (Gihon 1877:551) of one of the better known caves on Sao Miguel, the largest island in the chain, appearing in the March 1877 issue of *Harper’s New Monthly Magazine* remarked:

[pg. 551] Sao Miguel is the most populous island of the nine, and its capital, Ponta Delgada, seventy-five miles from Angra, is, in importance and population (estimated as high as fifty thousand), the third city within the Portuguese dominions... Ponta Delgada presents the usual features of Portuguese cities, and its inhabitants the characteristic traits of the islands... The fertile soil of St. Michael rests upon streams of scoriaceous lava, which have cooled on their exterior, while the central mass has flowed out and left large caverns, one of which, within the city limits, may be explored for more than a mile through wide and lofty chambers and tortuous passages, with arched roofs and channeled floors, from which spring walls and columns which look as though they had been shaped by hand.

References Cited

Anonymous


Dabney, Miss


de Bedemar, Conde [Count] Vargas


Gihon, Dr. A. L.


Shaler, N. S.


Webster, John W.

1821  *A Description of the Island of St Michael, Comprising an Account of Its Geological Structure; with Some Remarks on the Other Azores or Western Islands*. R. P. & C. Williams, Boston.
The island of Bermuda is a British Crown colony located in the Atlantic Ocean 580 miles due east of the state of North Carolina and approximately 1,000 miles southeast of Boston, Massachusetts. Covering an area of 19.3 square miles, the topography consists primarily of hilly terrain. Extensive field and documentary research reported by Forney (1973) has revealed that this relatively small island contains over twenty extant caves and it is known that ten caves on the island have been destroyed. Additional submerged caves have been reported. Various caves on the island were well-known tourist attractions as early as the mid-nineteenth century.

In no small part attributable to the island’s comparative remoteness from the eastern coast of the United States, little attention was directed to the island’s caves by the American press in the nineteenth century. One of the few exceptions to this was a brief account of a visit to the island authored by Christiana Rounds and published in the March 1874 issue of *Harper’s New Monthly Magazine*. As described by Rounds (1874:490):

*From St. George’s to Hamilton there is a fine ocean drive of eight or nine miles. Going by Harrington Sound, you will pass the Devil’s Hole [Fig. 1], or Neptune’s Grotto, between which and the sound there is a subterranean communication—the sound, by-the-way, being an arm of the sea. Fish caught at the most favorable seasons of the year are kept here until wanted for use. The usual number is 1000, though it will hold twice as many. There are many varieties of fish, and the spectacle is as pleasing as it is novel. These ponds, on a small scale, are quite numerous throughout Bermuda.*

![Fig. 1. “The Devil’s Hole” (reproduced from Rounds 1874: 490).](image-url)
Like most limestone countries, Bermuda abounds in caves [Fig. 2], and nowhere are they more beautiful than in Walsingham, not far from Neptune’s Grotto, on the road leading around Harrington Sound, one of the loveliest sheets of water imaginable. The whole region is singularly attractive. Mimic lakes, reflecting the varied hues of the rocks which inclose [sic] them, with trees overhanging their banks, teem with fish wonderful in variety and color, whose motions are the very ideal of grace. By-paths through the tangled wild-wood lead one through a wilderness of beauty. Nature has been lavish of her gifts all through this locality, and as it is geologically one of the oldest sections of Bermuda, all the rocks seem to have the weather stain which the vines love so well. Over the whole is thrown the charm of poetry, from the fact that it was one of Tom Moore’s favorite haunts while living in Bermuda. It is fitting that Nature should have her temples in such a place. Humility is one of the conditions of entrance to them, and so bending low, making a slight descent, we are soon standing in a room from whose arched roof hang large stalactites. Artificial lights bring out each in its full proportions, and one contemplates with wonder this strange architecture, regardless of the ages it has endured. In a second one nearby, and which is much more spacious, is a beautiful sheet of water, clear as crystal, and of an emerald tint. The finest cave is the Admiral’s, which guides may fail to mention from the fact that it is more difficult of access than any of the others; but to one at all accustomed to climbing there is little danger and no great difficulty in visiting any of them.

Fig. 2. “Caves on the coast” (reproduced from Rounds 1874: 494).
Despite seemingly frequent changes in the names of various caves on the island over the course of the past two centuries (cf. Forney 1973), the place names Devil’s Hole (Neptune’s Grotto) and Walsingham Cave have been in use since the early nineteenth century. Indeed, the Devil’s Hole has been credited by Forney (1973:97) as “Bermuda’s first tourist attraction” and was opened to the paying public in 1843. The “Tom Moore” mentioned by Rounds (1874:490) was Thomas Moore (1779-1852), a widely respected Irish poet of his era (cf. Moore 1869) and friend of both Lord Byron and Percy Bysshe Shelley. Moore worked as Registrar to the Admiralty Court in Bermuda in 1804 after graduating from Trinity College.

References Cited

Forney, Gerald Glenn

Moore, Thomas

Rounds, Christiana
A NINETEENTH CENTURY VISIT TO A CAVE IN CUBA’S YUMURI VALLEY

Donald B. Ball

With some notable exceptions such as an informative description of Ballamaer Cave (Cavada 1870) and passing comments on Cueva del Candela (Murray 1856:321), relatively few sources in English address the nineteenth century visitation of caves in the island nation of Cuba. One of those rare papers that does so is a charming account of an aborted tour of a cavern in the Yumuri Valley near the seacoast town of Matanzas.

Perhaps exemplifying the maxim “If it can go wrong, it will,” comments by Jonathan S. Jenkins (1898:947-948) published in the October 1898 issue of The Century Magazine should stand as a warning of things not to do in a cave:

Life and Society in Old Cuba

All the elements of fine scenery, sea, mountain, vale, and river, the tinted air and brilliant growth of the tropics, are combined in rare union, and furnish a series of the most magnificent views in and about Matanzas...

The city nestles just behind the giant shoulder of the Cumbre, a mountainous ridge which lifts itself up from the sea and abruptly terminates at the Bay of Matanzas, while at its feet flow the clear waters of the Yumuri River.

A narrow but lovely valley of the same name sweeps up behind the Cumbre, and is walled in on the opposite side by the flank of the mountains. A very noted cavern is situated up this valley, about a mile and a half from the city, and was evidently once the throat out of which the river flowed, though the entrance is now in the face of a cliff much above the level of the valley.

These subterranean openings occur in all limestone countries, and in Cuba, where the water still flows through them, are called sumideros. A stream which flows through the town of San Antonio is lost, about a quarter of a mile beyond, in one of these, and timber or other things thrown into it will, in time, appear on the neighboring sea-coast.

I first learned of the existence of this large cavern on the Yumuri from a Mr. Owens, who had partly explored it twenty years before. It was known to the natives, but from an undefined superstition they would not enter it. The mouth is high up in the face of the cliff, almost concealed by a thick screen of tropical trees interlaced with vines, and the crevices of the rocks are filled with broad-leaved plants. On the right of the entrance a room opens, where, tradition says, the patriots of 1820 held their secret meetings, and the constitution they framed was hidden.

The main body of the cavern goes on to the left of this, and the great number of fantastic figures formed by stalactites and stalagmites which succeed one another throughout its length give a weird and ghostly appearance. There is a general resemblance to the Mammoth Cave in Kentucky, though that is on a much grander scale. I explored the cavern pretty thoroughly, with the aid of ladders constructed on the spot, these enabling me to climb from place to place. The fame of the cave spread among the foreigners at Matanzas, and it became a place of frequent resort for picnics and to gratify curiosity.

There was some risk in going through the cave, due to the rents and chasms, into which the incautious were liable to fall. One of a large party of visitors slipped down the face of an inclined rock, and fell into an abyss, from which he was rescued with great difficulty; and I afterward fell at the same place, but in my descent, fortunately, caught my foot against a projection in the rock, and was saved.

An American man-of-war, the Boston, was lying at Matanzas... The captain of the Boston, having heard a great deal of the cave, expressed a desire to visit it, and some gentlemen present were kind enough to say:
“The ‘Bard of the Isle’ would be the best guide.”

“Well, Mr. Jenkins,” said Captain Babit, “I am told that you are the ‘Bard of the Isle,’ and the best guide to the cave up the Yumuri valley. Will you go with us tomorrow?”

I consented, and that evening the news of the purposed trip was circulated among the merchant vessels in the harbor, and there seemed to be a general desire to join us. The next morning the water was dotted over with rowboats, filled with jolly tars in clean dress, and their merry voices rang along the water like silver bells. This fleet of pleasure seekers moved up the Yumuri River, and after a pleasant trip reached the object of their curiosity. Each of the large company was supplied with two wax candles, and all crowded into the entrance to the cave.

Señor Blitz, the juggler, shot over a hundred vampire-bats, with the intention of making purses of their skins; others fired guns and pistols to cause a reverberation; some lighted blue lights and false fires to produce a ghastly glare upon the jagged walls, until, with conflicting noises, the scene was like pandemonium. The result of burning so much sulphur in a confined place containing over a hundred people soon made itself felt, and the want of air oppressed every one. This increased, and the mouth of the cavern becoming filled with a dense volume of smoke, the visitors became panic-stricken from fear of suffocation.

A lieutenant complained of a sensation of bleeding at the lungs, and the captain of the Boston grew faint. I counseled all not to be alarmed, and to keep together; that in one of my former visits I had observed the flame of the lamp flare in a current of air, and that another opening must exist in that direction. We accordingly followed the windings of the cavern for some distance, until at length a feeble light showed amid the darkness. We were overjoyed at our deliverance from the danger of a horrible death as we emerged by another outlet into the open air.

The utmost precautions should be taken by visitors to have proper guides, plenty of lights, and to be careful of their footsteps.

References Cited

Cavada, Gen. Frederico F.


Jenkins, Jonathan S.


Murray, Amelia M.

St. Louis, Missouri, is a city of caves. Of the 37 known caves under its streets, 21 were used by beer brewers in the 1800’s. Before the advent of artificial refrigeration, these cool subterranean spaces were ideal for the fermentation and lagering of beer. Without these caves, there would be no breweries. From these cold, wet, rocky caves, brewing giants like Anheuser Busch, Falstaff, and Lemp would rise.

Eventually, the use of caves by breweries was rendered obsolete by modern refrigeration, and many of these caves fell into obscurity. Some were seen as a nuisance and filled in. Many others were lost when the breweries succumbed to prohibition, and a continually growing, expanding, and evolving city removed all traces of the cave entrances. Although now gone, significant historical records concerning many of these breweries and their proximal caves is available. This information can be used to estimate the size of these caves, on the assumption that early brewery output was proportional to cave’s storage capacity.

To build the equation, three known caves were used. These caves, Lemp (now part of Cherokee Cave), Winkelmeyer, and English Caves were selected because of the accuracy of their measurements. These caves have been either mapped, or strong reliable recorded history of their size is available.

Along with the size of the cave, their 1860 beer output was obtained. The 1860 output is important because any measurement of beer output after 1870 would be skewed. After 1870 the introduction of artificial refrigeration revolutionized brewing and rendered the caves obsolete and moved brewing above ground. The numbers presented are rounded numbers. All measurements are in feet and barrels.

<table>
<thead>
<tr>
<th>Cave</th>
<th>Length in feet</th>
<th>Barrels per year output (1860)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemp²</td>
<td>720</td>
<td>8300</td>
</tr>
<tr>
<td>Winkelmeyer³</td>
<td>1600</td>
<td>16000</td>
</tr>
<tr>
<td>English³</td>
<td>260</td>
<td>5000</td>
</tr>
</tbody>
</table>
From the data, a basic representation of barrels per linear foot of the cave can be obtained.

<table>
<thead>
<tr>
<th>Cave</th>
<th>Barrels per linear foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemp</td>
<td>12.5</td>
</tr>
<tr>
<td>Winkelmeyer</td>
<td>10</td>
</tr>
<tr>
<td>English</td>
<td>19.2</td>
</tr>
</tbody>
</table>

But barrels per linear foot does not account for the varying width of the caves. Taking into account the widths, a more accurate assumption would be to calculate the barrels of beer per square foot of cave.

<table>
<thead>
<tr>
<th>Cave</th>
<th>Average width</th>
<th>Square footage of cave</th>
<th>Barrels per square foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemp²</td>
<td>20</td>
<td>14,400</td>
<td>0.576</td>
</tr>
<tr>
<td>Winkelmeyer³</td>
<td>18</td>
<td>28,800</td>
<td>0.555</td>
</tr>
<tr>
<td>English⁴</td>
<td>40</td>
<td>10,400</td>
<td>0.480</td>
</tr>
</tbody>
</table>

From these numbers we can get an average of the three caves which is 0.537 barrels of beer per square foot of cave. With this information the following equation to predict cave lengths can be used.

\[
Length = \left(\frac{Output}{0.537}\right) / \text{width}
\]

Via back calculation, this equation returns the length of the three caves to an accuracy of +/- 10%.

<table>
<thead>
<tr>
<th>Cave</th>
<th>Known Length</th>
<th>Equated Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemp</td>
<td>720 Feet</td>
<td>771 Feet</td>
</tr>
<tr>
<td>Winkelmeyer</td>
<td>1600 Feet</td>
<td>1653 Feet</td>
</tr>
<tr>
<td>English</td>
<td>260 Feet</td>
<td>232 Feet</td>
</tr>
</tbody>
</table>

Of course, the output of a brewery can be affected by many factors besides the size of the cave. Many of the factors were those factors above ground including brew master abilities, business climate, labor issues, grain shortages, etc.
Applying the equation to several popular and actively sought after lost brewing caves of St. Louis generates the following:

<table>
<thead>
<tr>
<th>Cave</th>
<th>Barrels per year output (1860)</th>
<th>Estimated Width in Feet</th>
<th>Predicted Length in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lafayette Brewery Cave</td>
<td>4500</td>
<td>20</td>
<td>418</td>
</tr>
<tr>
<td>Green Tree Brewery Cave</td>
<td>7500</td>
<td>20⁰</td>
<td>698</td>
</tr>
<tr>
<td>Home Brewery Cave⁷</td>
<td>4300</td>
<td>20</td>
<td>400</td>
</tr>
<tr>
<td>Kertzinger Cave</td>
<td>7000⁸</td>
<td>20</td>
<td>651</td>
</tr>
</tbody>
</table>

With an estimated 2170 feet of historic cave passage awaiting to be discovered just in these four caves, the overall amount of passage in all of St. Louis’ lost brewery caves could be significant.

ENDNOTES

1. St. Louis cave information is available from the Missouri Speleological Survey. The book *St. Louis Brews* by Herbst, Roussin, Kious, and Russell, has a listing of St. Louis brewery output for 1860 on page 9.

2. Length/width for the Lemp portion of Cherokee Cave is based on Dan Lamping’s map.


4. In the spring of 1914, the building containing English Cave was for sale. Detailed measurements of the cave were provided in the advertisement. See the Jan 18, 1914 page 47 of the *St. Louis Post Dispatch* for an example.

5. Experience has shown that long term breweries tended to modify their caves into a standard vaulted configuration.

6. Based off a May 6, 2007 talk by Henry Horbst at the Missouri Historical Society.

7. The cave that hosted Home Brewery was originally used by a brewery called German Brewery. See page 88 of *American Breweries II* by Van Wieren for more information on the life cycle of this cave.

8. The output for Kertzinger Cave is based on 1858 data from the May 30, 1858 *Missouri Republican*. This brewery was very short lived, but the cave was probably extensive.
SUBATOMIC CIRCUS UNDER THE CITY OF ST. LOUIS, MISSOURI

Joe Light

The caves under St. Louis, Missouri, formed in the calcite rich rock, limestone. Calcite reduced to its smallest components is a soup of calcium, carbon, and oxygen atoms. Reduce it even further and you get a swirl of electrons and clumps of protons. Even further down and you enter the circus world of subatomic particles. In this circus, there is a history contributing particle called a meson.

The existence and structure of the little meson particle is so complicated it requires years of study in physics and upper levels of mathematics. Few people had the education, except for a young, inspiring PhD student at Washington University in St. Louis. Marshall Fox Crouch was that student. He was studying physics there in 1949, and his plan was to study the meson in the subatomic circus.

To study it, he needed an ideal place for his monitoring equipment. His equipment needed to be shielded from the cosmic blast issuing from our sun, and the ideal place would be under a blanket of rock and earth. His search included caves, tunnels, cellars, mines, quarries, bunkers, sewers, and underpasses throughout the greater St. Louis area. For six months in 1949 through 1950, he searched.

He eventually found the ideal spot under the old Lemp Brewery Headquarters in South St. Louis. The spot was flat and level with the ideal amount of rock and earth above it. It lay inside Lemp Cave, which was a well know cave used by the Lemp Brewery for lagering their beer. Lemp Cave and a nearby cave, Minnehaha Cave, would eventually morph under the excavating guidance of Lee Hess into the tour cave, Cherokee Cave, but that is another story.

Marshall Crouch utilized one of the open shafts from the brewery to slowly lower his equipment into the cave. With his equipment in place, he battled the high humidity that attacked his equipment. Water was the enemy and at one point he strung a tarp to protect against the incessant dripping. Water did not stop the show and Crouch was able to conduct his research.

Crouch’s Meson Detector. This photo, taken in Cherokee/Lemp Cave, is from Crouch’s 1951 PhD dissertation. It is interesting to note how many scientific projects throughout time involve tarps.
Eventually, Crouch’s research concluded. The data was collected, and his dissertation was completed. He switched off his equipment, disassembled the devices, rolled up his tarp, and returned to the surface. His investigations into the subatomic circus contributed both to the collective knowledge of physics and the continuing history of the caves of St. Louis.

**References Cited**


NEW NATURAL BRIDGE VIRGINIA POSTMARK

Thomas Lera

Shortly after my monograph, Cave Post Offices in Virginia and West Virginia, was posted on the American Spelean History Association website (caves.org/section/asha/special-pub-1.pdf) the envelope below was listed on eBay.

The letter was mailed to Donald McRae from Natural Bridge on May 11, 1850 during John M. Eubank’s tenure as postmaster. The manuscript cancel shows an unpaid 10 (cents) to be collected upon delivery.

Although the letter was delivered without a street address, it is known that Donald McRae lived at 108 South Third, Wilmington, North Carolina, in the 1850s.¹

Unfortunately, I did not have the winning bid for this envelope, which would have made a nice addition to my collection.

A significant number of papers of speleological history interest were delivered at the 17th International Congress of Speleology in Sydney, Australia, in July 2017, including those by ASHA members. Most abstracts are accompanied by well-illustrated, full-length versions. They are presented below in the order they are found in the Proceedings but not all of them were presented in the designated history session.—Ed.

Cave Exploration during the Little Ice Age

Greg Brick

The expression “little ice age” was coined by geologist Francois Matthes in 1939 with reference to glacial moraines in the Sierra Nevada Mountains of California, USA. He was referring not to the Pleistocene ice age but rather a more recent readvance of the glaciers. Later, the phrase was capitalized and became applied to the Alps in Europe and to events in non-mountainous, unglaciated areas, becoming more of a climatic than a glacial term. The British climatologist H.H. Lamb assigned a specific date range to the Little Ice Age, “about 1550 to 1800.” A recent popular account brackets it more broadly by the years from 1300 to 1850. The centuries-long cold snap is usually attributed to solar variability or cooling due to volcanic eruptions. The Little Ice Age ended about 1850, when the present worldwide retreat of glaciers began, and this is often attributed, at least in part, to anthropogenic factors. There have been several book-length treatments of the Little Ice Age but perhaps the most popular is Brian Fagan’s The Little Ice Age: How Climate Made History 1300-1850, published in 2000. Fagan quotes two examples of caves demonstrating climatic change. Poissonet’s 1586 exploration of the Frodiere de Chaux in the Jura Mountains of France, the earliest account of an ice cave, reported much ice where none exists today. The Arveyron Cave at the source of the Arve River where it discharges from the Le Bois glacier, Chamonix, France, no longer exists, having melted away as the glacier retreated, but it was a tourist spectacle during the Little Ice Age, appearing in several paintings. These obscure narratives of cave exploration during the Little Ice Age have been resurrected and given new meaning in the context of the climate change discussion of our own times.
The Prehistory of Cave Fauna Paradigms

Greg Brick

Humankind has observed cave animals since Paleolithic times. But few groups of organisms have been so persistently classified by their degree of association with a particular environment as cave fauna. Scientists such as Schiner (1854) and Racovitzka (1907) are among the founders of biospeleology. The Schiner-Racovitzka ecological classification of cavernicole into trogloxenes, troglophiles, and troglobites, was early recognized as a possible evolutionary sequence. The chief paradigm of biospeleology had been established and is widely used today. But pioneers before this did not use an ecological classification. The German physician Theodor Tellkampf, for example, studying the fauna of Mammoth Cave, USA, described animals according to their degree of adaptation to caves, as bearing eyes, rudiments of eyes, or being eyeless (Tellkampf 1845). This is essentially what Christiansen (1962) revived with the concept of troglomorphy. Sket (2008) has given examples of the shortcomings of both paradigms.

Cyprus Caving History

Bernard Chirol

Since the late Prehistoric period Cyprus has been inhabited by mankind. At that time, dwarf fauna was living on the island and Mediterranean caves were often filled with animal bones of which Homer wrote about in the Odyssey. During the Renaissance a few books were written about the caves. Since the 19th century and during the second half of the 20th century the island has been explored mostly by the English. In 2003 in the northern part of the island, Turkish cavers from Ankara led a survey of 42 caves on or close to the Kyrenian Range. The Republic of Cyprus is currently concerned with the European project for bat protection in caves near Akamas and the Cape Pyla regions. A French team recently conducted investigations on the whole of the island to determine the real karstic potential and an NGO was created in the north after that expedition in 2014. A European caving project is programmed to start in 2016.

The Oldest Cave Maps in the World

Bernard Chirol

The first drawing of an artificial cave with orientation information is the plan of the Labyrinth of Gortyne (Crete) drawn in 1415 by Cristoforo Buondelmonti. Until now, it has been regarded that the map of the artificial cave “Stufe di Neron” situated at Pozzuoli near Naples and published by Georg Bauer (Agricola) in 1546 was the most ancient (Shaw, 1992). The Labyrinth drawing is a bird’s eye view, with orientation. It was published in 1417 (Buondelmonti, 1417). This “map” was found on the Internet when doing a research about Anna Petrochilou who studied it in 1984-1985.

Women Underground—A World History of Female Contribution in Speleology

Bernard Chirol

It seems that very few women in the world have chosen to become cavers. This work tries to show that women, since the prehistoric period, were in fact early and courageous cavers, and also have lead in scientific areas. Sociological obstacles are described. A large survey on many countries shows that by overcoming sexism during the pioneering times, women cavers deserve a good place in our common history, even if their percentage remains very low in many countries. Now the differences are being swept away in many cases. The survey will continue over the next few years.

Hermann Bock, A Forgotten Precursor of Cave Meteorology

Arrigo A. Cigna

More than one century ago Hermann Bock published the first paper on cave meteorology with a mathematical treatment. It was written in German and unfortunately this paper was ignored. New scientific quantitative studies and research started a half century later. He was an Austrian scientist born in Brünn on February 9, 1882 and died in Graz on January 2, 1968. During his life he published about 50 papers on different branches of speleology but, probably, the most interesting of his papers was a chapter entitled “Mathematical-Physical Investigation on Ice Caves and Wind
Investigating Mammoth Cave during the American Civil War

Joseph C. Douglas

Beginning in January 2016, the author initiated a research project to investigate the history of the American Civil War in Mammoth Cave National Park, focusing on the interactions between soldiers in the Union and Confederate armies and the cave environment and karst landscape. This is part of a larger regional study of Kentucky caves and the Civil War begun in 2015. After presenting an overview of the project goals, methods, and strategies, and consulting with National Park Service cave resource specialists, a core research team was assembled to conduct archival and cave graffiti studies, consisting of the author, historian Marion O. Smith, caver Kristen Bobo, and Larry W. Johnson of the National Park Service. Field work began in February 2016 and for the year as a whole included seventeen research days in Mammoth Cave National Park dedicated to identifying historic graffiti from the Civil War era, and recording them in notes and images. We also recorded the presence of other significant cultural materials even if not Civil War related, including evidence for Native American usage, saltpeter and onyx mining, and historic graffiti from other chronological periods, such as Antebellum and Gilded Age. Utilizing an intuitive survey methodology, we took five separate trips into different parts of historic Mammoth Cave which we knew or suspected might have soldier graffiti: Gothic and Gratz Avenues, Pensacola Avenue, Cyclops Gateway, the Labyrinth and the Ramble, Marion Avenue, and the Maelstrom. Fifteen other Park caves were examined in the remaining dozen field trips. Two of these, Long Cave and Salts Cave required two trips each to document in an even cursory manner. Thirteen other researchers, including cavers, Park staff, and Park volunteers assisted the project in the field during 2016.

Is the Inscription Dated 1213 in Postojnska Jama Really the Oldest Known?

Stephan Kempe

Many caves contain old inscriptions. Within the area of the former Holy Roman Empire of German Nation (dissolved in 1806) some of the better-known ones are: Einhornhöhle and Baumannshöhle (Harz Mountains, Germany), Drachenhöhle (Mixnitz, Austria), Sloup Cavern (Czech Republic), Postojnska jama (Adelsberger Grotte), Predjamski jama, and Vilenicka jama (Slovenia). Volpi (1821) and Schaffenrath (in Hohenwart 1832b) published inscriptions from Imenski rov, the old passage in Postojnska jama. The oldest date given is 1213, taken to be the oldest cave inscription known. However, we have not been able to locate it, in spite of a detailed survey and documentation of all of the ca. 400 inscriptions in the passage (Kempe and Hubrich 2011). The newly discovered text by Rumpf (1816) suggests, that these signatures were located not in the old passage but in front of it and that they are today obliterated by show-cave construction. The main doubt, however, against the old age of the date is that it was written in Arabic numerals. These are stylistically identical or at least very similar to the numerals that were used in the inscriptions dating from the 16th and 17th century in the cave and throughout that time period. During the 13th century all dates were exclusively written in Roman numerals, no date is known from the early 13th century written in Arabic numerals. Thus, we must conclude (and that applies to at least three more dates from Postojnska jama) that the date was either misread or even faked. Therefore, the inscription of Pfarrer Otto from Bruck an der Mur of 1387 in the Drachenhöhle at Mixnitz (Klebel 1931) must now be considered to be the oldest known cave inscription. It is written in Roman numerals: MCCCLXXXVII.

OPERATION “CAVE”—The East German Secret Service ‘Stasi’ and its Focus on Cavers and SPELEOLOGY

Friedhart Knolle, Bärbel Vogel, Andreas Wolf

Speleologists in former GDR (East Germany, German Democratic Republic) and those visiting, specifically from West Germany, were subject to observation by the Ministry for State Security (MfS), the largest GDR secret service, colloquially known as “Stasi.” Its interest focused on their contacts, the caves and cave areas visited and the potential military use of such knowledge by the West German secret services. Following the demise of the Ministry for State Security of the GDR in 1990, the “Federal Commissioner for the Records of the State Security Service of the former German Democratic Republic” (BSU) was created and opened the files. Previously secret archive material in the area of speleology has been available for historical analysis since then. Speleological research in this area is only at its infancy. Using these exemplary archive files, the mentality and ways of working of the GDR secret service is presented. This
paper is hoping to encourage other speleologists to conduct similar archive research. Previously, the author worked to shed light on the involvement of speleological research in the Nazi suppression apparatus. A symbolic success of these efforts was the establishment of the Dr Benno Wolf award by the Verband der deutschen Höhlen- und Karstforscher VdHK (German Speleological Federation), see Knolle (2001), Knolle et al. (2007, 2013). It remains frightening to see how effectively the secret services not only of the Nazi but also of the GDR and other totalitarian regimes managed to gain control over speleological and geological information and those producing it. The reason for this is the power of dictatorial states, the apolitical naivety and/or the opportunistic willingness of researchers to collaborate, the lack of interest or a combination of all of these and other factors. Without jumping to conclusions in comparing the Nazi dictatorship with the political structure of GDR, there is clear evidence that secret services of both systems were actively targeting speleologists and geologists.

**Karst and Caves through the Eyes of the Brazilian Emperor, Dom Pedro II (1831-1889)**

Luiz Eduardo Panisset Travassos, Sebastião Ricardo Machado Meireles

Dom Pedro II, the second and last emperor of Brazil, can be considered a scholar and enthusiast of arts and culture. He was also known as an important sponsor of science, although this is little known by most Brazilians. The Emperor was respected by European scientists like Graham Bell, Louis Pasteur, and Charles Darwin, among others. There are 43 personal journals written by Dom Pedro II during his travels during the 49 years of his reign. The emperor was educated based on Enlightenment ideals, concentrating his studies in Politics and Sciences. He studied Natural History, Geography, History, Literature, Latin, French, English, German, Italian, Spanish, and Greek, among other subjects. While travelling through Brazil and around the world, he wrote detailed accounts of fauna and flora, as well as recorded his geographical impressions of the various places visited. The importance of these accounts is so great that several imperial documents were included in the UNESCO Memory of the World Program (MoW), including the documents related to his travels. Such personal records are considered valuable documents of the second half of the nineteenth century, worthy of preservation. Less well known are his records regarding physical geography, caves, and karst areas through which he passed. Thus, it is the main objective of this work to highlight the emperor’s impressions on the karst landscape in Brazil and in other countries, identifying the places where he visited. To do so, the authors carried out research in the travel journals (1840-1889) that were scanned by the Imperial Museum (Museu Imperial), unit of the Brazilian Museums Institute, federal autarchy attached to the Ministry of Culture. The material was transcribed into about 1,064 pages, divided in two thematic axes: Travels in the Colony and Travels Abroad. About 29 records or mentions were found regarding the term lapa (meaning cave); 67 for the word grotto (gruta); 4 for the word cave (caverna); 1 for honr (sumidouro) and 10 for underground (subterrâneo). From all 43 volumes, the ones that stand out with the research theme are Volumes 02 and 09, 11 to 15, 17 and 19, 20 to 25, 27, 29 and 30. Although it is not possible to affirm that the records were strictly karstological or speleological, the notes are to some extent very scientific. Thus, it is impossible to deny the importance and cultural value of these documents.

**Karst, Caves, and Geodiversity in the “Travels in Brazil (1817-1820)” by Johann Baptist von Spix and Carl Friedrich Philipp von Martius**

Luiz Eduardo Panisset Travassos, Marcella Cristiane Amaral Scotti

Johann Baptist von Spix (1781-1826) and Carl Friedrich Philipp von Martius (1794-1868) were two important German naturalists of the eighteenth century. In 1817, they were part of the Austro-German mission that accompanied the Princess Maria Leopoldina of Austria who later became empress of Brazil. The main objective of the expedition was to create records and collections of Brazilian fauna and flora. The results of the research were published in two volumes entitled Viagem pelo Brasil, 1817-1820 or Travels in Brazil, 1817-1820. While traveling throughout Brazil, in addition to detailed accounts of fauna and flora, the naturalists recorded their geographical impressions of the various places visited. In this case, less known than the records of biodiversity, are those regarding karst, caves, and geodiversity of the areas visited. Thus, it is the main objective of this work highlight the general impressions of Spix and Martius about the Brazilian karst areas, identifying some of the sites mentioned. In order to do so, the authors carried out a research in the two volumes of the work. Available in about 690 pages, it can be divided in seven thematic axis, which starts in Munich and ends in the Amazon 1) preparation for the expedition, and the trip from Munich through Vienna to Trieste. 2) departure from Trieste. 3) Gibraltar and the arrival in Brazil. 4) from Rio de Janeiro to Vila Rica. 5) from Vila Rica to Diamantina and Minas Novas. 6) from Minas Novas to the São Francisco River to Bahia. 7) from Bahia to Maranhão and the Amazon. There were 15 records or mentions to caves; 20 regarding cavities; 01 for lapa (meaning cave), 03 for grotto, and more than 50 records regarding limestone. Particularly when mentioning limestone or calcareous formations,
the naturalists make very detailed observations. Therefore, it is possible to determine that the records of Spix and Martius are a noteworthy historical-geographical testimony of many regions in Brazil by means of written reports and illustrations of great scientific value.

**Historical Notes and Research History of the Non-Karst Caves in Hungary**

István Eszterhás, George Szentes

From historic times until the year 1983 only a few references, occasional observations and scientific studies characterised the non-karst caves related knowledge. Organised research began in 1983 with the launch of the Vulcanspeleological Collective. Their comprehensive activity controlled the exploration and research of non-karst caves in Hungary. Currently 996 non-karst caves have been listed, described and surveyed by the members of the Collective. Up to now they have organised 30 successful research camps and 26 expeditions to foreign countries. They have expounded the genetic types of non-karst caves. They engaged in the systematisation of speleothems occurring in the non-karst caves and they have solved the problem of ice development in low elevation basalt caves. They have carried out biological investigations in non-karst caves and investigated the historical data on the utilisation of non-karst caves and cave dwellings. The results have been published mainly in Hungarian, but occasionally in German or in English.

**Caves and Geotourism**

Greg Brick

Geotourism (sensu lato) is a new word for an old activity. While the bulk of the literature emphasizes recent decades, the Greek writer Herodotus (5th century BC) arguably became the world’s first geotourist and perhaps the Father of Geotourism when, on a trip through Egypt, he described the accumulation of sediments in the Nile River delta. But this perspective only highlights the late arrival of caves in the context of geotourism (as distinguished from utilitarian visitation). Cave tourism developed in the late 18th and 19th centuries with the rise of the middle classes. Caves offer the purest form of geotourism: a journey through the Earth itself, involving close encounters with the enveloping rocks.

**A Verbal Dispute between a Bat and a Partridge: A Satiric Allegorical Poem from the Medieval Period**

Konstantina Aretaki

In manuscript, no 701, held in the National Library of Greece, among other texts, there is a text in poetic form under the name “Tale of a bird-tracker about the Birds,” consisting of 500 verses. All the birds are invited to an official dinner-party by the Eagle, who celebrates the wedding of his son, at which a verbal conflict between 15 pairs of birds takes place. One of these pairs is the bat and the partridge. The poem probably dates at late 13th or early 14th c. AD and the specific manuscript from the beginning of the 16th c. Until today, six other manuscripts have been found in libraries around the globe (Vienna, Constantinople, St Petersburg, Escorial-Spain, etc.) containing variations of the same poem. In a sarcastic manner, all the birds mock each other giving a very accurate description of their characteristics and their behavior as it was conceived by the people of the 14th c. AD. Through these words, we can assume the beliefs held by the people during that era, as regards to the bats. The manuscript also contains drawings of the birds (among them the bat). It is an allegorical text with a didactic and ethical aim.
Cave Full of Diamonds Found, But Discoverers Are Arrested

Special Cable to THE NEW YORK TIMES.

JOHANNESBURG, Feb. 4.—A cave full of diamonds has been discovered by a party of Europeans who were lowered over the cliffs on the Namaqualand coast near Noloth in State-owned territory.

The prospectors, evading police who guard the richest diamond producing district in the world, entered the cavern at low tide. They declared it resembled Ali Baba's cave.

After each high tide, they found fresh stones uncovered. In their excitement the fortune hunters grew careless and the whole party was arrested.
BOOK REVIEWS


For those who like not only show caves but the multitude of wild caves, and literally everything found in between, this is the book for you. Even man-made caves carved out of sandstone, or modified from originally smaller caves, are covered. Going further, now inaccessible caves and caves in legend or myth, are covered. And if you like history as I do, you will find the book hard to put down once you start reading it. Many dates and other facts are mentioned, not to mention over 40 unique photos and historic drawings. In fact, this is the first book in 50 years to cover such a broad spectrum of caves from not only just the publicly accessible show caves like some books, but the now closed caves and general speleological points of interest as well.

The focus is directed at the history of these caves and is not a guidebook as such. Even if it were, few people would ever be so fortunate to get inside some of the now closed and sealed historic caves that Greg describes, or would they particularly want to. Those under Minneapolis are not the most pleasant to explore, but Greg not only has done it, but superbly documented them as well. I personally like how Greg has located and reproduced long ago cave advertisements, like Mystic Caverns, that was promoted as "St. Paul's Underground Wonderland." I could go on and name more caves he covered, but then that is half the fun of reading the book. But I repeat, this book is not meant to be an all-inclusive guidebook, or even a directory to various caves, as many have never been open to the public, or have since been cut off by the urban development, or activities of man. Some caves may no longer even exist.

Speaking of documenting things, Greg, made good use of his degree in geology by covering the various Minnesota rock strata types in his introduction. He has a nice glossary of his general references in the back of the book. He makes sure to point out in print that with some 300 caves in Minnesota, he cannot start to cover them all, nor is this book meant to be all inclusive. But those historic caves he does cover, like Carver's Cave, Chute's Cave, Fountain Cave, and many others, are nicely
presented. Yet other Minnesota caves are represented with historic postcards from the Gordon Smith collection, as well as the authors.

Well-known Minnesota caver, author, and speleo-historian, Greg Brick, has literally gone out of his way to try and bring you the "inside scoop" on caves, even going so far as to cover the caves literally under Minneapolis! But better yet, he has devoted whole chapters to cover man's use of some of these Minnesota caves from various brewery caves to mushroom gardening, and from cheese making to pure tourism. Even an extensive and fact filled story on the Castle Royal, a unique underground nightclub, is featured. Other chapters, are all arranged to tell a fascinating underground story that includes "Prehistoric Caves," and the "Caves of Pioneer Days." A history and sketch of petroglyphs recorded at La Moille Cave by Theodore Lewis are shown. This was during his "rock art ramble" down the Mississippi River in 1888.

I personally like how Greg has broken out and created a chapter on the "Southern Show Caves," particularly the sections on the ex-commercial Catacombs of Yucatan, Hiawatha Caverns, and even the Spring Valley Caverns that are so well known to the caving community. This ex-commercial cave has been greatly expanded by caver John Ackerman. Further on, it is worth pointing out that saber-tooth cat bones were found in Tyson Spring Cave in 2008. An authenticated radiocarbon date of 22,250 years has since been scientifically established for them!

Like a true nationally known cave historian, Greg even goes so far as to document "imaginary" caves which might have just been a myth, or documented in such a way that the modern day cave explorer can only guess what the original author was describing. Whether this is confusion or not, it all makes for a well rounded book of selected Minnesota underground wonders.

It should be pointed out that in putting a book like this together, it is only as good as the authors talents, resources, and educational background, not to mention his ability to try and bring it all together. Greg Brick has an advanced degree in Geology from the University of Connecticut. He worked for years as an environmental consultant. He has taught as a Professor of Geology at Normandale College in Bloomington, Minnesota. He has caved in Minnesota since 1988. He also belongs to the American Spelean History Association. In fact, his interest in cave history is obvious, as he currently edits The Journal of Spelean History (alternating with Dean Snyder). He also received the 2005 Peter M. Hauer Spelean History Award given annually at the National Speleological Society Convention.

For those who like to read and see photos of the mysterious underground world of Minnesota, I highly recommend it. Cavers, or even the general public with just a mild interest in caves and related man-made features, would greatly enjoy reading it. I know I have!
Although flooding is known to have a highly destructive effect on cave paintings, ancient artefacts composed of organic material are usually exceptionally well preserved in underwater caves. As such, the potential value of these unique environments for the study of archaeology is considerable.

Because of the unique challenges and very real dangers associated with the exploration and excavation of underwater caves, this specialized field of study has been largely ignored by the archaeology community. Thus, it is pointed out that "underwater caves are a door that only a few researchers have peered through..." And, while archaeological research in underwater caves has spanned decades of time, this has involved only a small number of investigators.

The Archaeology of Underwater Caves is a scholarly text, the format of which grew out of a conference on Submerged Cave Archaeology: Methods, Theory and Recent Findings at the 2012 meeting of the Society for American Archaeology (Memphis, Tennessee).

The presentation is global in scope, encompassing sites in the United States, Mexico, France, the Philippines, Belgium, Belize, Italy, and the Dominican Republic. Based on geological criteria, seven categories of underwater caves are defined in the text, each with varied association to the surrounding landscape and to early human activities (related, in large measure, to whether they were once dry or were always flooded): springs, siphons, sinkholes, cave lakes, sumps, flooded caverns, and sea caves. Emphasis is placed on discussion of both completely submerged (e.g., Florida springs) or partially submerged caves (e.g., Cosquer Cave, France), as well as underground lakes and rivers (e.g., Carver's Cave, Minnesota).

Discussion highlights both the methodologies and challenges of uncovering skeletal remains and ancient artifacts from underwater caves. Chapters feature aspects of geology, archaeology, paleoanthropology, and relevant paleontology. Findings are put into perspective to ancient human cosmologies, including an understanding of early cultures and ethnographies, evidence of habitation, ritual and religious practices, hunting behavior, and even the peopling of the New World. Aspects of cave diving, including the importance of early diving assistance rendered by members of the National Association for Cave Diving (the first cave-diving organization in the US) and, subsequently, the
Cave Diving Section of the National Speleological Society, are also briefly touched upon.

*The Archaeology of Underwater Caves* provides an interesting overview of this specialized discipline, with consideration given both to past findings and future research potential. Because of their fragility and vulnerability, it is important that archaeological investigations of underwater caves proceed before these sites are gone. This text will primarily be of interest to archaeologists, historians, and speleologists who study caves and culture. Members of the cave-diving community may be interested in some of the applications of cave diving to scientific studies, especially among divers interested in cultivating a relationship with archaeologists investigating underwater caves.
IN MEMORIAM

Louise (“Sis”) Baird Kinnard Halliday

NASHVILLE – Louise (“Sis”) Baird Kinnard Halliday, passed away in Nashville, TN on January 2, 2018, at the age of 86.

Sis was preceded in death by her father, Harold James Baird, her mother, Stella Louise (“Ludie”) Rice Baird, her siblings, Bill, Nell, Harold Jr., and her daughter, Madelyn Russell Kinnard. She is survived by her loving husband of 29 years, Dr. William (“Bill”) Halliday, her children, Mike Kinnard (Kathy), Chadds Ford, PA; Steve Kinnard (Judy), North Bergen, NJ; Jason Kinnard (Pam), Mt. Juliet, TN; and David Kinnard (Sharon), Nashville, TN. She is lovingly remembered by her 11 grandchildren, Claire, Clay, Grace, Madelyn, Jason, Lynsay, Jerica, Keaton, Matthew, Christian, Chad, and 9 great-grandchildren.

A native of Nashville, TN, Sis was born on November 21, 1931. She graduated from Ward-Belmont School in 1949 and earned a B.A. in Education from Vanderbilt University in 1953, where she was an active member of Pi Beta Phi Fraternity. She continued on to earn her M.A. in Education from Tennessee State University in 1988 and taught second grade at The Ensworth School for many years. She is fondly remembered by both students and parents alike.

As a member of Pi Beta Phi’s Nashville Alumnae Chapter, Sis volunteered many years at Christmas Village, an annual event supporting the Vanderbilt Bill Wilkerson Center. She also supported the Fannie Battle Day Home for Children through its Caroling for Kids program. She was an active member of the Centennial Club where she participated in bridge groups and sang with the Centennial Chorus, enjoying many trips to sing at local retirement facilities.

Sis had many friends and enjoyed a wide range of interests. She was an avid tennis and bridge player and enjoyed reading and learning foreign languages. She traveled extensively with her husband Bill, making annual trips to their home in Hawaii and accompanying him as he explored caves all over the world. Some of her favorite destinations included Italy, Spain, Turkey and Thailand.

Sis will forever be remembered for her outgoing personality and great sense of humor and will be missed by many.

A Memorial Service celebrating Sis’ life will be held at St. George’s Episcopal Church, located at 4715 Harding Pike, Nashville, TN, on January 27, 2018 at 3:30 pm. The family will receive friends and guests one hour before the service at 2:30 p.m.

In lieu of flowers, memorial donations may be made to The Ensworth School (www.ensworth.com), Vanderbilt Bill Wilkerson Center (www.vanderbilthealth.com) and Fannie Battle Day Home for Children (www.fanniebattle.org).