

Willard Rouse Jillson and the Crystal Cave of Sloans Valley, Kentucky

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In the thickly forested Appalachian foothills of southeastern Kentucky, nestled between the broadly looping entrenched meanders of the Cumberland River gorge and its South Fork, lies one of the greatest caves in the world. According to the lists painstakingly maintained by Bob Gulden, as of January 2019 almost 25 miles (24.64 miles or 39.654 km) have been surveyed in Sloans Valley Cave, ranking it as the fourth-longest cave in Kentucky, the twenty-third longest in the United States, and falling within the top one hundred of the world. The cave and its various entrances are located on both sides of U.S. highway 27 just south of Burnside in Pulaski County, Kentucky, and is developed in a hanging valley in the upper Mississippian limestones of the Slade Formation, primarily the Ste. Genevieve and the St. Louis. The cave also features one of the largest subterranean chambers in Kentucky, naturally called the Big Room, which measures 750 feet long, 130 feet wide, and 90 feet tall.¹

With at least sixteen known entrances, some quite prominent in the landscape, the cave was well known to the earliest inhabitants of the region. One of the more popular access points into the system was through the Great Rock Sink, a large karst window located on the east side of the old Jacksboro Road leading from Somerset, Kentucky, to Jacksboro, Tennessee, now known as U.S. Highway 27. With vertical limestone walls ranging from 50 to 80 feet in height, visually quite appealing, the Rock Sink features two entrances into Sloans Valley Cave, situated about 150 feet apart.

The lower opening at the western end of the sink, 50 feet wide and 15 high, leads to “West Cave” and the greater part of the system. The opposite “East Cave” entrance is much smaller, only 4 by 6 feet, and, prior to the flooding of this area of the cave in 1951 by Lake Cumberland brought visitors through a series of large chambers and passageways about 1,800 feet to an entrance on Haynes Bend of the Cumberland River, now submerged. About 800 feet before the river exit, a chamber roughly 55 feet wide and 190 feet long contained the remains of about 25 saltpeter vats, in the form of soil casts from which the wooden slats had long ago decayed. This is the only location in Sloans Valley Cave known to have been mined for saltpeter.²

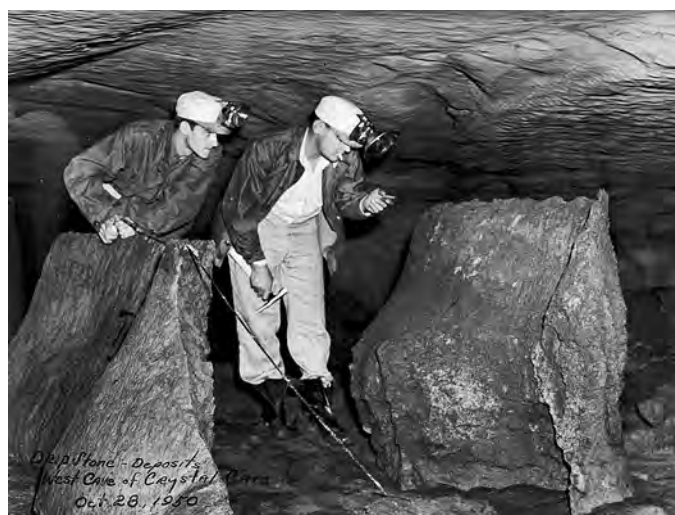
Although there exist no historic documents to indicate the operator of the saltpeter works, one very likely candidate was an African-American slave known as Frank, or “Free Frank” as he was known after his manumission in 1819. Frank was the property of George McWhorter, who owned a 170-acre farm on Fishing Creek, about ten miles from Sloans Valley on the north side of Cumberland River. In an unusual gesture of trust, when McWhorter moved to Wayne County in 1810, he left 33-year-old Frank behind with the authority to manage the farm. With his owner’s blessing, Frank saw the opportunity to make sufficient money to purchase his own freedom and that of his large family by engaging in the manufacture of saltpeter from one or more local caves. Although there are 17 caves in Pulaski County that are known to have been

mined for saltpeter, Sloans Valley is by far the closest location to Fishing Creek. Frank carried on mining and processing of saltpeter from about 1810 through the 1820s and was able to purchase the freedom of his wife in 1817 and his own in 1819. County records indicate that Frank owned “two still[s]...24 still Tubbs, Two Stake stands, two singling and one doubling kegs”; the “still” (steel) tubs were used as vats to boil the saltpeter leachate to crystallization. Because such entrepreneurial activity on the part of a slave was illegal despite McWhorter’s permission, Frank probably worked secretly at saltpeter manufacture at night after laboring publicly all day on the farm.³

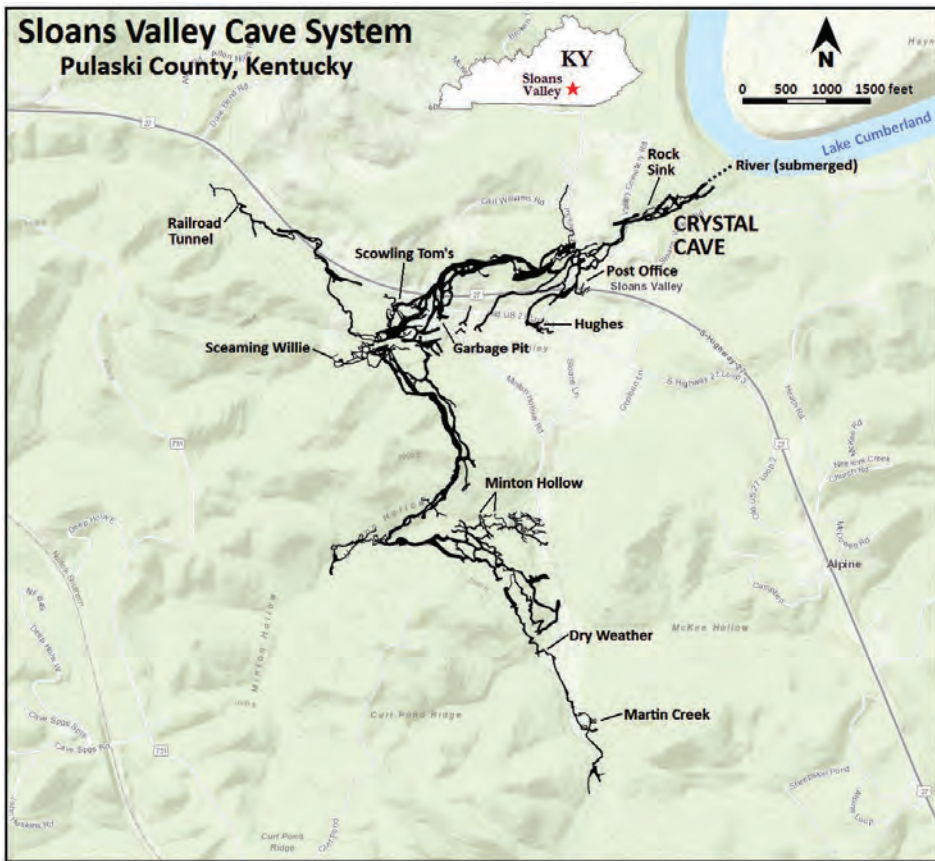
The Great Rock Sink served as the entry point for commercial tours of the adjacent sections of Sloans Valley Cave during the early twentieth century, when it was termed “Cumberland Crystal Caves” and operated by Clay Vest. In September 1911 Vest, who worked as a blacksmith in Yosemite, Casey County, purchased a house in the town of Burnside and moved to Pulaski County to practice his trade. A few years later, on March 1, 1918, he paid \$275 to obtain 50 acres of land along the Cumberland River that included the Great Rock Sink, and there made his home. Curiosity must have impelled Vest to explore the passages that lay beyond. So impressed was he with the size and grandeur of the subterranean vistas that, in 1934, Vest leased the cave to a group of investors from Illinois, headed by Paul C. Irwin, to develop and promote as a show cave under the not-much-exaggerated designation “Giant Wonder Caves.” Along with Irwin, an



Oscar G. Hinton, Transylvania student, exploring in Crystal Cave in 1950. The extra-large 7-inch reflector of his carbide lamp was not widely used in mining but was popular among coon hunters and fishermen.



Transylvania College students surveying in West Cave; Bob Jones with the steel tape, Oscar Hinton with the large reflector. Photographer probably student Louis R. Ponsetto; photo included in several student reports.



Topographic overlay of Sloans Valley Cave System, created from cave map featured in 1985 Speleofest Guidebook. The cave has sixteen known entrances connected by a permanently dark zone: Great Rock Sink (2); Cumberland River (submerged); Railroad Tunnel (2); Garbage Pit; Post Office; Scowling Tom's; Hughes; Screaming Willie; Minton Hollow (3); Martin Creek (2); and Dry Weather. Overlay map shows 22.425 miles of the system that had been mapped 1968-1971.

oil and gas field developer from Jacksonville, the other investors in "Giant Wonder Caves, Inc.," capitalized at \$8,000, were James V. Kennedy, a businessman from Jacksonville and Barnabas F. Sears, an attorney from Aurora. The new enterprise held its grand opening on Sunday, June 17, of which the *Somerset Journal* reported "A large crowd from everywhere was going and coming all the day." William F. (Billy) Williamson and his brother Herschel were among the local boys hired to build trails, stairs and handrails, and to guide tourists, for which they were paid \$30 per month. Despite the corporate presence, the operation was still very much a family affair, as tours were conducted for groups of ten to a dozen visitors by Clay and his daughters Ruby and Ruth as well as by the Williamson brothers.⁴

An advertising flyer, date unknown, stated:

The Caves contain a natural fountain, many crystal formations, and stalactites [sic] – unusual scenery that must be seen to be appreciated. You can traverse these Caves to the Fountain 2880 feet. Also there is another opening 1800 feet to the Cumberland River. There is also a Lost River and a 350 yard boat ride in traversing one of these routes. A competent guide will be furnished anyone

who wishes to make a trip through the Caves at a small fee.

A newspaper article reporting the "recent discovery" of the vast cave complex near Burnside noted that "sufficient mileage has been traversed to require a six-hour stay underground to pass through all of the caverns which have been explored and declared safe for the public." Tours of the West Cave included a visit to the Big Room, described with typical exaggeration as being 1,000 feet long, 200 feet wide and 150 feet high. The "Lost River" boat tour followed a section of cave stream 25 feet wide which "appears from an opening on one side of the cavern and then disappears on the other side." Elsewhere, the report noted, was an underground lake 800 feet long. The account continued at some length about the "beautiful sights" and "gorgeous splendor" exhibited by the ancient rock formations and tumbling waterfalls, comparing the sights favorably to those to be found in any other Kentucky cavern, including Mammoth Cave.⁵

Visitors obtained their tickets and walked down into the sink by a trail along the northeast side of the Great Rock Sink. Tourists were charged 50 cents for a trip to the Cumberland River entrance and back, and 75 cents for a longer trip to the

"Fountain of Youth." Guides wore hard hats and carried large flashlights and gasoline lanterns. Some of the tourists carried lights and wore hard hats provided for their use. One of the guides' favorite performances involved a hole that penetrated between levels. When a tourist obligingly peered down into the hole, Billy Williamson would drop his hat through it, which was later recovered when the group returned by the lower level. This feature thus became known as the "Hat Hole." The guides also entertained their guests by setting up rocks in the passage near the Fountain of Youth and casting shadows on the wall that resembled animals of various types. Billy and the other young men employed as guides often carried out explorations of the cave far beyond the usual tourist routes, emerging from some of the entrances on the west side of the highway. Eventually, Clay Vest took back the management of the cave, and it became known thereafter as Cumberland Crystal Caves. The show cave was finally forced out of business in 1951 by the rising waters of the newly impounded Lake Cumberland and the death of Clay Vest during the following year.⁶

The Great Rock Sink also served as a principal point of entry into Sloans Valley Cave when the first known scientific studies and mapping surveys were conducted in the cave, beginning in the early 1940s. Among the earliest of the biological reconnoissances in Sloans was carried out by Rendell Rhoades who in 1942 observed a new subspecies of troglobitic crayfish which he named *Orconectes pellucidus packardi*, noting that "They are abundant in the edges



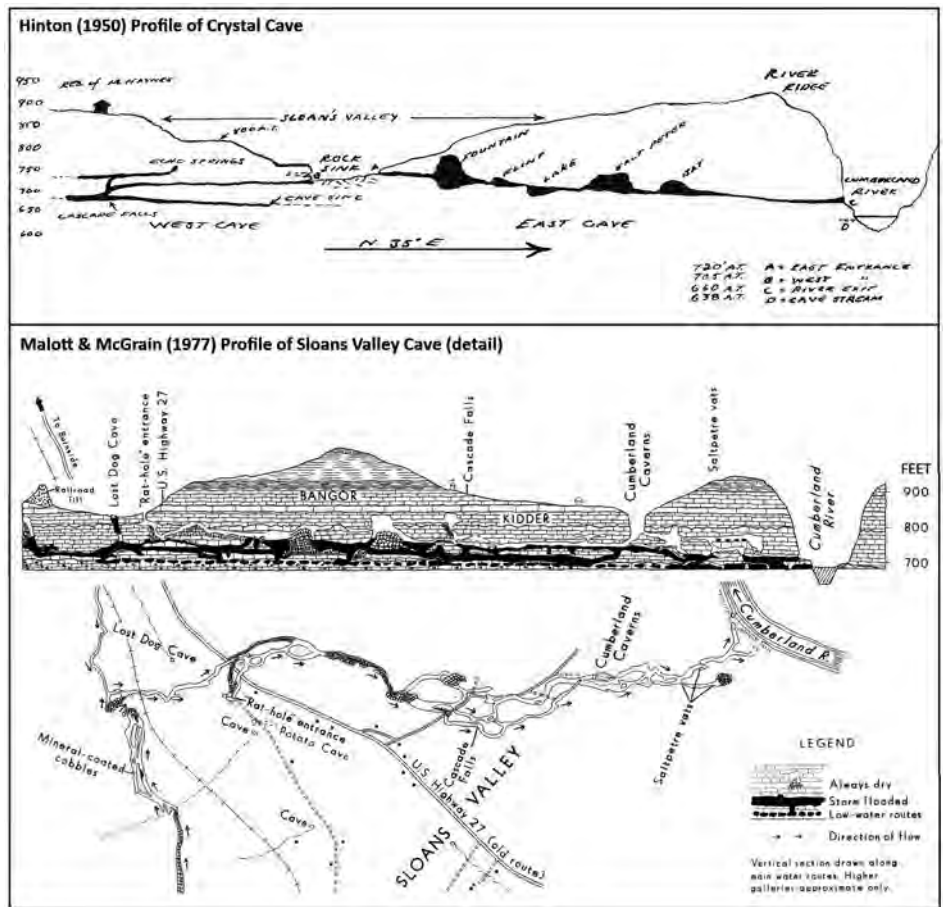
Group "geologizing," examining the outcrop for fossils in Great Rock Sink near the entrance to West Cave (lower left). Opening at upper right is the "Rock House," which is sealed with cave fill at the back. John C. Wyatt Lexington Herald-Leader photographs, University of Kentucky Archives.

of quiet pools which make up the stream in the upper part of Cumberland Crystal Cave. I was informed by Mr. Clay Vest, the owner through whose courtesy my specimens were obtained, that the lower fork of the cave, referred to as "Pumpkin Center," was also inhabited by this crayfish." While the guides who worked for Vest may have made crude sketch maps of the cave for their own use, none have been preserved and the first systematic surveys were conducted during 1940-1942 by the father and son team of Clyde A. Malott and teen-aged Floyd C. Malott although the map was not published until 1977. The Malotts surveyed more than 7.5 miles of the system from the Cumberland River entrance through Cumberland Crystal Cave and south through the Minton Hollow and Martins Creek sections. The elder Malott was chair of the Department of Geology and Geography at Indiana University and a pioneering karst researcher.⁷

A decade later, in the autumn of 1950, Dr. Willard Rouse Jillson, former state geologist of Kentucky, brought his geology students from Transylvania College in Lexington to Pulaski County to study and map 6,300 feet of the Cumberland Crystal Cave section, which he shortened in print to Crystal Cave. Jillson, who was unaware of the as-yet unpublished investigations and survey conducted by the Malotts, was motivated by the desire to provide some field experience for his students and carry out a survey of the cave before it was inundated by the rising waters of Lake Cumberland; the Wolf Creek dam had been completed in July and the lake was expected to fill by spring of 1951. During 1963-1967, Al Geiser and others of the Greater Cincinnati



Bob Jones checking the carbide in his lamp bottom while Dr. Jillson, standing, and Oscar Hinton look on. John C. Wyatt Lexington Herald-Leader photographs, University of Kentucky Archives.



Comparative geologic profiles of Crystal Cave section of Sloans Valley Cave system. Upper profile was made by Oscar G. Hinton, Transylvania College student, and submitted in his report to his instructor, Willard R. Jillson. Lower profile is the upper section of the cave map and geologic profile published by Clyde A. Malott and Preston McGrain in 1977 based on 1940 surveys by Malott and Malott. On the 1977 map, "Cumberland Caverns" is an alternate designation for Crystal Cave used during the pre-1950 period of commercialization. The entrance designated the "Rat Hole" corresponds to the "Garbage Pit" or "Greenhouse" entrance known to modern cavers.

Grotto (GCG) of Ohio made a rather rough survey of the cave from the Garbage Pit entrance through Crystal Cave nearly to the river entrance, a section of which was subsequently published in the GCG's *Electric Caver* and reprinted in the 1964 *Speleo Digest*. The modern survey of the cave, upon which today's published maps are based, was begun in 1969 by the brilliant but eccentric David Perry Beiter of Lexington's Blue Grass Grotto (BGG).⁸

I assisted Dave in some of the early surveys in a minor way, tying the Post Office entrance into the main cave. At the time, I was eighteen years old and relatively new to caving, having joined the BGG three years before. Sloans Valley Cave had recently become a popular destination for BGG cavers in those days, and having been on several such jaunts I was eager to assist Dave with his new project since he had become a rather close friend and a mentor in many ways. Previously, I had helped Dave with surveys made in the various caves in Cave Hollow, Lee County, Kentucky, which was the subject of his Master's thesis research,

so in March 1970 when he suggested that we do a little surveying in Sloans I was more than ready to help out. I have no doubt that I would have continued to work in Sloans for many years had I not become diverted to the caves of adjacent Rockcastle County that same year, which became my long-term personal project. Dave was willing to reciprocate, and so the initial surveys into Rockcastle's Goochland Cave were made by the two of us alone.



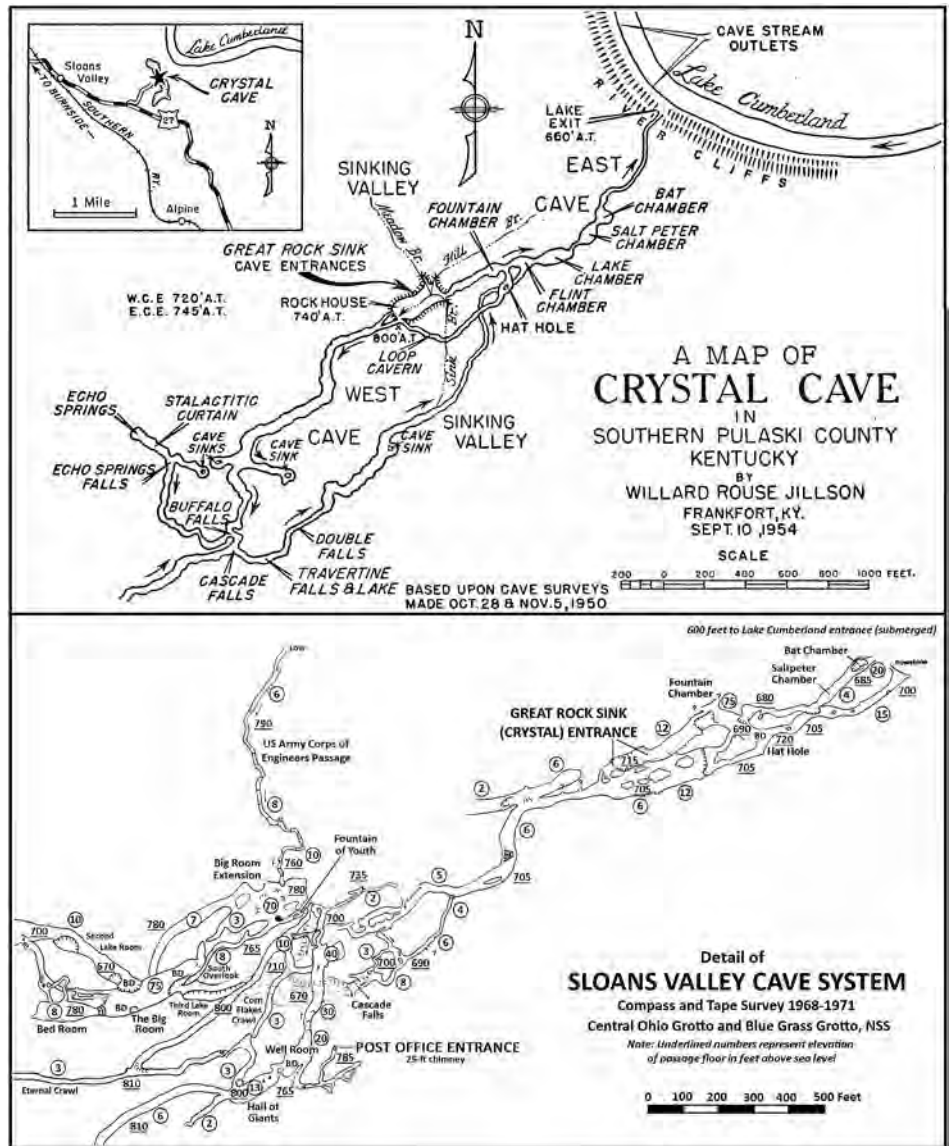
The Cumberland River entrance, submerged beneath the pool of Lake Cumberland since 1951. Photographer probably student Louis R. Ponsetto; photo included in several student reports.

I continued to be intrigued by the Crystal Cave section of Sloans Valley. Normally, most of the cave from near the Garbage Pit entrance to the Cumberland River entrance is permanently or periodically submerged beneath the Lake Cumberland impoundment. The normal pool level of the lake is 723 feet and the bottom of Great Rock Sink is 715 feet. When Jillson made his surveys in 1950, he reported the level of the Cumberland River outside the river entrance to be 650 feet and the entrance ten feet higher, or 660 feet. The Wolf Creek Dam, which creates the impoundment, is located 70 miles downstream from Sloans Valley. In the spring of 1968, serious leakage from the Wolf Creek Dam prompted the Army Corps of Engineers to drain the lake in order to locate and repair the leaking sections. The water level began dropping and in little more than a week had stabilized at 680 feet, nearly 50 feet below normal, and in the process not only temporarily drained many of the formerly flooded cave passages but also exposed the valley bottom in the vicinity of Burnside Island. I was fortunate, during June 1968, to participate in a BGG trip that took advantage of the exceptionally low water to enter Great Rock Sink and explore many of the very muddy passages of the Crystal Cave section. The river entrance was, of course, still underwater.⁹

My interest was also piqued, in that same year, by the initiation of a personal connection with Willard Rouse Jillson, to whom I am distantly related. My mother's adoptive parents were Frank and Mame Rhodenheber of Louisville; when Mame was killed by a careless driver during the famous Ohio River flood in January 1937, thereafter Frank remarried to Jillson's oldest daughter, Marie, on Christmas Day of the same year. My mother, Elizabeth, was nineteen years old at this time and away at college, but she became part of Jillson's extended family and



Cascade Falls, a prominent landmark in the West Cave section. The Transylvania College student survey indicated that the base of the passage beneath Cascade Falls in West Cave was at an elevation of about 675 feet, which today would be beneath nearly fifty feet of lake water. Photographer probably student Louis R. Ponsetto; photo included in several student reports.



Upper map of Crystal Cave was drawn from 1950 surveys by Transylvania College students directed by Dr. Willard Rouse Jillson, published in *Geology of Crystal Cave* (1954). Lower map is a detail showing the Crystal Cave section adapted from the 1980 map drawn by Lou Simpson and published in the 1985 *Speleofest Guidebook*. Additional place names have been added to allow comparison with the Jillson map.

Willard, her step-grandfather, was rather fond of her. So it was that, when my mother moved back to Kentucky in 1966, taking up residence in Lexington, she visited Jillson at his Frankfort home upon occasion and brought her teen-aged son along to meet the famous geologist.

Willard Rouse Jillson was a remarkable man by any measure. Born in Syracuse, New York, in 1890, he grew up on a nearby farm and was attracted to the natural sciences as a youth. Jillson received his undergraduate degree from Syracuse in 1912, followed by a Master's in 1915 from the University of Washington (State), where he also completed most of the work necessary for a doctorate, and afterward obtained graduate fellowships at the University of Chicago and at Yale. He was in very good company at Chicago, for of his class of twelve geology students

there, five including Jillson later became state geologists. He was awarded honorary doctorates by Syracuse in 1921 and by Berea College, Kentucky, in 1925. After a stint as a petroleum geologist in the South and West, Jillson came to Kentucky in 1917 and proceeded to amass considerable wealth dealing in coal, oil and gas leases. He began teaching geology at the University of Kentucky in 1918 until the following year when Governor A. O. Stanley appointed Jillson as the Kentucky State Geologist in the Department of Geology and Forestry, from which the geology section was separated in 1920 to become the Kentucky Geological Survey. He served continuously as State Geologist until 1932, being reappointed by five successive governors. From 1924 to 1928 Jillson was chair of the Kentucky State Parks Commission and was responsible for



The Transylvania College exploring party in the West Cave entrance. Willard R. Jillson in foreground, in white trousers and fedora hat; immediately on his right is student James R. Stovall, today the last living member of the group. Photographer unknown, probably Lexington Leader photo. From Robert Jones student report.



The East Cave section of Crystal contains the remains of about 25 saltpeper vats, these being residual soil casts from which the wooden hoppers have decayed away. The manufacture of saltpeper, the primary ingredient used to make gunpowder, was an important Kentucky industry from about 1800 to 1815. These vats were submerged by the waters of Lake Cumberland shortly after this photo was taken, but a 2009 trip here during a period of low water confirmed that the artifacts remain. Photographer probably student Louis R. Ponsetto; photo included in several student reports.

establishment of the first four state parks in the Commonwealth. While chair, he pushed hard to acquire Mammoth Cave as a state park, and failing in this, supported the creation of Mammoth Cave National Park in 1941. Joining the faculty of Transylvania College in 1947, Jillson created the Geology Department and taught classes there until resigning in 1951. He died at the age of 85 in Louisville, Kentucky, in 1975.¹⁰

The sheer volume of Jillson's published work is truly amazing. His interests were wide-ranging, and included geology, paleontology, regional history, biography, bibliography, and poetry. Of the 97 books he published approximately half addressed geological topics, and the other half on various other topics. In addition to books, Jillson also published more than 500 articles, pamphlets and brochures. He tended to prefer publication of his shorter works as pamphlets, rather than submitting to journals, and these amount to 165 individual titles. While few of his works were dedicated entirely to caves and karst – e.g., *American Karst Country* (1924, 8p.), *Geology of Roaring Spring* (1945, 44 p.), *Geology of Crystal Cave* (1954, 39 p.) and *Geology of Three Hundred Springs* (1957, 19 p.) being among the few – he was keenly interested in karst as part of the regional geology and topography of Kentucky. This can be seen in publications such as *Topography of Kentucky* (1928, 291 p.) and *Geology of Fayette County, Kentucky* (1968, 121 p.). Mammoth Cave also occupied a great deal of his attention; in 1924 he contributed an extensive bibliography of Mammoth as an appendix to Randolph and Huffman's *Mammoth Cave and the Cave Region of Kentucky*, which was later reprinted under

separate cover in 1953 as *A Bibliography of Mammoth Cave, 1798-1949* (80 p). In 1958 he conducted a short course on the geology of Mammoth Cave, on site, for students of Murray State University.¹¹

In the spring of 1969, seventeen years old, I had little enthusiasm when my mother announced that we were going to visit an elderly relative in Frankfort. This changed very quickly when I met Dr. Jillson, who received us with great cordiality and took a particular interest in me when he learned of my preoccupation with Kentucky geology and caves, immature as yet it was. At that time, I had been an active caver for a little over a year. He took me upstairs and showed me his extensive library and we spoke about caves and, in particular, about his investigation and survey of Crystal Cave which I learned to my surprise was part of Sloans Valley Cave. That spring I had just volunteered to take over editing *The Kentucky Caver*, the newsletter of the BGG, and so I asked his permission to reprint *Geology of Crystal Cave* in the newsletter, to which he readily agreed. It subsequently appeared in four installments during 1969-1970, covering first the Great Rock Sink, then East Cave and West Cave. One of my prized possessions is a letter Jillson wrote to me in his own hand, dated April 28, 1969, thanking me for the loan of a copy of *Speleology* by Moore and Nicholas, of which he said, "I enjoyed the reading of various parts of this little book – the scientific coverage of which seems to be very good." I wish now that I had visited him more often and engaged in longer discussions, but I was busy with caving and important teenage stuff; the opportunity was lost when he passed away a few years later.¹²

Others have written much on the explorations and mapping of Sloans Valley Cave, but the story of Jillson and his Transylvania College students in Crystal Cave has never before been fully told. On March 12, 1947, Transylvania College announced that Dr. Willard Rouse Jillson, then a consulting geological engineer in Frankfort, would organize and head a department of geology at the school. This was an ambitious undertaking, because for a time he would be the only instructor in geology and would have sole responsibility for teaching eleven courses: Physical Geology, Historical Geology, Economic Geology, Petroleum Geology, Paleontology, Vertebrate Paleontology, Rocks and Minerals, Mining Geology, Geology of Kentucky, Geological Literature, and Advanced Geology. Only a few of these would, of course, be offered in any one semester. For this he received a salary of \$2,400 for the academic year. The college president, Raymond F. McLain, congratulated him in May, 1948, writing that "You have really made a fine contribution to our college during this past year. I have seldom seen anybody come into the institution and get off to so quick a start and really challenge students in a new field." Like many academics, Jillson sought out grant money to support his research, and much of this was provided by the Carnegie Foundation in New York. On January 28, 1950, Jillson submitted a grant application to the Foundation, asking for \$400 to support three projects. Among these would be production of a geology of Pulaski County, Kentucky, which would require considerable field work. The grant was subsequently approved on February 14 of the same year, and Jillson spent 13

days in Pulaski County during May and July. In his subsequent report on grant expenditures, he noted that the field work on the Pulaski project was 90% complete and would be finished at a future date when additional funds became available. Despite this assurance, Jilison never published a "Geology of Pulaski County," although in 1954 he released *A Bibliography of Pulaski County, Kentucky: Citations of Printed and Manuscript Sources Touching Upon its History, Geology, Coal, Salt, Oil and Gas, with Brief Annotations* (30 p.)¹³

Jilison probably intended to complete the Pulaski project; the Jilison Papers at the University of Louisville contain a folder filled with his notes on the subject. Most likely, his attention was diverted to the necessity to quickly complete an investigation of Crystal Cave before the impinging floodwaters of Lake Cumberland made this impossible. He had been to the cave before in spring of 1928, while making a field inspection as State Geologist to ascertain progress in topographic mapping for the Burnside 1:62,500 quadrangle. On July 15, 1950, he visited Crystal Cave again using his Carnegie funding, "being engaged in a broad geological reconnaissance of Pulaski County," and it probably then occurred to him that this would be an ideal project for some of his Transylvania students during the fall semester. Like any good geology instructor, he considered field experience essential in the training of a geologist, and the college catalog for 1949-1950 notes that "All courses in Geology require laboratory and field trips."¹⁴

The Wolf Creek Dam and its lake, when filled, would be among the largest artificial

impoundments in the United States. Built as a combination of earthen embankment and concrete gravity dam 5,376 feet long and 258 feet high, the structure would have a storage capacity of six million acre-feet of water in a lake more than 100 miles long. In the wake of the devastating 1937 flooding on the Ohio River, the very next year Congress passed the Flood Control Act of 1938 which provided funding for numerous flood-control projects on Ohio River tributaries. The Wolf Creek dam on the upper Cumberland was the first of these projects, intended primarily for flood control but also equipped for hydroelectric power generation. Plans were drawn up by the Army Corps of Engineers in 1938, and the ground-breaking ceremony held at Rowena in Russell County, Kentucky, on September 1, 1941. When the United States declared war upon Japan three months later, Congress directed that the Wolf Creek dam be rushed to completion to furnish power for war industries in the southeast, but as the full impact of the war began to manifest, it became apparent that the construction materials, equipment and workers would be needed elsewhere for the war effort and the project was shut down in August 1943. After the war, construction of the dam was resumed during the summer of 1946, and final closure of the gates would take place in December 1950 to allow the lake to begin filling. If Crystal Cave was going to be investigated, it would have to be very soon.¹⁵

Thirteen Transylvania students would participate in the exploration and mapping of Crystal Cave, eight of whom were enrolled in Jilison's "Geology of Kentucky" course during the 1950 fall quarter, this being the number

who later submitted reports for grading. These eight students were: John W. Foley, a 21-year-old sophomore from Pineville, Kentucky; Oscar G. Hinton, a 27-year-old junior from Flemingsburg, Kentucky; Harold L. Holmes, 18-year-old freshman from Charleston, West Virginia; Phillip H. Jay, 24-year-old senior and WWII veteran from Radburn, New Jersey; James Robert Jones, 23-year-old junior from Paducah, Kentucky; John F. Kirby, a 24-year-old senior from Lexington, Kentucky; Louis R. Ponsetto, a 21-year-old junior from Leechburg, Pennsylvania; and James T. Renfro, a 19-year-old sophomore from Lawrenceburg, Kentucky. In addition to these young men, Transylvania students who may not have been enrolled in this particular course but came along for the experience were John R. Ballard, a junior from Lexington; Eldridge Cecil, a senior from Versailles, Kentucky; John M. Patten, a sophomore from Wilmette, Illinois; Henry A. Stovall, a sophomore from Hazel Green, Kentucky; and Joseph G. Gibson, a sophomore from Lexington. Henry Stovall's younger brother James, a freshman, also participated, but as he was not enrolled in Jilison's course Henry invited him to join him for some fun in cave exploring. Not all of the students would participate in both of the mapping trips.¹⁶

Jilison and a group of his students left Lexington on Friday afternoon, October 27, and drove to Somerset where they checked into rooms at the Hotel Beecher, reportedly the finest lodgings between Lexington and Knoxville. He wanted to accomplish as much as possible in the available time, so he roused his students early on Saturday morning and they were on the road to Sloans Valley by



During the summer of 1968 the water level in Lake Cumberland was reduced by 40 feet to address bypass leakage around Wolf Creek Dam, exposing the valley bottom east of Burnside Island. The community of Burnside was formerly situated in this valley and was relocated to the north. Visible in the photograph is old Highway 27, also relocated, with stranded boat docks in the background and the channel of the Cumberland River in the distance. The temporarily reduced pool level allowed cavers to enter Rock Sink and explore part of Crystal Cave. Photo: Gary A. O'Dell, 1968.



Cave and solution channels exposed in cutoff trench during excavations for Wolf Creek Dam, 1946. USACE engineers believe inadequate sealing of solution openings was responsible for the bypass leakage that plagued the dam ever since it was constructed. Source: Robinson (2015)., "Successful Foundation Preparations in Karst Bedrock of the Masonry Section of Wolf Creek Dam," in Proceedings of the 14th Sinkhole Conference, NCKRI Symposium 5, Carlsbad, NM, 2015.



Wolf Creek Dam and Lake Cumberland. Photograph was taken in November 2009 when lake level had been reduced to investigate and remediate serious bypass leakage. Regional cavers took advantage of the reduced pool to explore Crystal Cave passages. Source: USACE.



Participants in the 2007-2009 resurvey of Crystal Cave here pause to orient themselves with the Jillson map. L-R: Dr. George Crothers, Roger Brucker, Bill Walden, Dr. Hilary Lambert. Photo by Ivan Artiouchine

5:30 a.m. Twelve miles south of Somerset, they turned left off U.S. 27 onto a gravel road, passing between two limestone pillars at the entrance, and followed the road for about a mile to Minnie Hayes' farm, at the time being leased by Enett Jones. The Great Rock Sink was located behind the farmhouse about 200 yards to the north, an easy trail leading down to the bottom. Before entering the cave, Jillson and the students spent some time around the entrance area of the sink examining the stratigraphy and collecting fossil specimens. Their teacher informed them that, "some 1000 or 1500 years ago [Rock Sink was] one of the important chambers of the upper part of the cave. Its roof at last greatly weakened by abrasion above and solution below, fell in and thus produced the exquisite piece of wild box-canyon scenery that here meets the eye in the bright light of the blue sun-lit sky," or what we today would refer to as a karst window. An intermittent waterfall, fifteen feet in height, splashes down near the entrance to the East Cave section and is joined on the floor of the sink by two similar streams from the north and northwest. Above the West Cave entrance is an alcove Jillson termed the Rock-House, the back wall of which consists of fill sediments and which the geologist interpreted as being part of a passage chamber that once joined the East and West caves.¹⁷

The entrance to West Cave, 50 feet wide and 15 high, overhung by the Rock House and 80 feet of vertical rock face, was the lowermost of the two in the karst window and developed in the Ste. Genevieve limestone. Examination of the entrance area was completed by 7:00 a.m., and Jillson now led some of his students through the western opening to investigate the cave that lay beyond the reach of sunlight, while Harold Wesley Dobbs, a Burnside businessman,

guided another group of students through the East Cave to the river exit. Never adverse to publicity, Jillson had also arranged for two professional photographers from the *Lexington Leader* to accompany him through the West Cave to document the expedition. The neophyte cavers wore carbide lamps mounted on canvas miner's caps with leather brims and carried flashlights for backup; the headlamps worn by Oscar Hinton and Jillson featured huge reflectors which made them very popular for providing extra illumination. As the survey in West Cave progressed, Jillson lectured his students on paleontology and cave geology, pausing from time to time to collect "fossils, limerock and dripstone specimens" and to examine cave life.¹⁸

For the surveys, they were equipped with Brunton "pocket transits," compasses also featuring a clinometer for vertical angles, and 100-foot steel tapes. Turning points, or survey stations, were temporarily marked with a highly visible piece of white facial tissue held down by a small rock. Modern cavers generally take compass readings as azimuths, measured as the number of degrees away from north in a 360-degree circle. The Crystal Cave surveyors used quadrant bearings, which were commonly used in land surveys and geologic studies of the era; these give the angle in degrees away from north or south towards east or west directions. For example, a compass azimuth of 225 degrees would be a quadrant bearing of S 45 W, or 45 degrees to the west of South. The notes taken during the Crystal survey also differed from the format of modern cave surveys, being essentially a text description for each turning point. The following is a transcription of part of the survey notes for November 5, beginning at the base of Cascade Falls in West Cave:

Starting Pt S52°E for 133' – tunnel

is 25' wide – 10' high – soft clayey & sandy sedimentation on floor of tunnel – sedimentation inclined from left to right side tunnel looking in direction of strike taken

Turning Pt #1 – N77°E – 166' tunnel dimensions remain the same – more moisture – same sedimentation

Turning Pt #2 – N2°E – 100' – same as notes for previous paragraph

Turning Pt #3 – N58°E – for 220' – turning pt on edge of ponded water – 4-8' wide 30' long – depth few inches to about 4' – 26' from turning pt is a travertine falls – 8' wide and 6' high from water level – 12' beyond here is an abandoned falls of slightly smaller dimensions. Chamber 13' high – 20' wide.

There is no indication that any sketch of the passages was made, or at least such was not preserved with the extant survey notes. The unusually rapid progress of the Jillson surveys, as described in the survey notes and student reports, suggests that the mapping effort was considerably streamlined and much detail omitted. Student John Ballard, a junior not enrolled in the course but whose expertise was evidently trusted by Jillson, was given the responsibility of identifying and correlating the rock units as they traveled, a task he found quite challenging due to the almost complete absence of fossils.¹⁹

Although the survey notes for the October 28 trip were not preserved in the available records, the mapping team was probably the same as on November 5, for which the notes exist and indicate that Oscar Hinton took compass readings with the Brunton, John Foley, Bob Jones and Henry Stovall were "chain men" responsible for managing the steel tape, and Phillip Jay recorded the measurements. The survey progressed rapidly through a relatively large passageway, ranging from 6 to 15 feet in height and from 30 to 50 feet wide, lacking

any significant side leads, until they came to an intersection marking a complex labyrinth of passages. In the time-honored tradition of naming prominent features, the small waterfall at this location was designated Buffalo Falls. At this point, the students divided into two groups to continue mapping. Oscar Hinton, Joe Gibson, and John Kirby explored and mapped northward about 400 feet from Buffalo Falls to another water inlet they named Echo Springs. The remainder, with Phillip Jay on instruments, surveyed southward to a major water conduit at Cascade Falls, an expanse of flowstone 20 feet wide pouring over a head-high ledge, with rimstone above. The survey determined that the base of the passage below the falls was at an elevation of 675 feet above sea level, so Cascade Falls would today be submerged fifty feet below the normal pool level of Lake Cumberland, and in fact virtually all of what the group surveyed in the West Cave has been under water since 1951, except for relatively brief periods of low water in the lake. This accomplished, Jillson and his students exited the cave and spent some time investigating the upland pastures around Great Rock Sink for karst features and rendezvoused with the students who returned from exploring East Cave with their guide.²⁰

Jillson carefully documented the various forms of cavern life that he observed in Crystal Cave, noting that bats were the most conspicuous of all of the denizens of the cave. "During the periods of their hibernation...this ancient subterranean waterway becomes the habitat of literally thousands. In some rooms and chambers from every ceiling ledge and cranny they hang – head down – row upon row silent, immovable, dormant." Aware that there were about a dozen bat species inhabiting various Kentucky caves, he was puzzled to identify only two species occupying Crystal Cave, *Myotis soldalis*, the Indiana bat, and *Myotis lucifugus*, the little brown bat, both of which he acknowledged were "the most numerous and common of all cave bats in this Commonwealth." Also quite abundant in Crystal was the blind cave fish, *Amblyopsis spelaea*, "which frequents the larger pools and connecting streams in the lower part of the cavern." In the same environment, though requiring more careful observation to locate, was the long-tailed salamander, *Eurycea longicauda*, and the cave crayfish, *Orconectes (Cambarus) pellucidus*. Of invertebrate species, he recorded the presence of the common cave cricket, *Hadenocetus subterraneus*, "in most any of the moist, lower chambers and passages... sometimes found...in considerable numbers more or less regularly spaced over white or gray rock wall like cattle in a meadow

or soldiers deployed across a field." Jillson also observed two species of troglobitic cave beetle, but uncertain of correct identification, he later corresponded with noted zoologist J. Manson Valentine, who had published a monograph in 1952 on beetle species dwelling in caves of the Cumberland Plateau. Valentine had collected from Sloans Valley Cave in 1949, misidentifying the Crystal section as "Cassidy Cave," which he later described as a "gigantic cavern containing a rich fauna" now completely flooded by Lake Cumberland. As a result of their exchanges, Jillson was able to identify the blind carnivorous beetles he collected as *Amerodualius jeanneli* and *Darlingtonia kentuckensis*.²¹

On Sunday of the following weekend, November 5, the Transylvania cavers were back in Pulaski County at the Great Rock Sink, this time including Harold Holmes, Jimmy Renfro, and Louis Ponsetto, who had been absent on October 28. The *Leader* photographers were not present, having made their photographs for a newspaper story about the project that ran on Tuesday, but Ponsetto had brought his camera along and took numerous snapshots, many of which were later reproduced in multiple copies to be used in the student reports. Having become familiar with the route last time, surveying East Cave to the river exit was the primary goal on this day. The East Cave entrance is at a higher elevation on the opposite side of the sink than its counterpart opposite and developed at the top of the Ste. Genevieve near its contact with the Kidder limestone member of the Slade. Using the same team as on the previous occasion, with Hinton on instruments and Jay taking notes, they began mapping from the east entrance in Rock Sink at 7:00 a.m. The passage was sufficiently straight and spacious that the team was able to reach the Cumberland River entrance by 8:15 in only 15 shots over a distance of about 1,600 feet.²²

The passage from the East Cave entrance, about 50 feet wide, sloped downward gradually for about a hundred feet, the ceiling height increasing from 12 to about 20 feet, and then dropped in a series of stairsteps to create a large chamber the student cavers named the Fountain Room, decorated with a massive expanse of flowstone along the northern wall. A little distance farther, the ceiling lowered and the floor was covered with shallow pools, which area was named the Lake Room. Beyond this, at the midpoint of the East Cave, they came into the Saltpeter Chamber, head high, 190 feet long and 55 wide, which contained the remains, mainly soil casts, of about 25 severely deteriorated wooden vats that were used to make saltpeter during the War of 1812 period and perhaps for some years

Flyer advertising Cumberland Crystal Caves, date unknown. Courtesy of Kent Kurland.

afterward, if this site was in fact operated by Free Frank. In the survey notes, Phillip Jay recorded that the vats averaged about seven feet long and three wide, triangular in shape.²³

In this chamber Jillson erroneously recorded the existence of a score of graves off to one side, each marked with a head and footstone. This sort of claim is common for saltpeter caves, where the mounds represented by the casts of soil left in the vats have sometimes been mistakenly identified as human graves; this was the case for an area of saltpeter workings in Great Saltpetre Cave, Rockcastle County, Kentucky. Identification of gravestones in Crystal Cave was, however, a misinterpretation of the artifacts based upon information most likely reported to Jillson by Woodson Diamond, a geologist living in Somerset, who, as he informed Jones in a 1954 letter, he had spoken with "at one time or another during the past few years." According to Jillson, the so-called graves had been jointly excavated (probably in 1949) by Walter B. Jones, state geologist of Alabama, J. Manson Valentine, and Woodson Diamond, who identified bones found within as being human and probably those of white men. During the 2007-2009 resurvey of Crystal Cave, Kentucky state archaeologist George Crothers noted the presence of a number of stacked stone pillars in this room which had most likely been used to support log pipes which brought water into the processing area; these were probably the "headstones" and the excavation of human remains possibly a hoax that Diamond attempted to perpetuate upon Jillson. It is certainly odd that Jillson would have accepted such a claim, as he had

visited Mammoth Cave and must there have observed similar stone pillars associated with the saltpeter works. Access to the graves, whether real or not, is currently blocked by the waters of Lake Cumberland and so they must remain a mystery for now.²⁴

Just beyond the Saltpeter Chamber, the student surveyors entered the Bat Chamber, a large, dome-shaped room nearly 50 feet high, 80 feet wide and 138 feet long. At the time, Jillson estimated that 2,500 to 3,000 bats were clinging to the ceiling. From here, the survey progressed another 665 feet to the Cumberland River exit on a low bank of Haynes Bend, approximately one hour and fifteen minutes from the time they began surveying into the east entrance of Rock Sink. At 660 feet elevation, the exit point was just ten feet above the level of the river and developed in the St. Louis limestone. After searching for fossils along the cliffs and discovering two springs north of the cave (shown on the Jillson map), the party returned overland to the Rock Sink, scouting the terrain as they walked for evidence of karst features. There was unfinished business in West Cave. By 10:20 a.m. they were back at the base of Buffalo Falls and began surveying in a northwesterly direction, logging six stations for a total of 814 feet. At this point, because the last of the carbide supply was now in their lamps, they decided to suspend surveying and did a rapid reconnaissance ahead for estimated 750 feet, Jay noting that the passage continued beyond their stopping point without any apparent decrease in size. They returned to Buffalo Falls, probably unaware that they had just missed breaking out into the Big Room of the cave, certainly an awe-inspiring sight that would have earned a prominent entry in the field notes. Despite the shortage of carbide, the student team decided to add just a little more footage to their map by extending the survey to the southwest from Cascade Falls. After only 250 feet, their lights had begun to dim, and even though all had flashlights, prudence dictated a quick return to the entrance, reaching daylight at 12:25 p.m.²⁵

In two weekends, the students from Transylvania had surveyed approximately 6,300 feet in Crystal Cave, and in the student reports they submitted to Jillson at the end of the semester, many expressed the belief that their project would be of great benefit to geological knowledge because, given the rising water in the lake, it was unlikely that anyone would ever again be able to visit these passages, let alone survey them. Like Jillson, they were unaware of the 1940 map produced by the Malotts, and so, to them, this was, so to speak, an important work of "salvage geology" in which their map was the only one that would ever be. "The fact that geology had never been done on the

Cave," Jimmy Renfro wrote, "is purpose enough for the work done." Observing that they could not investigate all the passages because there were so many and their time was limited, Phillip Jay was of the opinion that "the true extent of these subterranean caverns is not fully realized" and that many miles remained undiscovered. John Foley put it more succinctly: "It is my belief that this whole area is undermined with caves." Jillson was himself more optimistic, noting in 1954 that the periodic and extended draw-down of the lake level from summer through early winter, required by hydroelectric power generation and to provide storage for spring snow melt and runoff, drains much of Crystal Cave and would allow further explorations.²⁶

To his students, Jillson speculated upon the effect that the impoundment of lake water within the cave would have upon the future development of the system. The most obvious effects were that subsurface erosion by dissolution and mechanical abrasion would virtually cease in the absence of free-flowing streams, and that ponded water would result in sedimentation in the cave as fine materials slowly settled out of suspension. All underwater surfaces would accumulate layers of sediment, which over time could cause, as Jay reported, "a great many of these subterranean chambers and tunnels [to] be partially or entirely sealed up by river muds." Bob Jones wrote, summarizing Jillson's belief, that the rising water in the cave would probably find alternate outlets to the surface where erosion and enlargement could result in partial draining of Lake Cumberland. Students Foley and Kirby expressed the belief, again probably derived from Jillson commentary, that if the dam should fail or be removed, streams in the uppermost passages would reactivate and gradually work downward, scouring out passages that had been plugged by lake-induced sedimentation, until the cave returned to its former condition.²⁷

After their geology course with Jillson, three of his students carried on to graduate from Transylvania in a few years; some transferred to the University of Kentucky to complete their undergraduate degree, and some would pursue graduate studies. Information on their future lives was difficult to ascertain for most, although at least two, Joseph C. Gibson and Louis R. Ponsetto, pursued careers in geology. Gibson obtained a Masters from the University of Kentucky and was associated with the Texaco Corporation for 28 years and later served as CEO of Zenith Petroleum. Ponsetto joined the staff of the Kentucky Geological Survey at Lexington in 1968, working in the Oil and Gas Section, and retired from the Survey in late 1984 or early 1985. Harold Holmes (B.A. 1955) became president of

the OK Trucking Company and was a life member of the Transylvania University Board of Trustees. Henry A. Stovall (B.A. 1953) obtained a Master's in Education from UK and became an elementary school principal in Dayton, Ohio. John F. Kirby taught in the Boyle County, Kentucky, school system. John R. Ballard graduated from Transylvania with a B.A. in 1955 but no further information is available. After nearly seventy years, all of the former participants in the 1950 Crystal Cave project, but one, have passed away. Henry Stovall's younger brother Jimmy, 85 years old, today lives in Shreveport, Louisiana, and is the last known surviving member of the Crystal Cave expeditions. Stovall transferred to the University of Kentucky in spring 1953 and obtained a degree in agriculture. After a stint in the Marine Corps, he spent nearly thirty years managing corporate farms; in 1983 he was hired by Rotec Industries and until retiring in 2003, traveled the globe helping to build highways, dams, and airport runways. Although after 68 years, the details of Crystal Cave are a bit vague in his memory, he recalled for me that "I was impressed with the beauty of the sparkling crystals and the abundant life in the cave. We did a lot of crawling on our bellies and knees, but occasionally got to stand and just look around at the marvels that God has made even in the dark underground world."²⁸

Willard R. Jillson resigned from Transylvania just a few months after the Crystal Cave project, at the end of the winter quarter in March 1951, to devote more attention to his work as a geological consultant and to better manage the oil and gas leases from which a significant part of his income was derived. With his departure, the geology program at Transylvania ended as abruptly as it had begun. In August of 1954 he wrote to Walter Jones in Alabama, informing him that "During a bit of leisure this Summer I decided to do a brief piece of writing on Crystal Cave and have here before me now the first complete draft of a MS of 33 pp. under the title of "Geology of Crystal Cave." Drawing upon his own notes and recollections, and probably also referring to the student papers submitted to him that he had retained, Jillson crafted a detailed geological, paleontological and biological description of the cave including a map, and privately published his *Geology of Crystal Cave* in Frankfort later that year. He would continue to write prolifically for the remainder of his life and in 1975 finally passed away in Louisville at the age of 85.²⁹

The immense cave system beneath Sloans Valley received little further attention for more than a decade after Jillson and his Transylvania students completed their investigation. During the 1950s and 1960s,

the Southern Railroad began to upgrade their trackage through southern Kentucky and Tennessee, and the tracks, tunnel, bridge and station at Sloans Valley were scheduled to be demolished, the line moved to the other side of the ridge. John Bardgett, an ardent cave explorer, was the resident engineer in charge of relocation of the Sloans Valley line. While residing in Pulaski County, he took the opportunity to investigate some of the local caves, including the "Tater Cave" (Sloans) well known to locals. After completion of the relocation in 1961, Bardgett was transferred to Cincinnati and soon contacted some of the members of the newly formed Greater Cincinnati Grotto (GCG). After meeting informally and exchanging stories well-lubricated with beer, he "began raving wildly about a huge cave in Pulaski County," a tale that was received with considerable skepticism by Ohio cavers. Eventually, his dogged persistence prompted a GCG trip to the Garbage Pit entrance of Sloans on April 5, 1963, an outing which left participants indelibly impressed with the size, extent, and complexity of the passages. "None of us had ever seen anything this large," Tom Klekamp later recalled. During the next two years almost every weekend brought a group of cavers down from Ohio, pushing farther and farther into the depths of the system. "We were guessing about how it all connected," Klekamp wrote, "and soon concluded that Sloans Valley would require a map if sensible exploration was to progress."³⁰

While the Cincinnati cavers debated the best approach to developing an accurate map of such a huge system, Al Geiser of the GCG quietly began his own project to survey the cave with the assistance of anyone he could recruit; it was carried out apparently just to satisfy his own impulses without any intent to publish. Geiser's approach was unsophisticated, compared to conventional cave mapping. Although he used the standard compass and tape, he did not bother to record passage measurements of height or width, did not draw cross-sections, and did not try to reference his map in any way to the external landscape of Sloans Valley. It was a line plot only, laid out on gridded paper which was spliced together and taped to the wall of his living room. As Klekamp humorously recalled:

It grew, and Grew, and GREW! As the miles of intricate cave were tallied and plotted, the living room took on the aspects of a war-time command bunker. Geiser's map became the prominent feature of the apartment. Cavers and curious non-cavers stopped by to inspect the abstraction which consumed one entire living room wall. Each weekend in Sloans Valley generated more map. After about a year it turned the corner of the living room, and wallpapered the door

to the closet. It had taken hold of the crown molding and was headed for the ceiling light fixture about the time I moved out of the apartment.

Although Geiser's unpublished map was certainly not portable and thus of little field use to cavers and of a format unhelpful to scientific study of the cave, it did stimulate exploration of more than sixteen miles of Sloans Valley during 1963-1967.³¹

About 1964 Geiser purchased a seven-acre farm at Sloans Valley on which an abandoned farmhouse was located, used as a fieldhouse for a time by the GCG. Sometime in 1969 or early 1970, Dave Beiter rented the house from Al Geiser, having become interested in producing a more complete and accurate map of the Sloans Valley system. Beiter made his initial survey into the Minton Hollow section in October of 1968 with Frank Reid of the BGG, and thereafter dedicated himself wholly to the project for several years. In late 1969, Lou Simpson and Bill Walden of the COG were exploring in the Minton Hollow section of the cave, unsuccessfully seeking (at that time) a possible connection to the Garbage Pit entrance. When they returned to their parked vehicle, they found a note on the windshield from Beiter suggesting that they should work together to survey the cave; a somewhat startling proposition as neither of the men had ever met Dave Beiter. After meeting with Dave at his nearby house, the three cavers agreed to begin an exhaustive survey of the cave, one that would continue for more than two decades, recruit nearly a hundred enthusiastic cavers primarily from the Central Ohio and Blue Grass grottos, and propel Sloans Valley Cave into world-class status. Surveys were made using Silva compasses, Abney levels, and television antenna wire marked by holes punched in at six-inch intervals. This form of measuring "tape," while less accurate than a steel tape, did not suffer the problems of kinking, breaking and mud jamming that plagued cave surveyors using the latter; fiberglass tapes were not then available.³²

Between the autumn of 1969 to the spring of 1971, Beiter's entire life revolved around the survey of Sloans Valley Cave. He often made two or three trips in a single week, and if no one were available to help him, he was perfectly willing to survey by himself alone in the depths. I have never known anyone else who was as much at home underground as any bat or cave salamander; trogloneic Dave was "born to cave," if ever anyone was, and this was his element. In October 1969, Beiter entered Great Rock Sink to begin solo surveying of Crystal Cave. He was obviously familiar with Jillson's map of the cave since his notes refer to "East Cave" and "West Cave" and

make reference to many of the same place names such as the "Hat Hole" and the "Bat Chamber." He was able to map nearly all of the passages that had been surveyed by the Transylvania students, connecting the Cascade Falls section in the West Cave to the Big Room, and in the East Cave was able to penetrate as far as the Bat Chamber before being halted by the pool of Lake Cumberland within the cave. His ability to

SLOANS VALLEY CAVE PRESERVE A REALITY AT LAST !!!

After years of working towards this goal, the Rockcastle Karst Conservancy (RKC) has purchased five acres of the former Tom and Cathy Crockett property, containing the Garbage Pit and Scowling Tom entrances to the Sloans Valley Cave Complex.

Sloans Valley is a 24-mile long cave system in Pulaski County, Kentucky, located near Somerset and Lake Cumberland. It is the fourth largest known cave in Kentucky, with 13 entrances. Eight of these entrances are closed to cavers. The large pit entrance on the Crockett property is one of the best known and holds a fondness in the memories of many old-time cavers since this was one of their first caving experiences.

Tom and Cathy Crockett and their children, Joshua and Emily, were welcoming to cavers for decades. Tragically Cathy died in a car accident in 1997. After Tom's death in 2009, the family lost control of the property to a bank. RKC worked with potential buyers of the property for a couple of years to get an option to purchase the entrances should their sale go through.

In February 2019, the property was sold and RKC signed an option with the new owners to purchase approximately 5 acres for \$25,000 to insure future caver access to this outstanding system. The acreage includes the Garbage Pit and Scowling Tom Entrances and will be called the Sloans Valley Cave Preserve. RKC closed the deal on our new Preserve on May 10, 2019. The Garbage Pit has been renamed the Crockett Entrance in honor of Tom and Cathy's long-standing commitment to keeping open access for cavers.

Besides the cost of purchase, work needs to be done for safety and aesthetics. A fence needs to be built around the Pit, a kiosk-change area added, gravel parking area installed, overgrown brush removed and a permanent ladder installed in the Pit. We project these improvements to cost approximately \$10,000.

RKC is excited to finally become guardians to this iconic system! We now have the opportunity to keep these entrances open to spelunkers, cavers and researchers to explore this grand cave system. There is an array of passages to explore from the mazy Grand Central Spaghetti, photogenic Paradise Passage, the Big Room, wet Lake Rooms and the muddy Appalachian Trail.

Please help us to raise the funds needed to cover this purchase! Donations can be made at rkci.org - just click on the "Help Repay the Preserve Loans" button in the lower left corner.
THANK YOU!

do so was made possible by recent draining of the lake in response to leakage, and a few months later I would visit the same area.³³

Wolf Creek Dam had been plagued by continuous leakage of gradually increasing severity ever since it had been completed. Although the dam was located 70 miles from Sloans Valley and in a different lithology, its base was still on limestone and the engineers in charge of construction had little understanding of the nature of karst terranes. The masonry section of the dam is comprised of 37 concrete gravity monoliths that rest on the original river channel, while the earthen embankment section extends along the right abutment. During excavations, solution features were observed in the bedrock beneath the right six monoliths and caves were exposed beneath two others. A grout curtain was installed beneath the masonry section to intercept solution features; the Corps of Engineers, however, today believes that some of the solution features were not adequately sealed. Adjacent to the concrete dam, surface alluvial materials were removed to bedrock level and the embankment constructed of more than 10 million cubic yards of compacted clay. Along the upstream edge of the embankment, a trench was cut down into the bedrock to seal off solution channels and cavities and thus inhibit underseepage. The cutoff trench intercepted many solution features, including large caves, that branched off at nearly right angles; these features ranged in size from less than an inch to more than forty feet wide. Many of the caves were never excavated to bedrock, their openings instead blocked with sandbags and backfilled with soil. A single line grout curtain was installed down the centerline of

the trench; in several locations grout intake was much greater than expected. The cutoff trench is considered one of the key design flaws of Wolf Creek Dam that has likely promoted water seepage and piping around the dam.³⁴

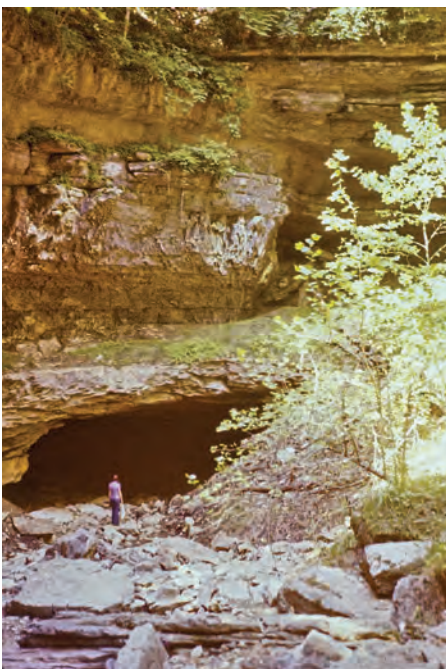
As might have been expected, constant bypass leakage became a serious problem, which reached critical status when numerous sinkholes developed along the embankment during 1967-1968. To carry out emergency remediation of the problem, the pool was lowered by about forty feet during the summer of 1968 to allow pumping of nearly 300,000 cubic feet of grout into the dam foundation, completed by June 1970. This was the circumstance that allowed Dave Beiter to carry out a survey of formerly submerged passages in Crystal Cave. The grouting did not solve the problem, however, and leaking beneath and around the dam continued to worsen, despite further attempts at resolution, until a review panel's assessment made in 2006-2007 that "a breach formation and loss of the reservoir was likely to occur within the next five years." This resulted in another emergency remediation, undertaken on a far more massive and expensive scale, during which the pool level was again lowered to an elevation of 680 for a period of several years and a barrier wall constructed and completed by 2013 at a cost of nearly \$600 million. Dr. George Crothers, the Kentucky State Archaeologist, and the late Bill Walden organized a surface and cave survey into Crystal that began in September 2007 to take advantage of this circumstance. They were able to penetrate, until halted by water, as far as the Bat Chamber where Crothers observed hundreds of bat skeletons, presumably the remains of bats trapped and drowned by rising lake water. In the Saltpeter Chamber they found the vat casts still intact despite long immersion, although the edges had been softened and rounded.³⁵

With completion of the barrier wall at Wolf Creek Dam, it seems unlikely that the pool level of Lake Cumberland will ever again be drawn down sufficiently to allow exploration of any significant part of the passages in the vicinity of the Great Rock Sink. Thus, it seems that, for the foreseeable future, the story of Crystal Cave has ended. Yet Crystal Cave represents only a very small part of the cave system, less than five percent. There are many more stories that yet remain untold. It took a large cadre of dedicated cavers obsessed with revealing the secrets of this great cave less than three years to investigate and record the greater part of Sloans Valley Cave, from the deeply pooled streams of Martins Creek, the labyrinth of Minton Hollow and the even more complex maze of the Grand Central Spaghetti section,

the awe-inspiring complex of the Big Room and its overlooks, to the long sinuous route of the Railroad Tunnel. These tales are theirs alone to tell.

Acknowledgements

First and foremost, I owe a considerable debt of gratitude to my friend and frequent collaborator Angelo I. George, who serendipitously came across Jillson's bound volume of student reports on Crystal Cave in a used bookstore many years ago and without hesitation paid a substantial price to rescue it from oblivion, and who recently made this available to me. Lou Simpson, who with Dave Beiter and Ken Smith was primarily responsible for the 1968-1971 surveys that turned Sloans Valley Cave from rumor to world significance, shared memories with me, as did Michelle White and Kent Kurland, great-grandchildren of Clay Vest, former operator of Crystal as a show cave, and James R. Stovall, last surviving member of the Transylvania students who mapped the cave in 1950. Betty Jean "B.J." Gooch, supervisor of Special Collections at Transylvania University, kindly assisted me in locating Jillson materials. My old friend Jim Currens provided unlimited access to Sloans Valley Cave data contained in the files of the Kentucky Speleological Survey in Lexington. George Crothers, Kentucky State Archeologist, shared his observations from recent trips to Crystal Cave made during low water, and Tracy C. Brown, president of the Oak Ridge Archeological Institute, kindly provided a copy of his research concerning the Rock Sink. Noted spelean archaeologist Kenneth B. Tankersley provided valuable information about prehistoric explorations of the system. And finally, I am very grateful to Patrick Gibson (Central Ohio Grotto), Andy Niekamp (Dayton Underground Grotto), Werner Jud (Greater Cincinnati Grotto) and Bill Torode (NSS library) for locating copies of old grotto newsletters.



Great Rock Sink entrance, mid-70s.

Dave Bunnell



Carol Vesely with formations near the Hughes entrance, June 1980.

Dave Bunnell

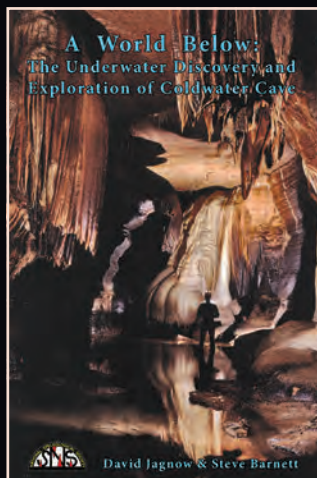
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- 6 Simpson, "Interview with a Sloans Valley Cave Guide"; "Vast Network of Caves."
- 7 Rendell Rhoades, "The Crayfishes of Kentucky, with Notes on Variation, Distribution and Descriptions of New Species and Subspecies," *American Midland Naturalist* 31 (January 1944), 121; Clyde A. Malott, "An Unusual Case of Unified Cavern Drainage" (abstract) in *Proceedings of the Indiana Academy of Science*, v. 50 (Indianapolis: C.E. Pauley, 1941), 132-133; Clyde A. Malott and Preston McGrain, *A Geologic Profile of Sloans Valley, Pulaski County, Kentucky*, Kentucky Geological Survey, Series 10, Report of Investigations 20 (Lexington: Kentucky Geological Survey, 1977); "Clyde A. Malott, 1887-1950," *Bulletin of the National Speleological Society* 12 (November 1950), 72. "Pumpkin Center" was named for dripstone features resembling pumpkins. A full-color map of the cave, "Sloans Valley Drainage System, Pulaski County, Kentucky," labeled "Clyde A. Malott, 1940," was in the possession of Preston McGrain, assistant state geologist of Kentucky 1950-1983 but was unfortunately discarded after his death; a copy of the map (ID# 1000214-65) is in the files of the Kentucky Speleological Survey in Lexington.
- 8 Jillson, *Geology of Crystal Cave*, 7-9; Al Geiser, Tom Klekamp, Bill Menrath, and Mike Vaughan, "Tater Cave," *Electric Caver* 2(1), 6, reprinted in *Speleo Digest 1964*, Wesley C. McGrew and Allan P. Haar, eds. (Vienna, VA: Speleo Digest Press, 1966), I-34; "Filling of Wolf Creek Lake to Begin June 1," *Lexington Herald*, March 3, 1950; "Barkley will Dedicate Wolf Creek Dam Today," *Ibid.*, September 1, 1951; Larry Simpson, "History of Eastern Kentucky Karst," *C.O.G. Squeaks* (November-December 2006), 6. Tater Cave was the name by which many local residents referred to Sloans Valley Cave. Klekamp and his associates added passage outlines and details to the Geiser map for publication in the *Electric Caver*. Transylvania College, the oldest institution of higher education west of the Appalachians, was not named for the craggy mountain area of Romania famous in western vampire lore. The institution derives its name from the Transylvania Colony, Richard Henderson's settlement scheme for the western frontier for which Daniel Boone led a group of pioneers into the wilderness in 1775 to establish Boonesborough, the first outpost in Kentucky. Transylvania translates as "beyond the forest." Transylvania Seminary was chartered by the Kentucky General Assembly in 1780, held its first classes near Danville in 1785, relocated in 1789 to its present site in Lexington and became Transylvania University on January 1, 1799.
- 9 Virgil Pryor, "Afield and Afloat," *Lexington Herald*, May 12, 1968; "Removal of Road Under Lake Cumberland is Requested," *Ibid.*, June 16, 1968.
- 10 George L. Willis, *Willard Rouse Jillson: A Biographical Sketch* (Louisville: Standard Printing, 1930); Willard R. Jillson, *The Memoirs of Willard Rouse Jillson* (Frankfort: Roberts Printing, 1971); "State Parks Considered," *Lexington Leader*, April 15, 1924; "State Geologist for Park," *Kentucky Post* (Covington), December 2, 1927.
- 11 Anne E. Overstreet, *The Scientific Writings (Geology, Paleontology, Mining) and Cartographic work (Maps, Sections, Sketches) of Willard Rouse Jillson: A Bibliography 1913-1963* (Toledo, OH: Talmadge Press, 1965); Overstreet, *The Miscellaneous Writings (History, Biography, Articles, Addresses, Narratives, and Poems) of Willard Rouse Jillson: A Bibliography 1907-1965* (Frankfort, KY: Roberts Printing, 1965).
- 12 "Geology of Crystal Cave" appeared as a serial in the *Kentucky Caver* 3 (April 1969), 3-4; 3 (October 1969), 3-5; 4 (April 1970), 8-9; 4 (July 1970), 3-5.
- 13 "Jillson to Head Geology at Transylvania College," *Louisville Courier-Journal*, March 12, 1947; *Catalogue, Transylvania College, 1949-1950* (Lexington: Transylvania College, 1949), 37-38, 57; Raymond F. McLain to Willard R. Jillson, May 10, 1948, Transylvania University Archives; Willard R. Jillson, Grant Application to Carnegie Foundation for the Advancement of Teaching, January 28, 1950, approved February 9, 1950, Transylvania University Archives; Willard R. Jillson, "Detailed statement of expenditures (Carnegie Grant)," October 1, 1950, Transylvania University Archives; Transylvania University Requisition #32359, Carnegie Foundation Fund, "\$400 to make various geological studies and surveys, especially in Kentucky," Transylvania University Archives. Transylvania is a small but prestigious school; during Jillson's time at the college, enrollment averaged about 400 students per quarter, typically about 60% male, with about 45 faculty members.
- 14 Jillson, *Geology of Crystal Cave*, 7; *Transylvania Catalogue 1949-1950*, 38.
- 15 Leland R. Johnson, *Engineers on the Twin Rivers, A History of the Nashville District Corps of Engineers, United States Army* (Washington: Government Printing Office, 1978), 197-198, 200, 215; "Ground is Broken on Site of Wolf Creek Cumberland Dam," *Lexington Herald*, September 2, 1941; James A. Miller, Jr., "Wolf Creek Dam is Being Built," *Louisville Courier-Journal*, August 25, 1946; Charles R. Grider, "Wolf Creek Dam," *Russell County, Kentucky: Its History and Families* (Paducah, KY: Turner Publishing, 1996), 36.
- 16 Willard R. Jillson, Crystal Cave notes, Jillson Papers, Box 89, University of Louisville Archives and Records Center; Willard R. Jillson, compiler, "Student Reports: Department of Geology, Transylvania College 1949-1951," Angelo I. George private collection. These are original student papers, including the eight reports on Crystal Cave along with other geological field trip reports, bound in a single volume and presented to the Transylvania Library in January 1954. Possibly Jillson was referring to these as he prepared the manuscript of *Geology of Crystal Cave* for publication. The volume was apparently discarded by the library at some later date and fortuitously acquired by Angelo George. Student status and hometown information are derived from Transylvania Catalogs for 1949-1950, 1950-1951, and 1951-1953, and ages determined by research on Ancestry.com.
- 17 James R. Jones, "The Geology of Crystal Cave and Rock Sink, Pulaski County, Kentucky," in Jillson, "Student Reports"; Oscar G. Hinton, "Geology of Crystal Cave, Pulaski County, Kentucky," in *Ibid.*; Jillson, *Geology of Crystal Cave*, 25, 27.
- 18 Jillson, *Geology of Crystal Cave*, 7-9; Jones, "Geology of Crystal Cave and Rock Sink"; "Local Geologists Survey Pulaski County Cave to be Inundated by New Dam," *Lexington Leader*, October 31, 1950.
- 19 Jillson, *Geology of Crystal Cave*, 9; Crystal Cave survey notes, November 5, 1950, Box 89, Jillson Papers; Jones, "Geology of Crystal Cave and Rock Sink."
- 20 Jillson, *Geology of Crystal Cave*, 7-9, 33-36; Jones, "Geology of Crystal Cave and Rock Sink"; Hinton, "Geology of Crystal Cave."
- 21 Jillson, *Geology of Crystal Cave*, 21-24; Jillson to J. Manson Valentine, August 30, 1954, and Valentine to Jillson, September 3, 1954, Jillson Papers, box 89; J. Manson Valentine, *New Genera of Anophthalmid Beetles from Cumberland Caves*, Museum Paper 34 (Tuscaloosa: Geological Survey of Alabama, 1952), 17-19, 22-23, 27-28. The long-tailed salamander is similar to its cousin, *Eurycea lucifuga* (also found in Sloans and many other Kentucky caves), but has a longer tail and yellowish, rather than orange, coloration. An isolated population of the southern cave fish, *Typhlichthys subterraneus*, is also present in the cave although not found elsewhere in eastern Kentucky.
- 22 Crystal Cave survey notes. Information about student participation from the student papers by Harold L. Holmes, Louis R. Ponsetto, James T. Renfro, all titled "Geology of Crystal Cave" in Jillson, "Student Reports."
- 23 Jillson, *Geology of Crystal Cave*, 27-30; Crystal Cave survey notes, Jillson Papers.
- 24 Jillson, *Geology of Crystal Cave*, 30; Jillson to Walter B. Jones, August 10, 1954, Jillson Papers; Angelo I. George, "Place Names Changes, Cultural Geography and Distribution of Saltpeter Hoppers in Great Saltpetrer Cave," *Electric Caver*, Greater Cincinnati Grotto, 26 (July 1990), 79; George Crothers, personal communication, July 30, 2018. Although Valentine's papers in zoology, archaeology and oceanography are scientifically sound, in later life he was associated with a number of pseudoscientific claims, becoming obsessed with proving the existence of lost Atlantis and, in 1974, he co-authored a book on the Bermuda Triangle with Charles Berlitz. On Valentine's

preoccupation with pseudoscience, see Brad Steiger, *Mysteries of Time and Space* (Englewood Cliffs, NJ: Prentice-Hall, 1974), 61, on Atlantis, and Valentine and Berlitz, *The Bermuda Triangle* (Garden City, NY: Doubleday, 1974).

- 25 Jillson, *Geology of Crystal Cave*, 30-33; Louis R. Ponsetto, Phillip H. Jay, separate reports titled "Geology of Crystal Cave, in Jillson, "Student Reports;" Crystal Cave survey notes, in Jillson Papers. The Big Room was part of the tourist route and so it was probably due to lack of time rather than ignorance of its existence that it was not surveyed.
- 26 James T. Renfro, Phillip H. Jay, John W. Foley, student reports; Jillson, *Geology of Crystal Cave*, 38-39.
- 27 Phillip H. Jay, James R. Jones, John W. Foley, John F. Kirby, student reports.
- 28 James R. Stovall, personal communications, July 21 and 24, 2018.
- 29 "Jillson Resigns Transy Position, *Lexington Leader*, March 19, 1951; Jillson to Walter B. Jones, August 10, 1954, Jillson Papers.
- 30 Tom Klekamp, "The 1963 Rediscovery of the Sloans Valley Cave System," *Cave Cricket Gazette* 14(May 1989, 27-28
- 31 Tom Klekamp, "Al Geiser and His Survey of the Sloans Valley Cave System," *Cave Cricket Gazette* 14(May 1989), 28; Geiser, et. al., "Tater Cave" map. The published Tater Cave map represents a small section of Sloans Valley Cave from the Garbage Pit through the accessible part of Crystal Cave, to which Klekamp with the assistance of Bill Menrath and Mike Vaughn had sketched in passage walls and added a few features and comments.
- 32 Klekamp, "Al Geiser," 28; Bill Walden, "Dave Beiter," *C.O.G. Squeaks*, Central Ohio Grotto (September 2003), 2-3; Louis Simpson, "David Beiter," *Ibid.*, 4.
- 33 Sloans Valley processed survey data, Kentucky Speleological Survey, Lexington. This is a bound volume containing the data reduction for the surveys made 1968-1971 listing area surveyed, date and participants along with the processed data. David Perry Beiter passed away at his home in Wayne County, Kentucky, in 2003, age 59.
- 34 Kyla J. Erich, "Wolf Creek Dam: A Case Study of Foundation Remediation for Dams Built on Karst Foundations," Master's thesis, Missouri University of Science and Technology, 2013, 6-11; David M. Robison, "Successful Foundation Preparations in Karst Bedrock of the Masonry Section of Wolf Creek Dam," in Daniel H. Doctor, Lewis Land, and J. Brad Stephenson, eds., *Sinkholes and the Engineering and Environmental Impacts of Karst: Proceedings of the Fourteenth Multidisciplinary Conference, 2015* (Rochester, Minnesota: NCKRI, 2015), 595-604.
- 35 Erich, "Wolf Creek Dam," 21-52, quotation 39; Preston Forsythe, "Great Rock Sink Entrances of Sloans Valley Cave," *KSS Newsletter*, Kentucky Speleological Survey (January 10, 2009), 3; personal communications from George Crothers, July 19, 30, 2018.

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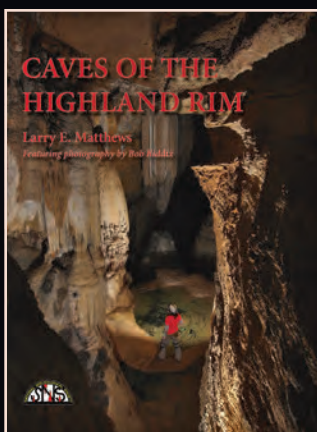


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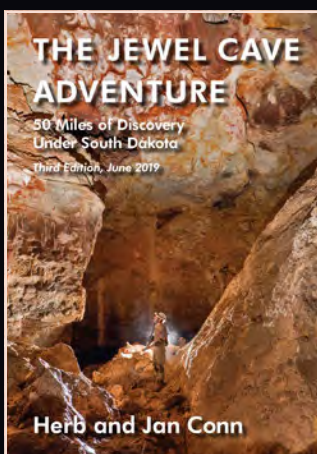
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