Sequoyah Caverns: A Testimony of the Genesis Flood

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Abstract

Sequoyah Caverns is a large cave system in northeastern Alabama. The main cave, open for commercial tours, is the object of this study. Its features, including speleothem formations, erosional wall patterning, fossilized marine creatures, and an unusual sedimentary deposit containing allogenic pebbles and disarticulated fossil mammals, all indicate the rapid and energetic development of this cave within the recent past. The cave system and its surrounding strata are easily explained by the processes of the Genesis Flood and its aftermath.

Introduction

Caves have served many purposes for humans over the millennia: habitation (Dunbar, 1955; Gen. 19:30; Job 30:6); protection from enemies (Judg. 6:2); safety from the elements (Dunbar, 1955); burial places (Gen. 23:19); sources for fertilizer (bat guano), saltpeter for gunpowder (Shaw, 1997), and water; spelunking; mushroom farming; illegal activities; and commercial touring. In 1841, an early pioneer of northern Alabama, James Ellis, settled and farmed the land that includes Sequoyah Caverns. Since that time, direct descendants of Ellis have lived on that land and owned and operated the cave and a campground for visitors.

Uniformitarian scientists use caves to support the concept of deep time. However, evidence presented here will demonstrate that the formation and development of Sequoyah Caverns could have been accomplished in a short period of time in the relatively recent past—as a result of the Genesis Flood.

Geologic Setting of Sequoyah Caverns

Located in DeKalb County of northeastern Alabama (Figure 1), Sequoyah Caverns opens on the eastern side and at the base of Sand Mountain, a synclinal plateau in the Appalachian Plateaus Physiographic Province (Osborne et al., 1989). The entrance to the cave is about 40 ft (12.2 m) above the floor of the anticlinal valley separating Sand and Lookout Mountains. The valley floor has an elevation of ~1000 ft (305 m) above mean sea level (msl) with the top of Sand Mountain above the cave entrance at ~1,560 ft (475.5 m) msl (DeLorme Topo USA, 1999).

This cave system was formed in the Bangor Limestone that uniformitarian scientists place in the Lower Carboniferous (Upper Mississippian) Period of the standard geologic timescale. The Bangor Limestone is one unit within several undifferentiated limestones in this region with a thickness of about 890 ft (271.3 m) (Mittenthal and Yin, 2001). According to uniformitarian assumptions, the Bangor Limestone dates between 360 and 320 million years old (GSA Geologic Time Scale, 1983). This supposed age will be shown to be implausible; a date of no more than a few thousand years better fits the data.

Sequoyah Caverns formed by dissolution of the host rock. Limestone is dissolved by natural acids such as carbonic acid, sulfuric acid (Oard, 1998; Silvestru, 2003), and numerous organic acids that occur in phreatic water (Austin, 1980). Both deep and shallow phreatic theo-

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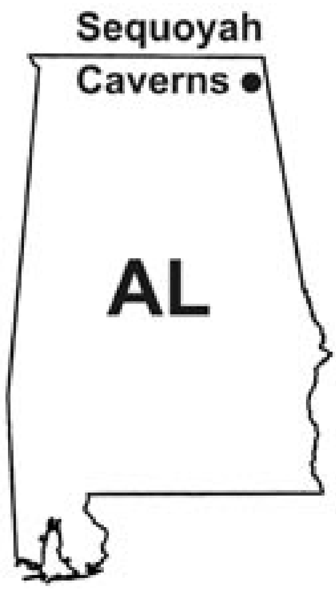

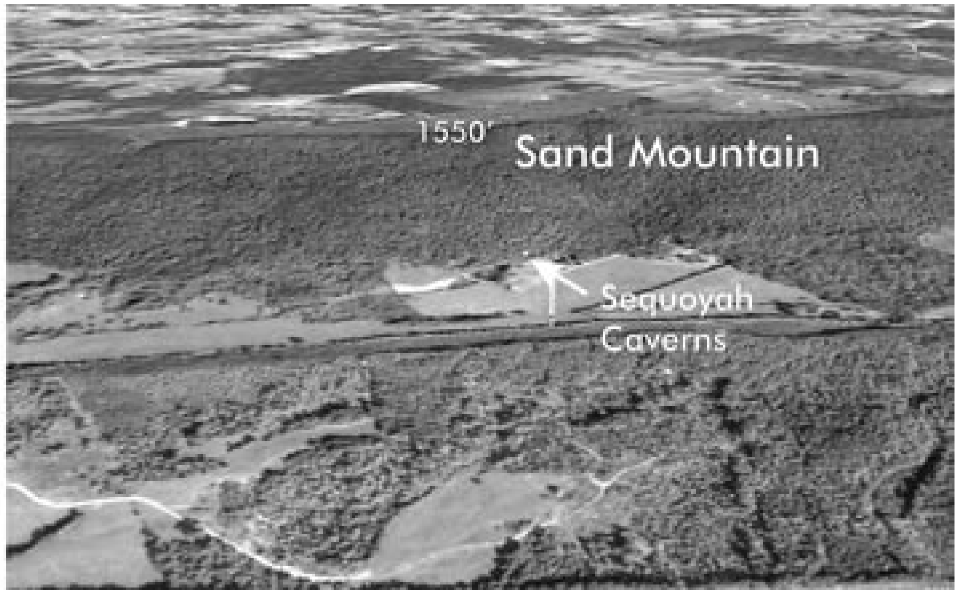

Figure 1. Location of Sequoyah Caverns in northeastern Alabama.

ries of cave formation have the cavity developed while totally filled with water (White, 1960). Then as the zone of saturation drops below the cavity, the cave is filled with air, allowing development of speleothems—mineral deposits, such as stalagmites, stalactites, helictites, flowstone, cave coral, etc.—formed in a cave by carbonate precipitation (Silvestru, 2003). Most uniformitarian models of cave formation claim that weak carbonic acid slowly dissolved limestone cave tunnels over vast periods of time. However, the evidence suggests otherwise.

Evidence in Sequoyah Caverns Favors the Young-Earth Flood Model

Speleothems

Various kinds of speleothems of unusual shapes and colors populate Sequoyah Caverns (Figures 2 and 3). Uniformitarian scientists assume slow growth rates over long periods of time. Hill and Forti (1997, p. 4, emphasis added) offer the general uniformitarian conjecture for the rate of speleothem formation:

Figure 2. Stalactites and stalagmites in the Ballroom in Sequoyah Caverns.

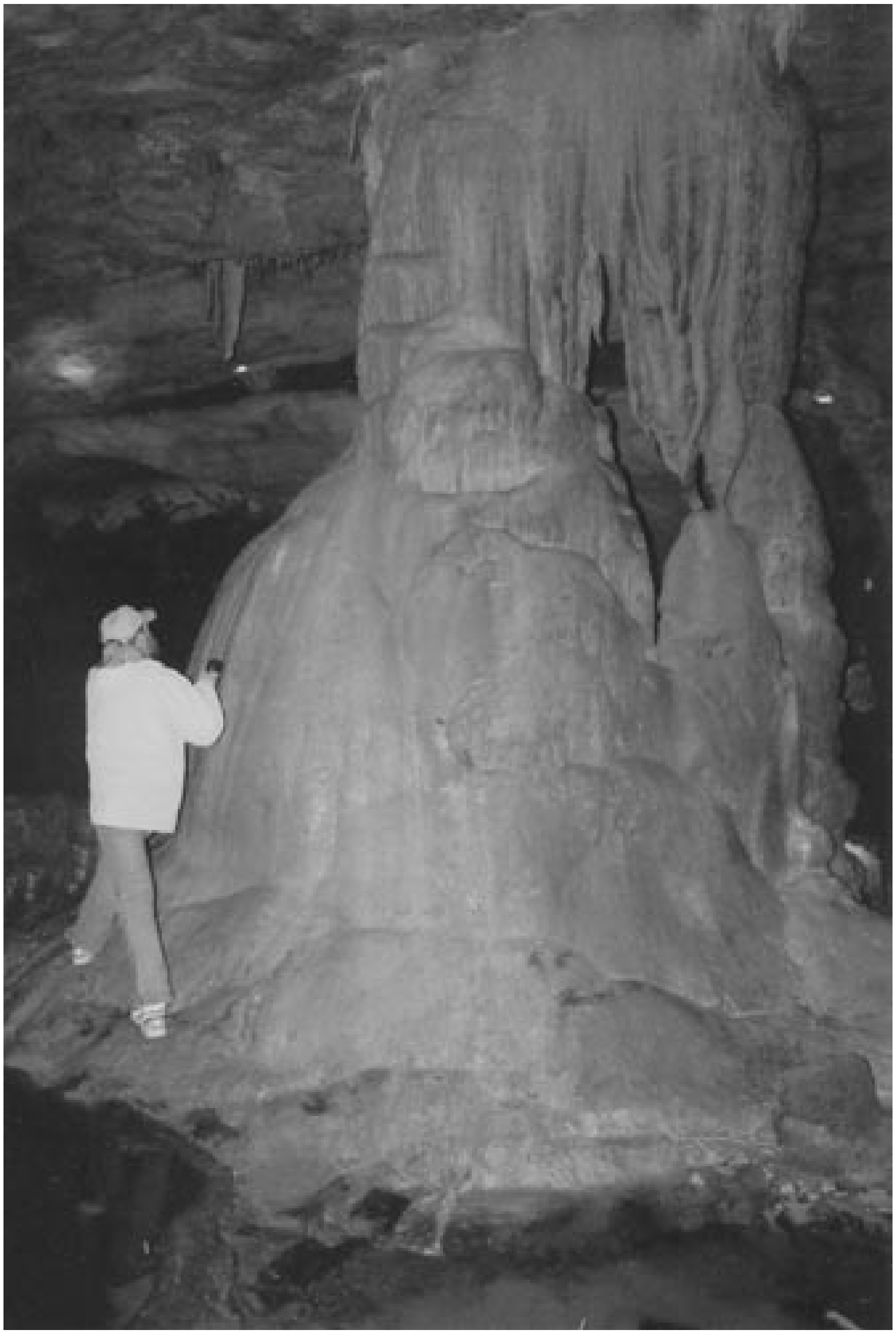

Figure 3. A large double column formed by the union of stalactites and stalagmites.

> Speleothems (cave formations) and cave minerals are fragile, extremely fragile. Delicate soda straws and eccentric helictites, for example, that took *untold thousands of years to create* can be destroyed in an instant by a careless or thoughtless act on our part.

Shaw (1997, p. 27, emphasis added) touches on the conflict between belief in a young earth and the uniformitarian assumption of ancient ages for speleothems:

> Speleothems have always been mysterious and remote—difficult and often dangerous to reach and, although some were enormous, *not perceptively increasing in size from year to year*. They were revered, like all natural things, as God's work. There was indeed a specific interface with the Christian religion because *their extreme slowness of growth* seemed inconsistent with the accepted age of the earth. … *This belief in a young earth affected ideas on speleothem growth. … Directly, it provided a constraint in the form of a maximum possible age*.

Can this conflict be resolved by actually measuring the growth rate of speleothems? To answer that question, we need to consider dripstones—such as stalactites and stalagmites—formed in caves by mineral deposition resulting from the action of dripping water. In some caves, the growth rates of speleothems have been measured and found to vary between 0.004 and 0.125 inches (0.01–0.32 cm) per year (Silvestru, 2003). Using these minimum and maximum figures of speleothem growth rates, a 10-ft (3 m) stalactite could vary in apparent age from 960 to 30,000 years. Williams et al. (1981) reported on a stalactite in Cottonwood Cave that was measured by cavers to have grown 12 inches (30.5 cm) in three months. At that rate, a 10-ft stalactite would develop in 30 months! White (2007) reported that the growth rates of stalagmites mostly fall in the range of ~0.0004 to ~0.004 in/yr (0.001–0.01 cm/yr). At that rate, a 10-ft stalagmite would need between 30,000 to 300,000 years to grow to that size, with those ages far exceeding the time posited by the young-Earth Flood model.

However, in any of these calculations, a fatal flaw in reasoning exists. Because the measurements are taken in a finite slice of time in the present and extrapolated backward in time to obtain the various ages, the resultant data cannot be certain because of unknown factors that might have occurred in the past. A change in the drip rate would significantly influence growth rate. Tectonic action; variation in local precipitation; changes in pH of the source water; occasional phreatic water infill of the cave (groundwater table changes); amount of water piped into the cave varying either by opening, closing, or constriction of the passages supplying water; ongoing changes in the form of the drip-canal by dissolution of the host limestone supplying carbonate in solution; freezing/thawing of soil (permafrost) changing throughput of water; and various other factors would cause rates of drip and subsequent mineral deposition to vary considerably. All of these many variables preclude an accurate age determination from data obtained in the present.

Rapid Speleothem Growth Noted in Sequoyah Caverns

In 1977, an experiment began to observe the rate of speleothem growth at Sequoyah Caverns. It was facilitated by Clark Byers, who in the 1970s helped operate Sequoyah Caverns and served as a cave guide. He placed a protective panel of clear plastic in an area where stalactites were forming to monitor their physical changes. In less than 10 years, the stalactites had grown about 10 inches (25.4 cm) or about one inch (25.4 mm) per year (Meyers and Doolan, 1987). Today, visitors to the cave can see these speleothems while they are still growing and developing. Stalactites and stalagmites have formed, and some have joined to form columns (Figure 4). At that rate, a 10-ft (3 m) stalactite would form in only 120 years. A four-foot (1.22 m) concrete wall constructed about 40 years ago along part of the tour trail has a flowstone buildup on it that begins on unconsolidated sediment just behind it, continues on the flat, horizontal top of the wall, and has grown down its side to the floor of the cave. The resulting fan pattern of deposited calcite has formed many small rimstone dams, each one complete with its rimstone pool (Figure 5). Speleothem growth rate and calcium carbonate formation are also discussed in Akridge (2002), Matzko (2000), Williams et al. (1976), Williams and Herdklotz (1977), Williams and Herdklotz (1978), and Williams et al. (1981).

What do Measured Rates of Speleothem Material Indicate?

Slow rates of calcite deposition indicate that at the time of measurement, the rate of deposition is slow, and accurate estimates of age are not possible. Also, the same reasoning can apply to measured rapid deposition in the present because the rate of deposition can neither be known from the past nor be projected for the future because of unknown variables. Given these constraints, is there a means of accurately dating speleothems?

Figure 4. Stalactites, stalagmites, and columns that have formed since 1977 and are still growing. Scale in cm and in.

Uniformitarian Methods of Dating Speleothems

Uniformitarian scientists have attempted to date speleothems using radiometry and other methods: carbon-14 (^{14}C), uranium-series radiometric decay, electron spin resonance decay, thermal luminescence, optical luminescence, relative dating, paleomagnetism, and combinations of these dating methods (Ford, 1997). Baskaran and Iliffe (1993) indicated that ^{14}C dating techniques are not appropriate for speleothems formed within the past 1,000 years because of the mixture of carbon sources in them. The upper limit of ^{14}C dating is ~50 thousand years (ka) and does not cover the uniformitarian spectrum of supposed ancient ages needed to support their geologic timescale. Presently, the uranium-series, and in particular, the uranium-thorium (U-Th) method is the "gold standard" for dating speleothems (White, 2007). It supposedly can define the age of a sample as old as ~400 ka and even extend as far back as ~600 ka by counting isotope ratios using a mass spectrometer (Ford, 1997). For example, a calcite layer in a New Mexico cave was dated by the U-Th method as 209 ± 9 ka (Lundberg and McFarlane, 2006). However, various problems associated with radiometric dating techniques render them questionable at best (cf. Woodmorappe, 1999).

Speleothem Production and Ages of Caves as Seen in the Young-Earth Flood Model

How does a creation scientist counter ancient ages reported by uniformitar-

Figure 5. Flowstone is being formed on loose sediment above and to the right of this 40-year-old concrete wall, covering the top of the wall and flowing down its side onto the cave floor. Many small rimstone dams and their pools occupy much of the area of the deposition above the wall and also continue forming on the upper part of the wall. Scale in cm and in.

ians? Much can be inferred from what is known about speleothem growth rates viewed through the lens of the young-Earth Flood model. Once a cave developed in the phreatic zone and lowering of the water table placed the cavity in the vadose zone, speleothems could form within the air-filled void. During, and even for a time after, the Genesis Flood, great quantities of water were available to develop caves. Because of the magnitude of the pre-Flood florae that covered the landmasses, carbon dioxide (CO_2) concentrations in the atmosphere would probably have been much higher. Water from heavy rainfall in the later stages of the Flood and afterwards would pick up the CO_2, forming carbonic acid that could react with underground limestone strata and help form caves. This would lead to much higher concentrations of dissolved calcite in the water that would substantially increase the rate of speleothem growth in the air-filled cave tunnels. This process continues, but with less precipitation and weaker carbonic acid than probably existed after the Flood, due to a lower percentage of atmospheric CO_2 today. That would result in a much lower rate of cave and speleothem formation than would be expected during and immediately after the Flood.

Uniformitarians usually date caves in millions of years (Ma). For example, White (2007, p. 86) indicated that cosmogenic isotope dating (used to indirectly date caves) is a recent method of dating certain cave sediments that covers a "timescale back to 5.0 Ma," which he writes is the "timescale for most active karst systems." Ford (1997, p. 282) stated that "a great many of the world's caves are probably between one and ten million years in age." Osborne (2005) indicated that "there are few open caves that have been reliably dated to ages greater than 65 Ma. This does not mean that such caves are extremely rare." These different opinions indicate that there are perplexing and unanswered questions about cave formation in the uniformitarian camp.

If the ages of caves are as old as geologists allege, then many active cave tunnels would be predicted to be filled or mostly filled with calcite and other mineral deposits and would not be large, open passages like Sequoyah Caverns. Active caves today exhibit speleothems that are still growing and developing,

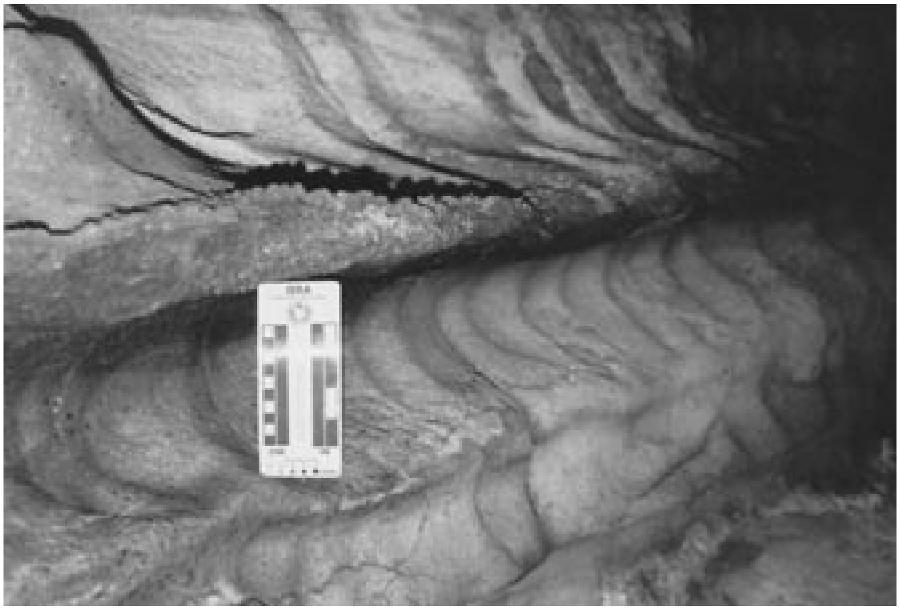

Figure 6. Erosional wall patterning is formed by high-velocity water flow containing abrasive particles and is seen in this short conduit that originally fed a great amount of water into the cave. In contrast to the dynamic water flow that formed these features, now only enough water is ever present to barely moisten the floor of the conduit. Scale in cm and in.

Figure 7. Many well-preserved marine fossils such as *Archimedes* are found in the limestone exposed in Sequoyah Caverns. A crinoid stem is visible near one end of the *Archimedes*. Scale in cm and in.

contradicting the ages conjectured by secular scientists. In Sequoyah Caverns, rapidly growing speleothems supply evidence favoring a recent age for both the cave system and its speleothems.

Erosional Wall Patterning in the Bedrock

Erosional wall patterning can be seen in certain areas of Sequoyah Caverns (Figure 6). These erosional features in the bedrock of the cave are the result of significant water flow during cave development. Sizes and shapes of these erosional features indicate velocity and direction of the water current that formed them (Jenolan Caves, 2010; Maslyn, 2001).

These features likely were formed when the cave was completely filled with water and shortly after, as the water table dropped. These features indicate a powerful flow of water, aided by abrasive materials, carved the bedrock during the cave's genesis. The fact that little or no flow takes place today in Sequoyah Caverns is evidence of unique paleoenvironmental conditions. Although uniformitarian models of cave formation employ stasis over deep time interspersed with random bursts of energetic events, a more reasonable explanation is supplied by high-energy geologic processes that occurred during the Genesis Flood and formed caves in a rapid and catastrophic manner

Marine Fossils Found in Sequoyah Caverns

Contained within the limestone bedrock of Sequoyah Caverns are voluminous marine fossils that remain as a testimony to the power of catastrophic water action during the Flood. Innumerable broken lengths of crinoid stems—remnants of stalked echinoderms that were prolific in the pre-Flood oceans—densely populate the limestone bedrock of the cave passage. Perfect five-sectioned heads of the blastoid *Pentremites* are also easily found. Specimens of once delicate bryozoans, such as spiraled *Archimedes* (Figure 7) and lacy, fanlike *Fenestella*, are represented as beautiful life-forms frozen in time.

A Creationist Interpretation of the Formation of Sequoyah Caverns

Secular geology does not have a credible interpretation for the formation of caves that are hundreds or thousands of feet underground and formed by dissolution of limestone by acidic water. Water loses its acidity in the first 100 ft (30.5 m) after penetrating the surface of a limestone (Silvestru, 2003). The question then arises: how can acidic water dissolve rock to form deep caves, such as Sequoyah Caverns? Acidic water can reach great depths only via preexisting conduits (Silvestru, 2003). Physical evidence at Sequoyah Caverns points to its origin by processes associated with the Flood.

During the Flood, thick deposits of sediment were laid down in this region. With its southern terminus in Alabama, the Appalachian Valley and Ridge Province contains thousands of cubic miles of sedimentary deposits—visible reminders of the Flood's scale and power. Sandstone, limestone, shale, and conglomerate are found throughout the Valley and Ridge Province (New Georgia Encyclopedia, 2006; Williams and Akridge, 2005). The rock record left by the Flood in the vicinity of Sequoyah Caverns is more than one mile thick (Osborne et al., 1989).

Initially, these strata deposited by the energetic Floodwater could have appeared in cross section as superposed layers of varying composition (Figure 8a). Still submerged, but before fully lithified, powerful compressional forces began acting on these newly deposited strata. Because these forces were exerted in a horizontal plane, the sediments deformed into sinusoidal shapes extending over hundreds of miles, and causing compressional and tensional stresses (Figure 8b) (Williams and Akridge, 2005). The resulting anticlines and synclines characterize the Valley and Ridge Province.

Afterwards, as the water of the Flood began to drain from the region, strong currents would have flowed parallel to the longitudinal axes of the anticlines. Psalm 104:8 gives an excellent description of what may have been happening across this region, as it describes rising mountains and subsiding ocean basins. This geologic upheaval would have provided a mechanism for accelerated drainage. Words used in Psalm 104:7 indicate drainage was rapid: *they* (the waters) *fled* and *they hasted away* (KJV), *the waters fled* and *they took to flight* (NIV), and *they fled* and *they hurried away* (NASB). Erosive currents in the retreating waters, while flowing over the anticlines and synclines, likely caused preferential erosion of the anticlines. Today, the anticlines are lower in elevation than the synclines.

Tensional stresses in the lithifying anticlines caused by compression (Wil-

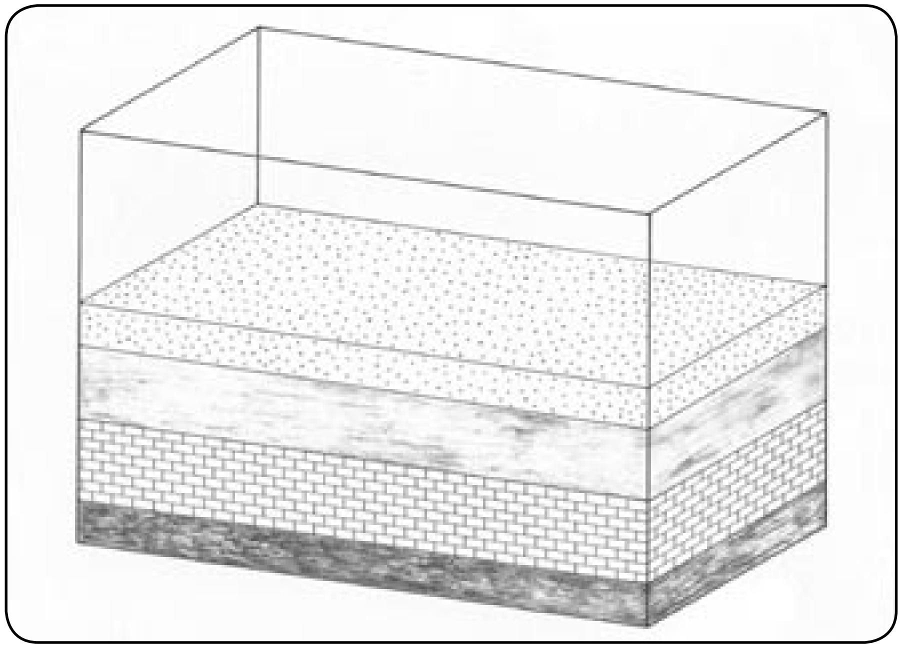

Figure 8a. The Appalachian Valley and Ridge Province was formed from Flood-laid sediments that were originally deposited over thousands of square miles in numerous horizontal layers (strata). These drawings (8a-8e) are not to scale and do not show all the many strata in this area, but the main stratum of interest, the Bangor Limestone containing Sequoyah Caverns, is indicated. Drawn by Elizabeth Akridge.

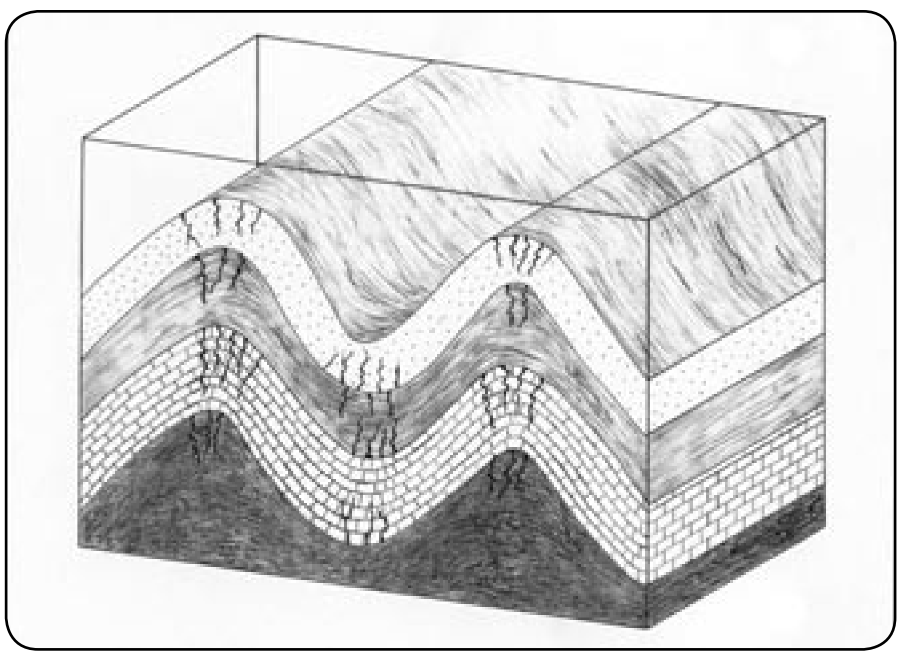

Figure 8b. After deposition in the Flood and before strata fully lithified, powerful compressional and tensional forces were exerted on the Flood-deposited strata, resulting in their being folded into sinusoidal shapes. Cracks developed along the tops of the folded layers by tensional forces during the deformation process. Drawn by Elizabeth Akridge.

liams and Akridge, 2005) caused fractures to propagate into underlying strata. Piping through these fractures would have enhanced erosional rates due to the high-pressure head available at that time. As the crests of the anticlines were eroded by receding Floodwater, these fractures would have enlarged, accelerating the rate of erosion along the anticlinal crests (Figure 8c). Once currents penetrated the interior of the anticlines, the rate of erosion could have increased due to less-lithified sediment and structural zones of weakness. Sediments in the interiors of the anticlines could have remained less lithified due to high fluid pressures slowing expulsion of entrained water. As erosion continued, increasing volumes of sediments would have been removed from the interiors of the anticlines. Eventually, the anticlines were eroded more deeply than their neighboring synclines.

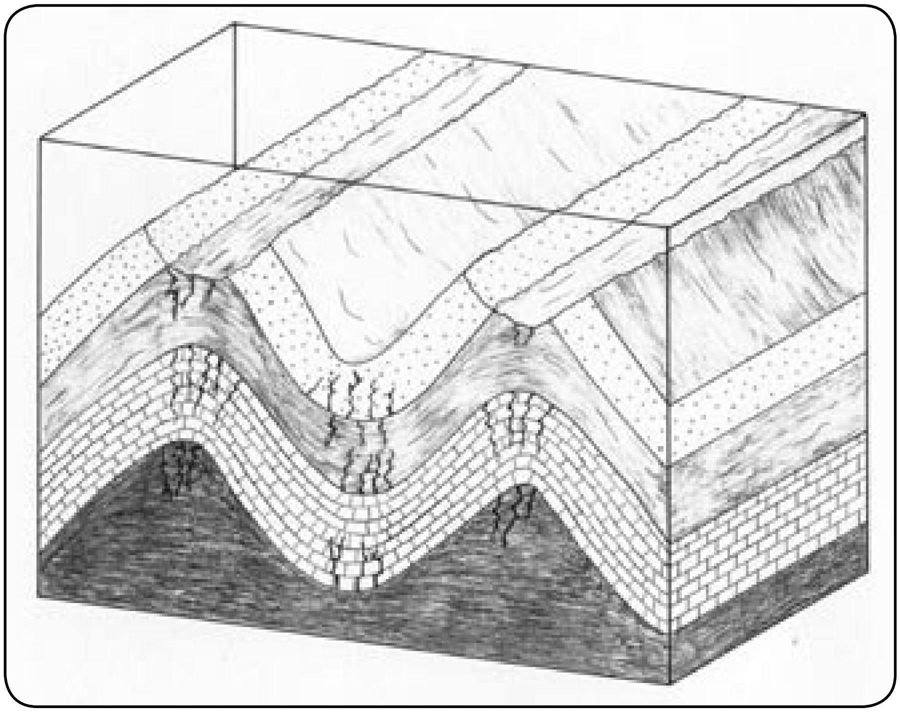

Figure 8c. During the Flood, conditions prevailed that enhanced greater erosional rates of the anticlines, ultimately reducing their elevations far below the synclines. Floodwater current is in direction toward viewer, paralleling longitudinal axes of anticlines and synclines. Drawn by Elizabeth Akridge.

Sand Mountain is one such elevated syncline. Deep fractures in the adjacent anticlines ultimately penetrated the partially lithified Bangor Limestone. Before those anticlines were eroded down to the elevation of the Sand Mountain syncline, water under high pressure would have been piped through these fractures, enlarging them. The pressure head was supplied by the significant elevation difference between the top surfaces of the anticlines and the limestone stratum underlying the Sand Mountain syncline. These fractures would become the conduits for the rapid flow of acidic floodwater into the Bangor Limestone. Several of these conduits can be seen today in Sequoyah Caverns as large ceiling fractures and side tunnels, such as “Whale’s Tongue.” One conduit called “Sow’s Belly” exhibits evidence of significant flow in the erosional patterning on its walls (Figure 6). Today, the conduit is dry; only rarely is any trace of moisture ever seen.

Cave formation was influenced by several factors, including: (1) elevated head pressure of the water flowing through the Bangor Limestone, (2) hydraulic milling when cracks allowed pressure differentials and resulting flow through them, (3) elevated underground temperatures resulting in probable hydrothermal water availability, (4) elevated atmospheric CO_2 increasing carbonic acid concentration, (5) acidic fluids moving upwards through the rocks due to compaction, and (6) the possible presence of sulfuric acid, which would have dramatically lowered the pH.

Sulfuric acid is produced by the oxidation of hydrogen sulfide (H_2S) gas in hydrothermal water (Oard, 1998; Silvestru, 2003). H_2S occurs in groundwater from the breakdown of buried organic matter such as decaying plant material. H_2S is also found in water that comes from shale, sandstone, and water that is near coal or peat deposits (Oram, 2008). Strata in this area contain shale, sandstone, and coal. As plants buried by the Flood began to decay or to form coal, H_2S could have formed, providing a source for sulfuric acid in the hydrothermal waters. This would have increased the rate of dissolution of limestone, quickly forming caves (Jagnow et al., 2000; Oard, 1998; Silvestru, 2003). This seems likely, since today’s Sulphur Springs, a nearby source of water emanating from a limestone aquifer at the base of Sand Mountain, emits H_2S (Dekalb County Communities, 2008).

With conduits supplying the synclinal limestone with hot, high-pressure, acidic water, vast volumes of the limestone could have rapidly dissolved even lithified zones, forming large-diameter, deep, water-filled passages. During that time, the neighboring anticlines continued to erode. Before they reached the elevation of what is now Sequoyah Caverns, that tunnel could easily have extended horizontally in the limestone

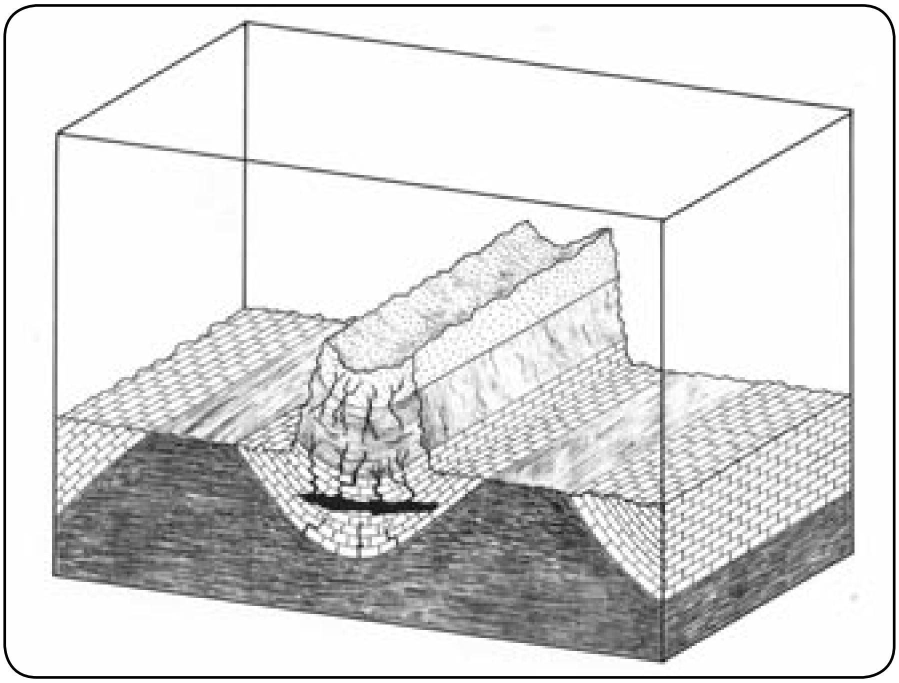

Figure 8d. Anticlines eroded below the elevations of the synclines, forming synclinal mountains like Sand Mountain illustrated here. During that process, a cavity developed in the limestone, ultimately becoming Sequoyah Caverns. Floodwater current is in direction toward viewer, paralleling longitudinal axes of anticlines and synclines. Drawn by Elizabeth Akridge.

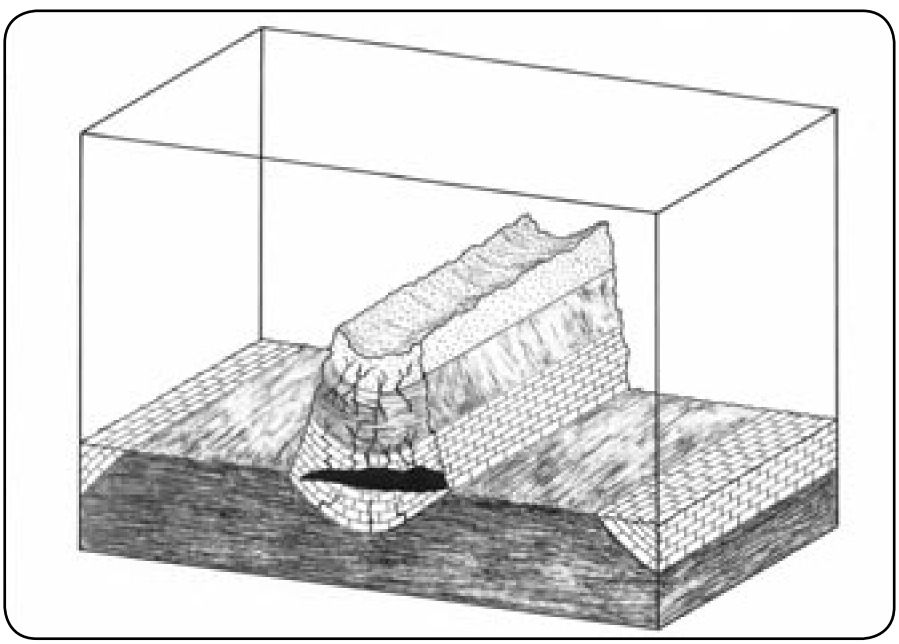

Figure 8e. The cavity that became Sequoyah Caverns was breached by the downward erosion of its adjacent anticline, resulting in the expulsion of most of the sediment and detritus that filled the cavity. Floodwater current is in direction toward viewer paralleling longitudinal axes of anticlines and synclines. Drawn by Elizabeth Akridge.

beyond what is now Sand Mountain (Figure 8d). Once the tunnel was breached by erosional downcutting of the anticline (Figure 8e), huge volumes of pressurized water from the tunnel would have been expelled from what is now Sequoyah Caverns into the Floodwater current as it swept by the newly exposed tunnel opening. Water would continue to flow through the tunnel, but the temperature, pressure, and water chemistry would likely be quite different, though it would still retain significant mechanical erosive power. Dewatering of strata in the interior of the rising Sand Mountain, and subsequent post-Flood precipitation would continue to enlarge the cave system, though at a slower rate.

Evidence Favoring the Rapid, Catastrophic Formation of Sequoyah Caverns

A variety of features of Sequoyah Caverns indicate a rapid and catastrophic origin for the cave system. Sequoyah Caverns contains a peculiar, unlithified sediment composed of angular, unsorted, fragmented, conglomeritic, and water-transported allogenic siliceous pebbles typically found as patches of sediment on the ceiling and walls (Figure 9). An alert cave guide found fossil mammalian remains within this sediment in a karst alcove located in an eroded fracture intersecting a sidewall of the cave. This small alcove is cylindrically shaped, about 2.5 ft (0.76 m) high and 1.5 ft (0.46 m) in diameter, with a small opening on the side of the fracture in the limestone bedrock (Figure 10).

The disarticulated remains are of an unidentified mammal, similar in size and morphology to a 15–20 pound canine. What made this find so intriguing is that the fossils are embedded in a thin (~3-inch) layer of the sediment found pasted on the limestone ceiling of the alcove. Non-petrified bones and teeth were found (Figures 11 and 12) by excavating carefully upward into the sedi-

Figure 9. One example of the patches of thin sediment found on the ceiling and walls of the cave. Note the inclusion of siliceous, angular, and unsorted pebbles in the sediment. These pebbles and sediment came from sources outside the cave. Scale in cm and in.

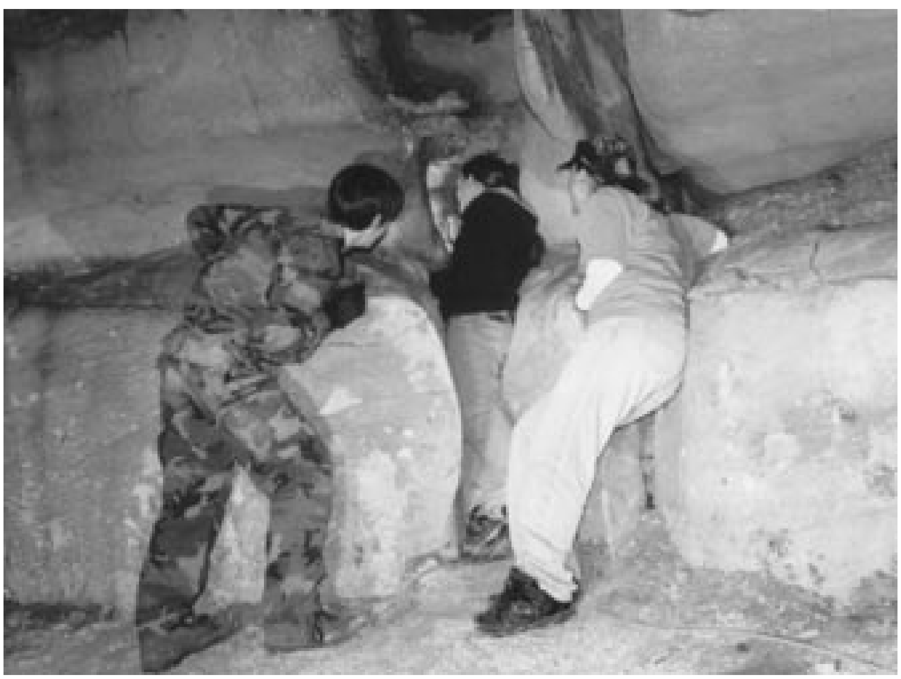

Figure 10. The center excavator has squeezed herself into the narrow joint leading to the small, round opening she looks into on the left side of the wall of the joint. A light placed in the hidden karst alcove defines its entrance point. That opening leads into the karst alcove where mammalian fossils were discovered in the thin sediment remaining on its ceiling. Specimens of disarticulated bones and teeth were removed for analysis by a careful, "upside-down" excavation.

Figure 11. Bones as they appeared in the thin sediment on the ceiling of the karst alcove before being excavated. Scale in cm and in.

Figure 12. A partial mandible displaying four bicuspid teeth protrudes from the sediment on the ceiling of the cave in close proximity to the karst alcove. Scale in cm and in.

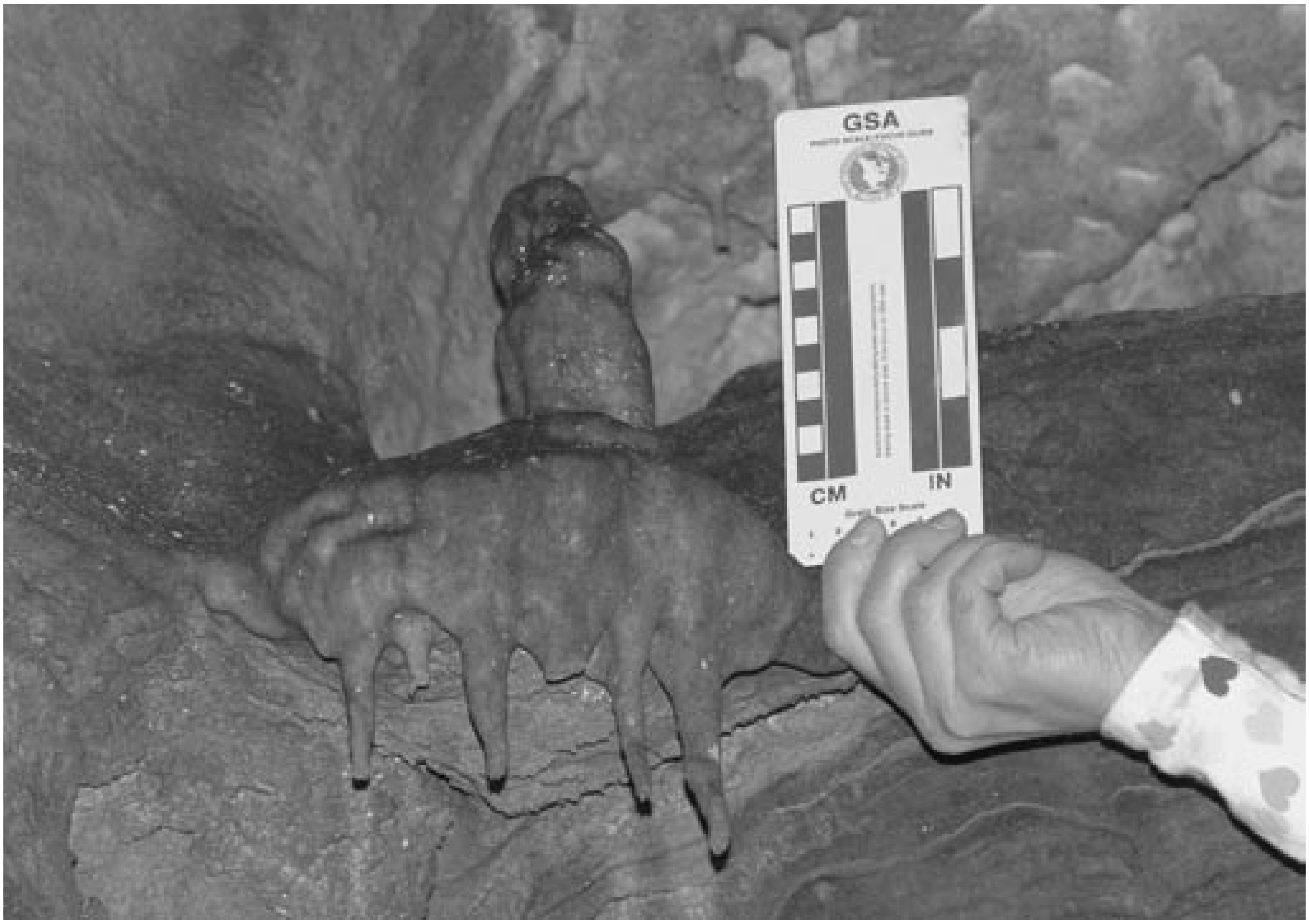

Figure 13. Near the excavation site and at the 12-ft ceiling of the cave, a narrow limestone shelf contains sediment that flowed over the edge of the shelf when the cave was being emptied of its infilling sediment through activity of the Flood. A stalagmite and accompanying small stalactites formed on the sediment after it hardened. These speleothems are still growing. Scale in cm and in.

ment. Some of the fossils were removed to identify the animals and gather any useful information. The bones were also dated using ^{14}C tests (see Appendix).

How were the sediment and fossils emplaced? Why is sediment found on the walls and ceiling of the cave, rather than the floor? How were allogenic pebbles deposited in sediment high on the ceiling and walls? And how were mammalian remains deposited on the ceiling of the solid limestone alcove? The best answer is that these sediments once filled the tunnel of the cave, and that the remaining patches on walls and ceilings are remnants. Because the patches are found scattered throughout the cave, the original extent of the sediment must have been great. It would have taken an immense volume of sediment to fill the cave complex. How was it deposited? How was it eroded? Where did it all go?

A Creationist Interpretation of Sequoyah Caverns Provides Answers

As described above, once the cavity that was to become Sequoyah Caverns formed deep within Sand Mountain during Floodwater runoff, the conduits that formed during erosion of the adjacent anticlines would not only have supplied large volumes of water to the Bangor Limestone, but also would have transported florae, faunae, pebbles, and sediment into the newly formed cavity. Unsorted pebbles, derived from as much as hundreds of miles upstream, would have been present in the slurry flowing through conduits. Thus, the cave passages were filled by various detritus, including the disarticulated animals killed in the Flood. Bloated, buoyant body parts would have tended to float on top of the slurry filling the cave passages, and thus would have been entombed at the top of the fill. “Quiet” zones in the tunnel would have trapped organic material circulating on top of the slurry. For example, the karst alcove containing mammalian fossils would have been an ideal "quiet" location for such floating material to be fixed in the matrix of sediment as it filled the cavity. Ultimately, sediment completely filled the tunnel and its associated voids.

How was that cavern fill removed from the developing cave and transported away? It is possible that when retreating Floodwater finally breached the cave at what is now the mouth of Sequoyah Caverns, there was greater hydraulic pressure inside of the caverns (Figure 8e). That pressure expelled water and sediment from the cave, emptying most of its sediment and detritus. Also, products, such as gypsum ($CaSO_4.2H_2O$), formed by the reaction of sulfuric acid (H_2SO_4) with limestone ($CaCO_3$), would have been flushed from the cave. That flow would have persisted due to dewatering of the Sand Mountain syncline. Later flow through the cave system caused by post-Flood precipitation would have further removed sediment. Thus the cave would have been purged of most of the sediment, leaving behind the irregular patches seen today on the ceiling and walls. Ultimately, the water table dropped below the floor of the cave, allowing speleothems to develop in the air-filled passages.

A small ledge near the ceiling of the cave and close to the fossil excavation site contains an interesting remnant of this sediment on its horizontal surface. As the majority of the sediment surrounding the ledge was purged, part of the plastic sediment on the small ledge "flowed" over its edge and solidified in that position. After the cave filled with air, a stalagmite formed on the hardened sediment that now hangs there (Figure 13), providing evidence that the mud entered and exited the cavity before speleothems began to form. Neither sediment nor water could have filled the cave tunnel afterwards because the elevation of the cave entrance on the eastern side of the Sand Mountain syncline is higher than the adjacent anticlinal valley floor and no evidence exists indicating that the entrance was blocked after it was opened.

Summary

The young-Earth Flood model provides a reasonable explanation for the origin of Sequoyah Caverns. It is supported by physical evidence in and around Sequoyah Caverns. Important features include: (1) remnant patches of sediment on the walls and ceiling of the cave, (2) allogenic pebbles in the sediment, (3) mammalian fossils contained in the sediment on the "ceiling" of a karst alcove, (4) the absence of most of the sediment that once filled the cave, (5) erosional, patterned markings on the walls of the cave, (6) marine fossils in the limestone bedrock, (7) speleothems, and (8) the peculiar characteristics of the regional anticlinal/synclinal topography. These are well explained by the Flood model but not by uniformitarian theories.

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To the Creator be all praise, honor, and glory!

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Appendix

The discovery of mammalian fossils in an out-of-the-way karst alcove by alert cave guide Carrie Payton provided scientific evidence leading to understanding events that support a creationist interpretation of the formation of this cave during the Noahic Flood. After the fossils were discovered, the owners were interested to find what could be learned by studying the fossil remains, so a partial excavation of the fossils was undertaken over three days in February 2007.

The first bones to be removed were those mostly exposed to air and those protruding from the sediment and downward into the air from the remnant three-inch-thick sediment that was deposited on the solid limestone "ceiling" of the small karst alcove. We found that bones exposed to air were fairly substantial, but bones contained completely in the sediment had the consistency of a jelly-like substance and could not be removed from the sediment without disintegration. The tooth enamel of the disarticulated and non-petrified fossils remained, while the internal part of the teeth had long ago dissolved away.

Enough of the substantial bone fragments were available for analysis by an accelerator mass spectrometer to obtain a Carbon-14 (^{14}C) age-date. The ^{14}C age-date was reported to be 2910 ± 50 ^{14}C years BP (^{13}C corrected), based on the Libby half-life of 5570 years and BP referenced to AD 1950 (Geochron

Laboratories, 2008). Although the ^{14}C age-date does not correlate with the date of the Noahic Flood of ~4,300-4,500 years ago, an age discrepancy was expected because of problems associated with radiometric dating techniques, in particular with the possibility of contamination of specimens by organic products influencing ^{14}C dating. The fossils could have been subjected to contamination and penetration by soluble organic remains such as fungi, fecal residue from bats, effluvia from the breath of thousands of persons who have toured the cave, dust from various organic sources, and airborne pollen from outside florae that filter into the cave. Such contamination would expectedly lower the ^{14}C age. Also, the pre-Flood atmosphere is thought to have had less ^{14}C than now because of better shielding from cosmic ray bombardment and that would be a possible factor to consider in trying to ^{14}C age-date Flood fossils. Regardless of what the ^{14}C testing demonstrates, their deposition in the Flood-deposited sediment as described in this paper would render them Flood-aged animals that met their demise in catastrophic, hydraulic, and high-energy events during the Genesis Flood. Additional studies of the fossils are in progress.

DVD Review

Life's Story: The One That Hasn't Been Told (DVD)

Exploration Films, Monument, CO

2004. 56 minutes, $23.00.

Life's Story is a DVD that highlights the design seen in the animal kingdom and demonstrates how such design could not have evolved by chance processes. The film contains two parts. The first is focused on underwater ocean life and the second on African wildlife. The footage is excellent, and the creatures discussed are fascinating.

The first section looks at how complex ecosystems exist underwater. Such systems contain many different types of plant and animal species that are interdependent. For example, certain coral reefs that many plants and animals depend on for shelter and food are themselves dependent on parrotfish to eat the algae growing on them. These types of relationships, known as *symbiosis*, demonstrate that evolution could not have produced either of the creatures, for if one existed without the other at some point, how could they survive? The production also highlights dolphins and shows how their design features are best understood as the creation of God, rather than randomly evolved matter.

The second section of the documentary discusses different African animals, including wildebeests, lions, giraffes, and ostriches. Each of these animals shows evidence that they were designed by God and did not evolve.

I came away from this film wondering how anyone could believe that random processes have produced such amazing creatures. The film ends by emphasizing that the Creator who made the whole world also sent His Son to die that we might have eternal life. The presentation is lengthy, at almost 56 minutes, but the story is worth hearing. This DVD is sure to become a standard in the creation library.

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