CENTRAL
OKLAHOMA
GROTTO
OF THE NATIONAL
SPELEOLOGICAL SOCIETY,INC

C.O.G.nizance

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Google Meet
Friday, September 9, 2022
At 7:00 central time
Becky will send you an invitation

If you are writing or drawing something to be included in the 2022 Oklahoma Underground please get it finished and sent to Sue. Thanks

MINUTES

CENTRAL OKLAHOMA GROTTO MEETING
MAY 13, 2022

In attendance: Duane Del Vecchio, meeting facilitator; Dale Amlee, Sue Bozeman, Becky Hunsinger, John Talbot, Duane Del Vecchio, Lil Town, John, Tammy, and Andrew Van Dyke, and Steve Beleu

Presiding: Assistant Emperor Dale Amlee
Start time: 8:22

OLD BUSINESS

Sue reviewed the materials that she has for publication, then encouraged contributors who have yet to send her the material they agreed to provide. No one was hurt. Yet.

NEW BUSINESS

1. I mentioned stupidly that there is no reason why we couldn't conduct our virtual meetings in July and August. Then I was reminded of the problems that this creates for our newsletter. We took no action on this idea, which I withdrew.

2. Becky reported that Mexican Free Tailed bats have returned to the caves in Bandelier National Monument.

3. We nominated Tammy Van Dyke to be a COG member and voted her in. Welcome!

4. We voted to donate $100 to Cave Sim.

5. We voted to suspend membership dues for the nonce. When we return to actual caving we will reinstate them. Sue hopes that we can return to caving in July.

6. Duane told us about new technology consisting of a smart microphone that can analyze the calls of bats and provide intel about what that bat/s that uttered the call is. He noted that one use of it can be to record within an area for some-odd minutes, then have it analyze the calls to provide a survey of bats in that area.

7. Duane noted that he is no longer the moderator for the COG Facebook web page. Tammy volunteered to step into his place, hooray and thanks!

TREASURER'S REPORT

John Talbot read his report which noted that we made several cents that month. Very good that; many people believe that we have no cents.

Meeting ended 9:18
Report by S. Beleu,
Secretary and Sergeant at Underarms

ANNOUNCEMENTS

*No trips planned at the present time.

*Next meeting may be September 9, 2022 on Google Meet. Becky will send out invitations.

*This is the correct email address for Tammy Van Dyke. tvandykesny@att.net

* Potential new member Levi Carter.
Hopefully we'll meet him at the September meeting.

Rance Ellis passed away

Celebration of Life for Rance William Ellis, age 86, of Mangum, Oklahoma will be at 1:00 p.m., Wednesday, August 3, 2022, at the Red River Cowboy Church, 1001 North Byers Avenue, Mangum, Oklahoma with Pastor Darrell Coffman officiating. Inurnment will be held on the family ranch at a later date. Services are under the direction of Jackson Funeral Home of Frederick, Oklahoma. Mr. Ellis passed away on Tuesday, July 26, 2022, at his home in Mangum.

Rance William Ellis was born on September 20, 1935, in Vinson, Oklahoma to Mose Ross and Mary Adele (Quinn) Ellis. He attended Vinson Public School, graduating from Vinson High School in 1954. Rance was united in marriage to Phyllis Jean Maples on January 11, 1956, at the First Baptist Church in Sayre, Oklahoma. After high school, he moved to Pampa, Texas where he was employed by Harvester Grain Elevator. He relocated to Levelland, Texas, and did farm work for a period of time. He then worked as a truck driver in Ropesville, Texas. He later moved to Dalhart, Texas where he worked at various farms prior to his employment with the Bob Meeks Hereford Ranch. After his father's heart attack, Rance returned home to take care of the family ranch. A year later he moved to Four Way, Texas where he worked for the Weymouth Ranch, prior to returning home to Greer County and working for Republic Gypsum while starting his Hereford herd. Rance enjoyed the outdoors; he loved roping and watching rodeos, and raised several bulls for breeding stock and bucking stock. He enjoyed hunting for Indian arrowheads and had an extensive collection. The Biggest source of pride for Rance was running the farm and ranch that his great-grandad, W. D. Ellis settled in1898.

He is survived by his wife of 66 years, Jean Ellis of the home; his children, Lynn Ellis of Mangum, Oklahoma, Marcheta Pence and her husband Greg of Reed, Oklahoma, Rhonda Kesterson and her husband David of Port Hueneme, California, and John Ellis and his wife Angie of Chattanooga, Oklahoma; Five brothers, Jim Ellis and his wife Wanda of Panhandle, Texas, Kent Ellis of Mangum, Oklahoma, Clinton Ellis of Clinton, Oklahoma, Carl Ellis and his wife Brenda of Vinson, Oklahoma and Randy Ellis and his wife Flossie of Crescent, Oklahoma; one sister, Shirley Derby and her husband Delbert of Clinton, Oklahoma; nine grandchildren, Brooke Kirby and her husband Jeremy, Katie Thornton and her husband Taylor, Makenna Kesterson, Will Ellis, Cade Kesterson Dustie Pence, Ethan Ellis, John Kesterson, and Ben Ellis; five great-grandchildren, Jackson Kirby, Charlee Kirby, Talula Kirby, Rance Thornton, and Ellis Thornton; and a host of nieces, nephews, cousins, and many friends. He was preceded in death by his parents, Mose and Adele Ellis; one son, William Rance Ellis; two brothers, Alvin Ellis and Clayton Ellis; and one sister Nancy Hayes.

Memorial contributions in memory of Rance Ellis may be made to the Red River Cowboy Church in Mangum or the Reed Fire Department in care of Jackson Funeral Home, P. O. Box 1068, Frederick, OK 73542.

Rance was a true cowboy. The first time I met him was when I pretty much started caving with COG. Sue called me and said a landowner by Mangum wanted to show us some holes on his land and asked if we would go out and look at them. When we got to the area we were suppose to go we saw this man come galloping up to us and I knew there really was a Marlboro man, rifle on saddle and all!

He asked us what we were doing on his land and we told him Sue and John asked for us to meet him. He said I know Sue, I know John, but I don't know you! Welcome to rural Oklahoma. After introductions were made he proceeded to show us cave entrances on his land and I marked waypoints on my GPS. Little did we know this was the beginning of many caving trips to SW Oklahoma and a friendship with Rance and his wife Jean. We'll miss you Rance.

WHITE-NOSE SYNDROME DECONTAMINATION PROTOCOL, September 2018

This is the latest formal revision of the national decontamination protocol to prevent spread of the fungus that causes white-nose syndrome. This document is the product of a collaborative effort with multiple federal and state agencies and several non-governmental organizations. Go to this website to view the detailed suggestions listed to help stop the spreading of WNS
https://www.whitenosesyndrome.org/static-page/decontamination-information

Wildlife Health Bulletin 2022-01
National Wildlife Health Center
Jonathan Sleeman, Center Director
January 31, 2022

Winter 2021/2022 Bat Submission Guidelines and Highlights of the 202/2021 White-Nose Syndrome Surveillance Season

Summary

The USGS National Wildlife Health Center has released updated guidance for bat diagnostic submissions for the 2021/2022 white-nose syndrome (WNS) surveillance season.

During the 2020/2021 surveillance season, WNS was detected for the first time in Wyoming and Montana, increasing the number of states where WNS has been confirmed to 37.

Field testing of several vaccine candidates to prevent WNS in susceptible bat species is ongoing, and field vaccination has proven to be safe in WNS susceptible animals.

Updated guidance from the USGS National Wildlife Health Center (NWHC) is now available for bat diagnostic submissions for the 2021/2022 white-nose syndrome (WNS) surveillance season. These guidelines are posted on the NWHC WNS web page and replace all previous NWHC bat submission criteria.

TREASURER'S REPORT

JUNE 2022 TREASURERS'S REPORT

	INCOME		**EXPENSES**
Dividends	$ 0.02	Donation	$ 100.00
TOTAL	**$ 0.02**		**$ 100.00**
CASH	$ 106.05		
CHECKING	$ 455.35		
SAVINGS	$ 1,432.81		
TOTAL	**$ 1,994.21**		

PREPARED BY TREASURER JOHN TALBOT NSS #30254

6/7/2022

AUGUST 2022 TREASURERS'S REPORT

	INCOME	**EXPENSES**
Dividends	$ 0.02	
TOTAL	**$ 0.02**	
CASH	$ 106.05	
CHECKING	$ 455.41	
SAVINGS	$ 1,432.99	
TOTAL	**$ 1,994.45**	

PREPARED BY TREASURER JOHN TALBOT NSS #30254

8/8/2022

TRIP REPORTS

NO TRIP REPORTS THIS MONTH

VISIT OUR CATALOG CATEGORIES FOR COMPLETE, ORGANIZED LISTINGS OF OUR BAT FRIENDLY GOODS BY SUBJECT.

Batgoods.com supports bat conservation and research through donations. Choose one organization at checkout to receive a donation of 5% of the cost of the goods on your order. Batgoods is giving you more choice and more distinctive, bat positve merchandise.

POTPOURI

Siberian bat

From Wikipedia, the free encyclopedia
Contributed by Steve Beleu

The **Siberian bat** or **Siberian whiskered myotis** (*Myotis sibiricus*) is a species of vesper bat in the family Vespertilionidae. It is found throughout northeastern Asia, primarily in Siberia.[2] It is known for its high life expectancy relative to its body size, approximately twice that of humans, and holds the record for the oldest bat; in 2005, one individual was discovered in a cave in Siberia that had been banded in 1964, making the bat at least 41 years old.

Taxonomy: It was previously classified within the Brandt's bat (*M. brandtii*), but more recent phylogenetic studies have found deep genetic divergence between both taxa, indicating that both are distinct species from one another, and they have thus been split by authorities including the American Society of Mammalogists, the IUCN Red List, and ITIS.

Distribution and habitat: It is found throughout much of the Palearctic east of the Ob River, from eastern Kazakhstan east throughout southern Siberia to the Kamchatka Peninsula, and south to northern China, northern Mongolia, North Korea, and northern South Korea. It is also known from Sakhalin & the Kuril Islands in Russia, and Hokkaido in Japan. It inhabits both lowland and mountain forests as well as forest-steppe ecosystems. During the summer it takes shelter in tree hollows, caves, and even buildings, but it winters exclusively in caves.

Description It is a small bat, with the length of its head and body only 39–51 mm (1.5–2.0 in). Its forearm is 33–39 mm (1.3–1.5 in) long; its tail is 32–44 mm (1.3–1.7 in) long; its hind feet are 7–9 mm (0.28–0.35 in) long; its ears are 12–17 mm (0.47–0.67 in). It has long fur relative to its body size. The fur on its back is pale brown with a golden sheen, while the fur on its ventral side is paler gray, sometimes with a yellowish tinge. Its tragus is narrow and pointed.

Biology: Populations in Siberia have exceptionally long hibernation periods, beginning in late September and continuing through mid-June of the following year.[8] During the winter, Siberian bats will roost in mine shafts, caves, tunnels, and cellars. Some–but not all– populations hibernate in the winter, while others are partially migratory. They are insectivorous, foraging at low altitudes through quick, maneuverable flight.

Reproduction: During the summer, females will form maternity colonies to raise their young. The litter size is one pup, though occasionally two are born. Pups are born in early summer, with pups becoming volant around one month of age. Maternity colonies are frequently in manmade structures.

Longevity: In the early 1960s, 1,544 Siberian bats were banded in Siberia. Of these individuals, at least 67 lived longer than 20 years (of note, all of these individuals were male). In 2001, two individuals were documented 38 years after capture, making them, at the time, the longest-lived individuals of this species ever recorded.[9] However, three years later, one of these individuals was documented again. This meant that the longest-lived individual of this species was at least 41 years old.[8] In mammals, larger animals tend to have longer lifespans than smaller ones; the Siberian bat is the most extreme outlier to this pattern, with lifespans exceeding 40 years in the wild while only weighing 4–8 g (0.14–0.28 oz). Compared with other animals its size, it lives 9.8 times longer than expected, which is the greatest value of any mammal with a known lifespan.

Status: This species is thought to have a declining population due to forest degradation and fragmentation, as well as the loss of roost sites in caves. The primary cause of forest loss is urban development, with deforestation and wildfires also playing a role in the decline. Disturbances by cavers are known to cause mortality in winter roosts. However, it has a wide population and is not thought to be declining at a rate that would qualify it for a more imperiled status, so it is classified as Least Concern.

This came out in the Lake of the Woods Area News magazine last month. There is also a link to a page telling you how remove a bat from your cabin:
https://batwatch.ca/what-do-if-you-find-bat-your-house
There's an agonizing trade-off in opening doors and windows at night: bat MIGHT go out; mosquitoes WILL come in. I'd rather close my bedroom door and let the bat leave through his secret door. Of course, sometimes we have enough family that I am on a sleeping bag in the living room, listening to the whispering wings and tiny squeaks. Ah, the dilemmas of life!
Becky Hunsinger

What to do if you find a bat in your house
If there is a bat in your house and you have not come into contact with it

In summer:

Restrict the bat to a single room by closing the door(s) to the room that it is in. Open the windows, remove the screens, and turn off the lights leave the room, closing the door behind you. In most cases, the bat will leave out the window on its own. If it does not leave, wait for it to settle down.

If the bat does not leave, wait for it to settle down, and then capture it using the protocol described below. After capturing the bat, it should be in a container inside a box. If the bat is obviously injured, take it to a nearby wildlife rehabilitation center.

If no people or pets have come in contact with the bat, you can release it outside. Open the container and put the box on its side at the base of a tree. The bat will be able to climb up the tree and fly away.

Check on the bat approximately 24 hours later. It is important that you wait at least 24 hours to check on the bat because bats are able to drop their body temperatures

(continued on page 5)

into a state called torpor where the bat may appear dead. In order not confuse a torpid bat from a dead bat, allow

into a state called torpor where the bat may appear dead. In order not confuse a torpid bat from a dead bat, allow the bat at least 24 hours to leave the box.

the bat at least 24 hours to leave the box. If the bat is still alive, but it still has not moved, take it to a nearby wildlife rehabilitation center. If the bat has died, contact the appropriate agency where you should report dead bats

In winter

If you find an active bat during the winter, it is because it has woken up from hibernation. It requires a lot of energy for a bat to awake from hibernation; therefore, they are very sensitive at this point in time.

Try to capture the bat using the method described above. Check if people or pets who live in the house may have come into contact with the bat.

Possible contact with the bat: Person (s) or child (ren) in the same room: Please contact the health line associated with your province or territory, or a doctor as mentioned in the previous section “If you come onto contact with a bat”. For pets, please contact your veterinarian.

No contact with the bat: Take it to a Wildlife Rehabilitation Centre near to you. People in charge of the refuge will organize the transport of the bat with you. For injured bats or in the absence of a nearby refuge, you must contact the nearest wildlife protection office to inform them as mentioned below.

Be careful if you come into contact with a bat. A wound inflicted by a bat can go unnoticed but should be taken seriously due to the small risk of contracting rabies. Anyone who has touched or been touched by a bat should: Immediately wash the exposed skin with soap and water for 15 minutes

Contact the health line associated with your province or territory, or a doctor to evaluate whether or not you should receive the rabies vaccination:

If possible, safely capture the bat. The health care professional will be able to guide you where you need to take the bat to have it analyzed. If your pet has come in contact with a bat or ended up in the same room without supervision, you should contact your veterinarian.

If you find an injured, dying or dead bat try to capture the bat. Next, place the box in a dark, quiet place.

How to capture a bat: Wear thick gloves whenever you are trying to capture a bat. Capture the bat under a solid container (e.g. yogurt container), then, slide a lid onto the container by lifting the container slightly off the surface. Make sure air can get into the container, then place it in a box in an area where it is dark and quiet. Then disinfect your gloves. Wash your hand with warm water and soap. Depending on the circumstances, follow the instructions above regarding who you should contact.

Preventing bats from entering your house: Try to find the opening where the bat entered the house; Either caulk or add a screen to the point(s) of entry; Make sure you have functioning screens on all your doors and windows

An Inventory of Fossils at Carlsbad Caverns National Park

ARTICLE PARK PALEONTOLOGY NEWS - VOL. 12, NO. 1, SPRING 2020

Scott Kottkamp, Paleontology Intern
Carlsbad Caverns National Park, New Mexico

https://www.nps.gov/articles/an-inventory-of-fossils-at-carlsbad-caverns-national-park.htm

During the fall and winter of 2019, I was recruited as a paleontology intern to help coordinate the first comprehensive paleontological resource inventory for Carlsbad Caverns National Park. This project involved collaboration between the park staff, the National Park Service Paleontology Program and the New Mexico Museum of Natural History and Science. The focus of the inventory primarily involved the compilation of baseline data documenting the scope, significance, distribution and management issues associated with park fossils. These inventories are useful for informing resource management decisions and are foundational prerequisites for the creation of full paleontological resource management and monitoring plans. It is impossible to set optimal policy and management techniques for a park without first knowing what is located within the park, where resources are located, and what risks are faced by the resources.

Carlsbad Caverns National Park (CAVE) is extensively fossiliferous; the entire park is situated in, and its namesake caverns are formed within, the remains of a middle Permian age reef and shelf complex. Furthermore, many of the caves contain Pleistocene- and Holocene-age terrestrial remains, with some bat bones in Slaughter Canyon Cave likely being more than half a million years old. Despite the abundance of fossils, a lengthy history of paleontological research, and the palaeoecological importance of the paleontological resources within CAVE, no baseline inventory had ever been done at the park. Management activity for fossils was largely folded into more general cave management, such as how monitoring activity largely coincided with cave surveys. An inventory of fossil taxa, localities, conditions, and programs/policies was needed to provide resource managers a summary of the scope, significance, distribution, and management issues associated with fossil resources present within CAVE.

My role in assembling the CAVE Paleontological Resource Inventory Report was that of lead author. I did the majority of the research regarding paleontological resources at CAVE, wrote initial drafts of most of the sections of the paper, revised those drafts according to feedback by coauthors and experts, and assembled the faunal lists. My work on the project began on October 22nd, 2019. In general, before writing each section, in an order determined by consensus among the authors, I would spend several days researching the subject matter. I would then write a draft, including citations to the sources I used for information, and submit that draft to coauthors or approved outside experts for review. Other duties that I performed included collecting photographs of fossils in-situ and discussing recommendations for future paleontological resource management with CAVE staff.

(Continued on page 6)

The CAVE inventory records 15 non-cave Permian localities, 5 non-cave Pleistocene/Holocene localities, and 44 caves containing documented paleontological resources from either time period. Some of these caves contain several localities; Lechuguilla Cave, for example, has 891 fossil localities and counting. These localities are not a comprehensive list of those potentially within CAVE; it is likely that more thorough surveys will reveal fossils in nearly all caves within the park and throughout the surface of the park. 209 invertebrate fossil taxa were documented from within the park, as well as 94 Pleistocene/Holocene vertebrate taxa and a small number of microbes, ichnofossils, and plants. Permian vertebrates and Quaternary invertebrates are known from localities near CAVE of analogous age and depositional environment, but not from within the park. The list of invertebrates is based on current published data and analysis, and it is highly likely that further investigation of Permian invertebrates at CAVE will identify hundreds of additional species within the park. Likewise, the micro-fossil assemblages from the Pleistocene and Holocene have not been researched in-depth and doing so is highly recommended in order to flesh out the herpetological and small avian constituents.

Permian fossils can be found in the rock throughout the surface of the park. These fossils are not monitored or recorded in as much detail as those found within the caves, and those that occur along public trails may be at increased risk of vandalism or theft.

CAVE is somewhat unique among national parks in that it records two time periods that are temporally, depositionally, ecologically, and environmentally distinct; a marine Permian reef-complex mostly represented by invertebrates and a variety of terrestrial Quaternary environs represented by vertebrates. Despite the differences between the two time periods preserved at CAVE, both share an intriguing and critically important similarity in that both record a time of major ecological change likely driven by climate change. The rocks at CAVE date from just before the Guadalupian mass extinction 260 mya, an event separated from the end-Permian mass extinction by ten million years. There is evidence in the rock record that the mesophotic reef shallowed out over time, corresponding to the change from a diverse macro-fauna and a micro-framework made up of the red algae Archaeolithoporella, the problematic organism Tubiphytes, and colonial bryozoans, to near-dominance by the sponge Gigantospongia among the macro-fauna, to a stage where only Archaeolithoporella/Tubiphytes and microbes made up the reef (Weidlich and Fagerstrom 1998). This shallowing corresponded with an increasingly arid climate, which may have cut off the basin from the ocean and led to the slow death of the reef by sedimentation and hypersalinity (Hill 1996; Kerans and Kempter 2002). Meanwhile, the Pleistocene assemblage reflects a montane and/or mesic environment, ranging from forests to lush grasslands, as evidenced by the presence of taxa such as: Harrington's Mountain Goat (Oreamnos harringtoni) (Jass et al. 2000); American Water Shrew (Sorex palustris); and the Shrub Ox (Euceratherium collinum) (Logan 1981; Morgan and Lucas 2006). However, as the fossil record transitions into the Holocene the more water-dependent taxa go extinct or are extirpated to refugia in the north (Murray 1957; Harris 1985). The remaining, and Holocene-exclusive, taxa come to more closely resemble the modern xeric-adapted fauna of CAVE. These mass extinctions and ecological turnovers are a critical aspect of CAVE's paleontological resources, holding importance to interpretation and future research at a time where climate change and invasive species threaten the Chihuahuan Desert.

Various bones and a skull of Tadarida constantenei, Constantine's Free-tailed Bat. The holotype of this species was discovered at Slaughter Canyon Cave at CAVE. Hundreds of thousands of bones are preserved within meters-high deposits of guano.

The largest known species of Permian sponge, Gigantospongia discoforma, was discovered just outside of the boundaries of CAVE and can be found within the park as well. This sponge was 2.5 m wide, but only 8-20 mm thick (Rigby and Senowbari-Daryan, 1996). It is currently hypothesized that these sponges grew horizontally outward from the wall of the slope into the marine water (Wood et al. 1994; Wood 1999). The large, platy Gigantospongia discoforma then sheltered fissures and crevices in the rock, where cryptobiotas of smaller sponges, bryozoans, and other organisms flourished. These cryptobiotas seem to have been some of the most diverse habitats within the reef, at least in terms of non-microorganisms. An alternative model for Gigantospongia is that it grew upright in a blade-like manner, and the cryptobiotas were formed by a debris pile of fallen sponge blades and other reef talus (Rigby et al. 1998).

One notable feature of CAVE's Pleistocene/Holocene record is the near-absence of woodrat middens, buildups of woodrat urine, debris, and nesting materials over subsequent generations of the animals. Large, stable middens are critical paleoecological records because they preserve a record of plant life in the area immediately surrounding the midden, and can be tens of thousands of years old (Borrelli and Holmgren 2016; Balmaki and Wigand 2019). However, despite woodrat fossils being common at CAVE, and caves often being excellent locations for preserving middens (Dézerald et al. 2019), middens are very rare at CAVE. The inventory only found one midden from within a cave or karst feature at the park, and it is small, recent in age, and unstable as it occasionally hydrates and flows. The absence of old middens despite the presence of woodrats within the park throughout the Quaternary is likely because of the large rooms characteristic of Carlsbad Caverns. The air in these caverns is very humid and this causes the hygroscopic urine binding the midden to hydrate and flow away, in turn allowing the plant material to rot (Betancourt, personal communication, November 2019). However, it is possible that some of the smaller karst features at CAVE could contain paleoecologically useful middens.

The inventory revealed a major data gap at CAVE, especially in terms of its backcountry caves and its Permian taxa. Because of the relevance CAVE's paleoclimate and paleoecology have to modern concerns, the inventory has indicated a need to resolve this data gap through future paleontological research at CAVE. The inventory will serve as a core foundation upon which to develop future paleontological resource management at CAVE, but further exploration of CAVE's potential paleontological resources is essential in order to properly assess best policies.

Over 150 people were left stranded overnight at Carlsbad Caverns National Park due to flash flooding.

Park visitors trapped by a rushing river from the recent rains in our region, were stranded overnight.

Park officials report that the stranded visitors stayed in the visitors center for about nine hours, but have now all been safely evacuated. The park's food concessionaire also opened up to provide food for stranded visitors.

Water, 20 feet deep in places, was reported to be roaring down the main road that provides access to the caverns and the visitors center, forcing visitors to stay overnight.

Explorers Just Discovered Australia's Deepest Known Cave

NATURE

03 August 2022

By GABRIEL C RAU, THE CONVERSATION

Members of the group who discovered the cave. (The Southern Tasmanian Caverneers)

Cave explorers have traversed what's now the deepest known cave in Australia.

On Saturday, a group of explorers discovered a 401-meter-deep cave, which they named Delta Variant, in Tasmania's Niggly-Growling Swallet cave system within the Junee-Florentine karst area.

Its depth just beat out its predecessor, the Niggly Cave, by about 4 meters.

With a descent that lasted 14 hours and took many months to prepare for, Delta Variant is causing a stir among explorer communities.

But it holds a different kind of fascination for researchers such as myself, who study the interaction between groundwater and rocks (including in the context of caves).

This helps us learn about natural processes and how Earth's climate has changed over millions of years.

Exciting as Delta Variant is in an Australian context, it is arguably just an appetizer in the wider world of caves; the deepest known cave, located in Georgia, goes more than 2.2 kilometers into the earth.

So how exactly do these massive geologic structures form, right under our feet?

How do caves form?

Put simply, caves form when flowing water slowly dissolves rock over a long time. Specifically, they form within certain geological formations called "karst" – which includes structures made of limestone, marble, and dolomite.

Karst is made of tiny fossilized microorganisms, shell fragments, and other debris that accumulated over millions of years.

Long after they perish, small marine creatures leave behind their 'calcareous' shells made of calcium carbonate. Corals are also made of this material, as are other types of fauna with skeletons.

This calcareous sediment builds up into geological structures that are relatively soft. As water trickles down through crevices in the rock, it continuously dissolves the rock to slowly form a cave system.

Unlike much harder igneous rocks (such as granite), calcareous rocks dissolve on contact with water that is naturally acidic.

When rain falls from the sky, it picks up carbon dioxide from the atmosphere and soils along the way, which makes it acidic. The more acidic the water, the faster it will erode karst material.

So, as you can imagine, cave formation can become quite complex: the specific composition of the karst, the acidity of the water, the level of drainage and the overall geological setting are all factors that determine what kind of cave will form.

In geology, there's a lot of spatial guesswork. Being able to see how deep a cave formation goes is a bit like getting into the deepest layers of a cake, where you may not find the same thing in all directions.

Stalagmites and stalactites: From a research perspective, caves are incredibly valuable because they contain cave deposits (or 'speleothems') such as stalagmites and stalactites. These are sometimes spiky things that point up from cave floors, or droop from the ceilings, or form beautiful flowstones.

Cave deposits form as a result of water passing through the cave. Like trees, these contain growth rings (or layers) that can be analyzed. They can also include other chemical signatures the water contained, which can reveal processes that occurred at the time of formation.

While they may not seem like much, we can use these deposits to unravel past secrets about Earth's climate.

And since they're a feature of the interaction between rock and water during cave formation, we can basically expect to find them in most caves.

How deep can we go? Descending deep into a cave system is no small feat. You can't use your mobile (since there's no reception), it's incredibly dark, and you're usually relying on a guide line to find the way back out.

There could be many dead ends for explorers, so effectively mapping the space requires time and great spatial exploration skills.

While cave systems are usually stable (shallow caves can in theory collapse and form sinkholes, but this is very rare) – there's always risk.

The unexpected geometry of caves means you could find yourself making tricky maneuvers, twisting and swaying in all kinds of uncomfortable manner as you abseil into darkness.

Although the air pressure doesn't change to a dangerous extent as you descend, other gases such as methane, ammonia, and hydrogen sulfide can sometimes pool and lead to suffocation risk.

Despite all of the above, cave exploration is something people continue to do, and it brings great benefit for researchers in various sub-fields of geology.

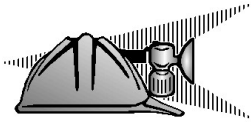
And though we've come a long way, there are always nooks and crannies we can't get inside – after all, humans aren't tiny.

I'm sure there are small spaces, too snug for us to explore, that open into much longer or bigger systems than we've ever discovered.The Conversation

Gabriel C Rau, Lecturer in Hydrogeology, School of Environmental and Life Sciences, University of Newcastle.

Central Oklahoma Grotto is a non-profit organization and a chapter of the NSS (National Speleological Society), 6001 Pulaski Pike, Huntsville, AL, 35810-1122 USA. Phone (256)852-1300. Dedicated to cave conservation and safety, C.O.G. publishes general information in a monthly newsletter ($6.00/year) and detailed cave surveys and related Speleological items in a yearly publication, *The Oklahoma Underground* ($3-$8/issue) Membership is by sponsor and is $12 per year for adults, $6 for spouses and students, and $3 if under 18. Central Oklahoma Grotto meets once a month on the second Friday of each month. For information, write Lil Town, 25692 Mosier Circle, Conifer, CO 80433: All submissions to the newsletter should be sent to the editor: Lil Town, 25692 Mosier Circle, Conifer, CO 80433: Telephone: (580)471-1238: E-mail: cavemoose@gmail.com. The deadline for submissions for any particular month's issue is the 20th day of the previous month. If you wish material returned, please include an SASE with submission. All materials in this newsletter are available for reproduction, provided proper credit is given with the article when you print it. Trade publications are welcomed. *Cave softly and safely!* Website: http://www.okcavers.com

Friday
September 9, 2022
There will be a
virtual meeting.
See you online!



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