CENTRAL
OKLAHOMA
GROTTO
OF THE NATIONAL
SPELEOLOGICAL SOCIETY,INC

C.O.G.nizance

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Google Meet
Friday, March 10, 2023
At 7:00 central time
Becky will send you an invitation

See you Friday evening online.

ANNOUNCEMENTS

*No trips planned at the present time.

*Next meeting may be March 10, 2023 on Google Meet. Becky will send out invitations.

* Be Happy, no one was blown away during the resent round of storms and tornados in Oklahoma! The Best place to be is underground. Caving in March???

MINUTES

CENTRAL OKLAHOMA GROTTO MEETING
FEBRUARY 10, 2023

In attendance: Dale Amlee, Sue Bozeman, Becky Hunsinger—virtual meeting facilitator, John Talbot Carol and Dale Town, Lil Town, John and Andrew Van Dyke, Duane Del Vecchio, Kelley and Jon Woltz, and Steve Beleu.
Presiding: His Majesty Dale Amlee
Start time: 8:08

OLD BUSINESS

1. Becky reported that we've had no return communications from the staff of Carlsbad Caverns.
2. Duane reported that there will be no one to coordinate bat research in Oklahoma until May or June when a new state coordinator will attend their next meeting.

NEW BUSINESS

1. We discussed a March caving trip to survey two caves in the vicinity of Grotto Cave.
2. Becky asked about the types of electric cave lights that are most currently used. Dale Amlee and Jon Woltz told her about the lights that they use which are state-of-the-science technology.

TRIP REPORT

Dale Amlee reported on the bat count of Jester Cave whose written report should be included in this newsletter. We discussed it. The count was down about 50% but they saw no sign of WNS among the bats. Total time was about 4½ hours in cave.

TREASURER'S REPORT – John Talbot delivered his report.

Meeting ended 9:00 Big Chief notes taken by Steve Beleu

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 2020/2021 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

March 2023 TREASURERS'S REPORT

INCOME		**EXPENSES**
Dividends	$ 0.01	
TOTAL	**$ 0.01**	
CASH	$ 106.05	
CHECKING	$ 341.87	
SAVINGS	$ 1,433.35	
TOTAL	**$ 1,881.27**	

PREPARED BY TREASURER JOHN TALBOT NSS #30254

3/8/2023

TRIP REPORTS

No trip reports to report this month...Maybe next month!

POTPOURI

Researchers find subterranean pharmacy in limestone caves

Staff Writer | February 14, 2023 | 3:45 am News Europe
http://www.mining.com/Researchers-find-subterranean-pharmacy-in-limestone-caves/

Moonmilk created from Macromonas bipunctata in the cave Bergmilchkammer. *(Reference image by Doronenko, Wikimedia Commons).*

A recent study on moonmilk—a mineral deposit found in caves and used for its curative properties—has led to the discovery of a cryptic compound active against bacteria that are resistant to multiple antibiotics.

Moonmilk, a concretion frequently found in various forms (pasty, dry or liquid) in limestone caves, is a speleothem most often observed in the form of a soft rock depending on its hygrometry. *(Continued on page 3)*

According to Sébastien Rigali, a molecular microbiologist at the Centre for Protein Engineering—CIP (InBios/Faculty of Science) of the University of Liège, there is a lot of archaeological evidence of its use as an anti-infectious agent, mainly in the Swiss and Austrian Alps.

Rigali's laboratory decided to study the microbial flora of moonmilk out of simple curiosity, in order to find a rationale for its use in human and animal therapy.

The first step was to go into the field, into the caves of the Condruzian plateau, to find deposits of moonmilk and to isolate filamentous actinobacteria – the bacteria that are champions in the production of antimicrobial agents. The researchers found many of them, both in number and diversity.

Analysis of the genomes of the isolated bacteria revealed that they participate together in the constitution of a vast subterranean pharmacy. This microbial consortium is capable of producing hundreds of antibiotics, some

Analysis of the genomes of the isolated bacteria revealed that they participate together in the constitution of a vast subterranean pharmacy.

of which are used daily today. But what is probably the most fascinating is that the vast majority of the biosynthesis genes involved in bioactive compound production found in these bacteria are cryptic – that is, it is not possible to associate a known molecule with them.

This means that these strains constitute a real reservoir for the discovery of new bioactive molecules. "Statistically, it's as if all you have to do is bend over and pick up and identify a new antibiotic, antifungal or even anticancer agents," Rigali said.

The reality, however, is much more complex. These molecules do not lend themselves easily to being grown under laboratory conditions. Extracted from extreme development conditions and oligotrophic, it is difficult to keep them 'alive' once they are brought to the surface. Moreover, their development in the lab is often not optimal, as the media generally used is too rich and therefore, to a certain extent, toxic, compared to the nutritive condition found in their original ecological niche.

To deal with these issues, Rigali and his team collaborated with other laboratories and with the company HEDERA-22, a ULiège spin-off. Recently, they were able to figure out the first cryptic compound.

"It is an antibiotic named 'lunaemycin' and produced by a new bacterium *Streptomyces lunaelactis*, lunaemycin and lunaelactis referring to the ecological niche from which this molecule and this bacterium originate, the moonmilk. The lunaemycin has interesting properties, particularly active against Gram-positive bacteria that are multi-resistant to antibiotics," Rigali said.

Other criteria still need to be evaluated to know whether this new antibiotic will one day be exploitable, but lunaemycin represents a first shot in the submerged part of the 'moonmilk iceberg', which contains many molecules that are still unknown to date and which could have similar properties.

The lunaemycin is also this first 'proof of concept' that demonstrates the capacity of research teams to discover new molecules, from the first contortions in the galleries of the Walloon caves to their structural resolution and the determination of their biological activities.

Rigali noted that all the learnings from this research have been transferred to the spin-off HEDERA-22, whose objective is to exploit the potential of the bacteria isolated from moonmilk and to reveal the most promising molecules in human therapy, but also in the agro-industrial field.

It's not a home, it's a 'true Ozark Treasure Pool Holler Cave' and it can be yours

The Kansas City Star

BY TJ MACIAS

UPDATED FEBRUARY 16, 2023 4:26 PM

Not exactly cozy — but definitely cool Screen grab from Zillow Anyone who has ever watched the horror film "The Descent" will tell you: Nothing good can come out exploring deep, dark caves. But we're sure there's nothing disturbing about this cave that's landed on the real estate market in Rolla, Missouri.

Yes — real estate market. "Here is your chance to own a true Ozark Treasure Pool Holler Cave," the listing on Zillow.com says. "When you enter the mouth of the cave you will walk along a spring branch running out of the cave past several stalactites and stalagmites you will begin to hear a roar but don't be frightened as you will end your hike at an underground waterfall."

The listing price is a cool $289,000 and it appears worth it thanks to the nippy breeze that flows out of the cave's mouth. And the 80 acres of land above the cave give a new owner a chance to build their dream home — and more — on the property.

"This wooded property has amazing building sites whether you like a private secluded holler or a cleared off hilltop with a view that you can see for miles," the listing says.

"There are 2 year-round creeks that flow through the property one of which is fed by the spring from the cave." It would also give you an opportunity to tell your friends and anyone who will listen "hey, I own a freaking cave."

Read more at: https://www.kansascity.com/news/state/missouri/article272528903.html#storylink=cpy

See It by Glass Elevator
By Evie Carrick
Published on February 12, 2023
www.traveland leisure.com/how-to-see-ruby-falls-chattanoogo-tennesse

How to see the incredible Ruby Falls, inside Lookout Mountain in Chattanooga, Tennessee.

If you're not sure if nature has a sense of humor, consider this: One of the most stunning natural wonders in the U.S. is hidden within another gorgeous American natural landmark. Ruby Falls, the tallest and deepest underground cave waterfall in the U.S. that's open to the public, is set inside Lookout Mountain, which itself is one of the area's top attractions.

Both sites are located in Chattanooga, Tennessee, a southern town known for its rock climbing, biking, and hiking. And while you'll see plenty of people lined up to ride the glass-roofed Incline Railway up Lookout Mountain, the real gem is found inside the peak.

The journey begins with a glass-front elevator that descends 26 stories into the heart of the mountain. At the bottom, visitors will see a series of stalactites, stalagmites, ancient formations, and of course, Ruby Falls, which is set 1,120 feet within Lookout Mountain.

In order to keep the underground cavern well-preserved and visitors safe, all visits to Ruby Falls must be guided. The popular Cave Walk tour offers a faster-paced journey through the cave to the waterfall with pre-recorded audio. There is also a before-hours Gentle Walking Tour with more in-depth information and an after-hours Lantern Tour.

A group of people gathered around Ruby Falls the under ground, in mountain waterfalls in
Those visiting around Valentine's Day this year can book the Romance at Ruby Tour, which takes place Feb. 10, 11, and 14. This romance-focused journey delves into the falls' past. Leo Lambert, who came across the falls in 1928, named the discovery after his wife, Ruby.

If a February visit isn't in the cards, don't worry, Ruby Falls is open year-round and boasts 60-degrees-Fahrenheit average temperatures in all four seasons.

In addition to seeing the underground cave and waterfall, travelers to Ruby Falls can climb the neighboring Lookout Mountain Tower and Blue Heron Overlook for sweeping views of the valley and the Tennessee River. High Point ZIP Adventure, a series of zip lines and a climbing tower, is also situated near Ruby Falls on Lookout Mountain.

Tickets to Ruby Falls' 70- to 80-minute Cave Walk are $25 for adults and $14 for children ages 3 to 12. The two-hour Gentle Walking Tour and Lantern Tour are both $40. Those interested in the Romance at Ruby Tour can book at
https://tickets.rubyfalls.com with rates from $90 per couple. Tickets to Ruby Falls must be booked online, ideally several days in advance.

The earliest human remains 11,000-year-old discovered in northern Britain
http://arkeonews.net/the-earliest-human-remains-11000-year-old-discovered-in- northern-britain/

An international team of archaeologists at the University of Central Lancashire (UCLan) has discovered 11,000-year-old human remains in the Heaning Wood Bone cave in Cumbria, England. The discovery is the oldest human remains ever found in northern BritainThe UCLan team has been able to prove at least eight different people were buried in the cave. Despite the fragmented condition of the human remains, the accompanying artifacts make it likely that these were all deliberate burials.

E.G. Holland excavated the Heaning Wood Bone Cave for the first time in 1958, yielding the skeletal remains of three adults and a juvenile dated to the Early Bronze Age by radiocarbon dating.

Archaeologists returned to the cave in 2016, revealing animal bones such as Bos, Sus, and Canis, stone tools, prehistoric pottery, and beads made from shells.

A recent excavation by Martin Stables uncovered a periwinkle shell bead and human remains dating back 11,000 years to the Early Mesolithic, when Homo sapiens, or modern humans, were the only hominid species still surviving in the British Isles. The team identified 8 individuals buried in the cave, 7 of which have been dated by researchers from the University of Nevada and Pennsylvania State University using radiocarbon dating.

The results show the cave was used for burials at three different periods in the prehistoric past: around 4,000-years-ago in the Early Bronze Age; approximately 5,500-years-ago in the Early Neolithic; and around 11,000-years-ago during the very early part of the Mesolithic period.

They discovered a date on one of the shell beads showed it was around 11,000-years-old and was likely to have used during a burial.

The shell bead discovered and radiocarbon dated to 11,000-years-old. Photo: Cumbriacrack
Martin said: "I never expected anything like the Early Mesolithic connection in my wildest dreams. After six years digging it's all ended up in a place I never expected it to get to. I can't wait to hear all the final results, it's staggering so far, difficult to imagine what it would have been like around here over 11,000-years-ago."

Earlier human remains are known from southern England and from Wales, but the destructive effect of past glaciations means that such finds are rare in northern Britain. Before this discovery, the 'earliest northerner' was a 10,000-year-old burial from the nearby Kent's Bank Cavern discovered in 2013.

UCLan's Dr. Rick Peterson added: "Cave burials like this are well known from some periods of British prehistory and the Heaning Wood burials are an important addition to our knowledge of funeral practices. Together with the slightly later dates from Kent's Bank Cavern, it shows, as people re-occupied the land, how important the whole of Britain was to this process."

The site is still being researched, and a detailed study of what happened to each individual after they were placed in the cave is still being conducted.

How karst caves can be used as a terrestrial simulation platform to test and design human bases in lunar lava tubes

by Beijing Institute of Technology Press

How karst caves can be used as a terrestrial simulation platform to test and design human bases in lunar lava tubes (phys.org)

Karst cave simulation platform. Credit: Space: Science & Technology (2022). DOI: 10.34133/2022/9875780

If human beings want to survive on the other planets for a long time, they must first find or set up a safe, stable, and long-term shelter. Lunar lava tubes are geological structures on the moon discovered in recent years. They take the form of hollow pipe-shaped caves formed on the surface of the planet by volcanic activity.

Because a lunar lava tube has a hard basalt roof, its internal environmental factors such as temperature changes, radiation doses, and the probability of being hit by meteorites are relatively limited. As such, it offers in theory an ideal human lunar habitat. Until now, more than 300 potential cave entrances have been identified on the moon. The "skylights" they display are the result of a kind of pit caused by the active lava tube collapsing.

In a new article published in Space: Science & Technology, the research team led by Gengxin Xie and Linli Guo has discussed the feasibility of using lunar lava tubes for human habitation, proposed the idea of using the Earth's karst caves to simulate extraterrestrial lava tubes, selected caves in Chongqing as the simulation site, and demonstrated the feasibility in terms of both structural and environmental aspects. They hope to promote the development of related research on extraterrestrial bases through simulation experiments.

The rationality of using a lunar lava tube to establish a lunar base

The external energy required by the closed system involved in the operation of a human lunar base mainly consists of three parts: human respiration, plant photosynthesis, and internal temperature control.

The researchers showed that the minimum energy consumption for maintaining a lunar base hosting 8 astronauts deep inside a lava tube cave is about 145.5 kW in a semicircular tunnel cave with an area of about 8,000 square meters and a height of 50 meters. At this stage, a lava tube is the best choice for establishing a lunar base.

Compared with the lunar surface, lunar lava tubes have the advantages of small radiation and less extreme conditions, more suitable for a human lunar base.

There is a variation in depth of radiation intensity of different particles in the lunar soil. This intensity at 6 m below the lunar surface is almost zero. Even at a depth of less than 1 m, solar flares and solar particle events (SPE) do not affect the interior of the lava tube.

A suitable tube should not be broken down by meteorites. This means that the possible influence radius of the meteorite must be smaller than the tube's burial depth. According to experimental and simulation studies, the safest condition the scientist have now calculated is the ratio of target thickness-to-crater diameter. That is, if it is smaller than 0.87 then a "skylight" (crater) will appear.

There is very little moon dust inside lunar lava tubes. Moon dust is the charged dust formed by small debris on the lunar surface under the action of the solar wind. Being charged, they can be adsorbed on equipment. In addition, moon dust is abrasive, and very harmful to people and machines. But the interior of lava tubes is a permanent shadow zone, generally inaccessible to the solar wind, where charged moon dust is hardly produced.

The moonquakes observed by the lunar seismic network between 1969 to 1977 varied in where, how often and how severely they shook the moon. The fact that the lunar lava tubes has survived on the moon for so many years suggests that its structure is stable enough to withstand the effects of moonquakes. This is a natural advantage over bases built on the moon's surface.

Intensity changes of various particles with depth. The figure shows the total particle mass, protons, neutrons, and other particles including electrons, positrons, protons, mesons, muons, k-mesons, and deuterons. Credit: Space: Science & Technology (2022). DOI: 10.34133/2022/9875780

Using a karst cave to simulate lunar lava tubes

Karst caves refer to the underground space formed by the dissolution, invasion, and collapse of soluble limestone under certain conditions. Taking karst caves in Chongqing as an example, the researchers show that Earth karst caves can be considered as good analogs of lunar lava tubes under three aspects: structure, environment, and insulation.

Structural aspects: Karst caves and lava tubes have different formation mechanisms and environments, but they are comparable in size. They are both curved semicircular caves. The space it provides can meet the research needs at this stage.

Environmental aspects: Karst caves and lava tubes have relatively mild environments. The temperature range in the cave is between 18 and 25°C. The mild temperature inside the lava tube can reduce energy consumption in terms of heat control. In terms of acidity and alkalinity, the lunar lava tube is mainly composed of lunar basalt. The rock composition is mainly composed of iron and titanium compounds. The hydrolysis product is weakly alkaline. The karst cave is mainly composed of carbonate rock, and most of the hydrolysis product is hydrogen carbonate, also weakly alkaline. In terms of air quality, one advantage of the lunar lava tube is that there is almost no moon dust. For karst caves, they is enough ventilation, oxygen and carbon dioxide contents are within the normal range, and no toxic and harmful gases are detected.

Insulation aspects: Karst caves and the lava tubes can provide an environment relatively isolated from the outside world. The lunar lava pipeline is protected by the weathered layer, and the internal and external environments are isolated. Due to the lack of conductive media, the internal environment is very independent. As for karst caves, since they have almost no communication with the external environment during their formation process, they are rarely affected by the external environment.

The researchers intend to use karst caves to simulate the internal environment of extraterrestrial caves and isolate them from the external environment by sealing the caves. The cave experiment is divided into two parts. The first part involves automatic construction technology in the cave and in situ utilization technology.

The other part is the artificial ecosystem experiment. Regarding energy supply and light, they plan to use light pipes to introduce sunlight into the ecological laboratory and provide it for crop growth and develop a set of automatic control energy control systems.

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
March 10, 2023
There will be a virtual meeting.
See you online!

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