



**Tar Heel Gem & Mineral Club, Inc.**

10609 Chelsea Drive  
Raleigh NC 27603

Cyndy Hummel – President  
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richard60green@yahoo.com  
(919) 848-1085

**We're on the Web!**  
See us at:  
[www.tarheelclub.org](http://www.tarheelclub.org)

**Program & Refreshments**

REFRESHMENT SCHEDULE:

Coordinator: Loretta Turcotte  
[rosevilla@nc.rr.com](mailto:rosevilla@nc.rr.com)  
(919) 263-8523

October TBD

PROGRAM SCHEDULE:

October Grab Bags AND (short) Program  
November Field Trip General Safety Session,  
Elections & Thank You from The  
Club

Remember, the club will reimburse you for up to \$85 (bring your receipts to the treasurer).

**October B-Day Members**

- Gerald Beck
- Brion Bromead
- Rachelle Brundage
- Brian Gray
- Larry Jackson
- Dexter Mills
- Walt Milowic
- Joe Moylan
- Alan Santala
- John Sieminski
- Melissa Whitfield

**October Treasurer's Report**

October Treasurer's Report

Jul. Ending /	
Aug. Beginning Balance	\$ 737.78
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Deposits (+)	
From CD	\$5,000.00
Checks from auction	\$2,354.00
Refund from SFMS	\$241.00
Cash from auction	\$716.00
Members dues	\$145.00
-----	
Sub total	\$8,456.00
-----	
Checks Written (-)	
Rocks for drawings	\$475.00
IMP (printing)	\$106.22
Wildacres (Member Prize)	\$480.00
-----	
Sub Total	\$1,061.22
-----	
Aug. Ending /	
Sep Beginning Balance	\$8,132.56
-----	
Deposits (+)	
N/A	
-----	
Sub total	\$0.00
-----	
Checks Written (-)	
Deposit for show	\$2,200.00
Rocks for raffle	\$400.00
Newsletter	\$106.22
Stamps	\$188.00
Facetron repair	\$205.00
Meeting food	\$85.00
Truck - haul auction items	\$50.00
-----	
Sub Total	\$3,234.22
-----	
Sep Ending /	
Oct. Beginning Balance	\$4,898.34



Membership applications may be mailed to:

Tar Heel Gem & Mineral Club, Inc.  
Attention: Treasurer  
10609 Chelsea Drive  
Raleigh, NC 27603

## Tar Heel Gem and Mineral Club, Inc. - September Meeting Minutes

Tuesday, September 20, 2016

No Minutes for September

Respectfully Submitted

Melissa Whitfield,

Secretary, Tar Heel Gem and Mineral Club, Inc.

### Prez Sez

Continued from Page 1

Please bring identifiable rocks to create the bags. Make these bags special as kids and adults enjoy the mystery of the grab bag. Also bring flats in which to place the bags. A sample bag will be shown to all and then the crowd will be let loose!

Nominations will be accepted during our business meeting.

We do need a refreshment volunteer. Please contact the coordinator for this - Loretta.

Ms. Shirley Green is stepping down from the position of Field Trip Chairperson. Let us all please thank her for doing

### The Secret Lives Of Rocks

Continued from Page 1

you are experiencing about 0.05 megapascals of pressure. At 1 kilometer deep in the Earth, rocks are experiencing an average vertical pressure of 25 megapascals *and* an average horizontal pressure of 10 megapascals. And those pressures double with every additional kilometer of depth. <sup>2</sup> That's what we're talking about. Rest assured, this is hard work. There is no vacation. There is no 10-minute smoke break.

Everything is always pressing on everything else. You can even think of the whole Earth this way — like a 3-D, spherical puzzle held together by its own tension. But here's the thing about those puzzles. When you see them at the toy store, they're always up on a high shelf, out of the reach of little fingers that might try to pop out a piece ... and change the balance of pressure.

Humans, as it turns out, are constantly doing just that. We hollow out mines, we bore tunnels for subways, we run sewer lines and pipes full of cables. And all of those things affect the pressures experienced by the rocks and the pressures they produce on other rocks.

Understanding what happens when lithostatic pressures meet a tunnel boring machine is critical, but the people who study rock mechanics — that is, what rocks do when we humans start blasting our way through — say this isn't easy, and it's getting even harder. We do more underground excavation now than at any other time in human history. That excavation is more important than it's ever been to human society.

And it's producing problems that are harder than any we've ever had to solve, including what might be the ultimate rock mechanics problem — creating the caverns where spent nuclear fuel will be squirreled away for hundreds of

this job for all these years. I know the club members have greatly appreciated all her hard work and effort as Field Trip Chair. If anyone is willing to take on this task, contact Shirley and she can guide you in this endeavor. Thanks once again, Shirley.

I hope to see many of you at the meeting.

Cyndy Hummel

President,

Tar Heel Gem and Mineral Club, Inc.

thousands of years. After decades of existing mostly as conceptual political footballs, several facilities designed to be permanent nuclear repositories are close to coming online, including ones in Olkiluoto, Finland; Forsmark, Sweden; and Bure, France. All three are expected to be operational by 2025. All three are highly dependent on engineers knowing what rocks do. If those rocks crack in the wrong way, nuclear waste could leak out.

You don't need to get that exotic, though, to see the importance of rock mechanics in modern life. Just think about the city you live in. "When we've got really dense population centers, the increased density increases the heaviness of the local footprint," said Leslie Gertsch, professor of geosciences and geological and petroleum engineering at the Missouri University of Science & Technology. The weight of a big city is enough to change the behavior of the rock underneath. And that effect is magnified by the city's underground infrastructure — tunnels, tubes and pipes. Especially when the pipes leak. In 2007, a 330-foot-deep sinkhole swallowed three people and several houses in Guatemala City. Water from the city's aging sewer lines had eroded out soil and soft rock. Eventually, the weight of the city above forced the whole thing to collapse into a straight-walled pit that looks more like an error in satellite image data than a natural disaster.

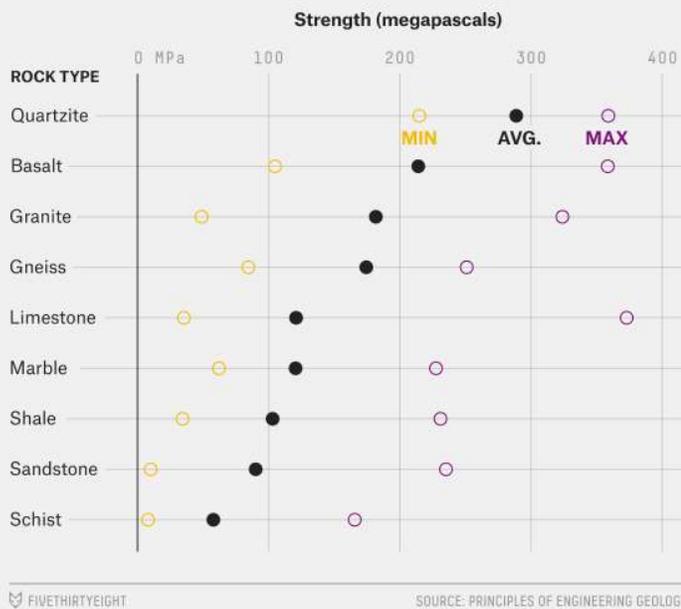
In other situations, collapse is exactly what engineers are trying to create. A method of mining called block caving relies on it. Miners build funnels and tunnels below a big deposit of ore and then blast apart the bottom of the deposit. That rock crumbles and falls into the funnels for easy collection, just like M&Ms falling out of a quarter candy machine. Meanwhile, the rock above has been destabilized. It's still being pushed on from the top, but now there's nothing pushing back below.

Slowly, *it* starts to crack and collapse, as well, falling, bit by bit, into the funnels.

Whether the venture is profitable or perilous, we know how rock collapses because of decades of lab experiments that test the strength of rocks under various kinds of pressure. The most common is the uniaxial compression test. Scientists drill out a cylinder of rock material, Gertsch told me. “Then we just squeeze the two ends together and see how much compressive force it can take,” she said. The trial ends when the cylinder of solid rock goes “poof” and shatters in a cloud of dust and giggling scientists. ([At least, that's how it works on YouTube.](#))

### The strength of rock varies widely

Uniaxial (in one direction) strength of different rock types



The data from those tests is used to build elaborate mathematical models that predict the behavior of certain kinds of rock under specific conditions. But squeezing granite like a stubborn zit tells us only so much. These tests have much to say about what a cylinder of rock does, but reveal significantly less about the behavior of rock as a massive unit. They also leave important uncertainties about how different types of rock masses behave as underground neighbors, said Charles Fairhurst, professor emeritus of civil and environmental engineering and geo-engineering at the University of Minnesota. For instance, you might have a nice, solid piece of granite, Fairhurst said. But if there is softer rock above it and below it, then the granite is carrying a bigger share of the weight — the same way your bones support more of your weight than your muscles. Dig a tunnel through the granite, and you could cause fractures that destabilize the whole thing.

It's also not enough to just know the strength of granite — you have to know the strength of the specific granite at the

specific location where you're digging, said Andrea Lisjak, an engineer with Geomechanica, a company that does rock mechanics simulation and consulting. Finally, Lisjak and Gertsch said the problem of human time versus rock time is crucial. It's one thing to know how a rock fractures in the first day, month or year after you tunnel through it — it's entirely another to know what it will do 500 years later. Or 1,000.

All of these uncertainties play a role in the construction of deep underground nuclear waste storage. These facilities are meant to hold nuclear waste essentially forever. The sites are chosen because they are made up of rock that has been geologically stable for tens of millions of years. But that doesn't mean the rock won't crack. It will. One of the answers to the question “what does rock do?” is, essentially, that it breaks, Lisjak told me. And it's definitely going to break when people start tunneling through it to build a nuclear waste storage facility. The trick is predicting *how* it will crack, and where, and when. Small fractures deep in the Earth aren't a big deal. Big fractures that reach to the surface, or to an aquifer containing our water, are.

Because of the uncertainties, Lisjak told me, making these predictions is much like predicting the effects of climate change — you test different scenarios in the mathematical models and end up with a range of more likely and less likely possible outcomes. There is no single answer. You will never know exactly what is going to happen.

But there is one more type of testing that engineers use to help them get their estimations a little closer to exact. At [18 sites](#) around the world, researchers have built full-scale models of nuclear waste depositories. These Underground Research Labs have all the tunnels, technological infrastructure and engineered barriers that a real depository would have. They're dug into the same kind of rock. They've got everything ... except the nuclear waste. The idea is that these models can be used to improve and verify what happens in the mathematical models. For instance, Lisjak previously worked at the Mont Terri URL in Switzerland. One of the things he did there was drill out narrow tunnels, exactly the diameter of the ones that could someday be filled with canisters of Swiss nuclear waste. As he did that, he monitored the rock around the tunnels — recording the tiny earthquakes that rattled through as pressure shifted around a new hole. Then, they checked to see how well their computer models lined up with what the sensors recorded. “If you can predict what's in the field, that's a good sign,” he told me.

No prediction is ever perfect. But every test helps scientists understand what rock does (and what it will do) a little better. And the more we know about that, the safer we'll be as we dig out bigger, more important projects underground.

*Maggie Koerth-Baker is a senior science writer for FiveThirtyEight. @maggiekb1*

<http://fivethirtyeight.com/features/the-secret-lives-of-rocks/>

## October Field Trip

By Shirley Green

TAR HEEL GEM & MINERAL CLUB

FIELD TRIP NOTICE

Saturday, October 22, 2016

Holly Springs Hanson Quarry

FIELD TRIP DATE	SATURDAY, OCTOBER 22, 2016
TIME:	08:45 am – 1:00 pm (or as directed by quarry manager)
QUARRY OPERATOR	Hanson Aggregates
QUARRY NAME	Holly Springs Hanson Quarry
QUARRY ADDRESS:	7000 Cass Holt Rd., Holly Springs, NC
QUARRY TELEPHONE:	(919) 567-9512
TAR HEEL TRIP COORD	Shirley Green 919 848-1085

IF YOU ARE INTERESTED IN ATTENDING THE ABOVE FIELD TRIP PLEASE REPLY BACK TO **Shirley Green** ASAP WITH YOUR NAME AND TELE # INDICATING HOW MANY WILL BE IN YOUR GROUP.

### NOTES

1. Let **Shirley Green** know ASAP if you are able to attend.
2. Sorry, the plant manager said no one under <18 will be permitted in the quarry.
3. If you bring snacks sure not to simply throw your trash on the ground...I state this cause I have seen this happen before.
4. This is a joint trip with the Cape Fear club and everyone is expected to obey the quarry rules.
5. I have never been to this quarry, so I'm not what sure what kind of minerals can be found there.
6. Remember we are guests.....

### "REQUIRED"

1. Everyone must comply with any and all safety requirements set forth by Hanson Aggregates
2. Everyone must stay away from quarry edges
3. No climbing on rock face's
4. Everyone must have and wear a hard-hat
5. Everyone must have work boots with steel toe.

## October Birthstone - Opal

### OCTOBER BIRTHSTONE OPAL

Opal is the birthstone for October. — It is a precious stone which has in it the bright fiery flame of a Carbuncle, the pure refulgent purple of an Amethyst, and a whole sea of Emeralds spring glory, or virescence, end every one of them shining with incredible mixture, and very much pleasure: so that this can't easily be counterfeited or adulterated as other jewels may.

**Note:** Sorry but do not show up wearing sneakers and expect to go down into the quarry.

6. Everyone must have safety goggles or glasses.
7. Everyone must have a safety vest.
8. Everyone must sign in at the quarry office and signoff on the safety rules

### EXTRA STUFF:

1. Feel free to bring buckets, picks, hammers, shovel, hand cart, rags, crow bar, etc.
2. **Sorry**, but children under 18 years are not permitted per the quarry manager
3. Bring a change of clothes in case you get wet.
4. Dress according to the weather, expect it to be cold. It is always easier to take clothes off then put stuff on that you don't have.
5. Camera
6. Magnifying glass or eye loop
7. Food, snacks
8. Drinking water to stay hydrated
9. Ask for help to load your take home rocks, as we don't want to see anyone hurt their back
10. Please be prompt as the quarry operator is coming in on his day off to host our club.
11. Be sure to thank the quarry operator upon leaving as we want to leave a good impression so as we can come back.
12. Temperatures in the quarry may be excessive **MAKE SURE** you bring plenty of fluids. It also doesn't hurt to bring a small cooler with water to dip a face towel into for cooling.
13. Be sure to arrive around 08:45 AM so as we can be safety briefed.
14. It will be hot, scorching, frying, boiling, etc. bring a closed bucket of water and a rag so as you can cool yourself.....take it from me there is nothing like wiping your face down with water. J
15. Have Fun and Rock On.....

### Directions

To: **Holly Springs Hanson Quarry, 7000 Cass Holt Rd., Holly Springs, NC**

### HAVE FUN !

Boeticus says of Opal, that it is the fairest and most pleasing of all other jewels, by reason of its various colors.

**Cardanus** says that he bought one for 15 crowns, that he took as much pleasure in, as he could do in a Diamond of 50 aureos (Latin – Gold).

### OCTOBER BIRTHSTONE COLOR

In many of Opals do appear **Sky-color**, Purple, Green, Yellow, Red, and sometimes a Black and White or Milky

color; but we must not think that all these colors are severally in the jewel, for break but the Opal, and all the variety of colors do perish; by which it doth appear that the variety of colors in the Opal, arises from the reflection of one or more colors; as sometimes is seen in the Rainbow, and may be experienced in a triangular Crystal, where the alone reflection of the light upon the angles, or corners of Crystal, do in the Crystal produce various colors, which otherwise is diaphanous, perfectly transparent, clear, and without color.



The finest species of Opals emit also the yellow of the Topaz and the blue of the Sapphire. Opal is, in one word, a natural prism, which, like the soap bubble or the three cornered glass, de-compounds the sunbeam into its elements. About the cause of this decomposition «doctors disagree». Brewster's theory seems the most plausible, viz. that this cause is the existence of fissures and cracks in the interior of the mass.

### OCTOBER BIRTHSTONE NAMES

Professor Nicol notices nine varieties of Opals, all possessing more or fewer of the same general characteristics, Our space will permit our touching; on but one.

We may premise, that the name of Opal is derived from the Greek «ōps», eye-the Greeks, who highly valued Opal, believing it to have the power of strengthening the eye. We may add here, to save a fresh reference, that the Greeks fancied it had the effect to conciliate universal good will to its possessor, and therefore named Opal also «pαιδερῶς», i. e. love of children. In the «Apocalypse», Saint John compares the Celestial City, as a whole, to Opal, as exhibiting all colors at once.

The finest of the Opal species is called the precious or noble Opal. Nicols names various parts of the East as producing it, Recent writers contradict him and say that

Hungary, Saxony, [the Faroe Islands](#), and South America are its native localities. Opal is found in small gangs and nests of the volcanic porphyry formation.

### OCTOBER BIRTHSTONE MAGIC & SYMBOLISM

It is reported of Opal, that it sharpens the sight of the processors of it, and cloudeth the eyes of those that stand about him, so that they can either not see or not mind what is done before them: for this case Opal is asserted to be safe patron of thieves and thefts; as it is related in *Lapidario*.

### OCTOBER BIRTHSTONE AS A MINERAL

Opal is used to be found near Freiberg in Saxony, but is at present met with only near Kasehau in [Upper Hungary](#).

From want of hardness and of crystalline form, the Opal can scarcely be ranked among the gems. It has, however, in all ages and countries been very highly esteemed.

Among the eastern nations at the present day the Opal ranks higher than it does in Europe; nor is this to be wondered at. From the general seclusion in which not only women, but even men of rank, pus the greater part of their time, the pleasure derived from the possession of gems must depend in a great measure on their intrinsic beauty, on the degree in which they are capable of gratifying, without satiating the taste or vanity of their owners.

In Europe, on the contrary, (with the exception of a few amateurs), gems are considered as mere ornaments being admired less on their own account than for the general homage that they receive from others. Hence the brilliancy, the far-darting luster of a jewel, the-distance from which it con-centers the gaze of by standers on its wearer, is its supreme, merit among us.

The color and fire of the Opal require a near inspection for a full enjoyment of, their beauty, which undoubtedly greatly detracts from its Worth as an ornament.

Fine Opal are extremely rare, and are generally used for ear-drops and rings; sometimes, however, they are set with group and clusters of other gems. When plates of porphyry (The matrix of Opal) can be, procured sufficiently rich in veins of Opal, they form a superb material for snuff-boxes, and similar articles.

Opal is, upon die whole, too soft and fragile to endure the ordinary process of the lapidary; it requires the utmost management in working, and a, moment of inattention is sufficient to destroy its beauty. It is always cut into a cabochon.

## UPCOMING SHOWS

**Nov. 18 - 20, 2016: Columbia, SC** - The Columbia, SC Gem & Mineral Society will hold its 49th Annual Gem, Mineral, & Jewelry Show. Jamil Temple, 206 Jamil Rd., Columbia, SC 29210. Jewelry, beads, loose stones, fossils, minerals, gold, silver, & tools for sale, Geodes sold & cut; Club member's rock collections on exhibit & lapidary demonstrations. Lots of fun for the whole family. South Carolina amethyst on display. Sponsored by The Columbia Gem & Mineral Society. Hours: Fri. 10:00 - 6:00; Sat. 10:00 - 6:00; Sun. 12:00 - 5:00. Admission: \$5.00 for adults, Sixteen & under free with adult. All military & their dependents free. Contact: Sue Shrader 803-736-9317; ashnader@mindspring.com. Dealers; Sharon Sterrett 803-356-1472; ssterrett@sc.rr.com. <http://www.cgams.org>

**Nov. 25 - 27, 2016: Salem, VA** - Roanoke Valley Mineral and Gem Society annual show; Salem Civic Center, 1001 Roanoke Boulevard, Salem, Va. 24153; Friday, Saturday, and Sunday, November 25, 26, 27. Hours, 2pm – 7pm Friday; 10am – 6pm Saturday; 12pm – 5pm Sunday.; Admission \$5.00 good for all 3 days; Door prizes, Fluorescent mineral display and new this year a video room showing videos about rocks and minerals. Door prizes, grand prize drawn Sunday at 4:30pm; Contact: Mark Hodges [markh5@cox.net](mailto:markh5@cox.net)

**March 31 - April 2, 2017: Raleigh, NC** – 41<sup>st</sup> Annual Capital Area Gem & Mineral Show. Tar Heel Gem and Mineral Club, Inc. Kerr Scott Building, NC State Fairgrounds, Raleigh, NC. The show is sponsored by the Tar Heel Gem & Mineral Club and includes 29 dealers. The Hospitality area sells grab bags with mineral specimens. Buy a rock at the Geode booth and be the first to see what is inside. The on-going Silent Auction has new items every hour. Dealers provide minerals, fossils, finished jewelry, gemstones, findings and beads for sale.. Hours: Fri 3-8; Sat 10-6; Sun 10-5. Admission: Free and Free Parking. Contact: Cyndy Hummel; 919-779-6220; [mchummel@mindspring.com](mailto:mchummel@mindspring.com); [www.tarheelclub.org](http://www.tarheelclub.org);

## Vugsites

The following are some links to Web-Sites that may interest some of our members:

<http://www.tarheelclub.org> / <https://www.facebook.com/tarheelgemandmineralclub/> These are the official sites for the Tar Heel Gem & Mineral Club. I would strongly urge all members to check them out on a regular basis.

<http://www.amfed.org> / <http://www.amfed.org/sfms> These are the official sites for the organizing body that the Tar Heel Gem & Mineral Club is founded under. I would strongly urge all members to check them out on a regular basis.

[http://www.amfed.org/sfms/lodestar\\_newsletter.html](http://www.amfed.org/sfms/lodestar_newsletter.html) The SFMS Lodestar Newsletter

<http://www.carolinageologicalsociety.org/CGS/Home.html> This site provides numerous downloadable field-trip guide books, maps, and charts of the Carolinas. It will prove to keep any avid rock hound busy for years. Great Site!

[http://www.ncminerals.com/ncmineralswebsite\\_files/page0011.htm](http://www.ncminerals.com/ncmineralswebsite_files/page0011.htm) And while we are on the subject, try this link. Its titled: Links of Interest to Rock hounds in NC. It will take you to a list of links for North Carolina gems and minerals.

<http://www.rocksforkids.com/> Just like the name says, a nice place to steer the younger members.

Information & photographs of over 6300 specimens from the Glenn & Martha Vargas Gem & Mineral Collection.

<http://www.rockhoundlounge.com> Scott Laborde, a club member maintains his own web site that might be of interest to people collecting in and around Wake County.

[http://www.msnbc.msn.com/id/29726500/ns/technology\\_and\\_science-science](http://www.msnbc.msn.com/id/29726500/ns/technology_and_science-science) This site highlights a half dozen of the most recent significant fossil finds.

<http://appmodo.com/13971/mole-quest-for-the-terracore-gem-app-review-for-the-iphone-and-ipod-touch/> If you have an iphone or an ipod touch, this rock-hounding may be the game for you.

[http://diamonddanpublications.net/index\\_files/page0009.html](http://diamonddanpublications.net/index_files/page0009.html) Diamond Dan's Mini Miner's Monthly

I would like to encourage all members of the THG&MC that maintain their own presence on the internet to send me a link to their site to be published in future Vugsites so that other club members may learn and enjoy the craft, the art, the interests that many of us have in common.

Park in the Cates Ave. Parking Deck off Jensen Dr. Enter Thompson Building directly across from the parking lot.

**Our Next Meeting is  
October 18, 2016 @ 7:30PM  
Thompson Building / NCSU Campus.**

***About Our Organization...***

The Tar Heel Gem and Mineral Club, Inc. was formed in 1974 as a nonprofit educational organization for people who enjoy the lapidary arts, earth sciences, and related subjects. The main objectives of the club are to investigate, preserve, and share knowledge of rocks, minerals, and precious stones, and to promote interest in mineralogy, paleontology, earth sciences, and lapidary techniques, among club members and among the general public. The club pursues these goals through publications, meetings, lectures, field trips, exhibits, demonstrations, and other activities.

**Come and be a part of the Fun!**



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