

FORSYTH GEM AND MINERAL CLUB, INC.

Nature's Treasures

March 15, 2018

In Memorial: Dick Hartz and Joe Gutierrez

***** PUBLIC VERSION *****



MEETING: The next meeting of the Forsyth Gem and Mineral Club will be held at **7:30 PM, March 15, 2018**, the third Thursday of the Month, at **Vulcan Materials Company's Training Center, 4401 N. Patterson Ave., Winston-Salem, NC.**



PROGRAM: The program for the March meeting speaker will be ex-club-member, ex-Vulcan-Geologist Alex Glover! Alex's presentation will be entitled, "Adventures of a professional Industrial Minerals Geologist", and will cover the vast trips/experiences of his career. Knowing Alex as many of us do from his time with the Forsyth Club, this should be both a fun and interesting talk!



Refreshments: Refreshments for the October meeting will be provided by **the Goodes and McGilvarys**. The Club will provide cups and napkins and ice for the refreshments. Those volunteering to provide refreshments need only provide sufficient drinks and snacks, such as, cookies, cakes, crackers, or donuts *and ice*

.2018 Refreshment List

January	Fulchers and Bakers	July	*** Two Needed ***
February	Myers and Gaskills	August	Picnic
March	Goodes and McGilvarys	September	Show
April	Whickers and Becks	October	Schlottmans + One Needed
May	Brouhles and McGilvarys	November	Marions, Reeds
June	*** Two Needed ***	December	Holiday/Show Dinner

If you enjoy the refreshments, please be prepared to take a turn in furnishing them. NOTE: if you volunteer to bring refreshments, please do so. If you are unable to attend for any reason, contact Vickie or Al Gaskill prior to the meeting so that alternate arrangements can be made.

Note: Due to equipment issues in the meeting area kitchen, it will be necessary for the refreshments providers to also bring ice for the drinks, at least for the next couple of months.

Dates To Remember:

March 16-18 – Magma show, Arden NC

March 23 – 25 – Hickory Gem Show

April 6 -8 – Raleigh Gem Show

August 18 - (tentative) – Annual club picnic

September 7-9 – Annual Gem, Mineral, Jewelry and Fossil Show

December 20 - (tentative) – Annual Show Celebration and Holiday Dinner



DON'T FORGET YOUR NAME TAGS



Roster Delay

Due to some timing and production issues, the information for the annual club roster was not completed in time to get it into the March newsletter, so the roster will be delayed until the April newsletter.



Members Lost

This is a time of great sadness for FGMC. Over the space of just a few weeks we have lost two of our long-time stalwart members.

On February 16 **Dick Hartz** passed away at the age of 98. One of the longest tenured members of the club, Dick also served as the club treasurer for many years. He was also noted as being one of the hardest workers at the annual club show, and his cabbing demos were always a major hit. Dick's high activity level often belied his age, and he was very active into his mid-90's when an auto accident and subsequent health issues finally slowed him down. He will be greatly missed, both by FGMC members and by a broad range of others.

Following quickly on the heels of that was word that **Joe Gutierrez** also passed away on March 6 at the age of 91. Joe was another long-term member of the club. He was also a Vulcan geologist for many years and served as the liaison between Vulcan and the club. Joe was also instrumental in getting the geology museum established at Vulcan Quarry and let many school classes, scouts, and other youth groups through the facility. The museum was named for him and his efforts in community relations and education.

Health issues have limited both of these men in attendance over the last couple of years, but they will leave major lasting impacts on the club and the members who knew them. It will take a lot of effort for the club to continue to live up to the standards that they set.



Club Field Trip

Note: FGMC Field Trips are for club members and their families only. Liability issues mean that these trips cannot be attended by the general public unless otherwise noted.

The "field trip committee" had a meeting at Jeff Schlottman's house on Thursday, Feb 22. Plans for trips for the coming year were worked on.

For March the club field trip will be to **Graves Mountain** (Georgia). This is a well-known southeastern location, and has produced numerous minerals such as rutile, kyanite, lazulite and turgite (iridescent hematite). More information/directions/times will be communicated at this month's meeting, on Thursday, March 15th. Car-pooling is recommended and can be arranged at the meeting. For those not able to make the meeting, please reach out to either Jeff Schlottman or Charlie Wicker for more information.



Inclement Weather Procedure

We have already had an early taste of winter, with the main season just around the corner. With it comes chances for bad weather for the next few months, so it is time to review the procedures to be followed in case of bad or threatening weather on any of the event or meeting dates.

If inclement weather is a possibility, plans are to try to make a go/no-go decision by the day before the meeting. If the decision is made to cancel, an email alert will be sent out, as well as a notice posted on the club web page. Members who do not have email or internet capability should call one of the officers.



New Vulcan Contact

At the February meeting we met with a new contact with Vulcan Materials. Denise Hallett is their Government & Business Relations Manager. She is also part of the team that currently handles the museum. She can be contacted to arrange trips for school groups, scouts, and others to the museum. Contact her through email (hallettd@vmcmail.com) or by phone at 336-744-2919.

We are looking forward to possibly working with her on other projects for the museum.



Upcoming Shows

March 16-18—ARDEN, NORTH CAROLINA: Annual show; M.A.G.M.A., Camp Stephens; 263 Clayton Road; Fri. 9-5, Sat. 9-5, Sun. 10-4; Free Admission; Numerous indoor and outdoor vendors specializing in gems, minerals, fossils, meteorites and artifacts from North Carolina and around the world. ; contact Richard Jacquot, PO Box 542, Leicester, NC 28748, (828)-779-4501; e-mail: rick@wncrocks.com ; Web site: www.americanrockhound.com

March 23-25: HICKORY NC – Unifour Gem, Mineral, Fossil, and Jewelry Show – Hickory NC – Fri-Sat: 9 AM – 6 PM, Sun: 10 AM – 5 PM - Hickory Metro Convention Center, 1960 13th Ave Drive SE, Hicory, NC – hosted by Catawba Valley Gem & Mineral Club – Theme: "Treasures in Our Back Yard, Gems and Minerals of the Catawba Valley" - Admission is \$5.00 which is good for all three days. Children 12 and under are admitted free. – for more info see web site: <http://cvgmc.com/SpecialEvents.html>

April 6-8—RALEIGH, NORTH CAROLINA: Annual show; Tar Heel Gem & Mineral Club, Raleigh, NC; NC State Fairgrounds, Blue Ridge Rd, Kerr Scott Building; Fri. 3-8, Sat. 10-6, Sun. 10-5; Free Admission; National Show - Host of American & Eastern Federation Meetings. Club areas of Demonstration of jewelry making, gem trees, faceting, cabbing, Hospitality with grab bags, t-shirts, door prize tickets, membership, Geode area with sales and cutting of purchased geodes, Silent Auction area for children and adults with minerals and jewelry.; contact Cyndy Hummel, 10609 Chelsea Dr, Raleigh, NC 27603, (919)-779-6220; e-mail: mchummel@mindspring.com ; Web site: <http://tarheelclub.org>



Reviewing: Zircon

From Geology.com/minerals

Used as a gemstone for over 2000 years. Today it is the primary ore of zirconium.

What Is Zircon?

Zircon is a zirconium silicate mineral with a chemical composition of $ZrSiO_4$. It is common throughout the world as a minor constituent of igneous, metamorphic, and sedimentary rocks.

Zircon is a popular gemstone that has been used for nearly 2000 years. It occurs in a wide range of colors and has a brightness and fire that rivals those of diamond. Colorless zircon is sometimes used as a lower-cost alternative for diamond. Zircon should not be confused with cubic zirconia, which is a man-made material.

Zircon is present in most soils and clastic sediments. Zircon-rich sediments are mined and the recovered zircon is used to produce zirconium metal and zirconium dioxide. These are used in a wide variety of manufactured products and industrial processes.

Geologic Occurrence Of Zircon



Zircon is a primary accessory mineral in most granitic rocks. It is also present in gneiss and other rocks derived from the metamorphism of zircon-bearing igneous rocks. Zircon is so common and widely distributed across the rocks of Earth's surface that it could be considered to be a ubiquitous mineral. However, zircon is usually not noticed in rocks and sediments because of its very small particle size. Grains of zircon over a few millimeters in size are rare - they are usually under one millimeter in size. It is one of Earth's most common but most overlooked minerals.

Zircon is highly resistant to chemical alteration and abrasion. When rock units containing zircon are weathered and their sediments are eroded, enormous numbers of tiny zircon crystals are dispersed. These can persist in soils, sediments, and sedimentary rocks for millions - even billions - of years. They can survive several cycles of uplift, weathering, erosion and deposition.

Some of the largest crystals of zircon are formed in pegmatites, carbonate igneous rocks known as carbonatites, and in limestones altered by hydrothermal metamorphism. These large zircons are sometimes of high clarity and suitable for use as gemstones.

Physical Properties of Zircon

Chemical Classification	Silicate
Color	Usually yellow, brown, or red. Also colorless, gray, blue, and green.
Streak	Colorless. Usually harder than the streak plate.
Luster	Vitreous to adamantine, sometimes oily.
Diaphaneity	Translucent to transparent
Cleavage	Imperfect
Mohs Hardness	7.5
Specific Gravity	4.6 to 4.7
Diagnostic Properties	Hardness, luster, specific gravity
Chemical Composition	ZrSiO ₄
Crystal System	Tetragonal
Uses	Ore of zirconium metal, ore of zirconium dioxide, whitening agents, white pigment, gemstones, radiometric dating.

Zircon as a Gemstone

Zircon has been used as a gemstone for over 2000 years. Its very high dispersion and refractive index give it a brilliance and fire that rival those of diamond. For that reason, colorless faceted zircon has been used as both a popular and fraudulent substitute for diamond.

Gemologists and many knowledgeable jewelers are able to distinguish zircon from diamond with a quick examination. To do this they look into the stone, through the table facet, and focus on the pavilion facet junctions, with a 10x loupe. The pavilion facet junctions should appear as double-images caused by zircon's double-refraction. Diamond is singly refractive and will not show doubling of features within the stone. This same test can be used to distinguish zircon from cubic zirconia.



Zircon is a popular gem because it is available in a variety of pleasing colors. Most natural zircons are yellow, red, or brown. Heating and irradiation can be used to produce colorless, blue, green, and many other zircon colors. Blue is the most popular zircon color. About 80% of the zircons sold today are blue.

Although it is not as durable as diamond, zircon has good physical durability as a gem. It has a hardness of 7.5 and imperfect cleavage. That combination makes it suitable for most gemstone uses that include rings, earrings, pendants, brooches and other jewelry. Some zircon, especially gems that have been heat treated, can be brittle. The facet edges of these gems are susceptible to nicks and chipping.

Zircon Damage in Tanning and Nail Salons

Most blue zircon sold in jewelry today is produced by heat treating brown zircon in a reducing atmosphere to 900 to 1000 degrees Celsius. Some people have damaged these blue zircons by exposing them to ultraviolet radiation in tanning beds or under ultraviolet lamps used to cure acrylic fingernail adhesives. The blue color can degrade to brown with just minutes of exposure. The color of some of these gems have been restored by exposure to low wattage incandescent light. To avoid ruining a nice gem, remove jewelry at tanning and nail salons.

Zircon Mining

Zircon has been mined from stream gravels for over 2000 years. This early mining of zircon was mainly to obtain nice crystals for use as gemstones. Today, most zircon is produced by mining or dredging zircon-rich sediments. These sediments can be in beach, littoral, or alluvial deposits.

Zircon has a specific gravity of 4.6 to 4.7, which is much higher than the typical detrital sediment grain that is between 2.6 and 2.8. This specific gravity difference allows zircon grains to be recovered from the sediments by mechanical separation. Specific gravity separation methods make it possible to profitably recover zircon and other heavy minerals at an ore grade of just a few percent. Zircon is often a coproduct at mining/processing operations where ilmenite and rutile are being mined for titanium. In the United States, zircon is mined in Virginia, Georgia, North Carolina and Florida.

Industrial-grade zircon is mined from land- and marine-based deposits of alluvial origin in many parts of the world. Australia, South Africa, China, Indonesia, Mozambique, India, Ukraine, Sri Lanka, Madagascar, Brazil, Kenya and several other countries were important producers in 2014. These alluvial deposits contain mainly sub-millimeter grains of zircon derived from the weathering of granitic rocks.

Gem-grade zircon has been produced from alluvial deposits in Sri Lanka, Cambodia, Myanmar, and Vietnam for hundreds of years. More recent gem-grade deposits are in Australia, Nigeria, and Madagascar. Deposits mined for gem-grade zircon must contain crystals at least several millimeters in size with good clarity. They are typically derived from the weathering of carbonate rocks and other rock types associated with hydrothermal activity. Some of the best gem-grade zircon crystals are mined directly from cavities in pegmatite.



Zircon, Zirconium, Zirconia and Cubic Zirconia

There is much public confusion between four materials: zircon, zirconium, zirconia and cubic zirconia. Summary definitions of these terms are provided below.

Zircon is a naturally occurring mineral with a chemical composition of $ZrSiO_4$.

Zirconium is a silvery white metal and a chemical element. It has an atomic number of 40 and an atomic symbol of Zr.

Zirconia is the white crystalline oxide of zirconium with a chemical composition of ZrO_2 . A naturally occurring, but rare, form of ZrO_2 is the mineral baddeleyite.

Cubic Zirconia is a synthetic gemstone with an appearance that is very similar to diamond. It sells for a tiny fraction of the cost of diamond and has historically been the most commonly used diamond simulant.

All of these materials are related. Zirconium, zirconia and cubic zirconia are all produced from industrial-grade zircon.

Industrial Uses of Zircon

Zircon sand has a low expansion coefficient and is very stable at high temperatures. It is used as a refractory material in many foundry and casting applications. One of its most common uses is in the production of ceramics.

Zirconium dioxide (zirconia) is produced by heating zircon sand to a high enough temperature to break down the zircon molecule. In powdered form, zirconium dioxide is bright white, highly reflective and thermally stable. It is used as an opacifier, whitening agent, and pigment in glazes and stains used on ceramics and pottery. Yttria-stabilized zirconia is used to manufacture cubic zirconia, fiber optic components, refractory coatings, ceramics, dentures and other dental products.

Zircon serves as the primary ore of zirconium metal. Zirconium is used in a variety of metal products that require a resistance to heat and corrosion. It is used to make high-performance alloys, specialty steel, lamp filaments, explosive primers, computer equipment and many electronics components.

Zircon and Radioactive Decay

Many zircon crystals contain trace amounts of uranium and thorium. These radioactive elements were incorporated into the zircon at the time of crystallization. They convert into their decay products at a steady rate. The ratio of parent materials to daughter products can be used to estimate the time of crystallization. Using this method, the oldest mineral grains in the world are zircon crystals found in Australia. They are estimated to be about 4.4 billion years old.

When radioactive elements in zircon crystals or nearby materials decay, radiation is emitted. The zircon crystal can be damaged by this radiation. Some zircon has been so damaged by exposure to this radiation that it no longer retains the clarity and optical properties of an attractive gem material. This is why some zircon is not suitable for use as a gem.

Author: Hobart M. King, Ph.D.



Meeting Minutes

The February 2018 meeting of FGMC was called to order at 7:30 by President Al Gaskill. There were 29 members and visitors present.

The program was a presentation by Dr. Bob Lauf on tourmaline.

Mention was made that we will again be assembling a large number of grab bags at the club picnic, so members attending field trips are strongly encouraged to gather samples.

Discussion was held that a field trip committee meeting would be arranged for February 22. There was also mention that a likely location for a March field trip would be Graves Mountain.

Respectfully Submitted,
Wayne Ketner, substituting for Lisa Reed, Secretary



Nature's Treasures

Nature's Treasures is the monthly newsletter of the Forsyth Gem and Mineral Club.

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