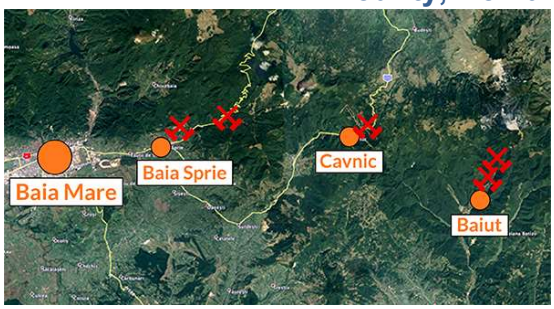
Lake George Gem & Mineral Club

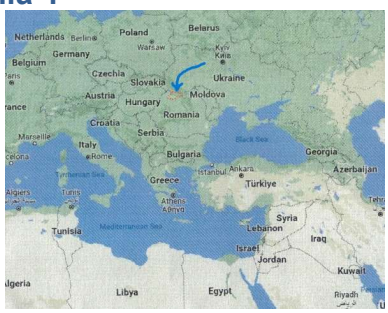
Club News,

October, 2023

Our next meeting will be at 9AM on October 14 in the Lake George Charter School. LGGMC member **Dan Mira** will talk about

"The Geology, Minerals, and Cultural History of Maramures County, Romania".





Mining in Maramures County, Romania, goes back to antiquity, with one of Europe's largest ancient metal-producing industries in the area. Lead, zinc, manganese, as well as small amounts of gold, silver, barium, and antimony have been produced since at least the 1300s. Mines whose names are familiar to mineral collectors include those near Baia Mare (Herja mine), Baia Sprie (Baia Sprie mine), and Cavnic (Boldut and Cavnic mines). Mindat.org (accessed September, 2023) lists 285 valid mineral species, including 8 type-locality minerals. Most famous are spectacular specimens of baryte, rhodochrosite, and stibnite, as well as clusters of calcite colored black by boulangerite. Dan's talk will introduce the geology, minerals, and history of this important mining area, which is precariously located on the border with Ukraine.

Representatives from **Newmont Mining** have offered to talk to us about the Cripple Creek district at our November meeting.

Our December meeting will be the traditional party and Towel Show. Watch for more information.

Markus Raschke will give a talk (not yet scheduled, but probably this spring) on his adventures tracking down a world-class scheelite-beryl-cassiterite deposit in the Tibetan Plateau of China.

ADDITIONAL COMING EVENTS OUTSIDE THE LGGM CLUB: (Nearby gem, mineral, fossil, and geology events that you may enjoy.) Go to each club's website for more information.

- **Cañon City Geology Club** meets on the 2nd Monday of the month at 6PM in the United Methodist Church, Cañon City
- **Columbine Gem & Mineral Society**, meets on the 2nd Thursday of each month, 6:30PM in the meeting room, Mt. Shavano Manor, 525 W. 16th (at J St.), Salida
- **Colorado Springs Mineralogical Society**, meets on the 3rd Thursday of each month at 7PM in the Mt. Carmel Veteran's Service Center, 530 Communication Circle, Colorado Springs;
- **Pueblo Rockhounds**, meets on the 3rd Thursday of each month at 6:30PM in the Westminster Presbyterian Church, 10 University Circle, Pueblo.

Thanks to **Pete Modreski** for the following list of upcoming events:
Coming Earth Science Events, October, 2023 onward

Denver Museum of Nature & Science, Earth Science Colloquium, *In the VIP Room; in-person only, all are invited, Museum admission not required; check in at the Security Post.*
See https://sites.google.com/view/dmnsdes2020colloquiumschedule/home ; Here is the DES Colloquium schedule for all the colloquium talks for the rest of the year:

Thurs, Oct. 19, 7:00 p.m., **Colorado Scientific Society** October meeting, **Permafrost and Melting in the Arctic,** by Denny Capps, Denali Park and Preserve Chief Geologist; in-person meeting at Calvary Church Golden; see https://coloscisoc.org/ for details. All are welcome.

Thurs., Nov. 16, 7:00 p.m., **Colorado Scientific Society** November meeting, **Colorado Structural Evolution,** by Lonn Abbot, University of Colorado; in-person meeting at Calvary Church Golden; see https://coloscisoc.org/ for details. All are welcome.

Thurs., Dec. 14, 6:00 p.m., **Colorado Scientific Society, December Annual Meeting, Potluck Dinner and Presidential Address, Cal Ruleman, US Geological Survey (presentation title TBA);** in-person meeting at Calvary Church Golden; see https://coloscisoc.org/ for details. All are welcome.

Show season is almost over, but here's a traditional show you won't want to miss:

Denver Area Mineral Dealers Annual Show - 11/17/2023

Start Date: 11/17/2023
End Date: 11/19/2023
Venue: Jefferson County Fairgrounds - Exhibit Hall
Address:
15200 W 6th Ave
Golden, CO 80401
Types: Rock & Mineral Shows

Field-Trip Guru **Dave Alexander** sent this report, wrapping up the 2023 collecting season and talking a bit about plans for next year:

"What a great field-trip season we've had so far! We had 32 trips planned this season, 3 of which were cancelled and will be rescheduled for next season. We have one more trip this season with Mile Hi RAMS club to collect cool goethite pseudomorphs after pyrite near Dotsero, which has plenty of spaces available if you are interested.

"In 2024, I will be joined in coordination leadership duties by **Cory Miller**, and we will co-coordinate the entire 2024 season together. This will be great for many reasons. I am planning to take a break from coordination leader duties in 2025, so having a co-leader next season will allow me the time to document and create training for a smooth transition to all future field-trip coordination leaders. I have worked with TectonicTreks over the last 5 years to build the registration application website and we've gone through lots of experiments and trial/error to get to this point (thanks for everyone's patience

along our journey; like most good collecting sites there are always bumps in the road) and we want to ensure we capture the current state to make onboarding future leaders as simple as possible, this is the legacy I hope to leave. Cory will verify the training I create is sufficient, and then the club can rely on this to bring future volunteers up to speed quickly.

"There is still opportunity for a tech-savvy volunteer to manage the website application, so 2024 would be a wonderful time for me to transfer this knowledge in person. For more information on this opportunity, check out the description I have posted on our Events Page, https://fieldtrips.lggmclub.org/club-events.

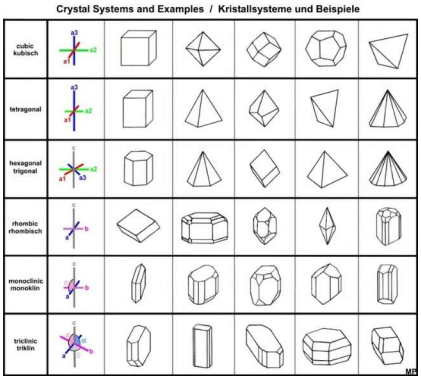
"I have scheduled a web-based virtual meeting for Thursday, November 2nd at 7:30pm to put together the 2024 field-trip calendar. Anyone is invited to attend, and we already have many folks signed up to participate (no waitlist, lol). The goal of this meeting will be to put as many events on the calendar as possible, even if we don't have a definitive date or trip leader just yet. In my opinion, it is important we tackle this duty before our club membership windows opens (January 1 - March 31) so those who are interested in joining or renewing membership have an idea of what the club will offer. Having the calendar drafted early also makes my job easier. I've learned from experience that planning is a good thing!

"If you are interested in suggesting locations, leading a field trip or two, or just listening in as we create our 2024 field trip program, please sign up as you would for any field trip. I will send out a virtual-meeting invite to those signed up as the date approaches. **Note that if you would like to lead a specific trip, participating in this meeting will give you the opportunity to volunteer** to lead the trip you want and even choose a date that is best for you (hint hint).

"Finally, I want to send my appreciation to everyone who helped with field trips this season! Since I have been coordinating trips, this year has had by far the greatest number of volunteers participate, and I'm thankful to each of you. There is no way we could have pulled off a great season like we've had otherwise! I'm looking forward to working with veteran and new volunteers in 2024!"

--dave

Our photo guru **Frank Rosenburg** sent some pictures from the September meeting:



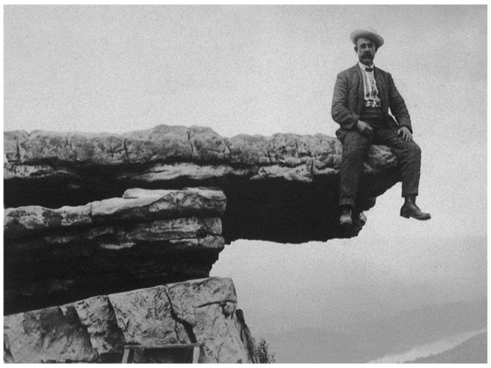
Not enough members enrolled in the "Basics of Crystallography" course, so we'll try again next spring. This 2-hour class introduces the fundamentals of how you can recognize the 6 (or 7) crystal systems. This is one of the basic physical properties that serious collectors need to be familiar with.

Brad Smith must have taken the summer off—once again, I received no "Bench Tips" this month. I hope he will continue to publish in the future.

If you've never heard of ***Pangea Ultima***, join the club! It's the name given to the supercontinent predicted to form 250 million years in the future, as described in this article: https://mail.google.com/mail/u/0/?tab=rm&ogbl#inbox/FMfcgzGtxSnzXCLQZshcHZBtrjDgWGKr

Rock Seeker has written a history of rockhounding through the ages: https://rockseeker.com/the-history-of-rockhounding/?ck_subscriber_id=1874913717&utm_source=convertkit&utm_medium=email&utm_campaign=%E2%80%8BThe+History+of+Rockhounding%3A+A+Riveting+Look+at+Rock+and+Mineral+Collecting+Through+The+Ages%E2%80%8B%20-%2011764965

Rock seeker also suggests you should be very careful about these deceptive stones: https://rockseeker.com/deceptive-stones-to-avoid/?ck_subscriber_id=1874913717&utm_source=convertkit&utm_medium=email&utm_campaign=Fakes+and+Forgeries%3A+8+Deceptive+Stones+to+Avoid%20-%2011734232



Notes from the Editor

Bob Carnein

Newsletter Editor
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Last month, I published the first part of an article about a locality that's near and dear to my heart, even though I now live half a continent away from it. Here's the second (and last) installment of that article.

Still Crazy (About Franklin) After All These Years (Part 2)

C.R. (Bob) Carnein

This is the second part of an article whose first part appeared in the September, 2023 Lake George newsletter. It talks about the locality that first got me interested in minerals as a 12-year-old.

History and Mineralogy. Franklin and Sterling Hill, in northern New Jersey, are most famous among collectors for their fluorescent minerals. Few mineral lovers haven't seen colorful specimens of calcite and willemite in "black light" displays in some museum or collector's basement (Figs. 1, 10, 14). In central Colorado, public displays can be seen at the Mines Museum (Colorado School of Mines) and the Western Museum of Mining and Industry. The common "red and green rocks" (Fig. 1, left) are only the tip of the iceberg—the two deposits host **nearly 100 fluorescent minerals**, giving Franklin the right to the title "Fluorescent Mineral Capital of the World". But, hold your hats! According to Mindat.org (accessed September, 2023), the Franklin district currently boasts **407 valid mineral species and 70 type-locality minerals,** out of 5960 minerals currently recognized on Earth. That means almost 7 percent of ALL the world's minerals can be found in this one district. Some of these occur nowhere else on the planet.

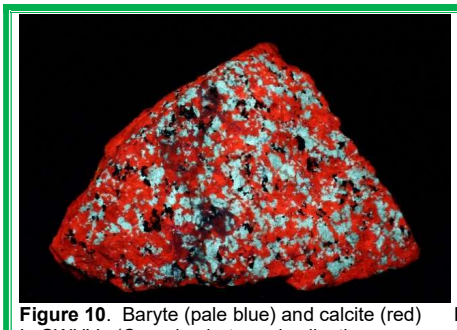


Figure 10. Baryte (pale blue) and calcite (red) In SWUV. (Carnein photo and collection

Figure 11. Horsehead Corporation (formerly NJZ) logo. (www.recyclingtoday)

The Franklin deposit's mines were exhausted and closed in 1954, after producing 22 to 23 million tons of ore bearing, on average, 19.6% zinc, 8.7% manganese, and 17% iron (Fig. 12). The Sterling mine closed in 1986, having produced 11 million tons of similar ore (Fig. 13). When it closed, the Sterling deposit had about 5 years of reserves left. Closure resulted from a tax dispute with the Borough of Ogdensburg.

These two deposits and the nearby, geologically related, iron-mining deposits (some of which belonged to Thomas Edison) led to the formation of the New Jersey Zinc Co., in 1852. In 1897, NJZ combined all of the various companies mining at Franklin and Sterling Hill. At one time, NJZ was the biggest producer of zinc in the U.S. An unfortunate merger with Gulf and Western, in 1966, combined with environmental liabilities at several zinc-smelting sites (including the Eagle mine, in Colorado), led NJZ (which by then had become Horsehead Corporation) to file for bankruptcy in 2002, and again in 2016, after which it re-emerged as a private company named American Zinc Recycling. AZR is now owned by a Luxembourg Company and is a pathetic remnant of what was once a major American corporation.

At both Franklin and Sterling Hill, the primary ore minerals were franklinite [$ZnFe_2O_4$], willemite [Zn_2SiO_4], and (minor) zincite [ZnO], but the proportions varied somewhat. These extremely atypical ore minerals required development of new processing methods that were quite different from those used for the more "typical" zinc ore, sphalerite. Ore at Franklin averaged 40% franklinite, 23% willemite, and less than 1% zincite. At Sterling Hill, the corresponding proportions were 33:16:1%. The remainder was mostly calcite, which was more common at Sterling Hill than at Franklin. Common accessories at Franklin included garnet (andradite), tephroite [Mn_2SiO_4], hardystonite [$Ca_2Zn(Si_2O_7)$], and Mn-humite [a complex silicate]; tephroite and Mn-humite were especially common at Sterling. Sphalerite was important only at Sterling.

Figure 12. Typical Franklin gneissic ore, consisting of willemite (gray-green), franklinite (black), and minor zincite (red). Sample is 23 cm across. (Carnein specimen and photo)

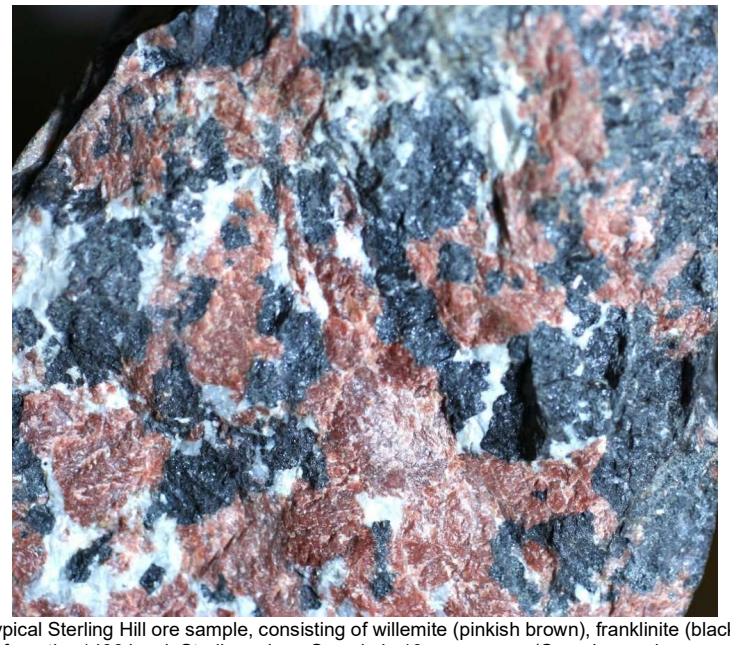


Figure 13. Typical Sterling Hill ore sample, consisting of willemite (pinkish brown), franklinite (black), and calcite (white), from the 1400 level, Sterling mine. Sample is 10 cm across. (Carnein specimen and photo)

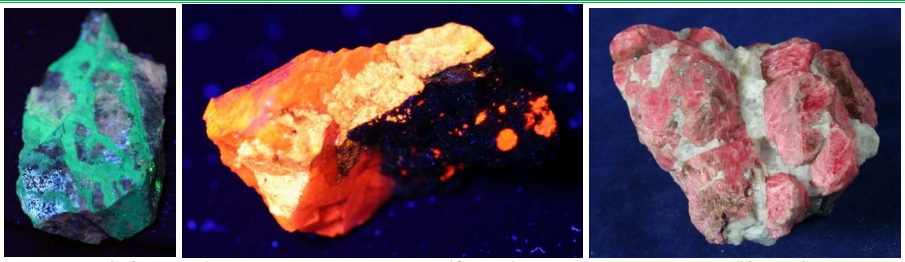


Figure 14. (left to right) znucalite and hydrozincite (SWUV); turneaureite and calcite (SWUV); rhodonite and calcite (white light). (Carnein collection and photos)

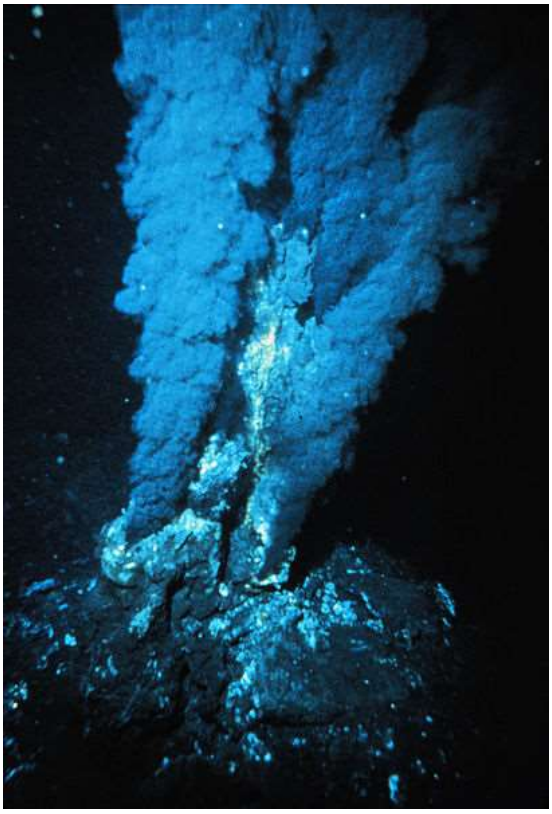
Myriad peculiar mineral assemblages occur at both Franklin and Sterling Hill, and serious collectors compete for good specimens of many of these. Some of the many rare minerals of collector interest are associated with:

- Feldspar-rich silicate "skarns" (really lime-silicate rocks): mainly orthoclase, hyalophane, celsian, pyroxenes, amphiboles, garnet, and calcite; also hendricksite, johannsenite, petedunnite, tirodite, rhodonite. The "Parker-shaft minerals", including barysilite, esperite, ganomalite, kentrolite, larsenite, nasonite, roeblingite, margarosanite, charlesite, marsturite, cahnite, and franklinfurnaceite, mostly with manganaxinite, microcline, and andradite, constitute a very special and localized concentration of lead-containing silicates. There are also peculiar assemblages that include glaucochroite, vesuvianite, bustamite, hyalophane, gahnite, minehillite, wollastonite, allanite, fayalite, realgar, and arsenopyrite (not all together). If you can pronounce all of these, let alone identify them, you must be an expert!

Figure 15. (left to right). Andradite garnet in marble; graphite in marble; zincite crystal from the Franklin, NJ district. (Carnein collection and photos)

- Discontinuous hydrothermal veins associated with joints and faults: calcite, rhodochrosite, kutnahorite, secondary willemite, pyrochroite, wurtzite, friedelite, leucophoenicite, manganpyrosmalite, bementite, and serpentine; very rare manganese arsenosilicates occur at both deposits, including schallerite, nelenite, kraissilite, mcgovernite, kolicite, and holdenite.
- Oxidation zone (especially at Sterling Hill): hemimorphite, goethite, chalcophanite, hetaerolite, various other Mn and Mn-Zn oxides; local hydrozincite, copper sulfates, azurite, chrysocolla, etc. (Various post-mining minerals also occur.)
- Franklin Marble: graphite (except near ore), phlogopite, tremolite, chondrodite/norbergite, calcite;

Figure 16. (left to right) Native copper; hemimorphite; aragonite from the Franklin, NJ district. (Carnein collection and photos)



- Alteration or replacement of primary minerals: tephroite, serpentine, talc, “caswellite”, etc. (there are many local and individual cases of replacement);
- Magnetite deposits (especially underneath the Franklin west limb and south of Sterling Hill): magnetite, fluorite, apatite;
- Cross-cutting camptonite (mica diabase) and pegmatite dikes, which post-date regional metamorphism. A peculiar occurrence in the Parker mine, near the contact between the orebody and what was a volatile-rich pegmatite, included caswelliite, ganophyllite, clinohedrite, esperite, larsenite, willemite, vesuvianite, datolite, cahnite, thomsonite, xonotlite, hodgkinsonite, manganaxinite, prehnite, cuspidine, pectolite, and others.

Figure 17. Deep-sea “black smoker” or hydrothermal vent. (Galapagos Conservation Trust)

Origin of the Ore Deposits. Most modern theories on the origin of the Franklin/Sterling ores and accessories depend not only on an understanding of geologic processes but also on sophisticated knowledge of geochemistry and thermodynamics that is beyond the author’s expertise and interest. The material below summarizes a detailed discussion by Dunn (1995), who was one of the most important scholars studying the Franklin district. The major theories start with the idea that the original metals were in place before Grenville metamorphism (that

is, they were deposited at about 1.3Ga). Most theories focus on what may be analogous metal concentrations discovered in the Red Sea in the 1960s.

Squiller and Sclar (1976, 1980) suggested an original Zn-Fe-Mn dolomite mixed with a mud containing Fe and Mn oxides and gelatinous silica. Their hypothesis suggests that the chemistry would reorganize, during high grade metamorphism and "dedolomitization", to form calcite and oxide solid solutions that, in turn, formed franklinite (from sediments containing abundant Fe and Mn oxides) or zincite (where Fe and Mn oxides were absent). If gelatinous silica occurred where Zn-dolomite (or smithsonite) was breaking down, willemite formed. One problem with this hypothesis is that it doesn't explain the highly localized occurrence of the zinc orebodies. One would expect the occurrences to be more widespread than they are, but much erosion may have occurred since they formed. The two orebodies may be erosional remnants of what were larger deposits.

Johnson, *et al.* (1990a and b) and Johnson (1990) took a different approach, suggesting models in which deposition occurred either as sulfides, possibly from "black smoker"-type sea-floor vents (Fig. 17), or as Red Sea-type hot brines. The latter idea is favored by more recent isotopic data. Either hypothesis might explain the localization of the orebodies.
Neither of the foregoing hypotheses adequately explains (1) why there aren't a few more deposits like Franklin/Sterling, considering the prevalence of oceanic rift, back-arc-basin and failed-rift deposits worldwide; (2) the lack of significant copper, which typically occurs with zinc and iron, as well as other elements, in ocean-floor sediments and black smokers associated with sea-floor spreading.

Dunn (1995) noted that, whatever their origin, the occurrence together of a zinc oxide (zincite), a zinc silicate (willemite), and a zinc-iron-manganese oxide (franklinite) is unique. Even Långban, Sweden, which shares many rare minerals found, especially, at Franklin, contains very little zinc (franklinite and willemite both occur there but in minor quantities, compared with Franklin/Sterling). Several other predominantly Mn deposits share minerals with Franklin, but there are few other similarities.

Final Note. One of the first things to strike anyone studying these deposits is likely to be how often major researchers use terms such as "hasn't been studied in detail", or "conflicting theories", or "requires further study". This is true even in Pete Dunn's monumental 977-page work published by the Franklin-Ogdensburg Mineralogical Society in 1995-96. Considering the abundant unanswered questions, both deposits are still ripe for research. Unfortunately, money is scarce, and, apart from a few hundred feet of passages at the Sterling Hill Mining Museum and some local surface exposures, not much rock is available for direct study.

If this article has piqued your interest in Franklin, I urge you to visit the area. It's readily located about 40 miles west of New York City. There are two excellent mineral museums, one (The Franklin Mineral Museum) in Franklin and the other (The Sterling Hill Mining Museum) in Ogdensburg. Each is different, in its own way, and both have excellent fluorescent displays. Each also provides opportunities for collecting minerals, and the latter has an awesome mine tour. See their websites for details.

References. There are probably 1500 references for Franklin/Sterling Hill. Only a few that were used by the author to compile this summary are listed here. For a more complete list, go to Dunn, 1995, Part I.

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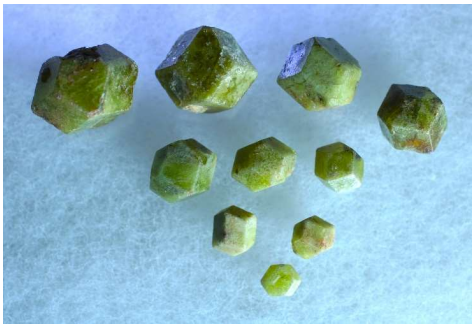
Monthly Mineral Quiz

Thanks to **Michael Chernik**, who caught a couple of recent errors in the Monthly Mineral Quiz. First, in the August unknown, I gave the SG as around 5; it should have been about 3. Second, in the September newsletter, I gave the answer for the July mineral, rather than the August mineral. The August mineral was tremolite, not bornite. Finally, in the September newsletter, I titled the monthly mineral as being "for July", rather than for September. My apologies for not catching those errors, and thanks to Mike for spotting them. I hope I do better for October!

The Monthly Mineral for October (Carnein photos and collection)



The monthly mineral for October is another common one that some of you have no doubt collected. It's a member of a group of minerals that have various compositions but nearly identical structures and crystallography. I'm looking for a **particular member of that group** that contains calcium, aluminum, and silica. Impurities result in a wide range of colors. This mineral is common in metamorphic rocks that result from contact or regional metamorphism of impure limestones and dolostones—lime-silicate rocks. It's isometric, has a hardness of 6 ½ to 7, a SG of about 3.6, and may occur as transparent or translucent crystals with no cleavage. As you might guess, that means it makes a relatively inexpensive, attractive, and durable gemstone. Mindat.org lists nearly 2 dozen Colorado localities, but there are no doubt many more, including some near Lake George. What is this common mineral?

Last Month's Mineral: Rutile

Rutile, TiO_2. Rutile, along with anatase and brookite, are polymorphous (several minerals having the same chemical composition). Rutile is the most common of the three and is an important source of titania, a white pigment used in various applications, and titanium metal, which is important in defense applications. It can be distinguished by its high hardness, brilliant adamantine luster moderately high SG, and common twinning, sometimes resulting in "sixlings", where 6 crystals are intergrown to form a ring. It is also common as fibrous or needle-like inclusions in quartz ("rutilated quartz")—a favorite stone for tumbling and cabochons. It is common in igneous and high-temperature metamorphic rocks and as rounded grains in beach sands and sandstones. Graves Mountain, GA, is the main source of fine crystals, including the twin to the left and those that some of you saw at this year's Lake George Gem and Mineral Show.

The Lake George Gem and Mineral Club is a group of people interested in rocks and minerals, fossils, geology and history of the Pikes Peak/South Park area, Indian artifacts, and the great outdoors. The Club's informational programs and field trips provide opportunities to learn about Earth science, rocks and minerals, lapidary work and jewelry making, and to share information and experiences with other members. Guests are welcome to attend, to see what we are about!

The Club is geared primarily to amateur collectors and artisans, with programs of interest both to beginners and serious amateurs. The Club normally meets on the second Saturday of each month at the Lake George Community Center, located on the north side of US Highway 24 on the east edge of town, sharing a building with the county highway shops. **In the winter, we meet at 10:00AM. From April through October, we meet at 9:00AM, to allow more time for our field trips.**

Our organization is incorporated under Colorado law as a nonprofit educational organization, and is a member of the Colorado, Rocky Mountain, and American Federations of Mineralogical Societies. We also sponsor an annual Gem and Mineral Show at Lake George, where collectors and others may purchase or sell rocks, minerals, fossils, gems, or jewelry. Annual membership dues (Jan. 1 through Dec. 31) are $15.00 for an individual (18 and over), and $25.00 for a family (parents plus dependents under age 18). New memberships and renewals are only accepted Jan 1 through March 31 each year.

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