Lake George Gem & Mineral Club

Club News

November, 2019

NOTE: LGGM Club meetings in November through March will start at 10:00 a.m.

Program for the Month: **Saturday, November 9, 2019, 10:00 a.m.**

Geology of the Newmont Cripple Creek-Victor Gold Mine

by Doug White, Principal Geologist
Newmont Cripple Creek & Victor Mine

Doug will discuss the history, geology and current operation of the Newmont Cripple Creek & Victor Mine.

Biography: In 1989, Doug received his degree in Comprehensive Geology from the Western State Colorado University. His career has included exploration geology for Tenneco Minerals of Silver Cliff, Colorado in 1990. Then in 1991, he began working as a rig geologist for Nerco Minerals. This was the beginning of his 28 years of mine production geology, geotechnical and exploration work at the Cripple Creek-Victor Mine.

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SCHEDULE OF LGGM CLUB PROGRAMS, FIELD TRIPS & EVENTS			
Date(s)	**What**	**Where**	**Leader/Notes**
No additional field trips are scheduled for 2019.			
Sa 11/9	Newmont CC&V Geology of Cripple Creek-Victor Gold Mine	LGGM Club Presentation	Doug White
Presentations and Field Trips for 2020 will be added to in future newsletters after they are confirmed.			

COMING EVENTS OUTSIDE THE LGGM CLUB: **(**Nearby gem, mineral, fossil and geology events that you may enjoy.)

- **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.

Pete Modreski suggests **the following upcoming events:**

Tues, Nov 12, "Golden Beer Talks" at the Buffalo Rose, 1119 Washington Ave., Golden. "Expand your mind with a beer in your hand". Held (usually) on 2nd Tuesdays. Doors open at 6; Talk begins at 6:35; Intermission – 7-7:15; Q&A/clean up 7:15-8.
Nov 12, Bob Raynolds, Geologist, CSM Adjunct Prof and DMNS Research Associate, "**Australopithecines to the Anthropocene: A Geologist's View of Where We Came from and Where We Are Going**"
Dec 10, Barb Warden, Goldentoday.com, "**Funiculars of Golden Colorado**".

Thur., Nov. 7, 3:00-4:00 p.m., **Evolution of topography in the southern and Patagonian Andes**, by Mark Brandon, Yale. Denver Museum of Nature & Science Earth Sciences Colloquium. All are welcome. VIP Room at DMNS.

Fri., Nov. 8, 8 a.m. – 4 p.m., **Colorado Science [Teachers'] Conference for Professional Development,** at the Denver Mart, 451 E. 58th Ave., Expo Hall Aimed mainly at classroom science teachers, anyone may register to attend this conference. There will be more than 100 different presentation sessions and more than 50 commercial and non-profit exhibitors. There is an early registration discount for preregistration made by Oct. 18. The registration fee is $60 through Oct. 18, $75 thereafter, and $20 for students, pre-service and first-year teachers, and retirees ($30 after Oct. 18). Full information and online registration info for the Conference are at: https://coloradoscienceconference.org/ and https://coloradoscienceconference.org/registration .

Tues. Nov. 12, 3:00-4:00 p.m., Denver Museum of Nature & Science Earth Sciences Colloquium, **400 Million Years on Six Legs: Evolution of the Insects,** by Michael Engel (University of Kansas); see https://eeb.ku.edu/michael-s-engel#link3 . VIP Room, all welcome.

Thurs., Nov. 14, 7:00 p.m., **Archaeology of Peru's North Coast: The Moche Culture and Beyond**, by Michele Koons, Denver Museum of Nature and Science. Colorado Scientific Society monthly meeting, Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood; social time at 6:30; all welcome.

Thurs., Nov. 14, 7:30 p.m., **Gold: A journey from the Big Bang to the forest of the Amazon**, by Dr. Terry Wallace, Director Emeritus, Los Alamos National Laboratory. At the bimonthly meeting of Friends of Mineralogy, Colorado Chapter; Berthoud Hall Room 109, Colorado School of Mines campus, Golden. All are welcome.

Fri.-Sat.-Sun., Nov. 15-17, Gem and Mineral Show, Jefferson County Fairgrounds; 10-5 Fri. & Sat., 11-4 Sun., 15200 W. 6th Ave., free parking & admission.

Fri.-Sat.-Sun., Dec. 13-15, Flatirons Gem & Mineral Show, "Rocks & Rails", Boulder County Fairgrounds, 9595 Nelson Rd., Longmont CO, Main Exhibit Building. 10 a.m. – 5 p.m. each day. Held in conjunction with the Boulder County Model Railroad Club Show.

Thurs., Dec. 19, 5:30 p.m., **Colorado Scientific Society Annual Meeting**, 2019 President's Address (Tom Casadevall, USGS), and potluck dinner. Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood; all welcome.

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For more lecture series during the year see:
Colorado Café Scientifique in Denver, monthly lectures on science topics held either at Blake Street Station or Brooklyn's, Denver; open to the public, no charge other than refreshments you may choose to purchase; see http://cafescicolorado.org/ .
Colorado Scientific Society (3rd Thursday, 7 p.m.), see http://coloscisoc.org/ . Meets at Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood CO, except when noted.
CU Geological Science Colloquium (Wednesdays, 4 p.m.)
see http://www.colorado.edu/geologicalsciences/colloquium
CSU Dept. of Geoscience Seminars (Fridays, 4 p.m.),
see https://warnercnr.colostate.edu/geosciences/geosciences-seminar-series/
Van Tuyl Lecture Series, Colorado School of Mines, (Thursdays, 4 p.m.): https://geology.mines.edu/events-calendar/lectures/
Denver Mining Club (Mondays, 11:30), see http://www.denverminingclub.org/ **.**

Denver Museum of Nature and Science, Earth Science Colloquium series, 3:00-4:00 p.m., VIP Room unless noted, day of the week varies. Museum admission is not required; see http://www.dmns.org/science/research/earth-sciences/
Denver Region Exploration Geologists Society (DREGS; 1st Monday, 7 p.m.), http://www.dregs.org/index.html
Florissant Scientific Society (FSS); meets monthly in various Front Range locations for a lecture or field trip; meeting locations vary, normally on Sundays at noon; all interested persons are welcome to attend the meetings and trips; see http://www.fss-co.org/ for details and schedules.
Golden Beer Talks (2nd Tuesday, 6-8 p.m.), at the Buffalo Rose, 1119 Washington Ave., Golden. Doors open at 6; Talk begins at 6:35; Intermission – 7-7:15; Q&A/clean up 7:15-8. "Golden's grassroots version of TED talks, Expand your mind with a beer in your hand", http://goldenbeertalks.org/
Nerd Night Denver is a theater-style evening featuring usually 3 short (20-minute) TED-style talks on science or related topics; held more-or-less monthly at the Oriental Theater, 4335 W. 44th Ave., Denver; drinks are available; for ages 18+. Admission is $6 online in advance, $10 at the door.
See https://www.nerdnitedenver.com/ .
Rocky Mountain Map Society (RMMS; Denver Public Library, Gates Room, 3rd Tuesday, 5:30 p.m.), http://rmmaps.org/
Western Interior Paleontological Society (WIPS); beginning January 2019, WIPS will meet on the 1st Monday of the month, 7 p.m., at Lowry Conference Center, 1061 Akron Way, Denver.
See http://westernpaleo.org/

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LGGM Club News:

At the October LGGM Club meeting, **Bob Carnein** gave a well- illustrated PowerPoint talk on the major geologic features of central Colorado. A brief introduction to basic geologic concepts preceded the main part of the presentation, which covered many of the stops that will be made on a pair of spring field trips, including the Ute Pass fault zone, Garden of the Gods, Manitou Park graben, and the Rampart range.

Note: Bob canceled this fall's "Central Colorado Geology" trip because only a half dozen people signed up. He will try to re-schedule the trip on two separate weekdays or weekends sometime next spring. He notes that he needs to have at least 10 registrants to justify all of the preparation involved.
Thanks--Bob

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Interesting Geological Articles Online:

From Wayne Orlowski we have the following link:

> **What is Garnet** - *Animation by Elena Hartley* *Narration by Anisha Parekh*Have you heard of garnets? Did you know how useful garnets actually are to geologist? Watch to find out.
>
> This animation was completed as a final project in Ms.Hartley's Science Illustration Certificate Program at California State, Monterey Bay. She says "I wanted to create a fun, informative animation about something complex."
>
> https://www.elabarts.com/animation?fbclid=IwAR19yNOhs1SDPo-pNuLroSZwVCenFiQhsFwn2qXPZZPBCdIOth_C6LFehoY

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The combined efforts of **Paul Combs**, Beth Simmons and **Bob Carnein** have brought us the following links about an interesting recent fossil find here in Colorado:

> https://gizmodo.com/incredible-new-fossils-show-how-quickly-mammals-took-ov-1839326256
> https://www.pbs.org/video/rise-of-the-mammals-zuzg8t/

The latest installment of **"Bench Tips" by Brad Smith:** (www.BradSmithJewelry.com)

Winding Jump Rings

If you need a few jump rings the same size, it's easy to grab a round rod and wind as many as you need. But when you need a lot of them, some form of winder saves a lot of time. A variable speed screw gun makes quick work of winding the coils. Screw guns are quite inexpensive at discount stores and are remarkably handy for odd jobs in the shop and around the house.

To wind a coil, just bend a right angle on the end of the wire about a half inch long and insert this into the screw gun chuck. Then wind slowly, keeping a tight coil. I like to rest the end of the mandrel on the edge of the table or bench pin. Finally, one note of caution. If you are winding an entire length of wire, be careful as you get near the end of the wire. If the end passes under your thumb, it can cause a nasty scratch or cut.

And for a nice set of mandrels, look for a set of Transfer Punches. The set has 28 sizes, from 3/32 inch to 1/2 inch, and is only about $12. In the US it is available from Harbor Freight as item number #3577, and in Europe, it's available from MZS in the Netherlands as item number 250575.

Touching Up a Bezel

Pumice wheels are good for touching up a bezel after you've set the stone. The hardness is about 6 on the Moh's scale, less hard than quartz, so it shouldn't scratch any of your agates or jaspers. However, I'd avoid or be real careful of using pumice near the softer stones like turquoise, amber, howelite, etc.

If you're unsure about the hardness of your wheels, test them on a piece of glass. Glass is about 5 ½ on the Mohs scale, softer than quartz. So if the wheel doesn't harm glass, it's safe for use on the quartzes and harder stones.

My preference is the one inch diameter ones such as those shown at riogrande.com/Product/AdvantEdge-Pumice-Wheels-Medium/332722?pos=2

Work Smarter With Brad's "How To" Jewelry Books
www.Amazon.com/author/bradfordsmith

Happy hammering,
- Brad

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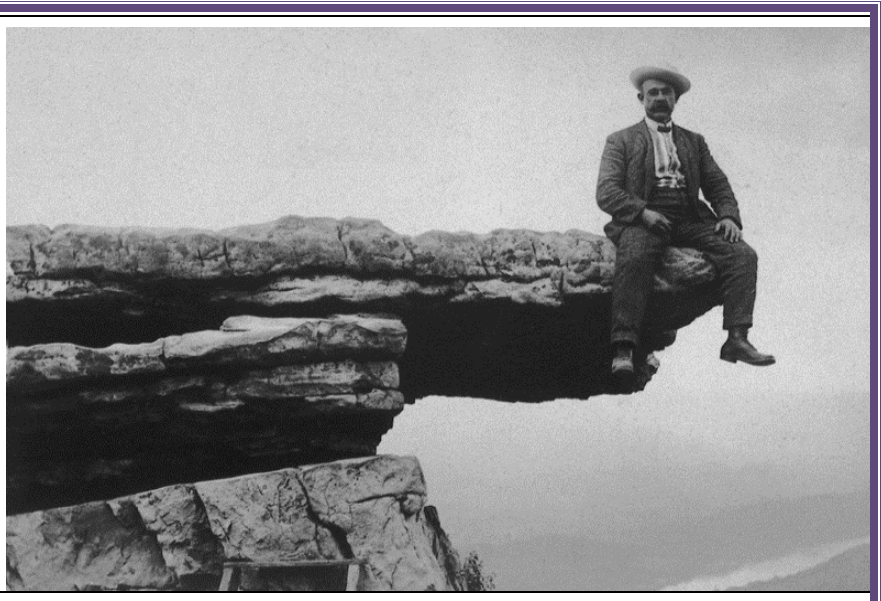

You might expect that the fossil record would show that the appearance of chlorophyll was the event that initiated rapid evolution of more complex plants and the animals that eat those plants. However, **Paul Combs** reviews some of the evidence that shows a very long delay after the first appearance of fossilized chlorophyll before the development of more complex plants and animals, and he discusses a hypothesis of the reasons for this unexpected delay.
-- Jerrolynn

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Oldest Discovery of Chlorophyll Reveals Why Complex Life Took So Long to Appear

by **Paul Combs,** Paleontology Study Group

Thousands of years ago, ancient humans were fascinated by geology, weather, astronomy and other natural factors. Archaeologists often find paintings and carvings of stars, rain clouds and other curiosities at archaeological sites. Many sites also contain crystals and fossils that ancient people collected. Later, many famous people from Plato to Leonardo da Vinci wondered about fossils, asking how those plants and animals could have gotten inside the rocks. They didn't know it then, but they had it backward; they should have asked how the rocks got around those plants and animals.

Today, we know a great deal about how fossils are formed. Tens of thousands of fossil species have been discovered and classified and more are found daily. We have enough information to outline every plant or animal's family tree. This tells us who evolved from whom and how those fossils are connected to living life forms, like us. It is also possible to determine what the environment was like when the fossil was a living organism. By combining this information, scientists can assemble fossil "communities", complete with the surrounding water temperature, clarity, currents, predators and prey, oxygen and salinity levels, distance from shore and even whether the ocean was advancing or retreating. Sometimes, the slightest traces can become important clues, in the same way that police CSI experts use DNA and other clues. This is one such story.

A few months ago, I described a little-known category of fossils known as **chemical fossils**. These are not the fossils you might ordinarily imagine: a leaf, a clam or a mammoth tusk. They are chemicals found in rocks that give us an organic trace of ancient life. Crude oil, oil shale and natural gas are three examples of chemical fossils because, even though there may be no eye-catching fossils to display in a museum, these chemicals tell us that something was living there at that time in the past. Very often, the chemicals we find are not the original chemicals from the bodies of plants or animals. The chemicals (mostly hydrocarbons) are usually subjected to alteration by time, heat and pressure. But some can remain stable over millions of years, under the right conditions (Gueneli *et al*., 2018).

In 1936, Alfred Treibs, a German organic chemist, announced that vanadyl porphyrin found in rocks is a chemical fossil of chlorophyll, which plants, algae and bacteria need for photosynthesis.

Fig. 1 Alfred Treibs, PhD (1899 – 1983)
The prestigious Treibs Award is named after him.
(Photo source: The Geochemical society)

It seems strange now that no one knew where crude oil came from as recently as 1936, but Treibs' discovery explained the biologic origin for petroleum (Treibs, 1936). We now know that the chemicals in crude oil and natural gas were formed from prehistoric algae and other microscopic life forms that were deposited on the ocean floor under conditions of little or no oxygen. (For a while, scientists suspected that crude oil was formed from the decaying bodies of dinosaurs, which is one reason Sinclair uses a dinosaur for its logo today!)

Treibs' discovery led to more questions. Paleontologists always want to know who was living when, and what the environment was like. One of the very biggest questions for paleontologists is why complex life forms took so long to evolve after the simple ones had appeared. Fossils of tiny cyanobacteria appear in the fossil record of Quebec and a few other localities about 4.28 billion years ago (Cyanobacteria: Fossil Record, 2019). But life advanced very little over the next 3.6 billion years—why? One theory that has been around for years proposes that there was too little oxygen to support animals like trilobites and crinoids during that period, but that idea has been shown to be incorrect. Another proposal holds that there was simply too little for animals to eat. But there are very few phytoplankton fossils from this long span of time, so that theory remained untested (Gueneli *et al*., 2018) until now.

In the July 24, 2018, issue of The Proceedings of the National Academy of Sciences, an international team led by Nur Gueneli at Australian National University published a paper that sheds a great deal of light on the 3.6 billion years when very little was happening. The scientists analyzed chemical fossils that they found in 1.1 billion-year-old black shale rock in Mauretania, West Africa. Their tests discovered the oldest chemical fossils of chlorophyll

which, of course, is used in photosynthesis (Gueneli *et al*. 2018). (Their discovery, by the way, is a whopping 600 million years older than any previous chemical fossils of chlorophyll.)

Further analysis shows that the overwhelming majority of the chlorophyll came from cyanobacteria, the extremely tiny life forms that date to at least 4.28 billion years ago (Gueneli et al. 2018), (Cyanobacteria: Fossil Record, 2019). On the other hand, the scientists only found traces of chemical fossils of chlorophyll that originated with algae or other life forms. Here was the long-sought answer to the question about why complex, active life forms had taken so long to appear in the fossil record. Crinoids, archaeocyathids, sponges (poriferans), comb jellies (ctenophores) and other complex life forms would have been unable to eat microscopic bacteria, but they can succeed very well on algae, which are about 1,000 times larger (Gueneli *et al*. 2018). All they need to do is filter the algae out of the water.

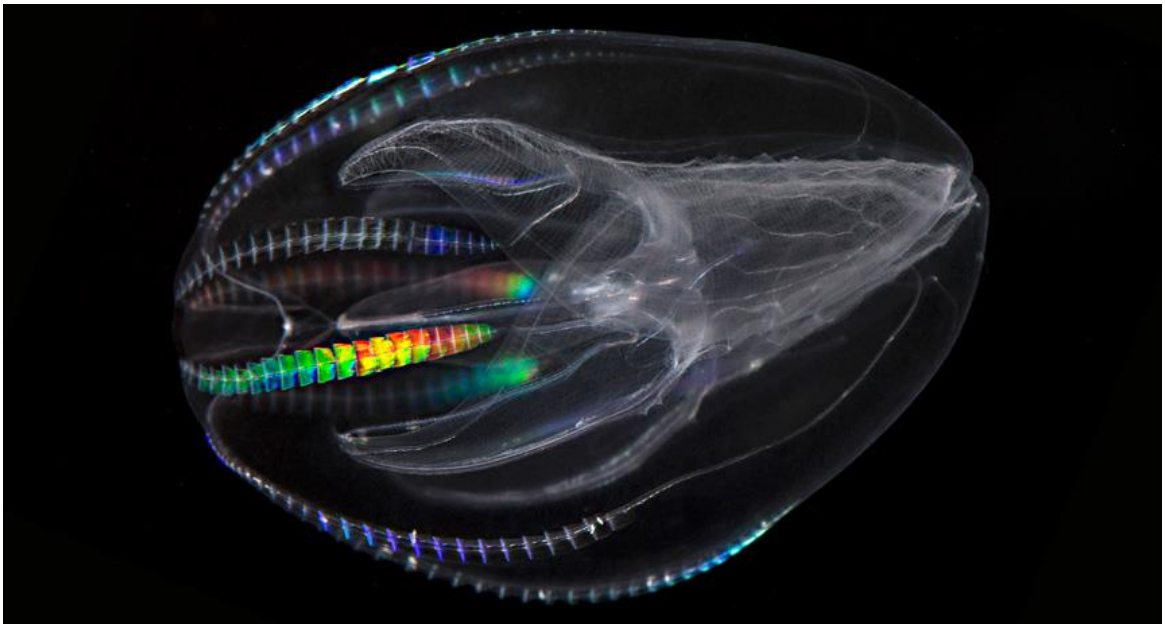

Fig. 2. The modern comb jelly (ctenophore) *Mnemiopsis leidyi. Fossil and DNA evidence show that these still-living animals were Earth's earliest complex animals and predators. (Photo source: Science News)*

The long-term scarcity of algae, plus the extremely tiny size of bacteria, would have halted the development of complex, active life forms. About 300 million years after the Mauretanian black shale, (800 million years ago), chemical fossils show that algae became much more common in the oceans and—sure enough—more complex life forms, including sponges and comb jellies appear in the fossil record (Gueneli *et al*. 2018 (Cyanobacteria: Fossil Record, 2019). These animals wouldn't impress anyone today, but they were a banner headline for complex life back then. Then, about 650 million years ago, the tiny cyanobacteria became less numerous leaving the much larger algae to proliferate throughout the oceans. This meant that filter-feeding animals could trap and eat the algae (Gueneli *et al*. 2018). Mobile predators could, in turn, feed on the filter-feeders. And that is what they did. Complex life forms, including the ancestors of echinoderms, mollusks, velvet worms and arthropods, begin to show up in the fossil record in China, Canada, Namibia, Australia and Greenland around 610 million years ago. This is the famous Ediacaran community of animals (Rich *et al*., 1996). Complex life forms continued to evolve and become more numerous into the Cambrian Period (581 – 485 million years ago). Many of those animals are obviously the forerunners of modern life forms,

including the chordates, which eventually gave rise to fish, dinosaurs, birds, cab drivers and astronauts. It was an event that scientists call The Cambrian Explosion.

Fig. 3. Early Cambrian predatory heavyweight: A fossil of the shrimp-like arthropod *Leanchoilia*. Life had already come a long way by 518 million years ago. (Photo source: *Cosmos Magazine*)

From our standpoint, here in the 21st century, it looks so simple. The proliferation of algae in the world's oceans finally provided an abundant lower life form that complex, filter-feeding animals could eat. In other words, algae established itself at the base of the food chain. It is still there today. After that key step, the rest was relatively easy. All you need to do is eat the filter-feeders. So the hypothesis of why complex life forms, including our own ancestors, took so long to appear is that dinner just wasn't ready yet.

References & Further Reading:

Cyanobacteria: Fossil Record. Retrieved from https://ucmp.berkeley.edu/bacteria/cyanofr.html OCT 10, 2019.

Gueneli, N., A. M. McKenna, N. Ohkouchi, C. J. Boreham, J. Beghin, E. J. Javaux, and J. J. Brocks, 2018, 1.1-billion-year-old porphyrins establish a marine ecosystem dominated by bacterial primary producers: PNAS July 24, 2018 115 (30) E6978-E6986; first published July 9, 2018 https://doi.org/10.1073/pnas.1803866115. Retrieved OCT 8, 2019.

Rich, P.V., T.H. Rich, M.A. Fenton, and C.L. Fenton, 1996. The *Fossil Book: A Record of Prehistoric Life***.** Mineola, NY: Dover Publications, Inc.

Treibs, A.E.**, 1936.** Chlorophyll- und Häminderivate **in organischen Mineralstoffen.** Agnew. Chem. 49 (38): 682–686.

Monthly Mineral Quiz

Last Month's Mineral. Kyanite, Al_2SiO_5, is a relatively common mineral found in metamorphic rocks and pegmatites. Although blue is typical, it can occur in a wide range of colors. Occasionally, it forms transparent or translucent crystals that are suitable for lapidary work, though its variable hardness (5.5 to 7, depending on direction) makes it a bit difficult to cut and polish. It typically occurs in high grade metamorphic rocks that formed under high pressure; sillimanite and andalusite have the same composition (the three minerals are *polymorphs*) but form under "normal" high temperature/pressure conditions and high temperature/low pressure conditions, respectively. Common associates are quartz (as in the sample to the left) and muscovite, as well as almandine and feldspars. In Colorado, notable occurrences are located in Chaffee, Gunnison, and Jefferson counties. The specimen to the left is from a famous locality in Connecticut, where the writer collected it in the 1950s.

This Month's Mineral

This month's mineral, from (left to right) Mali, New Jersey, and Connecticut. (Carnein specimens and photos)

Here is a another relatively abundant mineral that most commonly occurs in cavities in dark colored volcanic rocks (e.g. basalt). Other typical associates include datolite, epidote, and various aluminosilicate minerals known as zeolites. Its hardness of 6 to 6 ½ and relatively poor cleavage make it amenable to lapidary work—especially as cabachons. Although this mineral rarely occurs as well formed crystals, exceptions occur at Merelani, Tanzania, famous for the beautiful gemstone tanzanite. The typical color is some shade of green, but it may be pale blue, yellow, or various other light colors. What is it?

The Lake George Gem and Mineral Club is a group of people interested in rocks and minerals, fossils, geography 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 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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