# The Lake George Gem and Mineral Club -

# Club News

## August, 2017

**Program for the month: Saturday August 12, 9AM:**

At 9 AM on August 12 at the Lake George Community Center, we will meet to talk about the annual show, which will be held August 18-20 in the field next to the Lake George Post Office. We will finalize a list of volunteers for various jobs at the show, including the set-up. Please come and volunteer to lend a hand at this, our main fund-raising event! Also, **we desperately need to find someone to take over the planning for next year's show. Please consider volunteering for this important job!**

**Coming Events**

✔ ✔ Several mineral, fossil, and geology clubs meet relatively nearby and encourage visitors. These include:

>**Cañon City Geology Club**, meets on the 2nd Monday of the month at 6PM in the United Methodist Church, Cañon City;

>**Colorado Springs Mineralogical Society**, meets on the 3rd Thursday of each month at 7PM in the Colorado Springs Senior Center, 1514 N. Hancock Ave., Colorado Springs;

>**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;

>**Pueblo Rockhounds**, meets on the 3rd Thursday of each month at 6:30PM in the Westminster Presbyterian Church, 10 University Circle, Pueblo.

✔ ✔ **Pete Modreski** and others sent notices of the following upcoming events:

**Aug. 4-6, Creede Rock & Mineral Show**, at the Creede Underground Mining Museum and Community Center, Creede, Mineral County, CO. 10 a.m. – 5 p.m. daily; see http://creederocks.com/ .

**Aug. 10-13, Contin-Tail rock & mineral show,** Buena Vista Rodeo Grounds, Buena Vista, CO; see www.facebook.com/ContinTail

**Aug. 17-20, Woodland Park Rock, Gem, & Jewelry Show**, Woodland Park, CO; see https://www.facebook.com/woodlandparkrockandgemshow/

**Aug. 18-20, Lake George Gem & Mineral Show,** sponsored by the Lake George Gem and Mineral Club, Lake George, CO. See http://www.lggmclub.org/; set-up will be on August 12.

**Sep. 8-16, Colorado Mineral and Fossil Fall Show,** Crowne Plaza Hotel - Airport, 15500 E. 40th Ave. Denver, CO.

**Sep. 9-17, Denver Coliseum Mineral, Fossil, and Gem Show**, Denver Coliseum; see http://www.coliseumshow.com/

**Sep. 13-16, Denver Fine Mineral Show**, Denver Marriott West**,** 1717 Denver West Blvd.; see http://finemineralshow.com/denver/

**Sep. 14, Friends of Mineralogy September meeting; a tour of the new mineral collection archives at the Denver Museum of Nature & Science, led by Dr. James Hagadorn, Geology Curator.**

**Sep. 15-17, 50th annual Denver Gem and Mineral Show,** Denver Mart, 451 E 58th Ave., Denver, CO. **Gold and Silver** is the 2017 show theme. See http://denvershow.org/wp/

**Nov. 11-12, 38th annual New Mexico Mineral Symposium,** at New Mexico Institute of Mining & Technology, Socorro, NM; see https://geoinfo.nmt.edu/museum/minsymp/home.cfml

**Nov. 17-19**, **Denver Area Mineral Dealers Show,** Jefferson County Fairgrounds, Golden CO**.**

✓ ✓ **Bob Baker** sent this note about this summer's field trips:

**2017 Field Trips**

August 2: Mushroom gulch (jasper)
August 9: Spruce Grove (topaz) (moderate hike at 9000 ft.)
August 26: Eureka mine (fluorescent zircon/riebeckite/astrophyllite) (moderate walk)
Sept. 8-10: Great Salt Plains (gypsum crystals) (3-day trip to Oklahoma) Tentative: Need a trip leader!

Bob Baker
bobsboards46@gmail.com
719-464-7102

✓ ✓ Bobby Korzekwa asked me to report that he is stepping down as Treasurer for 2018. **Please consider volunteering to run for Treasurer in the election that will be held later this fall.** If interested, e-mail Bobby at bobbydorzekwa@yahoo.com.

✓ ✓ **Paul Combs** sent this item about the St. Peters Dome fluorite trip July 15:

We departed Cheyenne Mountain High School at 0900 today and I would estimate around 20 club members participated in the fluorite dig. Everyone found a lot, with plenty of good color. Surprisingly, most of the participants had never been to St. Peter's Dome, but they all seemed to be enthused and happy with their discoveries.

**Bob Baker** was also there, and he was very helpful with the club members. No accidents, injuries, etc., to report.

Several people pointed to a club member who was carrying a large-caliber pistol in a holster. Is that permitted on LGGMC collecting trips? I can't possibly imagine what he thought he was going to shoot, since rocks don't tend to run far, or fast, or shoot back. (Although I have been attacked in the past by aggressive rocks charging down a steep slope. They can move when pretty quickly when the urge hits them, and they hurt.)

I understand that open-carry is a form of political expression, but it is a dangerous one, especially with so many people preferring to carry pistols that lack safeties.

Anyway, to return to the fluorite, members began to depart when some very threatening clouds moved in. Later, when sprinkles arrived, we all declared it to be a fine collecting day and took off down Old Stage Road--which was in very good shape, by the way. Thank you, El Paso County!

✓ ✓ **Betty Cain** noticed that prices for National Park Service senior passes will increase from $10 to $80 on August 28. Anyone who doesn't have a senior pass and who will be 62 or older as of August 28 should buy theirs before that date. You can buy one online at the USGS Store ($10 handling charge) or go to the visitor's center at any national park or monument (e.g. Florissant Fossil Beds N.M.)

✓ ✓ **Wayne Orlowski** sent several interesting links, including the following:

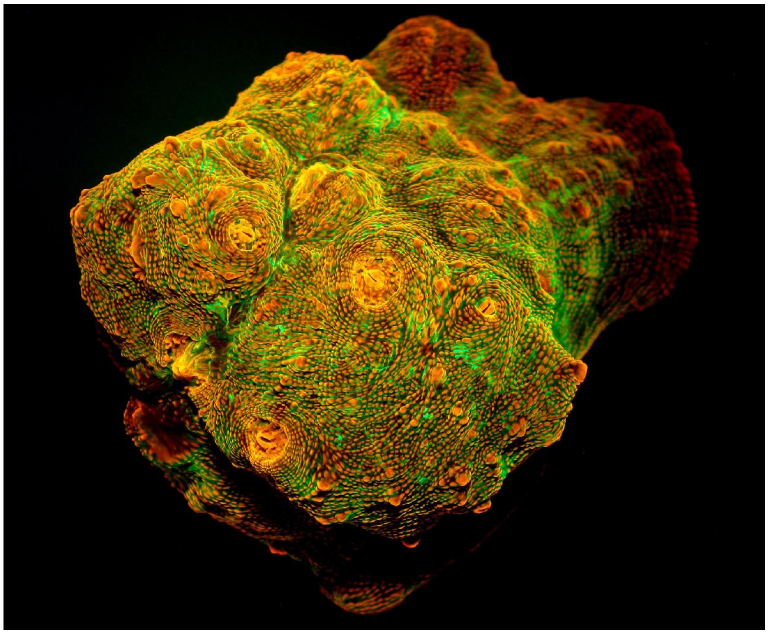
"Ice drilling project aims to unearth how islands form":
https://www.scientificamerican.com/article/iceland-drilling-project-aims-to-unearth-how-islands-form/

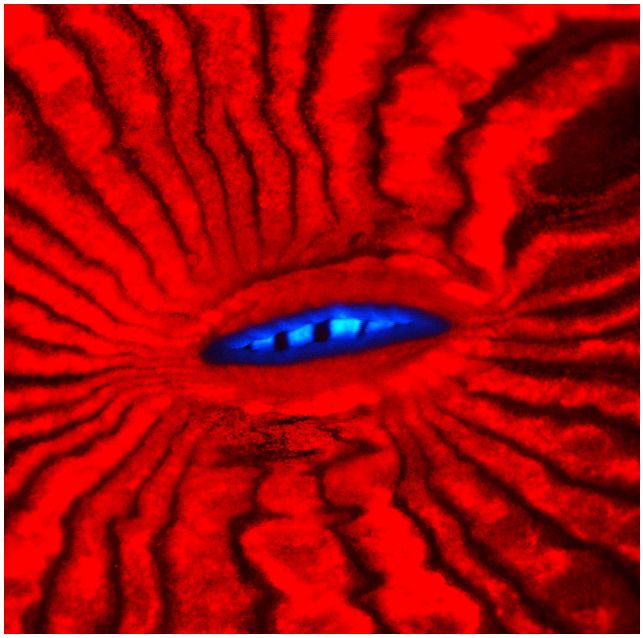
Scientists will look into the heart of Surtsey, an island created 50 years ago by a volcanic eruption.

…and:

In the Deep, Dark Sea, Corals Create Their Own Sunshine

By JOANNA KLEINJULY 7, 2017





Left: *Echinophyllia* sp., a deep water coral that produces fluorescent orange-red light. CreditE. Smith
Right: The mouth region of the coral *Lobophyllia hemprichii*. Some corals that live well below the ocean's surface produce light to drive photosynthesis for algae that live with them. CreditJ. Wiedenmann

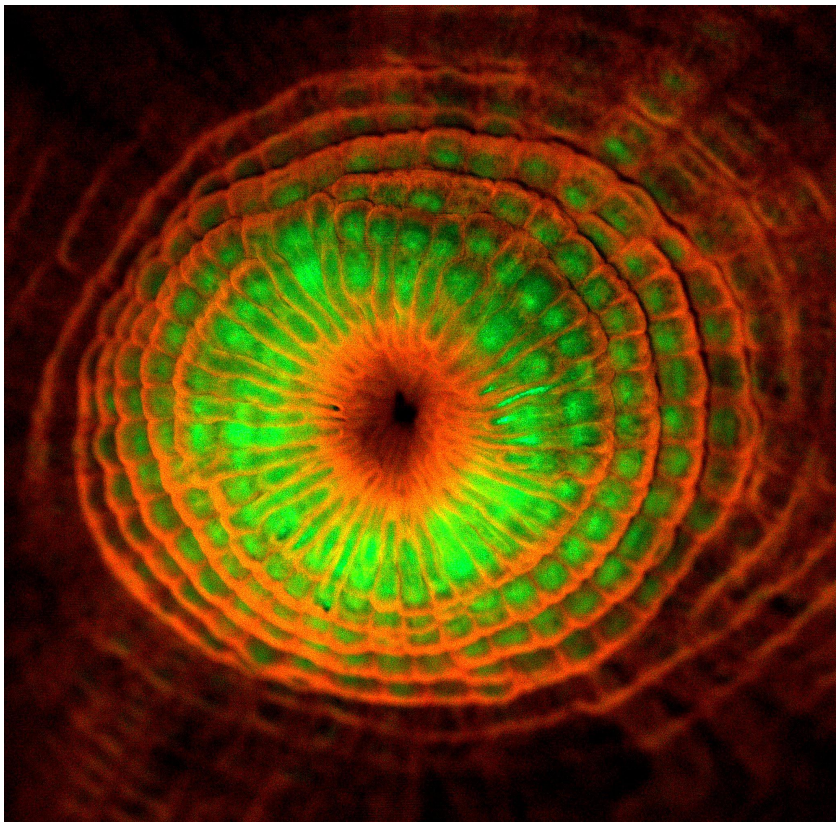
Corals are pretty and colorful and fluorescent. They produce their vibrant colors because they don't live alone, which is also what keeps them alive.

Over billions of years they've worked out a special arrangement with algae: Corals give them shelter and algae convert light into food for the corals. Corals do other things for the algae, too. Deep inside their tissue are little proteins that take the sun's ultraviolet light and turn it into a glowing green sunscreen, shielding from the sun these corals that live just below the water's surface.

But deeper in the water, it's dark and the little light that reaches that far down is only in the blue part of the spectrum. Somehow, there are corals that live up to hundreds of feet below the surface and also manage to glow burning hues of orange and red.

The reasons for this fluorescence have remained a mystery, until now: These deep-sea corals glow to get more sunlight, according to a study published on Wednesday in the journal Proceedings of the Royal Society B. Their proteins soak up the scarce light and shine it back out as red-orange light that penetrates deep inside their tissues where their microscopic roommates take up residence. This means there's light for photosynthesis, and the algae creates energy and food for the coral.

"This is a strategy that some corals pursue to cope with the challenges of a low-light environment," Prof. Joerg Wiedenmann, a biologist at the University of Southampton in Britain who led the study, wrote in an email. It's quite an adaptation, with a brilliant byproduct.



A polyp of the coral *Montastraea cavernosa*. The proteins in some deep-sea corals soak up the scarce light.

The research could have implications for coral-reef conservation by highlighting how different species of coral adapt to various light conditions. For two decades scientists have considered the idea that deep-sea reefs might provide a safe haven for shallow-water corals during threatening times of extreme heat. The thought is that shallow coral larvae pulled down by currents could survive long enough to reproduce and send their offspring back near the surface when temperatures returned to normal.

But "the depth might not offer a convenient escape road," said Dr. Wiedenmann. He said he worries that shallow-water corals may not be able to adapt to the little light down deep.

"We need to make sure that their homes in the shallows stay habitable," he said.

✔ ✔ And here is the latest installment of "Bench Tips" by Brad Smith (www.BradSmithJewelry.com):

## FIND THE BALANCE POINT

With odd-shaped pendants or earrings it's often difficult to find the right place to attach a bail or loop so that the piece is balanced and hangs straight. A quick way to make a tool for this is to modify a set of tweezers. Any set of tweezers will work. Spread the tips, sharpen them with a file, and bend the tips at a right angle to point towards each other. To use the tool suspend the pendant or earring between two sharp points to see how it will hang.

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## DRILL BREAKAGE

Using a small drill is difficult for a beginner, especially if it is hand held in a flexshaft or Dremel. They are easily broken if you push too hard or if you tilt the drill while it's in the hole. Most problems, however, are the result of buying cheap drills that suffer from poor quality steel or inaccurately ground cutting edges. A good drill from jewelry-supply companies is well worth the price.

Remember that drilling always goes easier with lubrication. A little wax or oil is all you need. Almost anything will work - Three and One, beeswax, mineral oil, injection wax, car oil, olive oil, or one of the commercial cutting waxes. The lubricant helps to move chips out of the hole and reduces friction of the drill against the side of the hole, keeping the drill cooler.

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See all Brad's jewelry books at Amazon.com/author/bradfordsmith

## Notes from the Editor

Bob Carnein, Editor
ccarnein@gmail.com
719-687-2739

Metamorphic rocks are common at many central Colorado mineral localities (e.g. the Sedalia and Calumet mines; Wilkerson Pass area; garnet area near Canon City). The following short article will help you to identify the metamorphic host rocks and the minerals that geologists use to determine the grade of metamorphism (high, medium, or low grade).

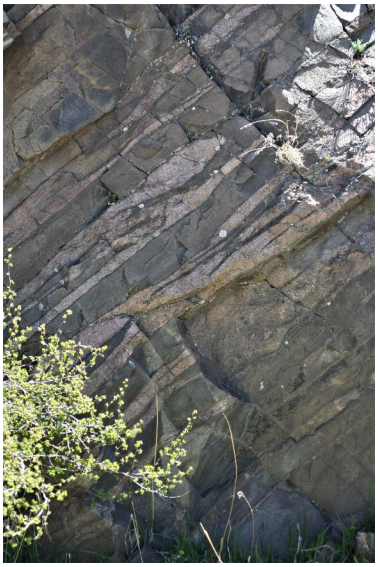
# Metamorphic Index Minerals

Bob Carnein

Metamorphic rocks form where previously existing rocks were exposed either to intense heat (contact metamorphism) or to the combined effects of heat and pressure (regional metamorphism). Contact metamorphism is usually confined to narrow (seldom more than a few inches) zones adjacent to igneous rock bodies (e.g. an intrusion or lava flow). In such rocks, the original minerals recrystallize but show random orientation (they are non-foliated) because there was no pressure to cause them to align themselves. Much more widespread is regional metamorphism, in which the effects of increased temperature and increased pressure cause platy or elongate minerals (e.g. micas, hornblende) to become aligned while they recrystallize.

Other than the Pikes Peak Granite, one of the most widespread rock units in central Colorado is the Idaho Springs formation (Figures 1, 2). This varied sequence of metamorphosed sedimentary and volcanic rocks is about 1.75 Ga (billion years) old, but the original rocks may be more than 2 billion years old. Those protoliths were deeply buried in a zone of mountain building, where tectonic plates or volcanic island arcs collided. They were compressed and heated to the point of partial melting—they underwent intense regional metamorphism. A common question for beginning mineral collectors is, “How do we recognize the effects of these old mountain-building episodes?”

Metamorphic petrologists are geologists who study the characteristics and origins of metamorphic rocks. Such rocks are recrystallized, and, except in very simple rocks such as quartz sandstone and limestone, their chemical components have been “reshuffled” to create new minerals. For example, clay minerals in a shale may recrystallize to form micas. Most important, although new minerals are forming, the new rocks retain the bulk chemistry of their protoliths—metamorphism is essentially

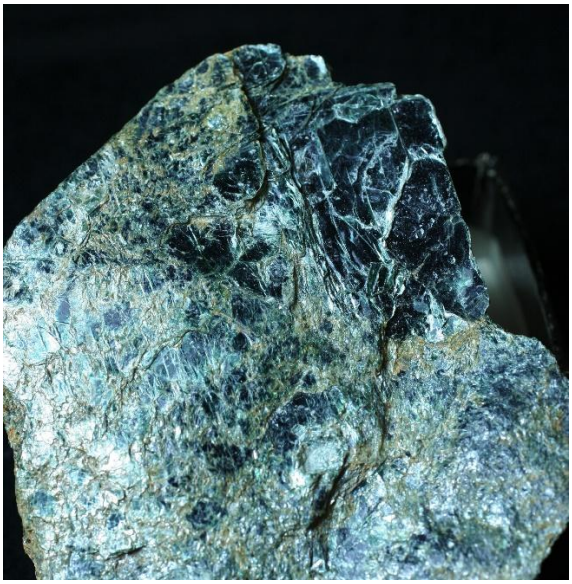
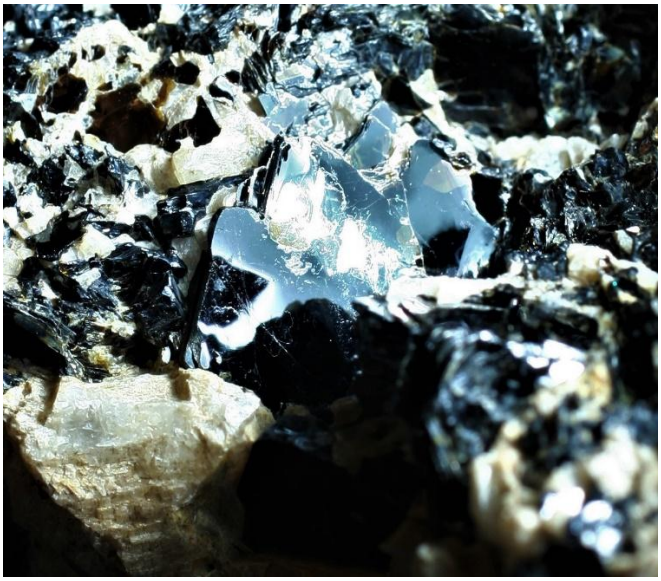


**Figures 1 and 2. Metamorphic rocks exposed in Cripple Creek. (Carnein photos)**

isochemical. Thus shale and mudstone (the commonest kinds of sedimentary rocks) have essentially the same bulk chemistry as a slate or schist formed when they are heated and compressed. Their mineral compositions are different, but their chemical compositions are the same. Thus, metamorphic rocks give us powerful clues about the rocks they were derived from.

In their quest to develop geologic histories of areas of complexly deformed rocks, metamorphic petrologists want to be able to reconstruct the grade of metamorphism—the combination of maximum temperature and pressure that the protolith was exposed to when it was deformed and recrystallized in a zone of mountain building. This can become very complex, because there are a nearly infinite number of possible protoliths. However, for the most common sedimentary protoliths (shale and mudstone, aka pellites), petrologists long ago recognized that a series of 6 common minerals appear, in succession, as the temperature and pressure increase. These minerals are called metamorphic index minerals, and, with a little practice, you can learn to look for and recognize these clues to metamorphic grade. Chances are that you already are familiar with at least 2 of them.
The clay minerals in shale and mudstone are mostly aluminum silicates, and, when metamorphosed, they recrystallize to form other aluminum silicates. At lowest metamorphic grade, the first such mineral to form is the green mica chlorite (Figure 3). As temperature and pressure increase, reorganization of the chemical components of the rock produces the black mica biotite (figure 4). Chlorite and biotite are both considered to be index minerals for low grade metamorphism.

While biotite remains stable, further increases in temperature and pressure may next produce almandine (garnet), indicating that the rock underwent medium grade metamorphism. Almandine can often be recognized by its reddish or purplish color and its great hardness (harder than glass or a knife blade). Almandine crystals are more or less equidimensional—they may appear to be nearly spherical in small grains (figure 5). If the chemistry of the protolith allows it, the next mineral to appear is staurolite. Staurolite occurs as medium to dark brown prismatic crystals, as shown in Figure 6. Note that staurolite, almandine, and biotite commonly appear together in a single metamorphic rock—geologists must look for them all and use the one that formed at the highest temperature and pressure to determine the metamorphic grade.

**Figures 3 and 4. Chlorite (left) and biotite (right) are micas that indicate low grade regional metamorphism. (Carnein photos)**



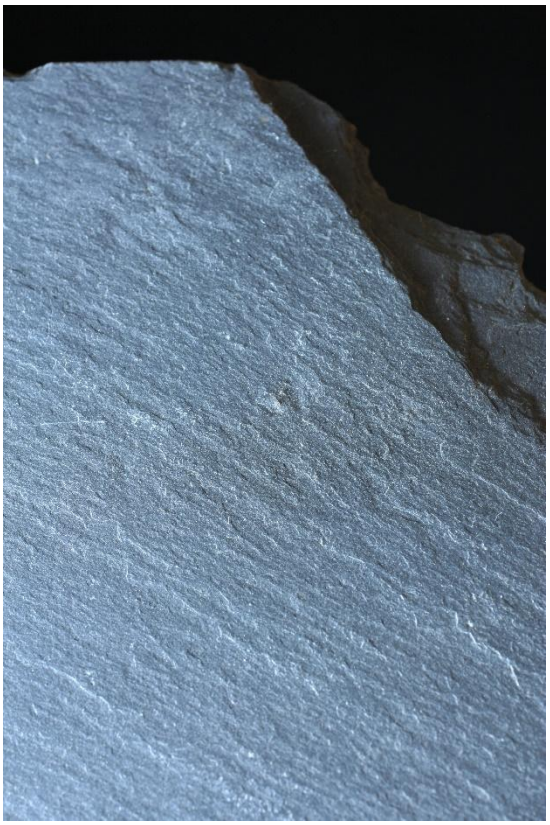
**Figures 5 and 6. Almandite garnet (pinkish purple) (left) and staurolite (brown) (right) are metamorphic index minerals for medium grade regional metamorphism. (Carnein photos)**

Next in line, especially where pressure was very high, is kyanite. Although its color is somewhat variable, most kyanite occurs as pale blue bladed crystals, making it easy to distinguish from most other common metamorphic minerals (Figure 7). Beware, though, that the crystals may be very

small—always use a 10x hand lens when trying to identify minerals in metamorphic rocks. At a combination of very high pressure and temperature, sillimanite forms from shale or mudstone protoliths. This mineral is generally light tan or gray and occurs as silky fibers that have cracks running across their lengths (Figure 8). It definitely is best identified with a hand lens. It is often associated with muscovite (the silvery mica) and/or orthoclase feldspar, which allows geologists to further refine their temperature and pressure interpretations.

**Figures 7 and 8. Kyanite (left) and sillimanite (right) are index minerals for high grade regional metamorphism of pellites. (Carnein photos)**

With increasing temperature and pressure, shale and mudstone also go through a series of changes of **texture** that are easy to recognize. Thus, shale first converts to slate, which is harder than shale and has a dull sheen caused by the parallel alignment of microscopic mica flakes (Figure 9). As temperature and pressure increase, the micas continue to grow, producing phyllite, which typically has a silky sheen caused by the larger (but still very small) mica crystals (Figure 10). If temperature and pressure increase further, phyllite converts to schist, in which the mica grains are clearly visible and identifiable (Figure 11, 12). If the original rock contained particles of quartz and feldspar, these may also grow during metamorphism. Eventually, they may separate from the micas, forming alternating bands in the rock called gneiss (pronounced “nice”) (Figure 13). Because the Idaho Springs Formation in central Colorado has undergone high grade metamorphism, most of them are now gneisses and schists.




**Figures 9 and 10. Typical appearance of slate (left) and phyllites (right). (Carnein photos)**


**Figures 11, 12. Chloritic mica schist (2 views). (Carnein photos)**

**Figure 13. Hornblende gneiss, showing banding. (Carnein photo)**

**Buena Vista Contin-Tail.**

PO Bo 171
Lake George, CO 80827

**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).

## Our Officers for 2017 are:

**John Sprouse**, President
402 Fremont St.
Penrose, CO 80814
719-372-3172
coedodge@yahoo.com

**John Rakowski,** Vice President
PO Box 608
Florissant, CO 80816
719-748-3861
rakgelogist@yahoo.com

**Bob Korzekwa**, Treasurer
11120 Falls Ave.
Green Mountain Falls, CO80819
bobbykorzekwa@yahoo.com

**Norma Rhodes**, Secretary
7546 Duck Hawk Place
Fountain, CO80817
normajalexander@gmail.com

**C.R. (Bob) Carnein**, Newsletter Editor
507 Donzi Trail
Florissant, CO 80816
719-687-2739
ccarnein@gmail.com