The Lake George Gem and Mineral Club -

Club News, November, 2009

Regular Meeting of the Lake George Gem & Mineral Club
Saturday, November 14, 10:00AM
Lake George Community Center

"A History of Miners' Lamps and Methane Detectors"

By Bob Carnein and John Rakowski

Over thousands of years, miners have used a variety of means to get light into dark spaces. From torches and mirrors to oil lamps, candles, acetylene gas, and batteries, the technology of mine lighting has taken many twists and turns. Miners' lamps are an interesting collecting sidelight that appeals to those who like the history of mining and technology. Miners' lamps have also served a secondary function in many mines. They are useful as indicators of dangerous gases (carbon monoxide, carbon dioxide, and methane) that are especially common in coal mines but that may also be encountered in other kinds of mining. The program will look at the history of underground lighting and gas detection and at modern gas-detection devices. **Bring specimens for the silent auction and "show and tell" items for identification.**

Coming Events

Mineral, Fossil, Gem, & Jewelry Show, Jefferson Co. Fairgrounds, 15200 W. 6th Ave. service road (west of Indiana St.), Golden. Free admission. Fri./Sat. 10-6; Sun. 11-4. **… Nov. 6-7**

Monthly meeting, Columbine Gem & Mineral Society, "Stamps featuring minerals"; 6:30PM, Shavano Manor, 525 W. 16th (at J St.), Salida **… Nov. 12**

Monthly meeting, Denver Gem & Mineral Guild, 7:30PM, Berthoud Hall, Colo. School of Mines **… Nov. 13**

30th Annual New Mexico Mineral Symposium, Macey Center, New Mexico Institute of Mining and Technology, Socorro. Contact Virgil Lueth at 505-835-5140 for info. … **Nov. 14-15**

Free GPS Map and Compass Class, USGS, Building 810, Federal Center, Lakewood; 9AM to 4PM; call 302-202-4689 for information and reservation. … **Nov. 14**

Pueblo Rockhounds Monthly Meeting, 7:30 PM, Westminster Presbyterian Church, 10 University Circle, Pueblo … **Nov. 19**

Colorado Springs Mineralogical Society Monthly Meeting, 7:30PM, Colorado Springs Senior Center, 1514 N. Hancock, Colorado Springs … **Nov. 19**

Littleton Gem and Mineral Club Silent Auction, noon to 3PM, Columbine Hills Church, 9700 Old Coal Mine Ave., Littleton. Call Jim Hooten, 303-770-7177 or jahooten@msnl.com for information … **Nov. 21**

Florissant Scientific Society Program: "Iceland Volcanoes" by Bob Knapp, Chevron Classroom at Dinosaur Ridge. Contact Beth Simmons at cloverknoll@comcast.net for information. … **Nov. 22**

46th Annual Pikes Peak Gem & Mineral Show, Phil Long Expo Center, Colorado Springs, contact Rick Copeland, 719-332-7915 or rick@rockymountainwonders.com … **Dec. 5-6**

Flatirons Gem & Mineral Show, Boulder County Fairgrounds, 9595 Nelson Rd. (Nelson & Hoover), Longmont … **Dec. 11-13**

Colorado School of Mines Book Sale (Details later) … **Feb. 15-19**

Denver Museum of Science & Nature Programs (visit their website for more info):

Nov. 3: Life Out There

Nov. 15: Meet Charles Darwin!

Dec. 3: The Tangled Bank: An Introduction to Evolution

Dec. 10: Sandstorms to Snow Leopards: The Cretaceous Tourist in Mongolia

Club News

⇨⇨About 28 people turned out in freezing fog for the October 10 meeting/field trip. New members at the meeting included **Bob Acker**, of Evergreen, and **Norma Engelberg** and **John Gibbs**, of Colorado Springs. **Sarah Lykens**, of the Coalition for the Upper South Platte, was also present and explained the Coalition's objective of cleaning up acid-mine drainage in the South Platte watershed.

⇨⇨We were all happy to see **Dee** and **Roger Loest** at the meeting. Roger is recovering from a recent illness. **Dick Lackmond** showed off his polished amethyst specimen, collected at the New Hope claim on the September 12 field trip (see photo below). It's hard to believe, but Pres. **John Rakowski** noted that planning has begun for the 2010 gem & mineral show. **Everett Johnson** has agreed to let us use the field in Lake George again. **Dan Alfrey**, our Vice President, webmaster, and field-trip czar, reported that the Club's website has been renewed. Check it out! Pres. **Rakowski** noted that, thanks to **Mary O'Donnell**, the Club's history book will be available to peruse at future meetings. Now, we need a volunteer to take over updating the book.

Dick Lackmond's New Hope Amethyst, with friends

⇨⇨John also reminded members of **Steve Veatch's** presentation on Earth Catastrophes at the first Pebble Pups meeting on Tues., October 13. (For more on the Pebble Pups program, see last month's newsletter and the new Pebble Pups Corner feature below.) A WalMart grant to help support the Pebble Pups is pending. After well received presentations by John and Steve in October, the Rocky Mountain Dinosaur Resource Center's Education Director, **Geri LeBold**, proposed to develop a 2-way cooperative arrangement with the Club. We'll no doubt hear more about this later.

⇨⇨**Pres. Rakowski** announced that the Colorado Federation of Gem & Mineral Societies has been rejuvenated. Club members voted to join the Federation, which aims to increase interaction among the 16 Colorado gem and mineral clubs. John then thanked **Becky Blair** for her faithful service as Club Secretary. He also thanked **Marge Breth** for agreeing to take over Becky's position. Members elected the following officers for 2010 by acclamation:

President: John Rakowski
Vice President: Dan Alfrey
Treasurer: Wayne Johnston
Secretary: Marge Breth

⇨⇨Members expressed their appreciation to **Dan Alfrey** and **Todd Mattson** for this year's great field-trip lineup. Todd gave away freebies of amethyst from the New Hope claim. The meeting was adjourned to allow members to go on a collecting trip to **Rich Fretterd's** Godsend claim.

⇨⇨Our condolences to Steven Woods, whose sister recently passed away.

"Pebble Pups Corner"

Our first Pebble Pups meeting was a success, with 6 students in attendance. **Austin**, **Casey**, **Connor**, **Kyle**, **Lindsay**, and **Patrick** all received free samples of marble and pyrite, thanks to **John Rakowski** and **Steve Veatch**. Steve gave a wide-ranging overview of geologic hazards and metamorphic rocks. November 10's topic will be "Ice Ages", and the study specimen will be **fluorite**. Remember, parents/family members are welcome to attend!

For the December 8 meeting, the topic has been changed to **"Minerals and How to Identify Them"**. Members who can donate spare samples (at least 10) of hardness-set minerals (especially **talc**, **gypsum**, **apatite**, **topaz**, and **corundum**), please contact Bob Carnein (at 719-687-2739 or ccarnein@gmail.com). We want to give each student a set, and, obviously, we don't want to buy samples if we can obtain them from Club members.

For January 12, the topic is "Ore Minerals". Again, if any of you have spare samples of the minerals listed below, please contact Bob at the above phone number/e-mail address.

bauxite	beryl	bornite	chalcocite
chalcopyrite	galena	goethite	hematite
lepidolite	magnetite	molybdenite	pyrolusite
scheelite	sphalerite	spodumene	stibnite
wolframite			

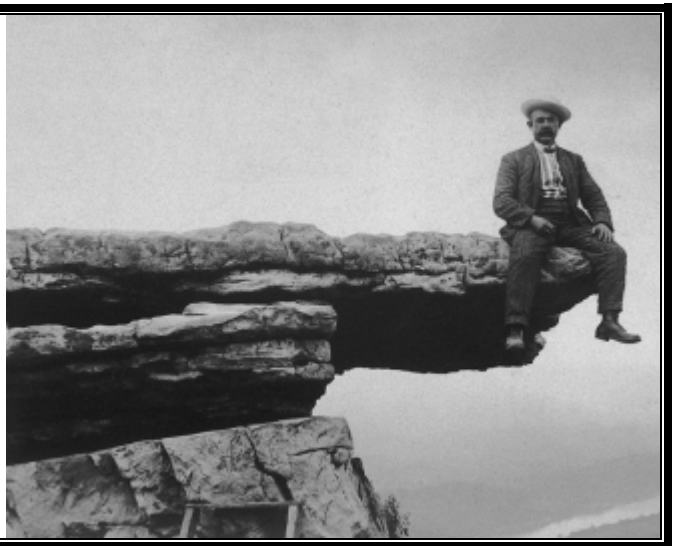
This is a "wish list"; if you have extras of other minerals, please let us know. We probably can figure out how to use them! Contact Steve Veatch, John Rakowski, or Bob Carnein.

Notes from the Editor

Bob Carnein, Editor

ccarnein@gmail.com

719-687-2739



News from CSM The Colorado School of Mines Museum now has a portable X-ray fluorescence (XRF) unit. Chemical analyses of specimens are available to the general public for $50 per sample. CSM also is organizing a new, non-profit "Friends of the CSM Museum" group. Dues are $30 (individual) or $50 (family). The Museum is also soliciting the loan of topaz specimens for a 1-year display, starting August, 2010. If you have something you would like to loan, contact Bruce Geller at the phone number below. Finally, the Museum offers special private tours for clubs. Contact Bruce at 303-273-3823.

This month's main article is on pyrite. If you think pyrite is, let's say, one of the less important minerals out there, think again!

Pyrite: It's More Than Just "Fools' Gold"

by Bob Carnein

Of all the sulfide minerals you're likely to encounter, pyrite (FeS_2) is by far the most common. It occurs in all three basic classes of rocks, as well as being a common constituent of

hydrothermal ("hot water") mineral deposits, where it's often found with other sulfides. Examples include galena (PbS), sphalerite (ZnS), and chalcopyrite ($CuFeS_2$), as well as more exotic minerals, such as molybdenite (MoS_2), tetrahedrite ($Cu_{12}Sb_4S_{13}$), and a large variety of other important ore minerals.

Pyrite bears a superficial resemblance to gold. Its brassy yellow color and metallic luster resemble those of some naturally occurring gold-silver alloys (e.g. electrum). Its specific gravity, at 5.02, is just high enough to make it noticeably heavier than most other common minerals. (For comparison, quartz is 2.65; gold is 15 to 19.) As a result, some inexperienced and overly optimistic prospectors have been known to collect bags full of it, thinking they had struck it rich. Hence the nickname "fools' gold".

Most collectors view pyrite as a common mineral that sometimes occurs as attractive specimens, but is otherwise of little consequence. Crystals, which are isometric ("cubic"), can be large and impressive and may show a number of simple or combined forms. The most familiar include cubes, octahedrons, and pyritohedrons (aka pentagonal dodecahedrons) (see Figs. 1, 2, and 3). Nearly every mineral show includes

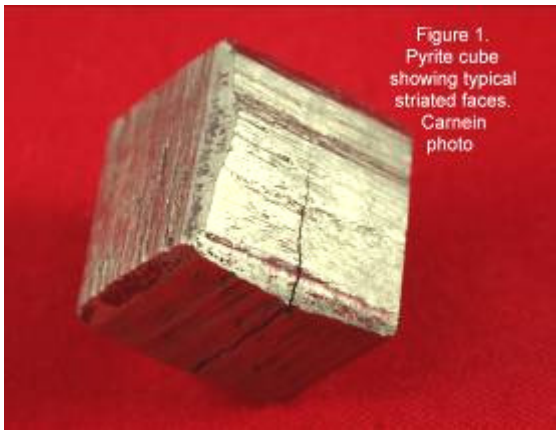


Figure 1. Pyrite cube showing typical striated faces. Carnein photo

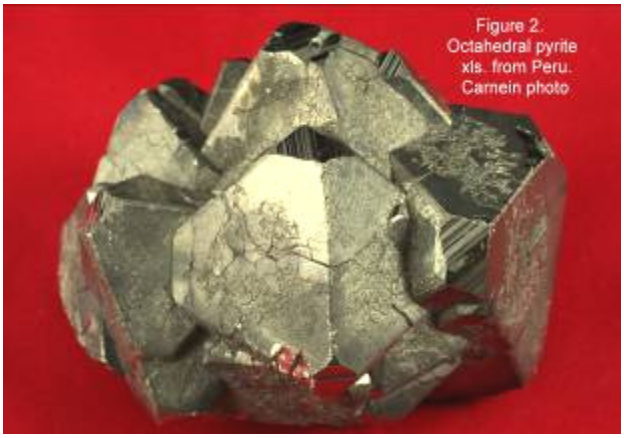
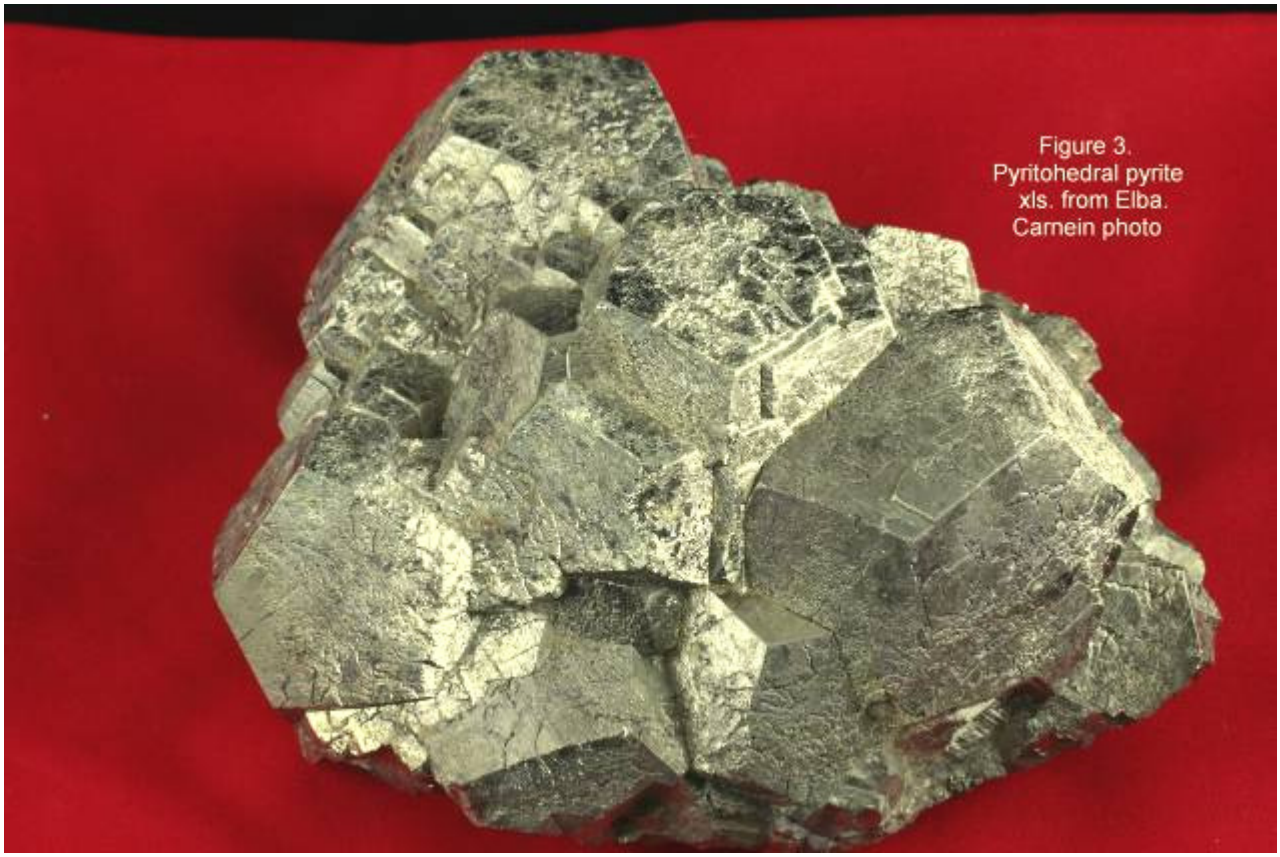


Figure 2. Octahedral pyrite xls. from Peru. Carnein photo

dealers selling spectacular groups of cubic pyrite crystals (often reassembled!) from Navajun, near Logroño, Spain. Many Colorado localities (most notably Leadville, Climax, Central City, Rico, and Gilman) yielded handsome crystals or crystal groups of interest to collectors. Pyrite crystals from the Leadville district include cubes up to almost 12 inches on edge (see Roots, 1951; Muntyan and Muntyan, 1994; and Eckel, 1997 for more information on Colorado pyrite).

Some pyrite is chemically unstable in the presence of moist air. The writer has had specimens eat through labels and cardboard trays in storage cabinets in the humid air where he used to live in Pennsylvania (Figure 4). Beautiful crystals may crack and crumble, yielding whitish iron sulfates that are extremely soluble in water. What's worse, the fumes emitted by rotting pyrite may attack other minerals stored in the same drawer. You can literally smell it as it decays. What, you might ask, is the problem?



The problem of decaying pyrite is far worse than just a matter of destruction of mineral specimens. When pyrite breaks down out of doors, it can produce an acidic brew that kills plants and animals in streams. The rust-colored streams of the Appalachian coal fields and some mining areas in Colorado are visual cues to the presence of pyrite in the rocks. When mining breaks up rocks, any contained pyrite is exposed to air, moisture, and helpful bacteria. Sulfur released as the pyrite breaks down contributes to the formation of sulfuric acid. Oxygen in the air combines with the iron to form various colorful iron oxides and hydroxides (e.g. "limonite", goethite, and hematite), all of which are chemically stable. These iron compounds

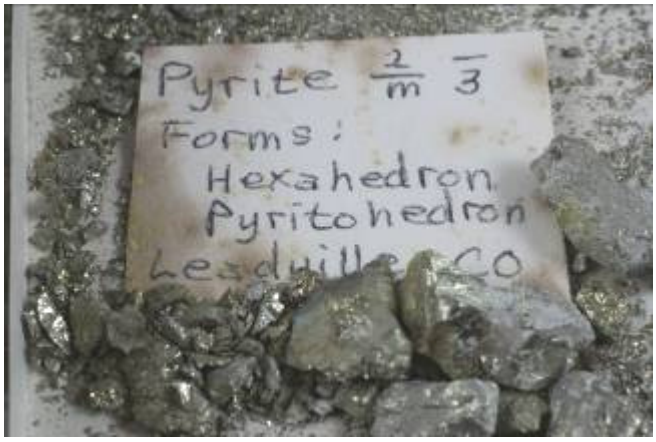


Figure 4. Deceased Leadville pyrite crystal in the writer's collection.

attach themselves to rocks in the stream bed, producing what some folks call "yellow boy"—a highly visible indication of acid-mine drainage (Figure 5). Acid-mine drainage has destroyed the wildlife in thousands of miles of streams in mining states, including Colorado. Nation-wide, the costs of cleaning it up are estimated in the billions of dollars, and all treatment methods require periodic renewal.

Figure 5. Yellow boy in acidified stream.

Of course, pyrite also breaks down as a result of slow, natural weathering processes, without the help of mining activity. In a moist climate, the dilute sulfuric acid normally forms in such small quantities that it is simply washed away, while iron oxides may coat fractures and mineral grains in the host rocks. In an arid climate, weathering processes are even slower. If rain water containing sulfuric acid soaks into the rock and soil over millions of years, rather than running off, the acid may gradually attack other minerals that are otherwise relatively stable. For example, in ore deposits that contain galena, sphalerite, and chalcopyrite, acid from the breakdown of pyrite attacks these minerals, releasing lead, zinc, and copper cations (positively charged atoms). These are carried by water through pores and cracks in the rocks. Above the water table, if oxygen (O^-), carbonate (CO_3), sulfate (SO_4) or other (negative) anions are present, the metal cations combine with the anions to form an amazing array of interesting and beautiful oxygen-containing minerals. For example, lead from galena may recombine to form cerussite ($PbCO_3$) or anglesite ($PbSO_4$); zinc may form hemimorphite (zinc silicate) or smithsonite ($ZnCO_3$); and copper commonly produces malachite and azurite (both copper carbonates). There are hundreds of other examples (400 or so for copper alone). Were it not for the presence of pyrite in the original rock, most of these minerals would occur only as inconspicuous crusts.

In arid regions, a thick cap of these secondary oxidized minerals may accumulate above the water table, along with iron oxides—the residue of thousands of feet of weathered ore, most of which has been lost to erosion. Besides making nice specimens for collectors, the resulting oxidized minerals may themselves be locally important ores. They are generally close to the surface and cheap to mine and process. Examples include the minerals cited above. Any metal ions that make it below the water table without being precipitated are re-deposited as secondary sulfide minerals, sometimes in bonanza quantities.

Ironically, although pyrite is often called fools' gold, it sometimes contains enough gold to constitute an important gold ore. In Colorado, significant amounts of gold occurred in pyrite in the Georgetown, Summitville, Red Mountain, Alma, and Telluride areas. The current huge open-pit gold mine north of Victor exploits some pyritic gold ores, in which calaverite is intimately mixed with pyrite in very small grains. Because gold is nearly insoluble, weathering of some pyritic ores may concentrate gold with the insoluble iron-oxide residue left behind when pyrite decays. As a result, in the old days, savvy prospectors commonly focused their attention on "rusty rocks" (Figure 6).

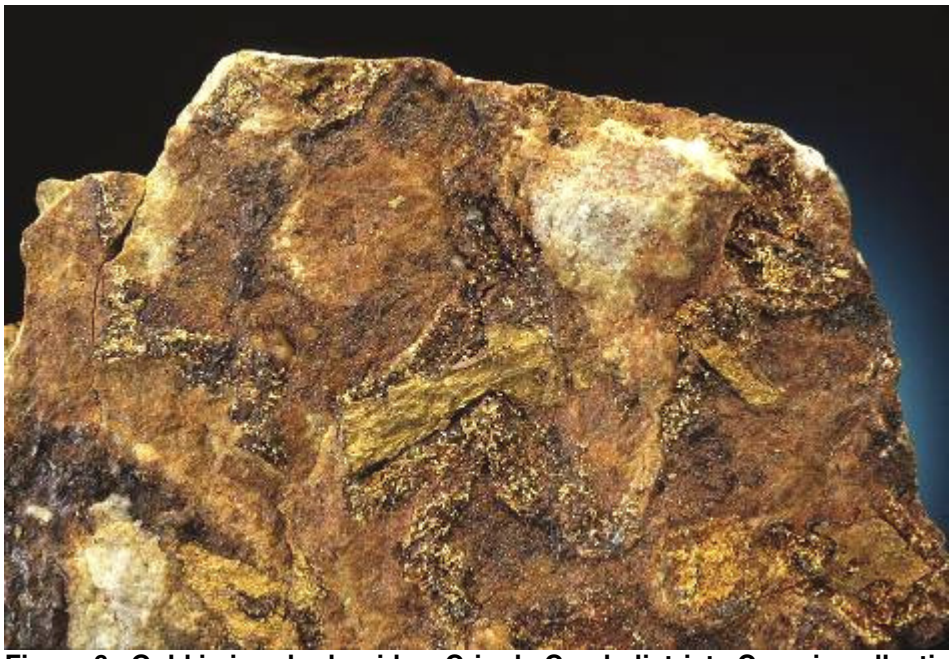


Figure 6. Gold in iron hydroxides, Cripple Creek district. Carnein collection; Jeff Scovil photo.

So, don't only think of pyrite as an environmental nightmare or as lowly "fools' gold". Although it seldom has much intrinsic value, pyrite is indirectly responsible for some of the most beautiful, coveted, and valuable mineral specimens seen in museums and at shows. It may even contain some real gold!

References Cited

Eckel, E.B., 1997, *Minerals of Colorado, Updated and Revised by R.R. Cobban, et al.*: Friends of Mineralogy-Colorado Chapter, Inc., Golden, CO, Fulcrum Publishing, 665 p.

Muntyan, B.L., and J.R. Muntyan, 1994, Colorado pyrite: Rocks and Minerals, v. 69, no. 4, p. 220-235.

Roots, R.D., 1951, Pyrite: Rocks and Minerals, v. 26, nos. 11-12, p. 598-600.

Lake George Gem and Mineral Club
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Lake George, Colorado 80827

2009 MEMBERSHIP APPLICATION

Name(s) _____

Address _____City _____State __ Zip _____

Telephone ( ) _____-_____ E-mail _____

Names and ages of dependent members: _____
_____

Annual membership - dues Jan. 1 through Dec. 31 are as follows:

- Individual (18 and over) …….. $15.00
- Family (Parents plus dependents under age 18) ……. $25.00

Annual dues are due on or before March 31. Members with unpaid dues will be dropped from the roster after this date. **Anyone joining after August 30 shall pay one half the annual dues.**

I hereby agree to abide by the constitution and by-laws of this club.

Signed _____ Date: ____/____/____

I have previously been a member of Lake George Gem & Mineral Club. Yes __ No ___

My interest areas include:
Minerals __ Fossils__ Lapidary __ Micromounts __
Other _____

I would be willing to demonstrate any of the above for a club program or educational activity? If yes, which: _____

Please indicate which of the following activities you might be willing to help with:

Writing _____ Editor _____ Mailing _____ Local shows _____

Club Officer _____ Programs _____ Field trips _____ Refreshments _____

Questions about the club or club activities? Contact John Rakowski (719) 748-3861

Lake George Gem and Mineral Club
P.O. Box 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 an opportunity to learn about earth sciences, 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 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 10:00 AM. From April through September, we meet at 9:00 AM, 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).

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