The Lake George Gem and Mineral Club -

Club News, July 14, 2007

Meeting Time 9:00 AM!

Come early for the Silent Auction:
For the silent auction, please bring items you are willing to contribute to the club, and a few dollars to buy things with!

<u>July 14th Field Trip: Petra Topaz</u>
On the day of the club meeting, club member Richard Fretterd has generously given permission to our club *on a one time only* basis to collect on his Petra mining claim, approximately 10 miles north of Lake George in the Tarryall region. This relatively new claim, staked April, 2004, has yielded beautiful crystals of topaz (see the excerpt, below, from an article on the Petra Claim, punlished earlier in this newsletter). This trip is an exceptional opportunity **for those who are in good health**.

The hike initially crosses a separate active mining claim where no collecting is allowed. It will be essential therefore for all who attend to listen carefully to instructions from Rich and/or Dan Alfrey (who is assisting). The hike continues up steep, rocky terrain to the collecting site at about 9500 feet elevation. Members attending should not wander off to explore the mountain. Mountain lions and bears have been known to frequent this area. Bring <u>plenty of water</u>, lunch, sunscreen, and a hat. Rain gear may be a wise addition. A rock hammer, gloves, a ¼" screen and a shovel may be helpful. A walking stick will be useful. Hiking boots are recommended as there is plenty of opportunity to turn an ankle. **No pets or children allowed on this hike.**

As usual, a signup sheet, including waiver of liability, is required to attend this trip. We will leave immediately after a short 9 AM business meeting at the Lake George Community Center.

<u>Sat, JULY 21st Field Trip: Manitou Formation Trilobite and Invertebrate Fossils</u>

This year the club is offering a second field trip in July, to the Rainbow Falls area, about 12 miles north of Woodland Park. Jack Null (719-635-1779; jgnull103@earthlink.net), will lead the trip.

We will meet at 9:00 AM at the Urgent Care parking lot in Woodland Park, located 50 ft. north of the intersection of US Hwy. 24 and Colorado 67. The field trip will go until 3:00 PM.

Be sure to bring water, lunch, gloves, and a rock hammer, chisels, wrapping material and some type of brush or whisk broom. *Goggles are recommended*,

Collecting can be done near the parking area, with minimal hiking involved. fossils are in hard dolomite which has sharp edges so be prepared. Fossils can be found by simply searching through rock debris on slopes; some minimal digging into the rock can be done, but "quarrying" is not allowed.

Everyone attending must sign our standard field registration form the day of the trip. Do not wander away from the main area. Kids are welcome, but must be supervised at all times. A brief introduction to the geology will be given, together with a map and handout.

Petra Topaz!

(From *New Discovery of Topaz in the Pikes Peak Back Country*, by Steven Veatch and Rich Fretterd)

The specimens from the Petra Placer are remarkable for their size and clarity. Many specimens have a bluish tinge. The specimen shown (here) was found loose, just below the surface in an alluvial/colluvial deposit. The slightly abraded specimen had been transported a short distance from a crystal-bearing pegmatite. This topaz specimen has a blocky, prismatic crystal habit with some of the prism faces slightly etched. The pale-blue crystal has a transparent interior and is terminated at one end—the other end is the cleavage plane. Topaz in the Tarryall Mountains are often found with smoky quartz crystals (figure 2). The specimen in figure 3 was found in a ravine on Fretterd's claim just after a rain shower

New specimens continue to be found. Anhedral specimens are faceted into gems, while euhedral specimens make their way into museums or the mineral cabinets of rock hounds. The Petra Placer is now a significant Colorado topaz locality.

Topaz specimen from the Petra Placer. This prismatic crystal specimen terminates with a frosted pyramid on top. Rich Fretterd specimen, Steven Veatch photograph.

Coming Events

Lake George Gem and Mineral Club … **July 14, 2007**

Monthly meeting, 9:00 AM at the Lake George Community Center. The meeting will be followed by a fabulous field trip).

Lake George Gem and Mineral Club … **July 21, 2007**

Field trip to the Rainbow Falls area for trilobite and other Invertebrate fossils (details elsewhere in this newsletter).

Heritage Day in Florissant … **July 28, 2007**

Pikes Peak Historical Society, in cooperation with the Florissant Volunteer Fire Department and the National Park Service's Florissant Fossil Beds National Monument, sponsors the annual Heritage Day. Activities all around town from the 7:00AM pancake breakfast to 5:00PM. Contact the Society at the Museum, (719)748-8259 for more information.

The Eocene Life Of Florissant: Paleontology of the Plants, Insects, Mammals, And Diatoms of the Florissant Formation … **July 28-29, 2007**

This seminar by Herb Meyer PhD., Dena Smith PhD., Jaelyn Eberle PhD., and Mary Ellen Benson, PhD. presents a complete overview of the ancient life that lived at Florissant during the late Eocene about 34 million years ago. A presentation of the Friends of the Florissant Fossil Beds. $65.00 fee To register and for more information call the Florissant Fossil Beds National Monument at 748-3253

The Creede Rock, Mineral & Fossil Show … **August 3-5, 2007**

10a-5p with free admission will be held at the Creede Underground Mining Museum with proceeds going to benefit the Creede Community Center. It is being sponsored by Rare Things Gallery and you may contact them at 719-658-2376 or you can call the Creede Chamber at 719-658-2374.

Geology of the Cripple Creek Mining District … **August 4, 2007**

9am - 5pm, presented by Steven Veatch, M.S. and Tim Brown, M.S. The Cripple Creek Mining District is one of the most interesting geologic regions in the country. In this field-oriented program, you will learn about the local geology and tour current operations at the Cresson surface mine. A presentation of the Friends of the Florissant Fossil Beds; $50.00 fee. To register and for more information call the Florissant Fossil Beds National Monument at 748-3253

"Contin-Tail" Rock Swap and Mineral Show … **August 9-12, 2007**

Rodeo Grounds, Buena Vista, CO. One or more field trips will be led to local areas. No charge; camping available. Sponsored by the Colorado Federation of Mineralogical Societies and hosted by the Columbine Gem & Mineral Society (Salida, CO). See http://www.coloradorocks.org/ or call 303-833-2939 or 720-938-4194 for information.

Leadville Field Symposium … **August 24 - 26, 2007**

Friends of Mineralogy Colorado Chapter will hold a Field Symposium in Leadville, Colorado on the mines, minerals, mining, preservation, and history of the Leadville Mining District. The Symposium will include talks at the National Mining Hall of Fame and Museum in Leadville and tours of the Museum, the Climax Mine and other mines and mineral localities around Leadville. There will be opportunities for collecting! Symposium events will start Friday evening and continue through Sunday afternoon. For more information contact Richard Parsons, FMCC President, at tazaminerals@att.net or 303-838-8859.

A New Park County Gem Discovery: Tarryall Fire Agate

By Steven Wade Veatch

Exceptional specimens of iridescent fire agate have recently been found in Park County, close to Tarryall Creek and near the Tarryall Reservoir. Fire agate is a variety of chalcedony (kal SED' uh nee), a form of microcrystalline or cryptocrystalline (crystals too small to be seen without high magnification) quartz (SiO_2) containing inclusions of limonite, producing an iridescent effect or "fire." Chalcedony is generally formed near the surface of the Earth, where temperatures and pressures are low. The Tarryall fire agate has a botryoidal (grape-like) growth form. The agate is also layered: it contains thin layers of plate-like crystals of iron oxide (limonite) in various planes. When light travels through these thin layers, the planes produce the iridescent color play of red, gold, and green.

Chalcedony	
Variety	**Color**
Agate	Variegated, banded
Carnelian	Red to brownish red
Chrysoprase	Apple green
Flint	Black dull gray
Jasper	Red yellow brown
Onyx	Black and white
Sard	Translucent, light to chestnut brown

Table 1.

The fire agate specimens were found as seams in granite near the Tarryall Creek. The Tarryall Creek is a tributary of the South Platte River, approximately 25 miles (40 km) long, in Park County in central Colorado. It drains a portion of north and central South Park, an intermontane grassland southwest of Denver. Tarryall Creek runs in several forks along the continental divide in the Pike National Forest and then flows to the southwest through a canyon where it enters South Park near the small town of Como and then crosses U.S. Highway 285 northeast of Fairplay. Tarryall Creek then meanders roughly southeast, later joining the South Platte River in the southeastern corner of South Park.

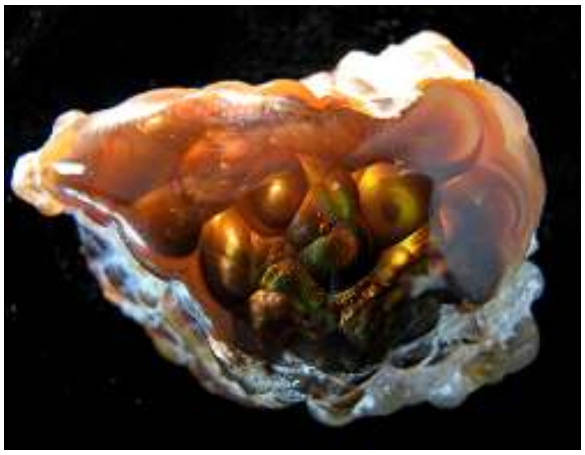
Fig. 1. View to northeast from Tarryall Creek Valley. Park County. Colorado. Photo date June, 2007, © by S. W. Veatch.

Dreams of gold and silver strikes lured early prospectors into the area. The Tarryall Creek, north of the present town of Como, was an active location for gold prospecting in 1859. The "Tarryall Diggings" and other nearby sites brought in thousands of prospectors over Kenosha Pass, and the town of Tarryall (now gone) was soon founded near the creek (McConnell, 1966). Failing to get rich quick, many of the

gold seekers moved on to other goldfields and mining camps while a few stayed on to ranch and log. The valley was rich in water and lush meadows. These early homesteaders cleared land, built cabins, strung up fences, broke ground for planting, and dug irrigation ditches in order to raise hay, barley, oats, and rye. Potatoes, turnips, carrots, and cabbage did well. Cattle ranching was the main economic activity. Several ranchers set up sawmills to provide lumber to other homesteaders along Tarryall Creek.

Prospecting still continues in the area today, chiefly for topaz crystals. A recent weekend trip to explore parts of the Tarryall Valley resulted in this new discovery of gem-quality fire agate. The fire agate was removed, in varying widths, from seams in granite rocks. The gem is thought to be formed when hot water, saturated with colloidal silica and iron oxide, invades cavities in country rock and then cools. As the solution begins to precipitate and grow layers of silica, iron oxide is deposited. These layers of silica and iron oxide cause the brilliant fire in the gem. As iron oxide is depleted in the solution, colorless chalcedony forms. This depletion of iron oxide can be seen along the edges of the specimen in figure 5.

Figure 4. A mid-to high end cutting fire agate specimen from the Tarryall Creek locality. Iridescent fire comes from thin layers of iron oxide crystals. This specimen measures 3.5 cm across. Lee Magginetti specimen. Photo date June, 2007, © by S. W. Veatch.



Physical Properties of Fire Agate (Table 2)	
Color	reddish brown, yellowish brown
Hardness	7
Specific Gravity	2.59-2.67
Light transmission	transparent to subtranslucent
Luster	waxy
Breakage	subconchoidal

Fire agate is also found in occurrences within the Sonora Desert region of northern Mexico and southern Arizona (*e.g.*, on Saddle Mountain, near Tonopah, Maricopa County and near Safford, Graham County), as well as in the Central Basin of Mexico.

Fig. 5. Good fire agates are impressive in their rich and dramatic color play. They form in cavities and cracks in the country rock from low temperature, silica-rich waters, similar to how black opal forms. Lee Magginetti specimen. Photo date June, 2007, © by S. W. Veatch.

References Cited:

National Audubon Society, 1979. *National Audubon Society Field Guide to North American Rocks and Minerals (Audubon Society Field Guide)*. Knopf, New York, 856p.

McConnell, Virginia, 1966. *Bayou Salado: The Story of South Park*. Sage Books, Chicago. 275 p.

Sedimentary Rocks: Shale

by John F. Sanfaçon

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In last month's issue, we mentioned that shale accounts for 70% by volume of all sedimentary rocks, which in turn account for only 5% of the Earth's crust to a depth of 10 miles. If that's the case, where is all that shale? After all, we are very familiar, at least in the 48 states, with the extensive outcropping of sandstone and limestone, which make up the other 30% of sedimentary species. The answer is that shale, composed of extremely fine (1/256 to 1/16 mm in diameter) particles of clay minerals (themselves the result of the chemical weathering of feldspars and micas), is beneath our feet in the soils and the bedrock below. Shale particles are so small that they cannot be identified with the naked eye, and therefore a number of tentative field terms have come into use, unfortunately meaning different things to different people: siltstone, mudstone, and argillite, plus adjectives such as clayey, argillaceous, silty, etc.

Shale sediments are microscopic, and tend to be tightly packed with tabular or flat fragments. But as shales contain very little porous space in which cementing materials in solution can percolate, the resultant rock tends to be crumbly, readily breaking down into soil cover. Shales thus can be physically unstable, yet impermeable due to their high clay content. Aquifers thus can be contained with these "waterproof" rock strata, whereas other, more porous rock species will more readily allow underground water to meander.

For the rockhound, shale is not as auspicious a matrix for mineral species as are limestone and dolostone, which can host a wider variety of mineral species because they are chemically vulnerable carbonate rocks. Sandstones and shales, on the other hand, are silicate-rich rocks made up of quartz or clay-family minerals which resist any further alteration. Therefore, shale hosts relatively few notable mineral deposits: the seams and cavities of Searles Lake, California, are home to various carbonates, sulfates and boron minerals. The round pyrite "dollars" found embedded in strata from Illinois are also well-known to collectors. Some collectors would call those strata *slate*, the metamorphic cousin of shale. As we will see next fall, the degree of metamorphosis is a judgment call, as we all now from our Franklin-Sterling Hill deposits. Is there a point where limestone irrevocably becomes marble, or are there intermediate grades between the two? Rock identification is much more tentative and problematic, *especially in the field*, than most of us would admit. Perhaps this is why there are so many "ball park estimate" terms in field use to this day. From my college days, I remember my professor using terms like "cherty flint" and "flinty chert", to the mystification of me and my classmates.

Shale may not figure prominently in the mind of a rockhound, but it certainly has come to the fore recently in the concern over rising gasoline prices and the long-term reliability of unstable political regimes delivering crude oil to the world at affordable prices. One type of shale, called *oil shale,* is a brown to black rock containing finely disseminated particles of *kerogen,* a yellowish hydrocarbon formed from different plant debris than that which gave us coal or petroleum. The Green River Formation, well-known to collectors for the plentiful fossil fish specimens sold at every mineral show*,* sprawls across 16,000 square miles of Colorado, Utah and Wyoming, and contains enough oil shale to produce between 800 billion and 2 trillion barrels of oil, which, at current rates of consumption, could provide the U.S. with 25% of its needed oil for the next 400 years. The problem is that much of this shale lies in 2,000-foot thick layers beneath 1,000 feet of overburden. Rather than try to extract this shale by conventional mining methods (which Exxon tried in the 1970's and '80's, and failed), Shell is working on a process by which the kerogen would be extracted *in place* by sinking high-temperature heaters in the rock for three to four years to liquefy the kerogen and pump it to the surface. To keep the kerogen from "leaking out", Shell would freeze the ground around the shale body's perimeter, which would also keep water out. The liquid kerogen would then be converted into a vapor, and finally distilled into the various petrochemicals familiar to us. However, the high costs of both heating and freezing would have to be justified by the yield: it is thought that such oil-shale liquid fuels would run from $55 to $70 a barrel. As crude oil now is hovering at the $70 a barrel figure, oil shale production is looking more and more feasible, especially when we consider just how much of it there is, and that it's all here in the U.S.A., thus reducing our reliance on imported fuels. Other technologies --- coal liquefaction and processing the oil sands of northern Alberta --- are less expensive, but also have environmental and political strings attached. We will certainly be hearing a lot more about oil shale and other non-conventional energy sources in the months to come.

Sources, & Suggestions for Further Reading:

- **Lavelle, M. "The New Oil Rush", *U**.S. News and World Report, April 24, 2006, pp. 43-50.***
- Lutgens, F. and Tarbuck, E. ***Essentials of Geology**;* Columbus, Ohio: Charles E. Merrill, 1982.
- Shand, S.J. ***Rocks for Chemists: An Introduction to Petrology for Chemists and Students of Chemistry***, New York: Pitman, 1952
    - Sinkankas, J. ***Mineralogy**,* New York: Van Nostrand Reinhold, 1964

Gemstone of the Month: Benitoite

by John F. Sanfaçon

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Benitoite, the official state gemstone of California, is a rare barium titanium silicate, with the formula $BaTiSi_3O_9$. First discovered in 1906 at the headwaters of the San Benito River, in the county of the same name, benitoite was at first mistaken for deep blue sapphire. Subsequent chemical analysis showed the mineral to be the only common barium-titanium mineral in the world; these two metals are usually not found in the same geochemical environment. Crystallographic studies of the triangular, flattened crystals showed that benitoite. was the first mineral known to crystallize in the dihexagonal dipyramidal class of the hexagonal system, a distinction it still holds. With a hardness of 6-6.5 and indistinct cleavage, benitoite is barely hard enough for everyday jewelry wear, and its tendency toward brittleness also works against it. Furthermore, the mineral's intrinsic rarity precludes it from ever being more than a collector stone, albeit a very expensive one at that. Benitoite has exceptionally strong "fire", close to that of diamond. However, such "fire" is often masked by the deep blue body color of the stone, in somewhat the same fashion as the Hope Diamond. Apart from its unique crystal form and chemical composition, benitoite is also noteworthy for its strong bluish fluorescence under shortwave ultraviolet; under long-wave ultraviolet, some colorless benitoite (quite rare) has been observed to fluoresce a dull red. By the way, the colorless benitoite is rarely faceted, being worth more as a mineral specimen. Some faint benitoites --- of a weak, pinkish color --- have been reported, but none seem to have surfaced in the gem trade. Perhaps these are the benitoites that have been reported from Belgium, or from Texas! At any rate, a choice matrix specimen of benitoite --- nestled in a natrolite-lined vein filling of serpentine, along with its rare associates neptunite and joaquinite --- would grace any collection.

The largest known faceted benitoite is the 7.8 carat stone in the Smithsonian. Joel Arem reports of a ***6.52*** carat stone cut for a private collector, but it was stolen in transit! Most gem benitoites are under a carat, with 2-3 carat stones occasionally seen. Even stones this small usually are badly flawed.

Sources, and suggestions for fi.irther reading:

- Arem, J. *Color Encyclopedia of Gemstones,* 2nd Edition, Van Norstrand Reinhold Co., New York, NY 1987.
- Sinkankas, **J.** and Miller, *A. Standard Catalog of Gems,* 2nd Edition, GeoScience Press, Tucson, AZ, 1996.
- Webster, R. ***Gems,*** 5th Edition, Butterworth Heinemann, Oxford, England, 1994.

Lake George Gem and Mineral Club
P.O. Box 171
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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.

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. Guests are welcome to attend, to see what we are about!

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. The Community Center is located on the north side of US Highway 24 on the east edge of town, sharing a building with the county highway shops.

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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