The Lake George Gem and Mineral Club -

Club News,
April, 2010, 9:00AM

Regular Meeting of the Lake George Gem & Mineral Club
Saturday, April 10, 9:00AM
Lake George Community Center

Directions: The Lake George Community Center is in the yellow metal building on the north side of US 24, shortly after you pass the Ferrell Gas yard. Please Note: Dues are Due. If we don't receive your 2010 dues, you will not receive next month's newsletter!

New Hope Mine Field Trip (weather permitting) (private club claim)

Trip Leader: Dick Lackmond 719-684-9736 dlackmond@msn.com
Alternate trip leader: Dan Alfrey 719-440-6234 alfreydan@aol.com
Where: Directions and map will be furnished at the meeting
Time: 9:20 AM Sat., April 10 following the regular meeting at the Lake George Community Center
Claim Owner: Canon City Gem and Mineral Society.
Collectables: amethyst !!!
Fee: none
Mileage / travel time: 45 miles / 1 hr
Hazards: snow and mud, all kinds of weather are possible, and watch for wild swinging hammers
Terrain: semi flat except if you want collect on the mine side and down the wash; then it varies
Difficulty: get out of your vehicle and walk 30 ft, sit down and dig hard rock
Vehicle: high clearance unless it is muddy; then you will need 4 wheel
Equipment: rock hammer, pry bar, small shovel / trowel, bucket to take specimens home
Drinking water: none, bring your own
Nearest town: Canon City 10 miles
Comments -- we will probably caravan and all arrive at the same time. The parking is good and flat. The main vein is in a ditch, and others are scattered around the area.

If the weather is bad, **John Rakowski** will give a talk on Drilling an Oil Well:

How to Drill an Oil Well:

First, you have to have an idea of where to drill and convince someone to spend the money to do so. Then, you must lease the drilling rights, followed by the actual drilling and hopefully production from the well. I'll have examples of seismic lines which show the underground reflections from surface energy sources used for mapping, and copies of the radioactivity and electrical surveys done in wells to evaluate those wells. We'll

discuss drilling rigs and rig sites as well as production facilities. I'll also have a real tri-cone drill bit and some samples of crude oil for folks to examine.

Coming Events

Colorado School of Mines Garage Sale, 9AM-4PM, corner of 13th and Maple St., Golden. Call 303-273-3815 for information	**… April 3**
Monthly meeting, Columbine Gem & Mineral Society; 6:30PM, Shavano Manor, 525 W. 16th (at J St.), Salida	**… April 8**
Silent Auction, 7PM, Flatirons Mineral Club, West Boulder Senior Center, 909 Arapahoe Ave., Boulder; all welcome	**… April 8**
"Geothermal Energy" by Charles Visser, 7PM, Western Mus. of Mining & Industry, free, call 719-488-0880 for info, or visit WMMI website	**… April 8**
Silent Auction, 6:45PM, North Jeffco Gem & Mineral Club, North Jeffco Senior Rec. Center, 6842 Wadsworth Blvd., Arvada	**… April 9**
Monthly meeting, Denver Gem & Mineral Guild; 7:30PM, Berthoud Hall, Rm. 109, Colo. School of Mines, Golden	**… April 9**
Monthly Meeting, Pueblo Rockhounds: The Calumet Mine, by Roger Pittman, 7:30PM, Westminster Presbyterian Church, 10 University Circle, Pueblo	**… April 15**
Monthly Meeting, Colorado Springs Mineralogical Society: 7:30PM, Colorado Springs Senior Center, 1514 N. Hancock Ave., Colorado Springs	**… April 15**
Silent Auction & Bake Sale, Colorado Springs Mineralogical Society, 10AM-2PM, WMMI Library, I-25 Exit 156A; see website for details.	**… April 17**
Earth Day Geology/Nature Hike by Pete Modreski, on Green Mtn., Lakewood; free, call 303-202-4766 or e-mail pmodreski@usgs.gov for info.	**… April 18**
Colorado Mineral & Fossil Show, Denver Central Holiday Inn, 4849 Bannock St. (I-25 and I-70), Denver; free admission and parking	**… April 23-25**
Wichita Gem & Mineral Society 57th Annual Show, "Tri-State Treasures", in conjunction with the **Rocky Mountain Federation of Mineralogical Societies Annual Convention**	**… April 23-25**
Gem & Mineral Club New Member Orientation, by Steve Veatch and others, Western Museum of Mining and Industry, 10AM-2PM (Free, bring your lunch)	**… April 24**
"When Crocodiles Swam the Seaway" by Dan Fanelli, 7-8PM, Dinosaur Ridge Visitor Center, 16831 W. Alameda Pkwy, Morrison, free	**… April 28**
"Dinosaur Discovery Day" public tour 10AM-3PM, Dinosaur Ridge Visitor Center; go to website or call 303-697-3466 for information	**… May 1**
Silent Auction, Friends of Mineralogy, 12-3PM, Clement Community Center, 1580 Yarrow St. (near Colfax and Wadsworth), Lakewood	**… May 15**
Combined Pebble Pups Field Trip at Florissant Fossil Beds N.M. and Florissant Fossil Quarry, by Steve Veatch; Cost is $13; details to follow	**… June 19**
"Rock Fair", Colorado Springs Mineralogical Society Show, Western Museum of Mining and Industry, I-25 Exit 156A; see website for information	**… June 26-27**
Lake George Gem & Mineral Club Gem & Mineral Show, Lake George. See our website for information	**… Aug. 20-22**

Denver Museum of Nature & Science Lecture Series:

April 7-24: "Trace Fossils: Tracks, Trails, Burrows, and Bites", Short Course by Greg McDonald, Wednesdays + Sat., April 24 field trip. Cost: $110 mbrs, $140 non-mbrs. Contact the Museum for more info.

Club News

At the March 13 meeting, 31 members and 5 guests gathered at Lake George to hear **Loren Lowe's** interesting talk about the Antelope Springs (South Park) gold prospect. Loren noted that there were dozens of exploratory pits in the area, which is off Colorado Route 9, near CR 53. The mystery is who did the exploring. Loren reported that he panned some samples from a pit and found "a few flakes".

Photos by Dan Alfrey

Guests at the March meeting were **Jessie Springer**, of Colorado Springs**, George and Jane Griffiths**, of the Bear Trap Ranch, and **Lydia and John Dilts**, of Guffey.

The August 20-22 show is coming together. President **John Rakowski** estimated total expenses at about $1175. **Dick Lackmond** is in charge of publicity for the show and the Pebble Pups; **Becky Blair** is handling dealer registrations; and **Bob Kane** volunteered to stay at the show grounds overnight. **Dave Harvey** said he could provide space for self-contained parking between the Contin-Tail and our show.

Dan Alfrey announced that **Erin Leidy**, daughter of members **David and Linda Leidy**, meets the criteria for the Club Scholarship. Members voted to offer Erin the award. Erin sent in the following autobiographical information:

"I have been a student for many years while also working on a career in the insurance industry. The insurance career was excellent but I recently realized that I was ready for a new challenge in my life. During an introductory Geology course I discovered that challenge. I fell in love with the material and it lit a passion in my soul. Rocks, minerals and the understanding about Earth's systems are fascinating and something that can become a new and exciting career. My immediate focus is hydrology and working with water resources. In the future I would also like to continue my schooling and work toward an Engineering Geology degree. Thanks again for your support and helping me achieve my goals!"

Erin Leidy

Members also voted to provide $500 in living expenses for a Florissant Fossil Beds intern this summer.

Dan Alfrey announced a new, password protected, "Members Only" section at the Club website. He then reported that there will be two field trips on some Saturdays this summer and that **Todd Matson** is working on a WigWam Creek claim. Dan and Todd are looking for volunteers to help out so that we have at least two leaders for every trip this year. Training will be provided; **contact Dan if you'd like to help out**. Planned trips for this summer include the Petra Placer, GodSend claim, Holcim Quarry, and the Last Chance mine, near Creede. There may also be additional fossil collecting trips, and trips to the Sedalia mine, near Salida, and the Devil's Hole, near Texas Creek, are possibilities.

Several members brought "show and tell" specimens to the meeting. **Dick Lackmond** had some itacolumite ("flexible sandstone") and an Alma amethyst specimen. **Al Barnes** showed off some excellent dendrites from near Leadville and donated them for use by the Pebble Pups. **John Gibbs** also donated some jasper, topaz, barite, and rhodochrosite for use by the Pups.

The Alma study, under the direction of **Steve Veatch** and **Dan Alfrey**, is well on its way. Dan can provide a great overview for those who are interested. Dan also provided the following information on a recent trip by team members to Alma:

"Five members of the LGGMC's Alma Exploration team had a productive morning in Alma on Friday, March 26th. They met with Alma Town Clerk Nancy Comer and the Executive Director of the South Park Heritage Area Linda Balough. We are extremely excited about the assistance that has been offered by these generous ladies & how well-received the concept is already in the community. It was thought that the LGGMC Study Group's presentation of results would be best shown in August or early September at the Old Stone Church in Alma. A field trip may follow the presentation. Proceeds would benefit The Alma Foundation and the Mosquito Range Heritage Initiative. Next up for the energetic group is research work at the Special Collections dept. of the Penrose Public Library in Colo. Sprgs. on March 30th at 10am."

Pebble Pups Corner

John Rakowski took over the March Pebble Pups meeting, with a talk on "How to Drill an Oil Well". Attendance was good, and everybody had a good time.

Photos by Dan Alfrey

The first Pebble Pups field trip will occur on Saturday, May 8. **Steve Veatch** provided the following information about the trip:

Date: Saturday, May 8, 2010
Meet: Lake George Community Center
Time: 10:00 am
Bring:

- Sack lunch
- Drinks
- Arctic clothing (dress warm)
- Tweezers
- 35 mm flim canister or small container
- Camera if you have one

We will be meeting and going to the claim with the Junior members (middle school) of the Colorado Springs Mineralogical Society. The group will carpool to the peridot claim, which is in southwest Park County. The road does not receive witner maintenance. If it is impassable we will return from that point. We will leave the area at 1:00 pm if we make it. Parents are encouraged to attend. Please call Steven Veatch at 719-748-5010 if you plan to attend.

Once again, the Pebble Pups group encourages any members who want to "sit in" to come to the meetings on the second Tuesday of the month, at 6:00PM. We are still looking for specimens to give to the kids at the meetings, so go through that pile of rocks in your garage and see what you can spare. Remember, we're looking for 8 to 10 samples of each.

Notes from the Editor

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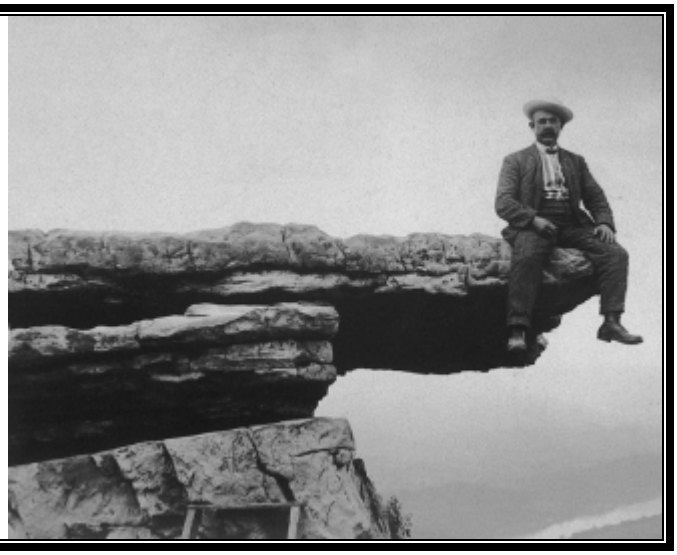

This month, I'm concluding the article started last month about geodes. Sorry that it's a bit long; my students used to accuse me of not knowing when to quit! So, don't start reading this unless you have time on your hands.

GEODES 2

Geodes in Sedimentary Rocks
by Bob Carnein

In the March newsletter, we looked at geodes that occur in igneous rocks. This month, we will think about sedimentary geodes and the minerals that have been described in geodes of both types. As is usual with most scientific topics, explaining the origin of geodes isn't simple. But don't despair; bear with me while we explore some geology and a little bit of chemistry.

Although geodes are found in sedimentary rocks of various ages and types, by far the largest U.S. deposits occur in carbonate rocks (dolostone and limestone) of Mississippian age (about 350 million years). These are found in a broad band extending from eastern Iowa into adjacent Illinois and Missouri, and in similar-age rocks in Indiana, Kentucky, and Tennessee. There are even some occurrences in Georgia and Alabama.

The Mississippian geodes are concentrated in layers of the Warsaw Formation and other carbonate rocks of the same age. It and the Ramp Creek Fm. of south-central Indiana include geode-rich zones that have supplied literally millions of geodes to collectors. In some places, creek beds are clogged with "geodes", most of which are actually solid quartz nodules. Local residents sometimes even use them to construct walls and houses.

www.providencehome.org/Grotto.htm

An "inverted" Keokuk geode, Henry Co., IA (author's collection)

Good exposures of the Warsaw beds near Keokuk, Iowa, result in some collectors using the common name *Keokuk geodes*, or simply *Keokuks*. Quartz is the most abundant mineral, and the geodes range from an inch or so to nearly three feet across. Their shapes vary from nearly spherical to irregular or flattened in the plane of layering in the enclosing carbonate rocks. Some resemble a head of cauliflower.

Commonly, rock layers immediately above the geode zone contain abundant fossils and fossil fragments, suggesting those rocks formed in an environment of shallow, turbulent, clear sea water with plenty of oxygen and nutrients. Fossils include mollusks (clams, snails, and cephalopods), echinoderms (sea urchins, crinoids, and blastoids),

brachiopods, horn corals, and sponges. Most of these animals "filter" food particles suspended in the water. However, the geodes themselves typically occur in layers of finer grained dolostone with relatively few fossils. These rocks probably formed in somewhat deeper, quiet water lacking abundant oxygen.

Even today, controversy surrounds hypotheses on the origin of the Mississippian geodes of the midwest. I will summarize two hypotheses, but you need to realize that we have here a textbook case of multiple working hypotheses—a fundamental principle underlying most geological research. The idea is that several researchers come up with competing explanations for how a given feature (in this case geodes) forms. These researchers then "battle it out" in peer-reviewed publications and by presenting their results at meetings. Eventually, a consensus develops among researchers, and one or two hypotheses win approval. In the case of the origin of sedimentary geodes, the two "theories" summarized below may both be correct.

Theory 1. The first theory suggests that geodes form by replacement of anhydrite ($CaSO_4$, calcium sulfate) nodules by silica. It is well summarized in Barwood and Shaffer (see references below). Imagine a Mississippian shoreline area in what is now the midwest (and extending along the margin of the Illinois basin 350 million years ago). The climate is hot and dry, similar to that in parts of the Persian Gulf today. Near the shore, wave action keeps the water stirred up and provides abundant oxygen. Marine invertebrate animals (most of which depend on suspended food particles for sustenance) thrive in this environment. Intense evaporation raises the salt content of the water, and brines form. (A brine is a solution that is saltier than "normal" sea water.)

Outline of the Illinois basin, a major Midwestern sedimentary depression. aapg.org

Unusual small geodes in a "shell hash" bed, from near Bedford, IN (author's collection). Note resemblance of right-hand geode to a fossil "sea urchin".

In shoal (shallow) areas, waves break up shelly material, forming a coarse shell hash. The brines work their way downward through this coarse carbonate sediment and outward toward the center of the basin. As these oxygen-rich brines work their way out into the deeper, oxygen-starved water of the Illinois basin, they lose oxygen and encounter finer carbonate sediments deposited in deeper water. Here, a crucial chemical change occurs. The limestones, which are made of the mineral calcite [$CaCO_3$], are converted to dolostone, which is made of the mineral dolomite [$CaMg(CO_3)_2$]. Magnesium ions in the brines substitute for half of the calcium in the limestone. This process releases calcium ions into the brines, and this "extra" calcium causes the precipitation of anhydrite [$CaSO_4$] as nodules on the sea floor.

As this process proceeds, the lack of oxygen, combined with other features of the chemical environment, causes some of the anhydrite around the outsides of the nodules to break down. This does two things: it makes sulfur available to form sulfide minerals such as pyrite; and it raises the pH of the water (makes the water less acidic). Silica in sponge spicules, volcanic ash, or other sources is more soluble in water of higher pH, so, as the pH rises, silica dissolves into the water and becomes available to replace anhydrite and limestone. Deposition of silica on and in the rinds of anhydrite nodules forms a gelatinous layer that is the beginning of geode formation (it becomes the chalcedony layer that forms the outer shell of most Mississippian geodes). Over time, water seeping through the silica gel dissolves out the remaining anhydrite in the core of the nodule, at the same time depositing additional silica (forming a layer of coarser quartz crystals) and other geode minerals (including pyrite and other sulfides). Voila! You end up with a layer of fine grained dolostone peppered with geodes. In deeper water, the fine grained carbonate rocks are partly replaced by chert, and in shallower water, the carbonate rocks are coarse grained and contain little silica. As the environment shifts, geode and chert formation will shift too. As a result, the distribution of geodes is patchy, rather than continuous.

Theory 2. Some geodes are thought to be "geodized" fossils or "exploded" fossils. One hypothesis (see Smith, 2007) suggests that, instead of anhydrite nucleating to form a nodule (as above), it nucleates in a cavity inside of a dead invertebrate. This may occur because the decay of organic material uses up oxygen, producing local conditions

like those described above. Quiet water is probably required for this to work. As the anhydrite grows, the host fossil "explodes", in some cases fragmenting to the point where it's barely recognizable. The anhydrite may even extrude through the side of the fossil. Then, silicification takes over, converting the anhydrite-filled fossil into a geode (again, as above). All gradations, from easily recognizable silicified fossils to badly distorted examples, are known from rocks in Indiana (Beanblossom Cr., Brown Co.), Iowa (near Keokuk), Kentucky (near Louisville), Illinois (near Hamilton), Ohio (near Hillsboro), and Tennessee (near Nashville).

In a slightly different category, I would be remiss not to mention the "geodized fossils" from near Tampa and Fort Drum, FL. Near Tampa, Miocene colonial corals have been replaced by chalcedony, forming the beautiful "agatized" geodes commonly seen at mineral shows.

Chalcedony-filled geode from near Tampa, FL. Author's collection

Fluorescent calcite in bivalve, Rucks Pit, FL. Appalachee-minerals.com

At Rucks Pit, near Fort Drum, clams of the genus *Mercenaria* and other fossils are filled with gold-colored calcite crystals that are very fluorescent. Finally, clams and other fossils of the Crimean peninsula are famous for rare fillings of anapaite, barite, rhodochrosite, and vivianite.

Rhodochrosite lining clam, Kerch, Crimean peninsula, Crimea Oblast' Ukraine. mindat.org

Anapaite in fossil bivalve. Kerch, Crimean peninsula Crimea Oblast', Ukraine. irocks.com

At the end of this paper, I have listed some references that you can consult to read more about these hypotheses, plus several more. Some are readily available and non-technical; others are relatively advanced.

"Geodized" fossils (crinoid; horn coral) Heltonville, IN (author's collection; Jeff Smith collector)

"Exploded" fossil brachiopod from the Ramp Cr. Fm., near Heltonville, IN (author's collection; Jeff Smith collector)

Minerals of Geodes. If you are a mineral collector, you might be interested to know what minerals, besides quartz and chalcedony, are reported to have been found in geodes. In the list below, I haven't tried to separate the minerals of igneous geodes

from those of sedimentary examples. Having originally thought that 20 or 25 minerals might be found, I was surprised at the number. Some of the examples are definitely identified, while others are reported but not confirmed. Here's the (by no means complete) list:

Anapaite	gypsum	ranciéite
Ankerite	hematite	retgersite
Apatite	hollandite	rhodochrosite
Aragonite	honessite	romanèchite
Aurichalcite	jamborite	rutile
Barite	jarosite	siderite
Beidellite	kaolinite	smithsonite
Birnessite	magnetite	smythite
Calcite	manganite	sphalerite
Celestine	marcasite	sulfur
Chalcedony	millerite	szomolnokite
Chalcopyrite	mordenite	tenorite
Copiapite	nontronite	todorokite
Cryptomelane	pyrite	violarite-polydymite
Dolomite	pyrolusite	vivianite
Fluorite	pyrrhotite	wurtzite
Galena	quartz	zaratite
Goethite	ramsdellite	

In addition, gas, mercury, opal, and water have been reported.

References and Additional Reading

Barwood, H.L., and N.R. Shaffer, accessed 2010, Observations on silicification in geodes from the Mississippian Sanders Group of Indiana and Kentucky: http://spectrum.troy.edu/~barwood/indianageode.htm

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Smith, J.R., 2007, Geodes and geodes after fossils from Heltonville, Lawrence County, Indiana: Rocks and Minerals, v. 82, n. 3, p. 200-208.

Vaisvil, K., 2003, Colorful Keokuk geodes from Lewis County, Missouri: Rocks and Minerals, v. 78, n. 4, p. 226.

Chalcedony geode, near Bedford, IN (Author's collection).

Ankerite in quartz geode, near Bedford, IN (Author's collection).

DUES ARE DUE DUES ARE DUE DUES ARE DUE DUES ARE DUE DUES ARE DUE

Lake George Gem and Mineral Club
Box 171
Lake George, Colorado 80827

2010 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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