The Lake George Gem and Mineral Club -

Club News, January 8, 2011

Regular Meeting of the Lake George Gem & Mineral Club
Saturday, January 8 at 10:00AM
Lake George Community Center

After the Jan 8 regular business meeting, club member **Richard Fretterd** will provide a Specimen-Cleaning Demo! The demonstration will pertain to Pegmatite Materials. Richard is a local miner who typically sells quality specimens, mostly from this area, at our own Lake George Gem & Mineral Show!

We will also have the silent auction of items benefitting the LGGMC and lucky buyers. Bring your extra specimens, books, or other items and some cash to pick up bargains!

Coming Events

Columbine Gem & Mineral Society monthly meeting, 6:30PM, Mt. Shavano Manor, 525 W. 16th (at J St.), Salida	… **Jan. 13**
Colorado Springs Mineralogical Society monthly meeting, 7:30PM, Colorado Springs Senior Center, 1514 N. Hancock.	… **Jan. 20**
Pueblo Rockhounds monthly meeting, 7:30PM, Westminster Presbyterian Church, 10 University Circle.	… **Jan. 20**
Tucson Gem & Mineral Show, satellite shows; various venues; free admission	… **Jan. 28-Feb. 13**
Tucson Gem & Mineral Show (Main Show), Tucson Convention Center (admission charge). Theme: Minerals of California.	… **Feb. 10-13**

Club News

❄❄ Twenty-three members attended the December 11 meeting, with occasional interruptions from **Dick Lackmond's** hat. We're happy to welcome a new Secretary for 2011: **Charlene DeVries**. President **John Rakowski** noted that recent articles about **Joe Dorris** have appeared in the Ute Pass "Courier" and "Rock & Gem".

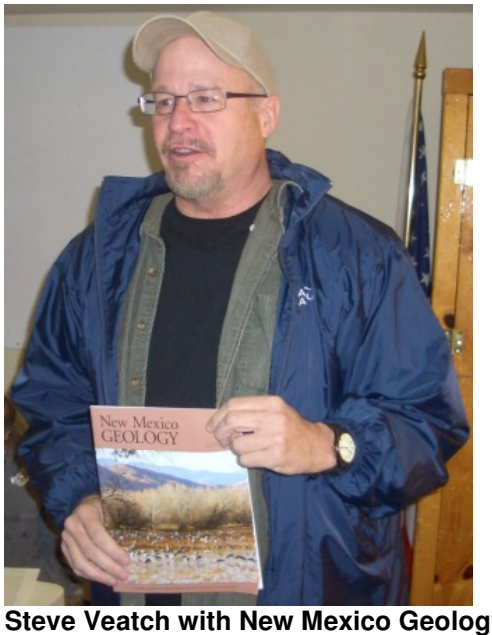
New Secretary Charlene DeVries (Dan Alfrey photos)

Dick Lackmond with his notorious talking hat and his new geologic map of Colorado.

Steve Veatch distributed copies of the New Mexico Mineral Symposium abstracts to members who helped with the Alma Project. He noted that the presentation at Alma went well, with proceeds going to the Mosquito Range Heritage Initiative and the Alma Foundation. A Buckskin Gulch field guide is in process. Steve will present the Alma Project at our February Club meeting. Steve reported that the Crystal Peak area has been suggested as the subject for the 2011 project. He's working on a low altitude flyover.

After the NM symposium Steve and his wife explored the nearby Bosque del Apache National Wildlife Refuge. Before they left the refuge, Steve and his wife stopped by the visitor center. While checking out the gift sore, he noticed a copy of *New Mexico Geology*. This is the issue that published the club's study on Victor the previous year. Everyone who participated in the project had their names published as coauthors in the journal. It was really exciting for Steve to see the work of the study group published in a journal that was for sale in a National Wildlife Refuge. Steve's wife took a picture of him holding the journal so that the study members could see where their year-long work was published. By being published in this journal, the club's hard work was now part of the permanent scientific and historical record. This quick photo session caused a considerable flurry of activity and discussion in the visitor center.

New Mexico Geology is a quarterly, peer-reviewed journal published by the New Mexico Bureau of Geology and Mineral Resources. The Victor study was published in volume 31, number 4. This edition is available as a back issue from the bureau or from this link: http://geoinfo.nmt.edu/publications/periodicals/nmg/backissues/home.cfml?Volume=31



Steve Veatch with New Mexico Geology

Members puzzle over items in the towel show

(Photos by Dan Alfrey)

John noted that the recently donated lapidary equipment was available at the meeting for inspection. It looks nearly brand new. John is working on getting a room at the old Lake George School in late 2012 for a lapidary lab. **Dick Lackmond** reported that the Ute Pass Historical Society has some empty spaces that we might use as a temporary lab. After the silent auction and towel show, **Dan Alfrey** presented Dick with a Colorado Geologic Map in recognition of all his help with various Club projects during the past year.

Is that really a camel jaw??

(Photos by Dan Alfrey)

Plenty of goodies for all to eat.

❄❄**Reminder** from **Dan Alfrey**: The deadline for submitting applications for the Club's annual Scholarship is March 1. Go to www.LGGMclub.org for information.

❄❄Here are the latest "Bench Tips" from Brad Smith. Brad has offered to provide monthly tips similar to these; let me know if you like them.

JUMP RINGS

It's better to use a round jump ring on the end of a chain instead of an oval one. Oval rings will wear faster because tension on the chain concentrates wear on the smaller ends of the jump ring. Wear is distributed evenly on a round jump ring because it can rotate through the last link of the chain and the clasp. This gives the ring a longer useful life.

ORGANIZING SMALL PARTS

With all the little components we use for our projects, it makes sense to have a good way to keep them organized and preventing them from getting lost. A great small container to use is available in numbers and for free at your local drugstore. Ask at the photo processing area for some of the 35mm plastic film cans. They have a tight fitting lid and are great for carrying beads, findings, jump rings and silver scraps.

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More **BenchTips by Brad Smith** are at: groups.yahoo.com/group/BenchTips/
or: facebook.com/BenchTips

Pebble Pups Corner

Pebble Pups will meet at the usual time: 6PM, January 11, at the Lake George Community Center. The topic, to be presented by **Steve Veatch**, is **"Fossils"**. If you know interested kids or home schoolers, please urge them to attend! Adults are welcome to sit in. Call **Steve Veatch** at 719-748-5010 for more information.

The article by the combined Lake George and Colorado Springs Pebble Pups that was included in the December Newsletter will soon be published in "Deposits", a British magazine. We'll hear more details when the publication date is announced. Steve has nominated a Lake George Junior and a Pebble Pup for this year's "Rockhound of the Year" award.

Steve also sent the following notice:
There will be a family day at the Western Museum of Mining and Industry January 8, 2011. This will be a field trip for the CSMS pebble pups, the Lake George Pebble Pups, and the other pebble pup group in Denver. This group has joined us before for field trips. Contact me for more details.

NOTES FROM THE EDITOR

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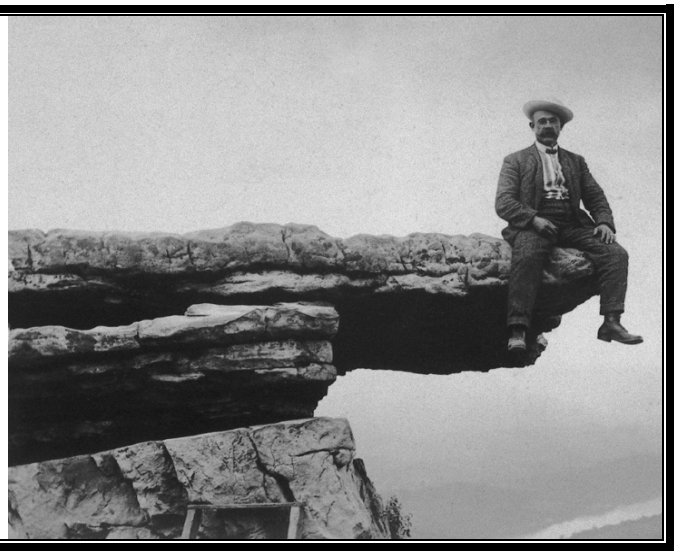


Many thanks to member Andy Weinzapfel (acwein@gmail.com) for the following article about rare-Earth elements, a topic that has received a lot of press coverage recently because of the world's dependence on China for most of its supplies.

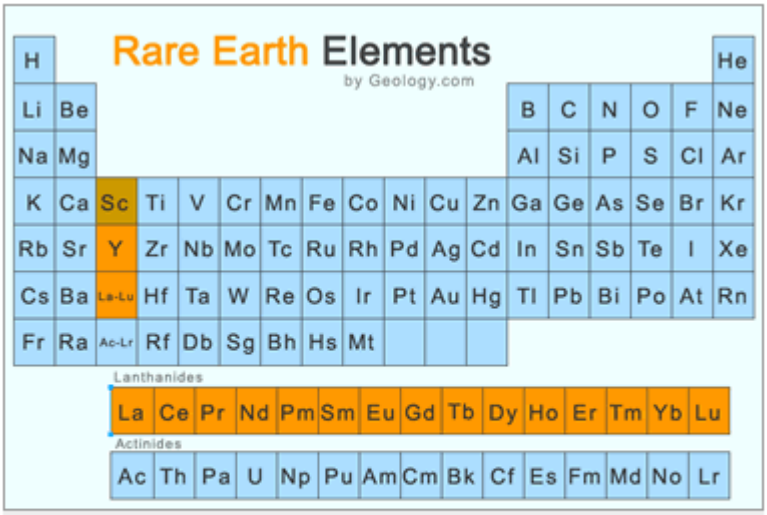
THE GEOLOGY AND GLOBAL POLITICS OF RARE EARTHS: WHY OUR HIGH TECH LIFESTYLE IS UNDER PRESSURE

By Andy Weinzapfel

Remember that old periodic table from high school? Rare earth elements (REEs) include the entire lanthanide group plus yttrium, as shown in orange below. Scandium is sometimes included. These elements have similar chemical properties and therefore tend to occur together in nature. They have one other thing in common: difficult-to-pronounce names!

The term “rare earth” is a misnomer, because most REEs are not that rare. The estimated average concentration in the Earth’s crust ranges from about 150 to 220 parts per million, exceeding that of many commonly mined metals, like copper (55 parts per million) and zinc (70 parts per million). The problem is there are few geologic processes that concentrate REEs, unlike most other elements. This has major economic consequences, addressed later.

REE ores are characterized as either “light”, dominated by cerium, or “heavy”, dominated by yttrium. Some well-known minerals that contain cerium and other light REEs include bastnaesite, monazite, allanite, lanthanite, cerite, and fluocerite. Well-known minerals that contain yttrium and other heavy REEs include gadolinite, xenotime, samarskite, euxenite, fergusonite, and yttrofluorite. The smaller ionic size of the yttrium-group elements allows greater solubility in rock-forming minerals, and thus yttrium and the heavy REEs show less enrichment in the Earth's crust than do cerium and the light REEs. This has economic implications: large ore bodies of the cerium (light) REEs are more common, while those of yttrium and heavy REEs tend to be rarer, smaller, and less concentrated.



REE Periodic Table: The Rare Earth Elements are the 15 lanthanide series elements, plus yttrium. Scandium is found in most rare earth element deposits and is sometimes classified as a rare earth element. Image by Geology.com.

REE Applications

While a few uses for REEs are mundane, most are exotic. Modern research into the diverse nuclear, metallurgical, electrical, magnetic, optical, and catalytic properties of REEs has opened up new cutting edge applications.

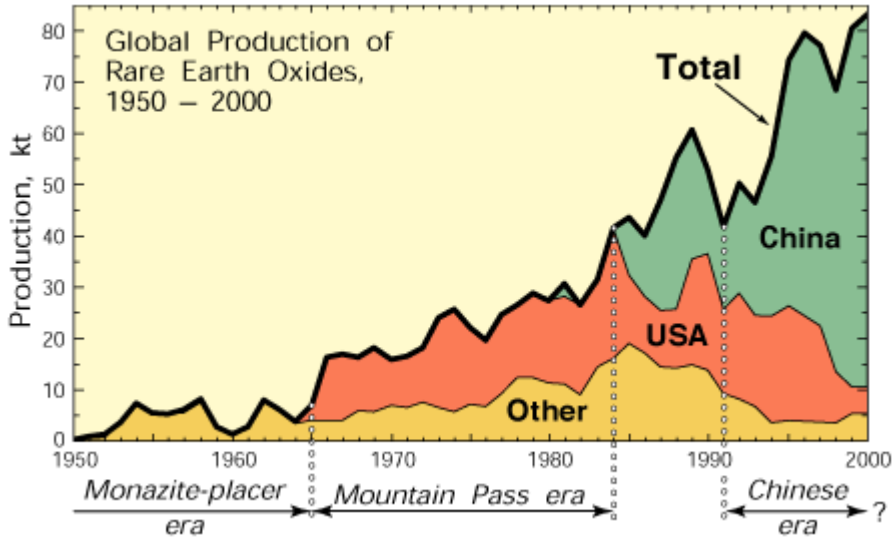
The lapidary world has used cerium oxide as a polishing agent for many decades. Perhaps the most notable use of rare earth oxides for polishing is on the Hubble Space Telescope mirror. YAG, synthetic yttrium aluminum garnet, was once common in jewelry, replaced for the most part today by cubic zirconia.

The earliest color TV sets had poor quality red, until europium was introduced as a phosphor dopant. REEs mixed with tungsten improve high temperature properties for welding. Various REEs are used in high refractive index lenses, catalysts for oil refineries and self-cleaning ovens, positron-emission tomography (PET scan), and wind turbines. Virtually everything in the kitchen—including your microwave oven and coffeemaker—uses REEs. REEs are critical to iPhones, MP3 players, high temperature superconductors, lasers, hybrid-car components (especially batteries and motors), and optical-fiber communication systems. Many defense-related products use REEs, including night-vision goggles, rangefinders, and smart-bomb guidance systems. A motor made with neodymium-iron-boron magnets is far more powerful than one made with iron magnets. One of the more interesting inventions is magnetic refrigeration and heating. Air conditioners that use REE magnets consume 1/10th the electricity of standard systems, with the added benefit of fewer moving parts to break down.

Geology and Geographic Distribution of Rare Earths

Even after 4.5 billion years of Earth history, natural geologic separation of REEs has been extremely poor relative to almost all other elements we consume. Although REEs disseminated in Earth's crust are not uncommon, *economic* concentrations of rare earth

elements are indeed rare. The illustration below, from the USGS, shows the historic production of REEs over a 50-year period:



From 1950-65, monazite, derived from veins and placers in South Africa, India, Madagascar, and Brazil, was the primary rare earth ore. The chief REE in monazite is cerium. Monazite is radioactive because of the presence of thorium.

In 1949, the most important REE discovery in the USA was made by accident, when two prospectors in the Mojave Desert of California, using a borrowed Geiger counter, located a radioactive outcrop they thought contained uranium. Samples sent to the USGS contained, instead, a "worthless" rare earth fluorocarbonate mineral called *bastnaesite*. Intrigued, the USGS conducted field investigations, which uncovered a 1.4-billion-year-old carbonatite intrusion containing light REEs. Carbonatites are unusual alkaline intrusive rocks composed predominately of calcite and dolomite. Globally, they often have higher levels of REEs and other unusual elements than average rocks.

From 1965 through the mid-1980s, the USA was virtually self-sufficient in REEs because of output from this deposit, the Mountain Pass mine. However, there were environmental problems with ruptures of a wastewater pipeline that spilled thorium – laced radioactive water, derived from bastnaesite. The mine was closed in the 1990s in response to both environmental restrictions and lower global prices for REEs, although processing of previously mined ore continued at the site. There are bold new plans for this deposit, discussed below.

The green area on the chart above addresses the production of REEs from Inner Mongolia, China, which began around 1985 and surged afterwards. China, a low cost producer, literally shut down REE mines elsewhere by exporting cheap product. Today, China produces about 95 to 97% of all REEs consumed, from a poorly understood geologic ore type known as lateritic iron-absorption clays. In tropical environments, rocks are deeply weathered to form iron-aluminum rich soil profiles as much as many tens of meters thick. These soils commonly concentrate heavy minerals, leached from previously exposed rock, as residual deposits. In China, REEs are concentrated

sufficiently in laterites to produce economic deposits of significant size and grade. These deposits contain both light and heavy REEs.

Granitic pegmatites, very coarse grained rocks solidifying late in the history of an intrusion, may also contain anomalous concentrations of REEs, both light and heavy. Often, these bodies are zoned, having a quartz core, with REEs concentrated outward. While many diverse REE minerals occur in pegmatites, reserves tend to be small, and pegmatitic deposits have therefore been of interest primarily to mineral collectors.

Ongoing exploration and development efforts include work in Canada, Vietnam, Greenland, Australia, and Alaska.

Geopolitics and the Future

Today, global demand for REEs is straining supply. The current Chinese near-monopoly, at a time when our high tech society is demanding more rare earths, is a big strategic concern, having national and global consequences. Furthermore, China has been gradually reducing export quotas, with the plan to continue this trend. China is thought to sell REEs to internal manufacturers for much less than export prices, in order to stimulate internal growth. They have also cracked down on smuggling of REEs. In December, 2010, they introduced new export taxes, essentially telling the rest of the world to "go find your own REEs". Japan's supply from China is especially threatened because of souring relations, and Japanese industry is scrambling to find rare earths elsewhere.

The Mountain Pass carbonatite deposit in California, discussed earlier, is the largest known economic occurrence of light REEs in the western hemisphere, and possibly the world. The areal photo below is from Long, *et al.*, 2010. This property, owned by Molycorp, has been the source of several recent developments that will impact global supply. In December, 2010, all necessary permits were secured to ramp up production from 3,000 metric tons/year rare earth oxides to 20,000 metric tons/year by 2012. Joint ventures with Sumitomo Corp and Hitachi Metals will supply capital and expertise to meet the company's "mine to magnets" stated goal. A new production facility will be built on site to manufacture neodymium-iron-boron alloys and magnets.

Another recent development is extraction of REEs from electronic waste. New advances in recycling technology have made extraction more feasible. Mining and refining of REE ores have significant environmental consequences if not properly managed, due to the common association of radioactive thorium and uranium. Continued possible price escalation, coupled with growing environmental initiatives worldwide, will make recycling of REEs an important part of future supply. Nevertheless, it appears that global demand will significantly outstrip total REE supply in a few years without major new discoveries.

Figure 6. Google Earth image of the Mountain Pass mining district, California. Molycorp's open pit mine—inactive since 2002—is at the center of this view; the pit covers about 55 acres (22 hectares) and is about 400 ft (122 m) deep. (Image used with permission of Google.)

References

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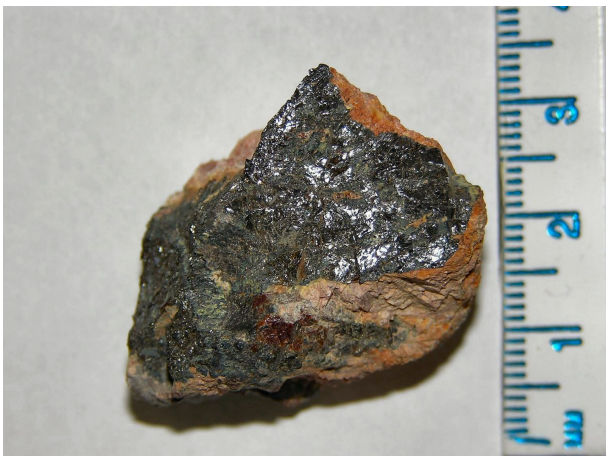
http://finance.yahoo.com/news/Molycorp-and-Sumitomo-Agree-bw-3807073262.html?x=0&.v=1

Rare Earth Elements-Critical Resources for High Technology, 2002: USGS fact sheet 087-02

The Mountain Pass Mine, date unknown
http://geology.csupomona.edu/drjessey/fieldtrips/mtp/mtnpass.htm

Bastnaesite crystal (Khyberminerals.com)



Samarskite, Jefferson Co., CO (webmineral.com)

DUES ARE DUE! DUES ARE DUE! DUES ARE DUE! DUES ARE DUE!

Lake George Gem and Mineral Club

Box 171

Lake George, Colorado 80827

2011 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).

Our Officers for 2010 are:

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