The Lake George Gem and Mineral Club -

Club News
June, 2016

June 11: During June, LGGMC has no business meeting; instead, we will meet at the Bayou Salado Trading Post, in Hartsel, at 9:00 AM to visit Dave and Lark Harvey's Hartsel Barite Locality. Be sure you sign up for this trip at memberplanet.net.

Current members only will be allowed on the trips. Guests or members who failed to renew on time will not be allowed to participate.

Please Note: If the weather is threatening, the officers of LGGMC will try to make a decision the evening before the scheduled meeting or trip to cancel, if road conditions might be dangerous in the area. Be sure to check your email BEFORE leaving your house for the meeting!

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** sent notices of the following upcoming events:

June 3-5, 53rd Annual Pikes Peak Mineral & Jewelry Show, Mortgage Solutions Expo Center, 3650 N. Nevada Ave., Colorado Springs. Admission charge.

June 17-19, 4th Annual Victor Gem & Mineral Show, on the streets of Victor, Colorado. Free Admission.

July 9-10, Tulsa Gem, Mineral, & Jewelry Show, Tulsa (OK) County Fairgrounds; admission charge.

July 15-19, the "**2nd Eugene E. Foord Symposium on Pegmatites**, Golden Colorado" will take place on the CSM campus. There will be a welcoming reception, two days of oral and poster presentations, and two days of field trips to Colorado pegmatite localities. For further information see http://www.colorado.edu/symposium/pegmatite/ or the Friends of the Colorado School of Mines Geology Museum page, https://www.facebook.com/LikeCSMGeoMuseum/ . Pegmatite researchers from around the country and internationally are expected to attend, as well as local presenters. All interested persons are invited to attend.

Aug. 12-14, Contin-Tail Gem & Mineral Show, Buena Vista Rodeo Grounds, Buena Vista, CO

Aug. 19-21, Lake George Gem & Mineral Club annual show, Lake George, CO (details later)

<u>The following are all parts of the annual Denver show:</u>

Sept. 9-16, Denver Expo Gem Show, National Western Complex, Expo Hall.

Sept. 10-18, Coliseum Mineral, Fossil, & Gem Show, Denver Coliseum.

Sept. 10-18, Miners' Coop Mineral Show, Denver Coliseum parking lot.

Sept. 11-18, Colorado Mineral and Fossil Show, Ramada Plaza Motel.

Sept. 14-17, Denver Fine Mineral Show, Marriott Denver West.

Sept. 15-18, International Gem & Jewelry Show, Denver Mart, Pavilion Bldg.

Sept. 16-18, Denver Gem & Mineral Show (this is the "main show"), Denver Mart, Expo Hall (admission charge).

✔ ✔ **Suzanne Core** sent this short article and photo about presentation of our 2016 Club scholarship to Trent Foky:

Former Club past president **Suzanne Core** presented a $1000 check to our 2016 scholarship recipient **Trent Foky** during the Woodland Park High School Awards Ceremony on May 18. Foky will be attending Whitman College in Walla Walla, Washington, to pursue a double degree in Geology and Biology. Foky was accepted at several universities, including the School of Mines, but told the scholarship committee the Whitman College program was "top notch" in his chosen fields.

Trent also sent a nice letter expressing his appreciation to the Club.

✔ ✔ Club hats are available for $10. Contact **Bobby Korzekwa** or **John Rakowski** to reserve yours.

✔ ✔ The following field trips are “on tap” for May and June. To register, you need to follow instructions received by e-mail (**note:** some trips have limits on attendance):

June 4: Duffield (fluorite, barite)
June 11: Hartsel blue barite
June 25: Topaz Mountain Gem Mine
July 8: Devil’s Head (smoky quartz, topaz, fluorite)
July 16: Smoky Hawk (smoky quartz, topaz, amazonite, fluorite)
July 23: Breckenridge (dipyramidal quartz)
August 6: Ace in the Hole (smoky quartz, amazonite)
August 27: Badger Flats (barite, fluorite, malachite, magnetite)
September 3: Patience/Piety claims (smoky quartz, fluorite, topaz)
September 17: Eureka Tunnel/St. Peters Dome (zircon, astrophyllite, riebeckite, fluorite)

✔ ✔ **Linda Watson** sent these photos from the Arroya Gulch garnet trip of May 21:

✓ ✓ **Dave Alexander** sent some pictures from the Wigwam field trip, in May:

✓ ✓ **Don Keith** sent this item about events at the Florissant Fossil Beds: **Ribbon Cutting of New Geologic Trail Exhibits and Unveiling of New Geologic Guide at Florissant Fossil Beds on Saturday, June 4**
National Park Service paleontologist Dr. Herb Meyer along with other park staff will conduct a ribbon cutting ceremony for a new Geologic Trail on Saturday, June 4 at 10:00 AM. The program will begin in the amphitheater behind the visitor center at Florissant Fossil Beds National Monument. Dr. Meyer will lead guided hikes on the trail at 10:00 AM and 1:00 PM. The hike is one mile round trip and will last two hours. The Monument will also be unveiling a new, Geologic Guide map which is recommended for the hike and will be available for first-day purchase in the Rocky Mountain Conservancy bookstore in the visitor center.
Saturday, June 4, National Trails Day: Ribbon Cutting and Hike on the New Geology Trail
Join community members, park staff, and paleontologists as we cut the ribbon and lead a hike on the new Geology Trail.
10:00 AM – Opening Ceremony followed by ribbon cutting and 2 hour, 1 mile, guided hike on the Geologic Trail
1:00 PM – Guided hike on the Geologic Trail, 2 hour, 1 mile. Meet in the amphitheater behind the visitor center.
There will also be a variety of regularly scheduled ranger programs occurring throughout the day. In addition, Florissant Fossil Beds National Monument offers 14 miles of beautiful, yet lesser known, hiking trails to explore, a free Junior Ranger Program, a park video and museum exhibits, and bookstore. For additional information, please call (719) 748-3253 or visit our website:www.nps.gov/flfo or on Facebook at /FlorissantNPS

✓ ✓ **Dave Alexander** sent this link to an article about somebody not too smart mining and selling crystals from Federal land, without either a claim or a mining permit:
http://www.gjsentinel.com/news/articles/man-gets-6-months-for-illegal-mining

I have met many folks that dig crystals on public land, not on a claim, and sell their material. This is a reminder that the BLM is actively pursuing unethical activity, and the penalties are in my opinion pretty steep!

✓ ✓ **John Rakowski** sent this item about geocaching at the Pikes Peak Historical Society:

PPHS Geocaching

The Pikes Peak Historical Society now has five geocaches published on the site Geocaching.com. This is a series of several planned caches to be placed in the area. They are all related to historical places and events and include history and photos courtesy of Celinda Kaelin.

The first geocache was placed on June 8, 2015 and since that date, it has been found close to 100 times. The purpose in placing these caches is to share the wonderful history of our area in a fun and different way.

CURRENT PPHS geocaches are:

PPHS - Museum; (GC5X5ZN), PPHS - Teacherage; (GC6F19K), PPHS - Twin Creek Ranch; (GC6FTCM),

PPHS - Prayer Tree; (GC6G26H), PPHS - Ute War Trail (GC6HZMQ)

The coordinates for these caches can be found using the GC codes on the site Geocaching.com.

PPHS - Florissant Pioneer Cemetery and PPHS - View of Crystal Peak will be in place soon.

✔ ✔ **Membership in the Lake George Gem and Mineral Club is now closed for 2016. If you haven't renewed, your next chance to reconnect will be next January.** You are welcome to attend regular Club meetings, but field trips are open only to current members.

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

QUICK CLOSE-UPS

Often, when trying to get a close-up photo with your iPhone or Android, you end up with a fuzzy, out-of-focus image. Next time, try using your loupe over the camera lens. It works quickly and easily.

LITTLE THINGS CAN BITE

Most jewelers treat motorized equipment with caution. We've all heard stories about workpieces coming loose in the drill press or about getting long hair or clothing caught in the polishing machine. It stands to reason that a machine with a motor of a half horsepower or so is going to win out over its operator. We all know that, and I'm not going to harp on it. That's not the point of this story.

I want to talk about the smaller motor powered machines we often use, the ones with little 3-inch-diameter motors. For instance, these small motors are used in flexshafts and micro buffers. They're so small that many of us forget caution when using them. I'm guilty of it myself sometimes, and believe me, it can get you in trouble. Here's what happened to two people I know.

One friend had a polishing bur bend in the handpiece and then whack the thumb that was holding the workpiece so badly

that it seemed the bone might be broken. The swelling was substantial, and it took several weeks to regain normal use. A small underpowered motor? I don't think so.

Another friend was using one of the small buffing machines, the kind you can stop when you apply too much pressure to the wheel. Not to worry about such an underpowered beast you say. Wrong. It literally jumped up and bit the hand that feeds it!
The buffer was set on a low table to do a quick polish, so it was not mounted or clamped. A buff was installed on the right spindle, no buff on the left. My friend was wearing a tight-fitting, long-sleeved sweater. While buffing on the right wheel, the left tapered spindle caught a thread on the friend's left sleeve and started grabbing more and more threads and sleeve.

Rather than pulling the arm into the machine, the light buffer quickly lifted off the table and started climbing up the underside of my friend's arm. There was no way to get a hold of the on/off switch because the unit was spinning wildly and battering my friend like a club wielded by a mad man. Only when my friend could grab the gyrating power cord and yank it from the wall did the mayhem stop.

So when you're in the shop, please think safety. Don't take even those little motors for granted.

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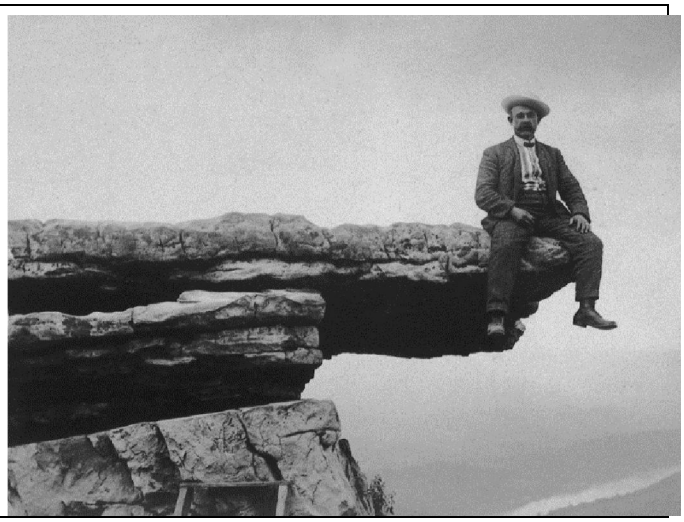
"Bench Tips for Jewelry Making" and "Broom Casting for Creative Jewelry" are available on Amazon

Notes from the Editor

Bob Carnein, Editor

ccarnein@gmail.com

719-687-2739



Here's an article for you to read when you're trying to fall asleep tonight!

Di-Hard Diamond

by Bob Carnein

This is the last of a series of 10 articles on the minerals of the Mohs hardness scale. Diamond is number 10 on that scale. Articles about numbers 1 through 9 can be found in the following issues of the LGGMC Newsletter: March, 2011: **Talc**; November, 2011: **Gypsum**; February, 2012: **Calcite**; November, 2010: **Fluorite**; October, 2012: **Apatite**; March, 2013: **K-feldspar**; September, 2013: **Quartz**; April, 2015: **Topaz**; November, 2013: **Corundum**.

Diamond, whose composition is C, is one of several polymorphs (different minerals having the same composition) of native carbon. Many collectors are familiar with graphite, the commonest polymorph of C. Structural differences between diamond and graphite account for the amazing differences in the two minerals' physical properties.

Crystallography. Diamond is in the isometric (cubic) crystal system. There is some debate about its crystal class, but the isometric system gives it higher symmetry than most minerals. The commonest crystal forms are cubes, octahedrons, and dodecahedrons (Figure 1), often in complex combinations. Unless twinned, crystals

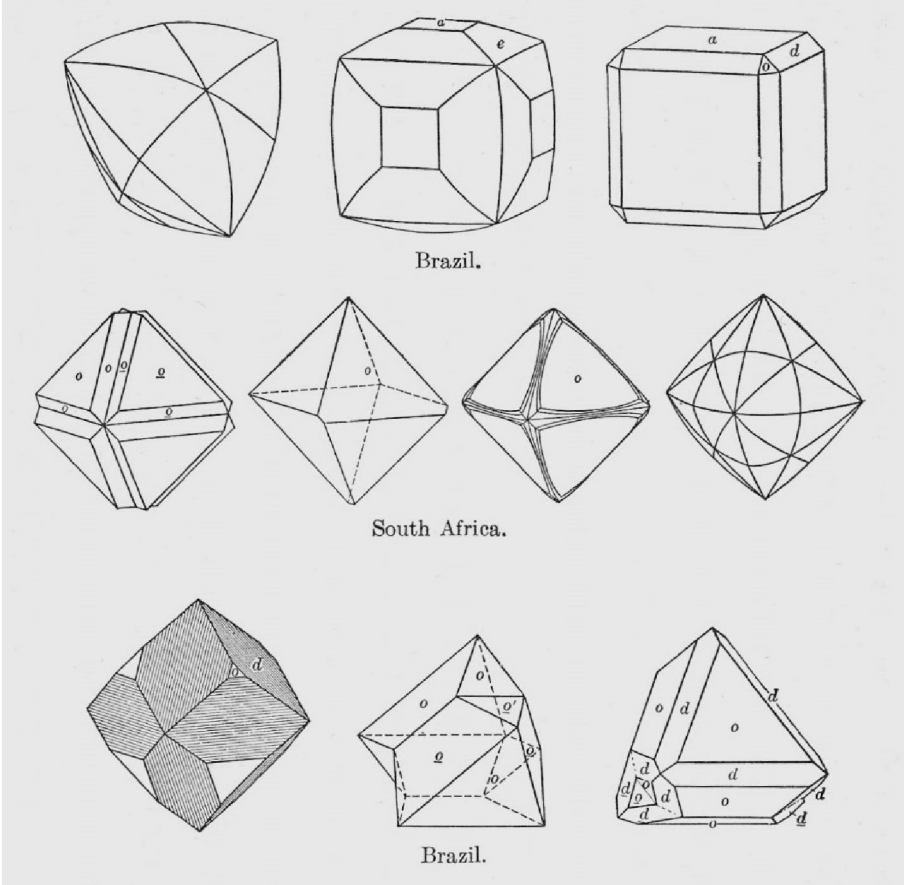


Figure 1. Typical diamond crystal forms. (Palache, *et al.*, 1944)

are generally more or less equidimensional, in some cases with curved faces. Twins are common, often producing triangular plates called ***macles*** (Figure 2). Diamond may also occur in spheres of radiating crystals, spherical masses with concentric layers, and cryptocrystalline to granular masses, called ***bort*** or ***ballas*** (Figure 3).

Figure 2. Twinned diamond (macle). (commons.wikipedia.org)

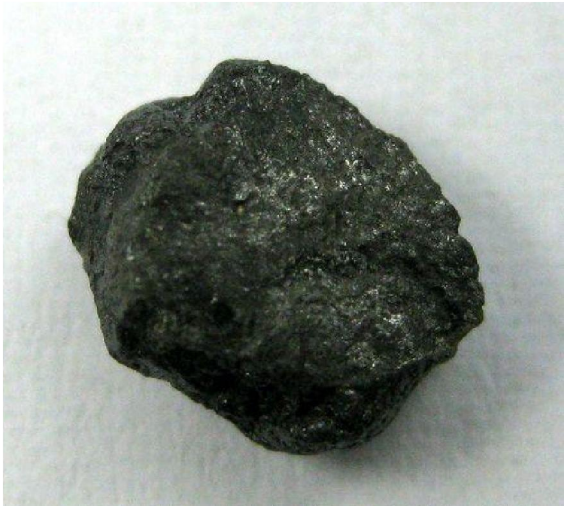


Figure 3. Bort. (www.e-rocks.com)

Physical Properties. Diamond has the highest hardness of any natural substance. This results from very strong (mostly covalent) bonding of the carbon atoms, which produces a 3-D network in which each atom is attached firmly to 4 other carbons (Figure 4). The arrangement of the atoms also produces planes of weakness, resulting in perfect octahedral cleavage. Gemologists make use of the cleavage to remove flawed parts of large crystals, where sawing would cause too much loss.

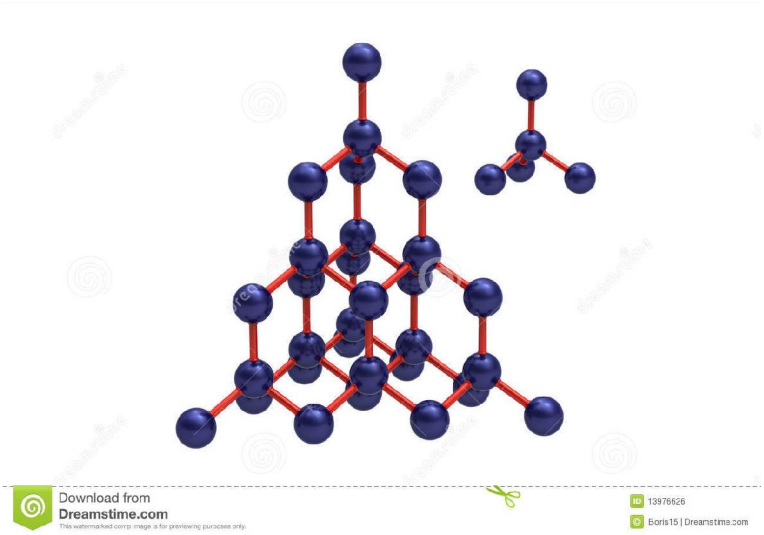


Figure 4. Diamond atomic structure. (www.dreamstime.com)

Most diamond has an *adamantine* luster, which is the highest luster for transparent gemstones. (Bort tends to have a greasy luster.) This results from its very high refractive index, which is a measure of how light rays are bent when they enter a stone or other substance. Gem cutters utilize their knowledge of refractive index to cut faces that produce the maximum "sparkle" or internal reflection. Old gemstones cut before the science of reflection and refraction was fully developed tend to be relatively lifeless. As a result, old diamonds are often re-cut to increase their sparkle.

Diamond's specific gravity varies between 3.50 and 3.53 (Palache, *et al.*, 1944)—relatively high for a non-metallic mineral made up of a low density element. For comparison, quartz and the feldspars average about 2.7. This high density is another result of the close packing of the carbon atoms in its structure.

An interesting property that is critical to correct identification of diamond is its low thermal conductivity (high thermal inertia). This measures how quickly the surface temperature of a material changes when a certain amount of heat is applied for a fixed amount of time. All common diamond simulants have lower thermal inertias, so electronic probes (Figure 5) are used to measure this property. These must be used carefully, because simple mistakes can cause false readings, depending on the particular probe used (Hurlbut and Kammerling, 1991).

Figure 5. Diamond testers. (www.gemselect.com); (www.jcrs.com)

Other physical properties include color, which is very varied but also very important in determining price per carat; fairly common UV fluorescence and phosphorescence, which sometimes relate to impurities or internal structure; and X-ray fluorescence, which is critical to methods commonly used to mechanically separate very small amounts of diamond from the large volume of other minerals that occur with it in the host rock. Various treatments are used to change or mask the colors of unattractive diamonds. These may be a challenge to detect, but the effort is worthwhile because treated stones aren't valued as highly as "natural" ones.

Geologic Occurrence. Diamond occurs in 3 main types of geologic deposits: (1) in peridotite or orangeite; (2) in lamproite; (3) in placers.

Peridotite (Figure 6) is a relatively rare igneous rock made up of olivine and pyroxene (usually altered to serpentine), along with varying amounts of phlogopite mica, calcite,

Figure 6. "Typical" kimberlite. (earthphysicsteaching.homestead.com)

red garnet (pyrope), and green, Cr-rich pyroxene. The last two minerals act as "indicator" minerals used by diamond prospectors (Figure 7). Peridotite commonly occurs in small dikes and carrot-shaped pipes (diatremes) (Figure 8) at scattered locations on all of the Earth's continents. Thought to originate in the mantle, below 120 km., these intrusives commonly contain broken pieces of the rocks through which they ascended, along with fragments from deeper in the mantle, in which the contained diamonds themselves originated (Best, 2003).

Figure 7. Diamond "indicator minerals" Red is pyrope; green is chromium-rich clinopyroxene. (www.wyomingjewelryarts.com)

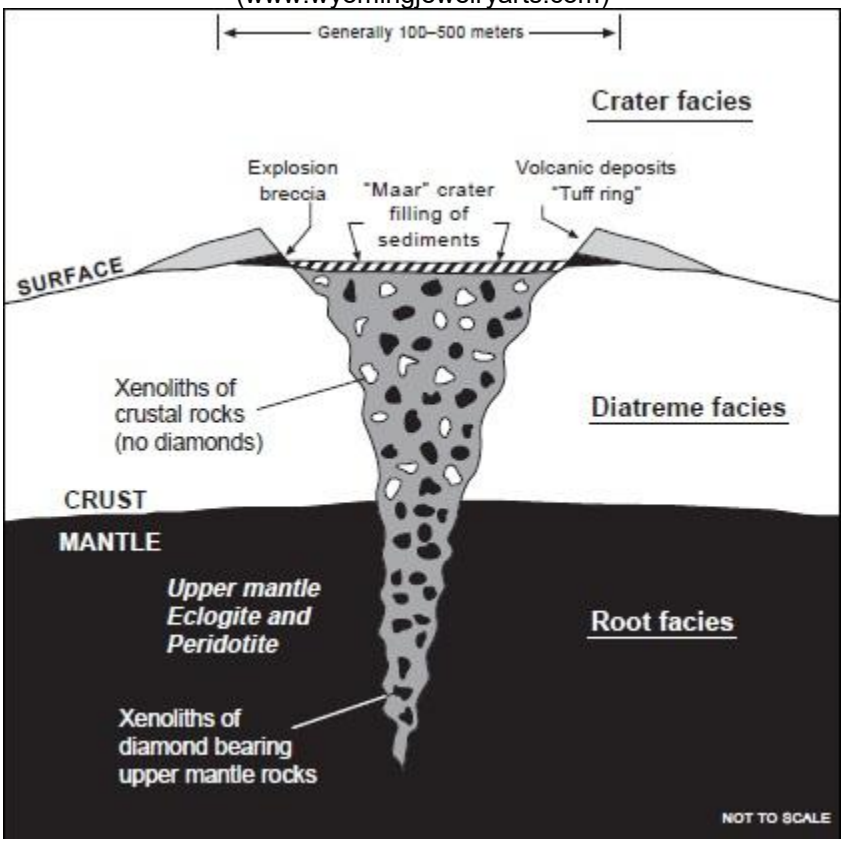


Figure 8. Cross section of a kimberlite diatreme. (coloradogeologicalsurvey.org)

Of 5000 or so kimberlite bodies known (Best, 2003), about 600 contain diamonds (Craig, *et al.*, 2001), but only 100 are of commercial importance (Figure 9). Commercial value depends mainly on the number of carats per ton of ore and on the percentage of gem quality vs. industrial stones. The State Line district, in northern Colorado, produced diamonds from a kimberlite body, starting in 1996.

Although an unusually high 25 percent of the stones were of gem quality, the production volume was too small to make this deposit commercially viable. Stones are mainly sold on the collector market.

Lamproite is a rare (less than 100 km^3 world-wide) high potassium igneous rock, similar to peridotite but without pyrope or calcite. It is much more restricted than kimberlite, occurring mainly in southeast Africa, Western Australia, and the Lucite Hills, Wyoming. Small pipes, dikes, and lava flows are known, and diamonds occur in a few, including the Crater of Diamonds (Arkansas) and the far more important Argyle pipe (Western Australia). The Argyle deposit contains 75 million tonnes of ore averaging 6 to 7 carats per tonne, valued at an average of $7 per carat. Note, however, that this deposit is the world's only important source of pink diamonds, which can sell for over $2,000,000 **per carat**!

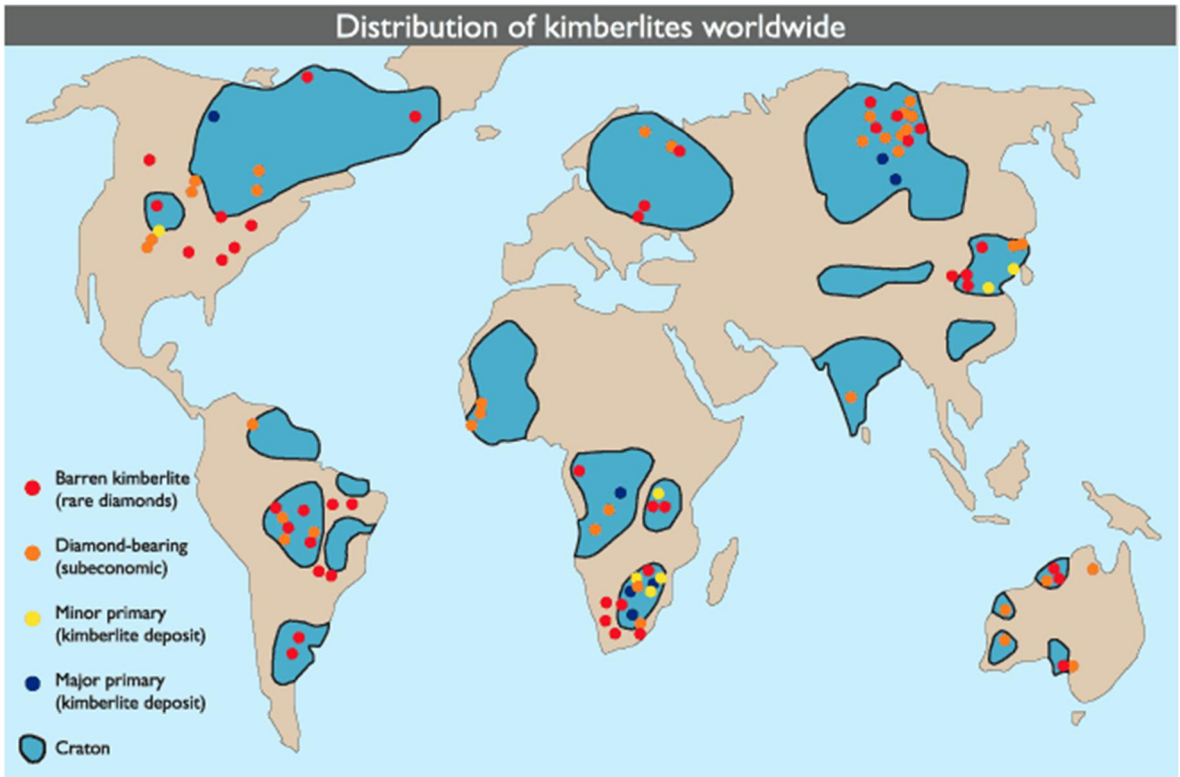


Figure 9. Major world kimberlite provinces. (www.geus.dk)

Because of its toughness and high specific gravity, diamond often occurs in placer accumulations downstream from primary kimberlite or lamproite deposits. Both stream placers and beach placers are commercially important. In addition, diamonds may be widely dispersed in glacial deposits, as in the upper midwestern U.S.

Minute diamonds have also been found in meteorites from Arizona and Antarctica. The biggest diamond known was discovered in 2004 by the Harvard-Smithsonian Center for Astrophysics. Star BPM37093, the crystallized core of a white dwarf, is 2500 miles across and weighs 10 billion trillion trillion (1 followed by 34 zeros) carats. In about 5 billion years (give or take a few), scientists predict that our sun's core will also become a giant diamond crystal.

Synthetic Diamonds. Synthetic diamonds were originally developed for industrial use in the 1950s. Currently, several hundred million carats of industrial diamonds are

manufactured each year (over 200,000,000 carats in the U.S. alone). Manufacturing costs vary from less than a dollar per carat to over $100 per carat, depending on size and quality.

For years, synthesis of large, gem quality diamonds was not commercially possible. However, in the early 2000s, new production methods brought down the costs of gemstone synthesis. Gem diamonds in the 0.25- to 2-carat range are now routinely manufactured for prices that depend on size and color. Small stones are cheaper than their natural equivalents, but stones over 1 carat are often very pricey ($5000 to $6000 per carat). Costs may eventually come down, but the prices of natural stones are artificially inflated, and price wars may occur at some point. Luckily, several properties can be used to distinguish between synthetic and natural stones.

References Cited

Best, M.G., 2003, *Igneous and Metamorphic Petrology, Second Edition*: Oxford, UK, Blackwell Science, Ltd.

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2017 Membership Application, Lake George Gem & Mineral Club
Box 171, Lake George, Colorado 80827
www.LGGMClub.org

Date: _____/_____/20____

Name(s) _____

Address _____ City_____ State_____Zip_____

Telephone ( )_____-_____ Email (please print) _____
(required to receive newsletter and field-trip info)

Names/ages of family members (if family membership)_____

Dues for Jan 1 through Dec. 31 each year are as follows (please check membership type):

____ Individual (18 and over)……..$15.00

____ Family (includes dependents under age 18)……$25.00

Dues are due on or before March 31. Members with unpaid dues will be dropped from the roster on April 1.

I agree to abide by the Club constitution, by-laws, and rules regarding field trips and club claim visits.

Signed_____ Date:_____/_____/20____

I am or have previously been a member of Lake George Gem & Mineral Club. Yes____ No____

My interest areas include (check all that apply): Minerals___; Fossils___; Lapidary___; Micromounts___; Colorado geology___; Pebble Pups (ages 7-17)___; Mining History___; Crystallography___; Other _____

I am willing to give a talk/presentation to (the Club) or (Pebble Pups) on _____

_____and/or lead a field trip to (list)_____

I am willing to participate/help in the following ways (can choose more than one): Club Officer____; Newsletter Editor/Writer____; Local Show/Show committee____; Nominating Committee____; Winter Programs Committee____; Field Trips____; Art (badges)____; Membership Coordinator ____; Website Assistance____; Pebble Pups____; Other (be specific)_____

Questions about the Club or Activities? Visit the website or contact a Club officer.

Updated 05/01/2015

Lake George Gem & Mineral Club
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 2016 are:

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

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

Bob Korzekwa, Treasurer
270 Ridge Court
Woodland Park, CO 80813
bobbykorzekwa@yahoo.com

Norma Rhodes, Secretary
7546 Duck Hawk Place
Fountain, CO 80817
normajalexander@gmail.com

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