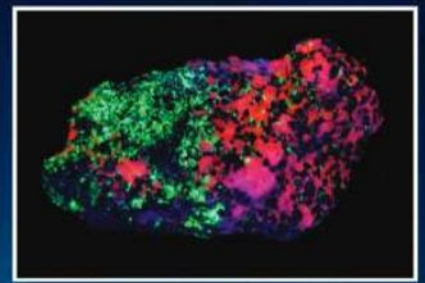


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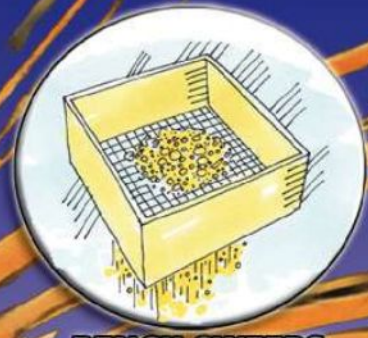
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Rock & Gem

Volume 40, Number 10

October 2010

ON THE COVER

The Violet Claims in Utah's Wah Wah Mountains are among the few known localities in the United States that produce red beryl crystals. (Jeff Scovil photo/The Collector's Edge specimen)

FEATURES

Collecting Utah's Red Beryl..... 12

A rare trip inside the Wah Wah Mountains source

by **Bob Jones**



Bancroft's Lesser-Known Collecting Spots 20

12 mineral occurrences in Canada

by **Lori Lamb**

Slab Saw Blade Repair 32

Save money on replacements with a few simple tools

by **Dave Fisk**

Rock & Gem Kids..... 38

Kid-size articles, puzzles and prizes

44



52



SUBSCRIPTION QUESTIONS? Call (760) 291-1549

62



Modern Mineral Classics..... 44

Part V: Choice vanadinite, smithsonite, pyrite, crocoite, cerussite and cuprite

by **Bob Jones**

Colorado Yule Marble 62

Famous white rock from a forgotten mine

by **Barbara L. Miller**

FIELD TRIP

Sacramento Mountains Azurite 52

Colorful copper minerals in the High Rolls district

by **Robert Beard**

REGULAR COLUMNS

All She Wrote 6

Craftsman of

the Month..... 8

Show Dates..... 10

Shop Talk..... 18

Rock Science..... 28

Picks & Pans..... 42

Off the Dop..... 60

Contest Rules..... 61

Many Facets..... 66

On the Rocks..... 72

Field Notes 74

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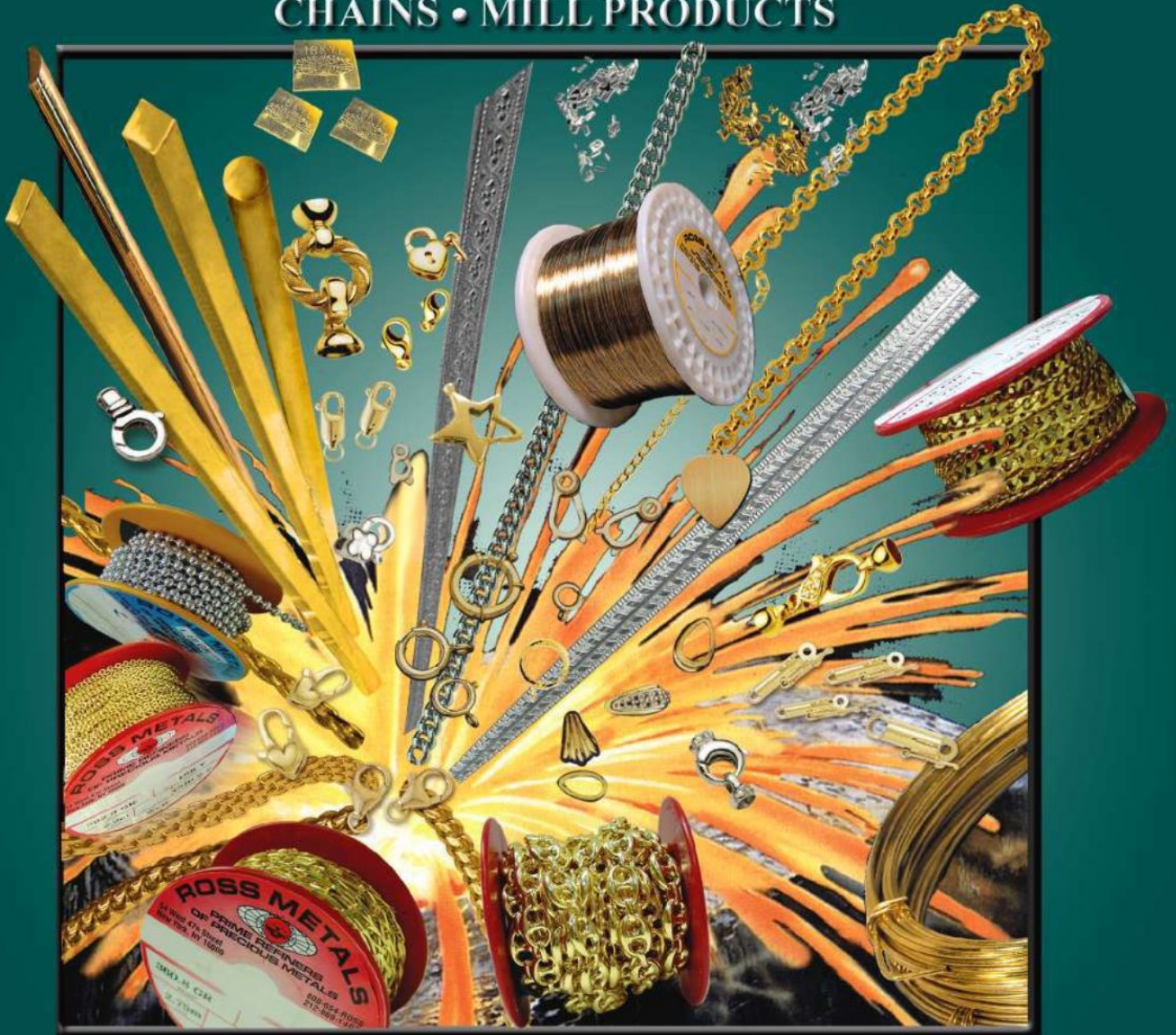
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Off the Beaten Track



BOB JONES PHOTO

For 40 years, *Rock & Gem* has been bringing its readers inside information on minerals and sources that are not easily accessible to the public. In this month's issue, we do it again, featuring several collectibles and collecting areas that are off the beaten track.

Red beryl is an attractive and rare gemstone. Even rarer is an opportunity to dig crystals of the gem from one of only a handful of known sources. Bob Jones shares his experiences on just such a trip to the Wah Wah Mountains in "Collecting Utah's Red Beryl" (p. 12).



LORI LAMB PHOTO

Many rockhounds know of Bancroft, Ontario, as a boon of colorful minerals and collecting opportunities. In "Bancroft's Lesser-Known Collecting Spots" (p. 20), Lori Lamb shares 12 of her favorite locations that aren't on the list of usual stops. Think of it as an insider's guide to mineral treasures in this rockhound-friendly part of Canada.

Colorado's famous Yule marble graces many a national monument and architectural structure and is a popular medium for sculptors. Barbara L. Miller visited the now-closed source of this snow-white stone and relates some of its history in "Colorado Yule Marble" (p. 62).

CALL FOR ENTRIES

Rock & Gem invites you to submit your entry to our Craftsman of the Month contest. You could win a personalized plaque and a Dremel rotary tool kit. See page 8 for complete details.



BARBARA L. MILLER



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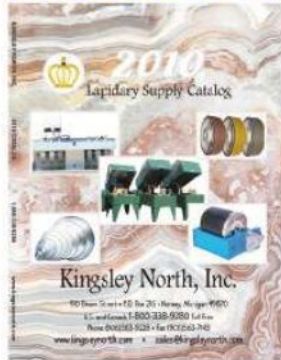
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CRAFTSMAN OF THE MONTH

I am fairly new to the lapidary craft, having cut my first stone just two years ago," writes October Craftsman of the Month Dennis Williams, of Albany, Oregon. "I took a course in silver work and have had an enjoyable time crafting jewelry. When polishing a stone for a traditional bezel set, I frequently could not decide which side of the stone was better. I wanted to show off both sides of the stones. I have started to 'rim-set' or 'rim-wrap' the stones and am gratified with the results.

"For this project, I chose a nice piece of lapis that showed interesting graining on both sides. I began by grinding the stone to the desired shape using a 100 grit diamond wheel, then followed with a 450 grit polish. At this point, I clamped a stop, or fence, on my trim saw so the blade was centered to the thickness of the stone. Holding the flat of the stone against the stop, I incised a groove about $\frac{1}{32}$ inch deep around the perimeter of the stone. I finished polishing the stone through 325, 600 and 1200 grits, finishing with 14,000 diamond grit. These steps removed any minute chips caused by the grooving process.

"When the polishing was done, I was ready to begin the setting sequence. I measured the circumference of the stone and added 2 inches. I cut a piece of 22 gauge square silver wire to this length. I then grasped the wire in the jaws of hemostats, which had been filed smooth to keep from marring the silver,



about 1 inch from each end. I twisted the wire one complete turn for each inch of circumference.

"Removing the wire from the hemostats, I formed the twisted portion around the stone, leaving 1 inch of length on each end. I grasped the two ends at the top of the stone with another pair of hemostats. This pulled the silver wire tightly into the groove around the stone. I bent the two ends out in opposite directions, 90 degrees from the face of the stone and used a tiny bit of TIX solder to secure the ends and form the shank of the bail. TIX melts rapidly at low temperatures and does not impart too much heat to the stone.

"I removed the hemostats, formed the two ends around the shank of a $\frac{5}{32}$ -inch drill bit, and bent the wire so that it lay along the soldered shank and trimmed the ends flush with the stone. Once again, I grasped the shank of the bail (now four pieces of silver) with the hemostats and soldered them together using another tiny bit of TIX. After cooling, I cut a short length of 22 gauge half-round, dead-soft silver wire. Placing a short end through the bail, I held it along the shank, then wrapped the wire around the shank down to the stone and trimmed it off. This covered the soldering on the shank and gave a finish to the piece. I separated the round sides of the bail and the piece was ready to wear and enjoy, showcasing both sides of the stone."💎



Would you like to be named Craftsman of the Month?

To enter the contest:

- Write a 500-word step-by-step description of how you crafted your lapidary project from start to finish. Submit an electronic copy of the story, along with your printed manuscript, if you are able.
- Take least one sharp, close-up, color photo of the finished project. Submit a photographic print or a high-resolution (300 dpi at 4 inches by 5 inches) digital photo as a .tif or .jpg file on a CD. (Contact the editor with questions.)
- Send your materials, along with your name and street address

(required for delivery), to Craftsman of the Month, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003. Submissions will not be returned, so do not send originals. Only winners will be notified.

Craftsman of the Month winners receive a two-speed Dremel Model 200 N/40 MultiPro kit and a wall plaque in recognition of their creativity and craftsmanship. Winning projects are also posted on our Web site, www.rockngem.com.





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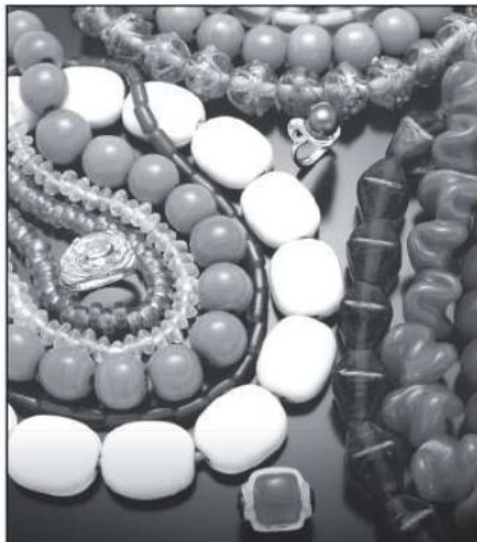
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SEPTEMBER-OCTOBER 2010

28-3—IDABEL, OKLAHOMA: Show and sale; McCurtain Gem & Mineral Club; Museum of the Red River, 812 SE Lincoln Rd., Hwy. 70 S. bypass; Tue. 9-5, Wed. 9-5, Thu. 9-5, Fri. 9-5, Sat. 9-5, Sun. 11-4; free admission; contact Doris Perkins, 405 SE Ave. G, Idabel, OK 74745, (580) 286-3133; e-mail: rperkins8236@sbcglobal.net

OCTOBER 2010

1—COLUMBUS, OHIO: Show, "Rings & Things BeadTour"; Rings & Things; Crowne Plaza - Columbus North, 6500 Doubletree Ave.; Fri. 2-6; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

1-3—ANCASTER, ONTARIO, CANADA: Show, "Ancaster Gem, Mineral, Bead & Jewellery Show"; Robert Hall Originals; Ancaster Fairgrounds, 630 Trinity Rd.; Fri. 9:30-4:30, Sat. 10-6, Sun. 10-5; adults \$6, children under 12 free; jewelry, crystals, fossils, rocks, more than 30 dealers, free seminars; contact Robert Hall Originals, P.O. Box 29, 138 Sugar Maple Rd., St. George, ON, N0E 1N0, (519) 448-1236; e-mail: rockshow@roberthalloriginals.com; Web site: www.roberthalloriginals.com

1-3—INDIANAPOLIS, INDIANA: 12th annual show; Treasures Of The Earth Gem & Jewelry Shows; Indiana State Fairgrounds, Ag/Horticulture Bldg., 1202 E. 38th St.; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$5 (3-day ticket), children under 16 free; jewelry makers, goldsmiths and silversmiths size, reconstruct, repair, design or make original jewelry from customer-selected gems, stones, opals and crystals, wire wrap, wire sculpture, stone beads, pearls, stone setting, dealers, amber, opal, fossils, minerals, door prizes, grand prize, 500 Earth Science Club display, silversmithing demonstrations and classes, lampwork bead demonstrations, wire wrapping classes; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: vawimmer@verizon.net; Web site: www.toteshows.com

1-3—LIVONIA (DETROIT), MICHIGAN: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Embassy Suites, Livonia/Novi, 19525 Victor Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 10-3; contact G&LW, P.O. Box 98, Flora, MS 39071-0098, (601) 879-8832; e-mail: info@glwshows.com; Web site: glwshows.com

1-3—SARASOTA, FLORIDA: Show; Frank Cox Productions; Municipal Auditorium, 801 N. Tamiami Trail (Hwy. 41); Fri. 10-5, Sat. 10-5, Sun. 10-5; gems, jewelry, beads; contact Frank Cox Productions, 755 S. Palm Ave. #203, Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

1-3—SCHAUMBURG, ILLINOIS: Show; MalicJewels Jewelry & Gift Show; Renaissance Schaumburg Hotel & Convention Center, 1551 Thoreau Dr.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

2—CINCINNATI, OHIO: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn - I-275 North (Ballroom), 3855 Hauck Rd.; Sat. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

2-3—GREELEY, COLORADO: Show; Rock & Mineral Society of Weld County; Greeley Senior Center, 1010 6th St.; Sat. 10-6, Sun. 10-3; free admission; jewelry, door prizes, gems, minerals, fossils, raffle, demonstrations, rough and polished rocks; contact Melanie DeHart, (970) 352-8149; e-mail: hamlethouse@yahoo.com

2-3—JACKSONVILLE, ARKANSAS: Show; Central Arkansas Gem, Mineral & Geology Society; Jacksonville Community Center, 5 Municipal Dr.; Sat. 9-5, Sat. 9-5; free admission; more than 100 tables, more than 20 dealers, demonstrations, exhibits, door prizes, kids' dig, mineral identification; contact Pat Kissire, 4900 Sparks Rd., Little Rock, AR 72210, (501) 821-2346; e-mail: pkissire@sbcglobal.net; Web site: www.centralarrockhound.org

2-3—JEFFERSON, WISCONSIN: 38th annual show; Rock River Valley Geological Society; Jefferson County Fair Park, Jackson and Peurmer Rd.; Sat. 10-5, Sun. 10-4; dealers, minerals, rocks, fossils, gems, jewelry, demonstrations (wire wrapping, faceting, cabochon cutting); contact Robert Schweitzer, (920) 674-2544

2-3—LEXINGTON, KENTUCKY: 20th annual show and sale; Rockhounds of Central Kentucky; Kentucky National Guard Armory, 4301 Airport Rd.; Sat. 10-6, Sun. 12-5; adults \$1, children 6-12 50 cents, or \$3 per family, Scouts in uniform free; dealers, minerals, jewelry, equipment, club sales and exhibits, Kentucky agate, door prizes, kids' quarry, silent auctions; contact Allen Ferrell, (859) 277-2469; e-mail: KYROCK2010Kentucky@yahoo.com; or Lamon Flynn (606) 726-9237; e-mail: flyrebec@aol.com; Web site: www.lexingtonrockclub.com

2-3—OMAHA, NEBRASKA: 55th annual show; Nebraska Mineral & Gem Club; Westside Community Center, 108th and Grover St.; Sat. 9-6, Sun. 10-5; contact Tim Kutsch, (402) 397-9606; Web site: www.nerockgem.us

2-3—OROVILLE, CALIFORNIA: 3rd annual show; Feather River Lapidary & Mineral Society; Oroville Rock Club, Municipal Auditorium, 1200 Myers St.; Sat. 10-5, Sun. 10-4; adults \$2, children under 12 free; rocks, gems, minerals, fossils, vendors, rough material, cabochons, handmade cabinets, tools, books, tumblers, wire wrappers, Wheel of Fortune, grab bags, polished rocks, raffles, door prizes, 2nd Annual World Rock Tumbling Championship; contact Connie Rossetto, P.O. Box 5772, Oroville, CA 95966, (530) 589-1840; e-mail: Crossetto@aol.com; Web site: www.orovillerocks.com

2-3—WAYNESBORO, VIRGINIA: 43rd annual show; Shenandoah Valley Gem & Mineral Society; Kate Collins School, 1625 Ivy St.; Sat. 10-6, Sun. 12-5; admission \$1; eight dealers, gems, minerals, cutting material, jewelry, beads, door prizes; contact Roland Stetler, (540) 463-6098; e-mail: Kenneystetler@embarqmail.com

3—INDIANAPOLIS, INDIANA: Show, "Rings & Things BeadTour"; Rings & Things; Crowne Plaza Hotel - Indianapolis Airport, 2501 S. High School Rd.; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

7-9—MOUNT IDA, ARKANSAS: Show, "Quartz, Quiltz and Craitz Festival"; Mount Ida Area Chamber of Commerce; Montgomery County Fairgrounds, Fairgrounds Rd.; Fri. 9-5, Sat. 9-5, Sun. 10-4; free admission; dealers, minerals, jewelry, quartz crystals, kids' crystal digging contest; contact Maureen Walther, Mount Ida Area Chamber of Commerce, Mount Ida, AR 71957, (870) 867-2723; e-mail: director@mtidachamber.com; Web site: www.mtidachamber.com

7-9—MOUNT IDA, ARKANSAS: 22nd Annual World's Championship Quartz Crystal Digging Contest; Mount Ida Area Chamber of Commerce; Montgomery County Fairgrounds, Fairgrounds Rd.; Thu. 9-3, Fri. 9-3, Sat. 9-3; adults \$80 (\$95 late registration); meet other miners, keep all you find, maybe even win a prize; contact Maureen Walther, Mount Ida Area Chamber of Commerce, Mount Ida, AR 71957, (870) 867-2723; e-mail: director@mountidachamber.com; Web site: www.mountidachamber.com

8-9—WEST SPRINGFIELD, MASSACHUSETTS: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Eastern States Exposition, Young Bldg., 1305 Memorial Ave. Fri. 10-6, Sat. 10-3; contact G&LW, P.O. Box 98, Flora, MS 39071-0098, (601) 879-8832; e-mail: info@glwshows.com; Web site: glwshows.com

continued on page 16

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Far Left: The diggings where Welo opal is found are scattered for several kilometers, along a mountainous river gorge.

Left: The entourage escorting us down to an overlook to view the Welo opal diggings.

2010 Ethiopia Opal Buying Trip

Day 5: Rose early for a full day of travel. We were all packed and on the road at 9:00AM, for a full days travel (375 kilometers) to Kambolcha. Steve's feeling better and Darlene is pretty much back to normal...but neither of us felt up to eating breakfast...we're on the Africa diet? Our vehicle is a relatively new Toyota Land Cruiser with 2 spare tires on a roof rack...hope that's not an indication of road conditions. Driver is Solomon and our guide is Fitsum. Fought traffic through Addis...we like to call it combat driving. I wouldn't have a chance behind the wheel here. But out in the countryside, highway driving changes from combat style to animal avoidance style. Our driver had an almost instinctive reaction to the numerous sheep, donkeys, camels, cattle and goats...knowing which way the animals would turn...steering the Land Cruiser the other direction.

Heading out of Addis we began climbing into the mountains. The countryside thinned of car and truck traffic and became green and lush. Just past Debre Birham we drove through a mountain pass at near 10,000ft. The scenery was fantastic...thick stands of aromatic gum trees, similar to what we've seen during our many trips to Australia, but surrounded with cool crisp Montana like mountains. And then, before reaching Kambolcha, we dropped down into the hot desert-like country...near the Danakil Depression: one of the hottest places on earth, where we saw camels used as the main mode of transportation, instead of donkeys.

Our first night out of Addis was spent at the Sunnyside Hotel in the southern end of Kambolcha. Very nice bar and dining room, but the rooms weren't up to what we had seen in Addis or in North America. Hotel accommodations outside of Addis: if you have a working shower, toilet that flushes and sound bed...you count your blessings. And the blessings in this hotel were a very nicely appointed, clean dining room with tasty western style food.

Day 6: Welo opal mine day. We found a decent 2 lane black top road leading to Desse, full of tight turns and switchbacks...climbing steeply into the mountains. Passing through the busy market streets of Dessie we turned onto a rugged, rough mountain road heading up into the terraced igneous mountains. Our first flat tire happened while crossing a dry stream...the tire being cut by the sharp basalt gravel covering the road. Delanta appeared when we topped out on the mountain above the steep river gorge. Stops were made at the local Mining Ministry office for more permits and the police station for a police escort armed with a Kalashnikov rifle. Our driver carefully drove the Land Cruiser as close as he could to the edge of town...right above the stunning geometric basalt column cliffs. With several guides and mining officials we descended the narrow foot trail along the steep cliffs. This trail wasn't



The diggings where Welo opal is found are scattered for several kilometers, along a mountainous river gorge.



Good sturdy shoes are a requirement for the steep trail; down to the opal workings.



Sitting at 10,000ft, his long arduous foot trail down to the Welo opal diggings was more than a match for Darlene and I.

for the faint of heart. An hour's worth of hiking brought us down to an overlook, from where we could see opal miners working to remove stones from a soft igneous layer...perhaps a fine grained pyroclastic rock or tuff layer. Asking how to actually get down to the mines themselves, our guides pointed out a steep winding 5 mile trail, on the adjoining mountain, which led over and down to the opal mines we were photographing. At this altitude and with this climb, this would have been a 2 day hike for us...so this was obviously out of the question. As this deposit extends along the river gorge for several kilometers, we were able to photograph only one of many opal diggings along the mountainside below Delanta. Some areas have high concentrations of opal where a single miner may dig out a kilogram of this bright crystal opal in a day. But other deposits may require a week or more for the same results. Due to the remote location of this deposit I'd guess some very intense prospecting might be in order...perhaps it already is. The Welo deposit is much richer than present day Australian opal deposits. But all work in Ethiopia must be done with relatively simple hand tools carried for miles down to the mines. Then all the tools and opals must be carried back up to Delanta on foot...every night. Of course all this is done at approximately 10,000ft. The opal found at the Welo deposit is a type called hydrophane opal. This opal is very hygroscopic and absorbs water quickly, losing its base color and most of its play-of-color...until given a few days to dry out and return to its original state. Since much of the opal is mined in a moist soft matrix, the miners allow it to dry for several days before it is sold to various licensed Ethiopian opal buyers. Only an Ethiopian with a special export license is allowed to ship opal out of country.

On the road back from Delanta, the rough road claimed another tire. While our guide and driver were changing the tire we hiked down to a dry nearby dry river bed. Among the colorful rounded river rock we found a plentiful supply of medium sized white (and some green) agates. Yup... opals aren't my only vice. What a great day... opals and agates! On the winding road down the mountain from Desse to Kambolcha, we sighted a hyena running across the road in our headlights. Back to the Sunnyside Hotel for a late tasty chicken dinner.

See our website "Trip Report Section" for the complete version of our opal adventures to Ethiopia along with many more photos: www.villagesmithyopals.com.

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Collecting Utah's Red Beryl

A Rare Trip Inside the Wah Wah Mountains Source

Story by Bob Jones

One of the great things about being a teacher is hearing from one of your students years after you retire. I've heard from a few. One is now a college professor, another co-owns a plastics factory, and happily, a couple of them have continued collecting minerals or working in the mineral and gem hobby in some way.

One of the fellows who was in my after-school mineral group is Clay Holman, a delightful student who has been involved in minerals ever since school. He has a thriving trilobite claim in Utah and works as assistant and manager of one of two red beryl properties in the Wah Wah Mountains, near Milford, Utah.

I was lucky because Clay remembered his old teacher when he saw my mug shot in *Rock & Gem* and called to make contact with me in 2004. He invited me to come to Utah and dig red beryl in the Wah Wah Mountains. My son Evan and I jumped at the chance to dig gemstones and enjoy reconnecting with one of my students. I reported on that dig in my article "Utah's Red Beryl" (June 2009 *Rock & Gem*).

Red beryl and emerald are colored varieties of the same mineral, beryllium aluminum silicate, which also has given us such lovely gems as blue aquamarine, yellow heliodor, and colorless goshenite. The only difference in these varieties of beryl is the chromophores that impart the lovely colors we enjoy. Emeralds owe their color to chromium. Red beryl is colored by manganese ions that affect the light being transmitted to your eye when it leaves the crystal.

In my November 2004 article "The Yin-Yang of Beryl", I described green emerald and red beryl as representing the Taoist philosophy of opposite and equal qualities (yin and yang). This pairing has caught on in the gem and jewelry worlds. Both these beryl varieties are fine collector minerals, as well as very popular gems.



JOE BUDD, PHOTO/KEVIN WARD, EXCEPTIONAL MINERALS SPECIMEN

Red beryl crystals were found in the Wah Wah Mountains in greater quantities than those from the Thomas Range. The main crystal in this specimen is about 1.5 millimeters high.

When Clay called me again in spring 2010 and said he was re-opening the red beryl dig, Evan and I were excited at the chance to dig red beryls once again, even though we knew it would be a really tough dig! I was already committed to lead a mineral tour of England (see "A Unique Tour of England", September 2010), so we had to wait until I got back in mid-May. As soon as I returned, Evan and I got our tools together, planning to go to Utah the next week. Joining us was Marc Miterman from the Philadelphia area. Marc and Evan often partner in buying minerals to sell, so we knew he'd be a great partner on a dig.

The three of us headed north into some of this country's most stunningly beautiful landscapes. The red rocks of Southern Utah are fantastic, forming lovely spires, mesas, buttes, and deep, lined canyons with varicolored sedimentary layers. In some areas, the red rock has been eroded into gracefully arched over, rainbowlike formations. Every vista presents a photo opportunity, so a drive into Southern Utah is a treat all by itself! But we had big crystals to find, so we only enjoyed the sights as we traveled.

In Milford, we met with Clay and his lovely wife, Jennifer, who would join us the next day in the red beryl quarry. We excitedly discussed the prospects for finding specimens and obtained directions to the quarry before retiring for the evening.

In the morning, the drive to the red beryl dig site took us along a broad valley on an unmarked tar strip. We were surrounded by verdant hills, and slightly undulating landscape rich in sagebrush green from early spring rains. Going west, we eventually traveled far enough to see a broad, white slash of exposed rock across the face of the Wah Wahs. This was our destination high up on the mountain slopes.

The drive would have been quite pleasant if it were not for the smell! When the wind is right, the malodorous scent of pigs fills the air. The valley is full of clusters of hog-raising buildings. I was told that a million pigs a year are shipped from this area to Southern California. No wonder the valley was smelly! Imaging the amount of waste a million or so pigs can produce. Luckily, the dig is up-slope in the Wah Wahs, not far from the 7,200-foot summit, so once we left the valley, we were able to breathe freely again.

The red beryl deposit was discovered in the 1950s by folks using Geiger counters to search for radioactive minerals. They did not find significant evidence of radioactivity, but they did find small, red, hexagonal crystals lying about in quantities that exceeded the few rare crystals previously known from the Thomas Range north of the Wah Wahs. The prospectors decided the beryls would be fun to collect on their free weekends, so they staked claims.

Today, we benefit from that early accidental discovery as specimens of red beryl are available in the international gem market. Prior to the Wah Wah Mountain production, red beryl was too scarce and crystals were too small to encourage a market for them. They were simply considered a novelty, not a viable or significant gem. That has changed, and today efforts to mine red beryl are carried out sporadically.

The big problem in the Wah Wahs is the rhyolite host rock. I've worked many a dig across the United States, but nothing compares with the snow-white rhyolite of the Wah Wahs for hardness. Whoever coined the old saying "hard as a rock" must have had this stuff in mind. To break up the massive outcrop with the usual rockhound tools is a near impossibility. Clay uses a massive hydraulic hammer—actually a tapered point hanging from the suspended arm of a huge backhoe—to mine for gems. This immense device pulses hammer blows onto and into the rock. You've probably seen this type of tool pounding concrete to manageable slabs. This rhyo-



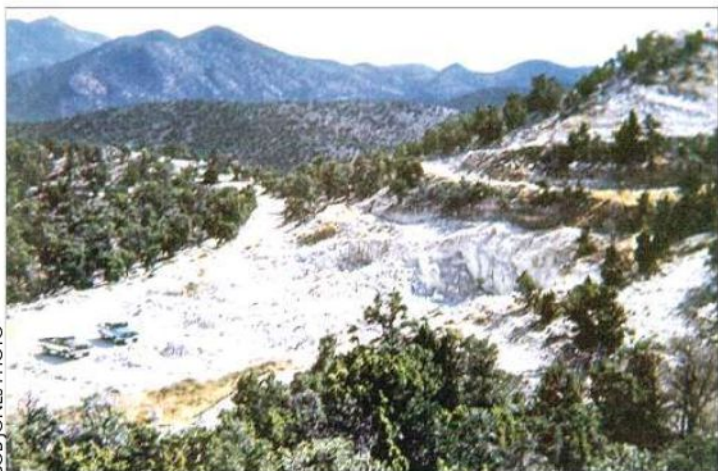
BOB JONES PHOTO

The lucky group that got to dig in the red beryl quarry included (left to right) Marc Miterman, Evan Jones, Marlow and Jean Cropper, and Jennifer Holman.



BOB JONES PHOTO

Clay uses a massive hydraulic hammer—actually a tapered point suspended from the arm of a backhoe—to crack the snow-white rhyolite into large boulders.



BOB JONES PHOTO

The red beryl quarry is a broad, white slash of exposed rock across the face of the Wah Wah Mountains, not far from the 7,200-foot summit.

lite is much tougher than concrete! The hammer literally bashes and pounds the rhyolite into submission. The noise is deafening, but the results are a good start in breaking up the rock.

All that big hammer did was crack the rhyolite into large boulders to be worked on by smaller power equipment. That's when we were able to bring an electric hammer/chisel into play. This tool works like a jackhammer to widen the tiny cracks and joints. It's a wonderful tool for reducing the rhyolite into manageable chunks we could attack with our hammers and chisels.

Unfortunately, red beryl, unlike many crystal species I've dug, does not occur in nice open pockets or seams where you can see your target and plan removal accordingly. Red beryl has formed in narrow, closed seams filled with white clay. The seams are so narrow that they restrict crystal growth, which accounts for the fact that the majority of the red crystals are well under an inch.



BOB JONES PHOTO

An electric power hammer reduced the boulders of hard rhyolite into manageable chunks for hand tools.



BOB JONES PHOTO

This single half-inch red beryl on rhyolite matrix is typical of what we found on our dig.



BOB JONES PHOTO

The final work of recovering the red beryl crystals from their clay-filled seams is best done with hand tools.

These very narrow clay-filled seams run hither and yon through the rhyolite, giving no clue as to where to dig. You simply find a seam, which is not the easiest task, then bash away along that seam in hopes it will produce the elusive red gem! The unpredictable pattern of the seams is due to random shrinkage of the rhyolite as it cooled. Remember, rhyolite is silica-rich volcanic rock, so its hardness is higher than that of most rocks!

The clay-filled cracks are stark white and almost identical to the rhyolite, so you can't easily trace them. There are some minor indicators that may indicate crystals are nearby. The color of the clay may change slightly to grayish white. If you run into small, black, altered garnets, that's a good sign crystals may be near. Hyalite opal is another possible indicator, as thin crystalline sheets and patches form on the walls of the seams. I suspect a night search with a portable ultraviolet lamp could prove fruitful—for showing not beryl, but quantities of crystalline hyalite opal.

Just where the red beryl, and the very minor microscopic topazes that are sometimes encountered, came from has not been definitively proved. It looks like volatile gases from the original rhyolite melt may have been trapped in the cracks, concentrating a small amount of beryllium aluminum silicate, which crystallized in the very narrow available openings. Maybe "concentrate" is not a good word to use, as the crystals are usually isolated and seldom occur in clusters. And they may be anywhere in the seam.

The crystals from the Ruby Violet claims are seldom over 1/4 to 1/2 inch long and are most often loose singles than small clusters. Some crystals exceed 2 inches in very rare cases. They are almost perfect hexa-

gons with flat C-face terminations. Most crystals have included clay, so they range from completely included crystals to only slightly included at the base of the crystal. Crystals with minor inclusions at the base are gemmy at the termination end and can be faceted into marvelously rich red gems. Most of these gems are cut into stones only 1 or 2 carats in weight, while a few cut into 5-carat or larger gems. These are especially desirable and command high prices.

Our plan was to spend two full days digging. We knew the going would be tough. Digging, even in May, can be made challenging by high temperatures because the white rock quarry faces south! Luckily, a cold front passed through, so we were not subjected to high heat. But at over 6,000 feet we were at the mercy of strong UV rays from the sun. Broad-brimmed hats and sunscreen help a lot, but it was amazing how much UV was reflected back into our faces from the white rock surfaces as we worked to split seams.

We labored on the rock side by side with Clay and Jennifer, who wielded a hammer and chisel with the best of us. She is a long-distance runner, so she is very fit for the task. We were also joined by quarry owner Marlow Cropper, an older fellow who is a dedicated rockhound. In spite of needing a crutch to help him navigate down into the quarry, Marlow joined us along with his wife, Jean, for a day of digging. They spent a good portion of the day banging away and finding nice crystals.

That first day was successful, given the tough rock and random occurrence of crystals. Evan pulled a rather nice, small cluster of beryls, still embedded in clay, from the seam he worked. The rest of the day, that seam produced small clusters and a good

assortment of loose single crystals. The problem is that crystals are often just embedded in the clay, so they tend to drop loose when you are working the seam. Other beryls are firmly attached to the rhyolite and lend themselves to nice specimen clusters.

Marc did as well as Evan working the other end of that same vein. He pulled a very nice, large thumbnail cluster, a number of small single crystals in rock, and a nice handful of loose red hexagons, some of which had nice gem sections.

The second day's dig was not quite as fruitful, though we pulled out a lot of nice singles. A very nice half-inch hexagon, partially included, was my best find of the day. Luckily, temperatures in the quarry were very bearable because we had to dress for protection against a very fierce wind that swirled into and out of the quarry. In the shade, it was down right bone chilling! The rock dust it raised was blinding. Luckily, we had wraparound sunglasses, so we did not suffer too much. I suspect the wind gusts hit 50 mph. Luckily, it was coming from the north and not from the smelly valley below! That would have challenged our patience.

All in all, we had a great two days of hard work, good crystal results, and a really fun time working with Clay. He's a great guy, no thanks to the science teacher he had in Scottsdale so many decades ago!

As for the red beryl quarry, it is now being closed down for various reasons. It is a claimed site, so it is not open to collectors. Marlow is reaching that age when digging rocks is a real test. The road in also needs serious work to make the quarry accessible, so what we dug may be the last of the breed for a time. Check with Evan when you see him at a show. He'll be happy to show you the results of his digging prowess! 🍷

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Orlando, FL.....October 29-30-31

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Show Dates from page 10

OCTOBER 2010

8-10—BIG SUR, CALIFORNIA: 19th annual show, "Big Sur Jade Festival"; South Coast Community Land Trust, Pacific Valley School PTO; Pacific Valley School, Hwy. One, opposite Sand Dollar Beach in Los Padres National Forest; Fri. 12-6, Sat. 10-5, Sun. 10-5; free admission; jade, jewelry, sculpture, raffle; contact Kirk Brock, (831) 659-3857 or 831-402-1143; Web site: www.bigsurjadefestival.com

8-10—HUNTSVILLE, ALABAMA: 42nd annual show; Huntsville Gem & Mineral Society; Von Braun Center, 700 Monroe St., South Hall; Fri. 10-6, Sat. 10-6, Sun. 12-5; adults \$2, children under 5 free; contact Tony Smith, 3624 Grizzard Rd. NW, Huntsville, AL 35810, (256) 603-3095; e-mail: tsmith@erc-incorporated.com; Web Site: www.huntsvillegems.org

8-10—MOAB, UTAH: 51st annual show; Moab Points & Pebbles Rock Club; Old Spanish Trail Arena, 5 miles south of Moab on Hwy. 191; Fri. 10-7, Sat. 10-7, Sun. 10-4; free admission; vendors, demonstrations, spin wheel, displays, door prizes, field trips; contact Jerry Hansen, P.O. Box 1459, Moab, UT 84532; e-mail: moabrockclub@live.com

8-10—PLEASANTON, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Alameda County Fairgrounds, 4501 Pleasanton Ave.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

8-10—SACRAMENTO, CALIFORNIA: Show, "Gem Faire"; Scottish Rite Center, 6151 H St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

8-10—ST. CHARLES, MISSOURI: Show; MalicJewels Jewelry & Gift Show; St. Charles Convention Center, South Hall, 1 Convention Center Plaza; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

8-10—WARREN, MICHIGAN: Show, "Greater Detroit Gem, Mineral, Fossil & Jewelry Show"; Michigan Mineralogical Society; Macomb Community College Expo Center, Bldg. P, 14500 E. 12 Mile Rd., at Hayes; Fri. 9-7, Sat. 10-7, Sun. 11-5; adults \$8, seniors (62+) \$5, children (5-17) \$4; museum and university exhibits, private collector displays, educational displays, more than 50 dealers, minerals, gems, jewelry, carvings, fossils, lapidary supplies, beads, fossil dig, gold panning, gemstone hunt, silent auction, lectures, demonstrations, free mineral identification; contact Carol Werner, 3401 Briar Hill, Hartland, MI 48353, (248) 887-3906; e-mail: briarhillwerner@comcast.net; Web site: www.michmin.org

8-10—WAUSAU, WISCONSIN: 4th annual show and sale; Exclusive Inspirations; East Gate Hall, Marathon Park; 2101 Stewart Ave.; Fri. 12-5, Sat. 9-5, Sun. 10-4; free admission; gems, minerals, fossils, jewelry, lapidary supplies, experts; contact Jennifer Damrow, 1709 Prairie Rd., Madison, WI 53711, (715) 212-7080; e-mail: Jennifer@exclusiveinspirations.com; Web site: www.exclusiveinspirations.com

9-10—FORT WORTH, TEXAS: Show and sale, "LMRA Rockfest Fort Worth"; Lockheed Martin Recreation Assn.; LMRA Trinity River Park, 3400 Bryant Irvin Rd.; Sat. 10-5, Sun. 10-5; free admission; rocks, flint, gems, minerals; contact Steve Shearin, 860 Stafford Station Dr., Saginaw, TX 76131, (817) 777-1997; e-mail: steve.l.shearin@lmco.com; Web site: www.facebook.com/profile.php?id=100001244652268&v=ap_p_2309869772#/group.php?gid=132202050142082

9-10—GRASS VALLEY, CALIFORNIA: Show, "Earth Treasures 2010"; Nevada County Gem & Mineral Society; Nevada County Fairgrounds, Main Exhibit Hall, 11228 McCourtney Rd.; Sat. 10-5, Sun. 10-5; rock and mineral exhibits, special petrified wood display, display cases, hourly prizes, mineral identification, children's games, raffles, door prizes; adults \$2, children free; contact Kim Moore, (530) 470-0388, or Joyce Emerson, (530) 559-2595

9-10—MARYSVILLE, WASHINGTON: 36th annual show, "Rocktoberfest"; Marysville Rock & Gem Club; Totem Middle School Cafeteria, 7th St. and State Ave.; Sat. 10-5, Sun. 10-5; door prizes, exhibits, raffle, demonstrators, dealers; contact Bill Moser, (425) 238-8222; e-mail: bill-ij@comcast.net; or George Haage, (425) 339-2272; e-mail: haag@gte.net

9-10—ORLANDO, FLORIDA: Show, "Fossil Fair"; Florida Fossil Hunters; Central Florida Fairgrounds, 4603 W. Colonial Dr.; Sat. 9-5, Sun. 10-4; adults \$4, students \$1; fossils, rocks, gems, minerals, educational exhibits, children's dig pit, raffles, silent auctions, vendors, books, supplies; contact

Valerie First, 223 Ringwood Dr., Winter Springs, FL 32708, (407) 699-9274; e-mail: vjfirst@aol.com; Web site: www.floridafossilhunters.com

9-10—PAYSON, ARIZONA: 13th annual show; Payson Rimstones Rock Club; Mazatzal Hotel & Casino Event Center, Tonto Apache Reservation; adults \$3, children under 12 free; gems, minerals, fossils, lapidary equipment, children's (and adults') education center, spinning wheel, silent auction; contact Barry or Margaret Jones, (928) 476-3513 or (928) 970-0857

9-10—ROSEVILLE, MINNESOTA: Show; Anoka County Gem & Mineral Club; Har Mar Mall, 2100 Snelling Ave.; Sat. 10-6, Sun. 12-5; free admission; gems, minerals, jewelry, fossils, agates, collectibles; contact Martha Miss, 8445 Grange Blvd., Cottage Grove, MN 55016; e-mail: rockbiz@cs.com

9-10—SIERRA VISTA, ARIZONA: 36th annual show; Huachuca Mineral & Gem Club; Elks Lodge, Wilcox Ave.; Sat. 9-6, Sun. 9-4; free admission; live demonstrations, educational displays, dealers, jewelry, gems, fossils, equipment, lapidary supplies; contact Maudie Bailey, P.O. Box 1596, Sierra Vista, AZ 85636, (520) 378-6291; e-mail: gm Bailey@msn.com

9-10—TOPEKA, KANSAS: 54th annual show; Topeka Gem & Mineral Society; Kansas Expo Centre AG Hall, 17th and Topeka Blvd.; Sat. 10-6, Sun. 10-5; adults \$4, students (13-17) \$1; children under 13 free; special displays, 4-H displays, dealers, lapidary equipment and supplies, rock, jewelry, beads, supplies, demonstrators; contact Millie Mowry, 1934 SW 30th St., Topeka, KS 66611, (785) 267-2849; e-mail: Rock2Plate@aol.com

9-10—TRONA, CALIFORNIA: 69th annual show, "Gem-O-Rama 2010"; Searles Lake Gem & Mineral Society; SLGMS Lapidary and Show Bldg., 13337 Main St. (at Trona Rd.); Sat. 7:30-5, Sun. 7:30-4; free admission; 21 dealers, 50 exhibits, geode cutting and sales, demonstrations, door prizes, kids' games, field trip supplies, field trip video presentation, 3 field trips to Searles Dry Lake; contact SLGMS, PO Box 966, Trona, CA 93592-0966; or Jim Fairchild; e-mail: jfairchild@iwisp.com

9-10—VISTA, CALIFORNIA: Annual show; Vista Gem & Mineral Society; Antique Gas and Steam Engine Museum, 2040 N. Santa Fe Ave.; Sat. 10-5, Sun. 10-4; free admission; 13 dealers, gems, jewelry, slabs, specimens, fossils, tools, books, gem identification, demonstrations, displays, wheel of fortune, raffle; contact Fred Wilson, (760) 433-8446, or Lois M. Harr, (760) 724-0395

10—SPOKANE, WASHINGTON: Show, "Rings & Things BeadTour"; Rings & Things; Mirabeau Hotel Spokane Valley (Ballroom), 1100 N. Sullivan Rd.; Sun. 11-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

15-17—COLUMBUS, OHIO: Show; MalicJewels Jewelry & Gift Show; Greater Columbus Convention Center, Hall C, 400 N. High St.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens and gifts; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

15-17—DEL MAR, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Del Mar Fairgrounds/Exhibit Hall, 2260 Jimmy Durante Blvd.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

15-17—FORT WAYNE, INDIANA: 49th annual show and sale; Three Rivers Gem & Mineral Society; Allen County Fairgrounds, 2726 Carroll Rd.; Fri. 10-7, Sat. 10-7, Sun. 10-5; adults \$3, seniors \$2, students \$1, children free; 12 dealers, club displays, silent auction, door prizes, fluorescent display, kids' games, touch 'n' feel table, demonstrators; contact Michele Yamanaka, 4336 Charter Ln., Fort Wayne, IN 46815; e-mail: yamanakam@cs.com

15-17—KNOXVILLE, TENNESSEE: 20th annual show; Knoxville Gem & Mineral Society; Kerbelia Temple, 315 Mimosa Ave.; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$4, children under 12 free; contact Travis A. Paris, 5604 Malmbsbury Rd., Knoxville, TN 37921, (865) 691-8228; e-mail: nuggetnose@comcast.net; Web site: www.discoveret.org/kgms

15-17—SPRINGFIELD, OREGON: 53rd annual show; The Springfield Thunderegg Rock Club; Gateway Mall, 3000 Gateway St. (I-5 Exit 195A, right on Gateway St.); Fri. 12-7, Sat. 10-7, Sun. 11-4; free admission; dealers, demonstrators,

door prizes, raffle, spin the wheel; contact Bob Smith, PO Box 312, Springfield, OR 97478, (541) 741-0060, or John Randall, (541) 683-2661

15-17—VICTORIA, TEXAS: Show; Victoria Gem & Mineral Society; Victoria Community Center, 2905 E. North St.; Fri. 9-6, Sat. 10-6, Sun. 10-5; adults \$4; contact Patty Shay, 306 W. Houston, Refugio, TX 78377, (361) 526-2936; e-mail: pshay4@yahoo.com; Web site: www.victoriagemandmineral.com

16—WEST HILLS, CALIFORNIA: 12th annual show; Woodland Hills Rock Chippers; First United Methodist Church, 22700 Sherman Way; Sat. 10-5; free admission; dealers, gems, minerals, rocks, fossils, jewelry, displays, demonstrations, silent auction, crafts, Future Rockhounds of America booth, kids' activities; contact Mary-Beth Pio, (818) 349-2943; e-mail: info@rockchippers.org; Web site: www.rockchippers.org

16-17—BILLINGS, MONTANA: Show; Billings Gem & Mineral Club; Billings Hotel and Convention Center, 1223 Mulloweny Ln.; Sat. 10-6, Sun. 10-5; contact Lynn Edwards, 93 Cache Dr., Billings, MT 59102, (406) 855-3675

16-17—BRISTOL, CONNECTICUT: 38th annual show; Bristol Gem & Mineral Club; Beals Community Center, 240 Stafford Ave.; Sat. 9:30-5, Sun. 10-4; adults \$5, seniors \$4, children under 12 free; gems, jewelry, mineral specimens, crystals, hands-on educational exhibits, raffle, free children's games and activities; contact David Korzendorfer, 208 Westledge Rd., West Simsbury, CT 06092, (860) 651-9980; e-mail: bristolgem@hotmail.com; Web site: www.bristolgem.org

16-17—CAYUCOS, CALIFORNIA: 9th annual fall show; San Luis Obispo Gem & Mineral Club; Cayucos Vets Hall, 10 Cayucos Dr., next to Cayucos Pier; Sat. 9-5, Sun. 9-5; free admission; rocks, gems, mineral, fossils, crystals, meteorites, beads, slabs, carvings, lapidary equipment, door prizes, drawing; contact Mike Lyons, 7343 El Camino Real #301, Atascadero, CA 93422; (805) 610-0757; e-mail: jadestar@charter.net; Web site: http://slogem.org

16-17—CLIO, MICHIGAN: 43rd annual show & sale; Flint Rock & Gem Club; Carter Middle School, 300 Upland Dr. (off Vienna Rd., M57); Sat. 10-5, Sun. 10-5; adults \$3, children (6-18) \$1.50, Scouts in uniform free; mineral and crafters' displays, lapidary demonstrations, children's tables and activities, dealers, jewelry, gems, minerals, rough, door prizes, raffle; contact Ed Hearn, (810) 687-2339; e-mail: edleo324@att.net; Web site: www.flintrockandgem.org

16-17—COTTAGE GROVE, MINNESOTA: Show, "Great Lakes, Great Rocks!"; The Minnesota Mineral Club; National Guard Training and Community Center, 8180 Belden Blvd., U.S. Hwy. 61, Grange Blvd. exit; Sat. 10-5, Sat. 10-4; adults \$2, children \$1, families \$5; exhibits, dealers, tailgate sales, programs, demonstrations, kids' corner, agates, rocks, gems, minerals, fossils, jewelry, beads; contact Rita, (651) 457-4285, or Sandy Fuller; e-mail: rockbiz8@cs.com; Web site: www.minnesotamineralclub.org

16-17—DES MOINES, IOWA: Annual show; Des Moines Lapidary Society; Paul R. Knapp Animal Learning Center, Iowa State Fairgrounds; Sat. 10-5, Sun. 10-4; adults \$5, children 12 and under free; minerals, fossils, gems, crystals, jewelry, books, tools, equipment, lapidary supplies, silent auction, demonstrations, displays, door prizes, children's activities; contact Steven Cunningham, 6752 SE 32nd Ave., Pleasant Hill, IA 50327, (515) 262-4578; e-mail: stevurv@mchsi.com

16-17—HONOLULU, HAWAII: Annual show; Hui Pohaku O Hawaii (Hawaii Rock & Mineral Society); Outrigger Waikiki on the Beach Hotel, 2335 Kalakaua Ave.; Sat. 11-7, Sun. 11-7; free admission; learn about fossils and minerals, club members will help you identify your minerals; contact Markus Faigle, P.O. Box 62223, Honolulu, HI 96839, (808) 239-5958; e-mail: hui.pohaku@gmail.com; Web site: http://pohakugalore.net/HI_Rock_Mineral_Society.html

16-17—JOHNSTOWN, NEW YORK: Show; Fulton County Mineral Club; Moose Lodge, 109 S. Comrie Ave.; Sat. 10-5, Sun. 10-4; adults \$2, students and children free; contact Paul Cornell, (518) 725-7076; e-mail: plienroc@frontiernet.net

16-17—LEWISTON, IDAHO: 44th annual show, "Gifts from the Earth!"; Hells Canyon Gem Club; Nez Perce County Fair Grounds, 1229 Burrell Ave.; Sat. 10-6, Sun. 10-5; adults \$2, students and children free; dealers, rough rock, fine jewelry, displays, demonstrations, kids' corner, silent auction, door prizes, grand prize; contact Rick Westerholm, 813 Bryden Dr., Lewiston, ID 83501, (208) 746-2101; contact Rick Westerholm, P.O. Box 365, Lewiston, ID 83501, (208) 746-2101; e-mail: rkwest@cablone.net; Web site: http://hellscanyonclub.com/

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continued on page 30

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Shows of Integrity

SHOP TALK

by William A. Kappeler

Making a Mosaic Buckle

Back in the age of the dinosaurs, I got tired of cutting cabochons for bola ties, pendants, brooches, rings, and so on, so one day I decided to give belt buckles a try. It didn't take too long, though, to realize that all of the commercially available buckle blanks were pretty much the same.

One day, at a show, I noticed some interesting cast brass buckle blanks, so I bought a few. They came in round, oval, square and rectangular shapes and had a rim around the perimeter so that large cabs or polished slabs could be inset. Both would make fine buckles, but I had a sudden (and rare) bright idea that I could make a mosaic buckle with small pieces of gemstone.

Now, I was born in 1931 and grew up during the Great Depression, so I learned at an early age that you never throw away anything that might be of use someday, even if you can't see a use for it at the time. With such a philosophy, you can imagine how many small pieces of gemstone I accumulated over the years from all the preforms I had trimmed. With this stock of raw material on hand and with my newly acquired brass blanks, I started to plan my mosaic buckle.

If you would like to give one a try, here are the steps I followed. Since these buckles are usually unpolished castings, they often have a fair amount of texture. I didn't mind, so I left it alone. If you would rather have a polished surface, just go to work with a couple of metal files and work the surface until it is smooth. You might even want to round over the edges or reshape the profile a bit. Follow the filing by sanding with progressively finer grits of emery paper and finish up with a trip to the polishing wheel.

Your next step is to sort through your bits and pieces and find some that you think go well together. Luckily, there are no rules for this sort of thing, so just find pieces you like and go for it. The shape of the mosaic is up to you, too. Although squares and rectangles are probably easiest for a first attempt, notched pieces, angle cuts, and diagonals are all fine. You are the artist; make what you like.



If you are confident with the pattern and the stones you have, you can begin cutting and fitting them. If you are not so sure, it might be better to get some thin card stock or even plain paper and cut some patterns. You can then move them around in the buckle blank and modify them until they fit and form the pattern you like. When you are satisfied, transfer the outlines to the stones with a Sharpie® and start cutting them to shape.

At this point, you will probably discover that the little slabs are not all of the same thickness. This problem can be solved in several ways. If you have a flat lap, a disc-style capping machine, or a wheel-type machine with a diamond disc on one end, you can grind each piece to a predetermined thickness. This is time consuming and tricky to get just right, though. Again, if you have the flat discs, you can fit and glue the pieces, then grind and polish the whole thing as if it were a solid slab.

A third way is a little off the beaten path, but it can be done with a wheel-type machine. Just leave the pieces at different thicknesses, or even grind some down to increase the difference. Then put a very slight dome on each piece and bevel the edges. I think this makes a very interesting buckle, but then again, what do I know? No matter which method you use, when you are finished you will have a very unique piece which is sure to get a lot of oohs and ahhs. Happy buckling. 💎

Please feel free to send your questions and comments about any of my columns to Shop Talk, 25231 Pericia Dr., Mission Viejo, CA 92691 or quappelle@cox.net.



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BANCROFT'S

Lesser-Known Collecting Spots

12 Mineral Occurrences in Canada

Story and Photos by Lori Lamb

For sheer variety of minerals, coupled with accessibility in a localized region, the Bancroft, Ontario, area is hard to beat. Some of the sites, such as the Bear Lake Diggings, are world renowned and have been written about frequently. Others are less well known, yet are equally worthy of a visit. The specimens from these sites may not be glamorous or exotic, but there are exceptional speci-

mens of many of the classic rock-forming minerals, as well as fluorescents and radioactives, to be found in the area. Samples of feldspar, apatite, hornblende, actinolite, sodalite, diopside, scapolite, and many other minerals lie waiting to be excavated. But why are so many different minerals, some in exceptional sizes for their species, found in this location? The answer lies in a review of basic continental formation.

Geologically, the lithosphere is the outermost, rigid part of the earth's crust. A basic component of each continental lithosphere is a continental shield. Each continental shield is composed of the oldest rocks, typically broad areas of crystalline rock that have not changed appreciably for over a billion years. These shields are postulated to have formed over 2.5 billion years ago when the earth's interior was hotter than it is today. This rock has been exposed over its geologic life to great heat and pressure that produced enormous metamorphic forces.

North America's continental shield, which extends across most of Canada from Manitoba to Ontario, is known as the Canadian Shield. Across much of the continent, the shield is covered by younger rock and is not accessible, but the core of the shield, once so deeply buried, is actually very close to the surface in Ontario. Credit for this exposure is owed to the great ice-age epochs. Roughly 1 million years ago, continental glaciers began advancing southward, covering Ontario. Over thousands of years, they advanced and receded at least four times, each time scouring the rock beneath. Ultimately, the action exposed the core of the continental shield in this area—and uncovered minerals of great variety and size.



A swirling matrix of purple fluorite and pink calcite hosts fractured green apatites at the Richardson Fission mine.



Part of Bancroft's economy is based on the rockhounds who visit its collecting areas every year.

Mining in the richly mineralized Bancroft area began over 120 years ago. The earliest mining, in 1880, was for iron, with magnetite as the lode ore. Corundum was discovered in 1898 and was mined from the Craigmont and Burgess mines in Carlow Township. In 1907, molybdenum was discovered in the area, and several mines were active through the 1930s. Feldspar, along with nepheline syenite, was mined through the 1950s. Fluorspar, marble and biotite were also briefly mined at small prospects around Bancroft.

The two most famous mining ventures in the region actually targeted two very different minerals for vastly different purposes. The Princess sodalite mine provided decorative stone that is world renowned for its rich blue color. Mining began in 1906 and, while carefully controlled, is still active today. Faraday Uranium Mines tapped into the radioactive minerals around Bancroft, and the area subsequently became a major player in the uranium market of the 1950s. Many other mines and prospects jumped on the boom, which eventually yielded 125 claimed sites, but by the mid-1960s, most—if not all—of the commercial production of uranium had ceased.

The prevalence of old mines and claims, combined with the benefits of the surface proximity of the Canadian Shield, has enabled Bancroft to bill itself as the "Mineral Capital of Canada". To support the segment of the economy fueled by the visiting rockhounds, the Bancroft & District Chamber of Commerce (www.bancroftdistrict.com) hosts collecting trips to selected sites during the summer. Guidebooks and maps, as well as mining permits to private sites, are available at the small museum in the Chamber building for those who want to visit area sites on their own. The museum is a must-see stop for those planning to collect in the region, as it features excellent examples of the various minerals found there.



A sharp eye is required to pick out the bluish- to greenish-gray pieces of corundum from the pink feldspar tailings of the Burgess mine.

The greatest challenge in Bancroft is choosing which of the myriad road cuts, outcrops, quarries, and old mines to visit, especially if your time is limited. My family has actually made three separate trips to Bancroft—in 1998, 2001 and 2006—and we have still not visited every site.

Even in an area that bases part of its economy on rockhounding, site availability changes. Before visiting any of the sites described in this article, check with the Chamber of Commerce or one of the local rock shops to determine its current collecting status. Be advised that mention in this article does not in any way imply permission to collect or guarantee access to a given site.

ESSONVILLE ROAD CUT

Along Essonville Road, in Monmouth Township, Ontario, is an outcrop of calcite in a gneiss matrix with a dense inclusion of fluororichterite, also reported as edenite. The fluororichterite is an amphibole in the hornblende family, but the crystal structure is quite distinctive, being much more flattened than blocky. The crystals are abundant in the calcite, but this particularly tenacious calcite does not give them up easily. This site has been known for some time and is listed in several of the guidebooks. When we visited the site in 2001, it was obvious that the easy material had been removed long ago.

The black, doubly terminated crystals visible in the outcrop range from 1/4 inch to 6 inches across. We were able to obtain a few matrix pieces using a hammer and chisel and elbow grease, but the fluororichterite specimens are very densely distributed in the calcite and break during attempted extraction. While nice matrix specimens are always desirable, our best luck was in finding some floaters in the washes down the road from the outcrop.

In drainage ditches along the roadside at the base of the outcrop, we found several

exceptional, near-perfect crystals. The predominant form of the crystals, in which a cross section shows one axis that is three to four times as long as the other axis, seems to be unique to the Essonville Road area. This axis arrangement results in the compressed, flat, but wide appearance of these specimens. Associated minerals include phlogopite mica, green pyroxenes, and occasionally goethite.

GRACE LAKE ROAD CUT

This site is really located on Burleigh Road, which is near Grace Lake. We visited it twice, first in 1998 and again in 2006. The finds here are tremolite grading occasionally into gem-quality blue-green actinolite, phlogopite, and very nice diopside crystals. We have found both floaters and matrix pieces. Collectors have scurried up the hills into the woods and excavated pits in the weathering marble of this pyroxenite skarn occurrence. On our first trip, we did not proceed to the top of the hill, yet we still found numerous, very nice prismatic, pale-green to gray diopside crystals loose in the soil. Classic, tightly stacked phlogopite was also abundant at this site and occurred closely associated with the diopside. Matrix pieces with both green diopside crystals and the golden-brown hexagonal phlogopite make very nice cabinet displays.

For permission to collect and directions to collecting sites, contact:

Bancroft & District Chamber of Commerce
12 Flint Ave.
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K0L 1C0 Canada
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(888) 443-9999
chamber@commerce.bancroft.on.ca
www.bancroftdistrict.com

On our second trip, I vowed to assess this spot more carefully. We ventured farther up and around the hillside and came upon numerous freshly dug pits. Further digging was not necessary, as specimens abounded. This area was richer in the slender, sometimes translucent blue-green blades of actinolite/tremolite, and we collected quite a few nice specimens with ease. Resource books identify the specimens here as primarily tremolite, yet all local guides refer to the specimens as actinolite; given their series, it is a toss up. The actinolite at this site is splintery and sharp, so wear gloves. Phlogopite was again prevalent, and we even found a small specimen of molybdenite. Pyrite in small cubes was also present.

DIAMOND LAKE ROAD CUT

This road cut is on South Baptiste Road, near Diamond Lake. Here, the road has dissected both granite gneisses and granite pegmatites. Any outcrop with safe parking along this stretch of highway deserves a look. One area of the exposed rocks yielded a couple of nice combination pieces with yellowish scapolite accompanied by a dark green pyroxene—probably augite—and biotite mica. The scapolite fluoresced orange-red under shortwave ultraviolet light. Extracting these took some chisel work and a few lucky angle exposures, but the samples are excellent representations of these species.

MUMFORD ROAD CUT

This outcrop is along Provincial Highway 648 (Loop Road), just past Mumford Road, near the town of Harcourt, located west of Bancroft. This stretch of highway is a wonder to drive, as it passes repeatedly through huge, heavily crystallized road cuts and outcrops. Again, any area with safe parking should be investigated. This site is not specifically mentioned in any of the guides, but when you can clearly and easily identify hornblende and feldspar crystals protruding from the rock walls while traveling at 60 mph in a car, the attraction speaks for itself.

This location had multiple crystals that were 8 to 10 inches on a side and had classic form. We worked to free one nice grayish-pink orthoclase from the face. The hornblendes tended to fracture more easily, so we were not as successful in extracting these. Meanwhile, our son ventured to a safer area back from the roadside. Eagle-eyed as always, he began finding deep red apatite crystals loose on the surface. Though small, they did not have the fracturing that is common in the region. The color was homogenous and the hexagonal shape crisp, with clean lines. These were unexpected, but serve as a testament to the fact that any exposure in this region seems to produce something desirable.



Extremely crystalline outcrops like these with amphibole and feldspar crystals are common along road cuts in the Bancroft region.

Roadside collecting has historically been allowed in the Bancroft area. However, on our last trip there were a couple of specific stretches of highway that had signs prohibiting roadside collecting. These notices should be respected. Fear not, however, for there are plenty of other locations with outcrops and exposures.

CLARK MINE

When we visited this site in 2001, it was under claim by the Chamber of Commerce, from which we obtained permission to visit. The mine was originally a small adit, part of which was still visible. Negotiating the site required care, as trenches were also present, and standing water served as an incubator for mosquitoes. The desired material here are the deep purple, gemmy fluorite cubes sprinkled amidst rich, deep green, blocky pyroxene crystals. A crack hammer was the only necessary tool, but good specimens were not abundant on the dumps. Still, the purple fluorite contrasting with the olive-green pyroxene made a catchy display piece. Scapolite can also be found here, but the quality is only average.

DESMONT MINE

We visited the Desmont mine in 2001 on one of the geologist-guided field trips sponsored by the Chamber of Commerce. This site, which is now basically tailings and trenches, was reportedly mined for molybdenite and uranium minerals in the 1940s and '50s. Specimens are found in which calcite veins cut through a sugary textured pyroxene rock.

Some folks searched the tailings for quartz and pyrite, while others dug into



Blue-green actinolite occurs in a weathered pyroxene at the Grace Lake road cut.



The slow cooling of the once very deep Continental Shield produced large crystals of many rock-forming minerals, such as feldspars.

the calcite veins. The calcite itself is collectible, as it is a particularly bright orange and cleaves into classic rhombohedrons. Frequently, the calcite will host an area of bluish actinolite, which is an interesting color contrast. These calcites, unlike some from the Bancroft area, did not fluoresce.

At the contact zones between the calcite and the pyroxene host rock, molybdenite crystals were reasonably abundant. Though not as large as those from famous locales in Quebec, these are still respectable representations of the mineral. The malleable, silvery discs contrasting against the granular green pyroxene also made an interesting cabinet specimen. However, please note these are more fragile than most area minerals, and require care during both extraction and transport.

RICHARDSON/FISSION MINE

This site was originally discovered by W.M. Richardson in 1922 as a source of uraninite. It was mined on and off for uranium minerals from 1929 through 1949, with further exploration taking place into the 1950s. It was the first officially explored uranium property in the district. Uraninite was the ore of significance, and one of the world's largest uraninite crystals was collected here in 1945. It is now on display at the Royal Ontario Museum.

The site has two destinations: the original Richardson adit and some diggings atop a hill proximal to the mine. The adit is dark and wet, and seems unproductive of specimens. It is not posted or secured and one can traverse easily from one opening to the other, but entering old mines is always a risky business.



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The pit on the hill, in which collectors have actively worked the calcite veins, is the site to visit. Here, pink calcite and purple fluorite occur in alternating bands, mixed in almost equal proportions. Fluorite crystals are not evident, but there are fractured deep-green apatite crystals embedded in the swirling pink-and-purple matrix. We collected several with ease by cracking a few of the many pieces lying about. Some contained apatites of about thumb size. The color combinations of these pieces make them unique shelf specimens.

I found one questionable grayish metallic crystal that, though it got no reaction from the Geiger counter, otherwise looked like uraninite. Yet, with no appreciable radioactivity, it must have been something else.

SILVER CRATER MINE

The Silver Crater mine is a private site; visit the Chamber of Commerce to get permission to collect and pay your fee. This site is known to many collectors as a productive location for betafite crystals. Its genesis, though, was in 1927 as a mine for biotite; it was revived in the 1940s. The books of biotite here are impressive: large, hexagonal plates of classic black, with some specimens stacked tightly several inches high. From 1953 to 1956, the site was explored for uranium, targeting the betafite as the ore. The betafite here is considered to be highly radioactive, with a reported 15 to 20 percent uranium in its composition. We visited this site in both 2001 and 2006 and found a significant change in the condition of the mine after just five years.

In 2001, we were told by the Chamber of Commerce that the site had been freshly blasted. After paying the fee and obtaining the map to the pits, we progressed down the very rough road for about a mile, then parked and hiked the remaining half mile in. Sure enough, the smaller pit to the left was freshly blasted, and nice material lay at our feet. Pink calcite dikes are the host material here, and large pieces were everywhere. To our amazement, there was an apatite crystal still embedded in the wall that was almost as big as our son.

Collecting at this site was exceptional. We used a crack hammer to trim specimens to a manageable size. The apatites at the site were fractured, but more blue-green in color and gemmier than at other local sites. Large books of biotite, some up to 12 inches across, were abundant, and the betafite was forthcoming. The key to finding it was to check the calcite for reddish halos produced by the radioactive betafites. We found several in situ, ranging from 1 to 4 centimeters. The earthy luster, brown-gray



The black, doubly terminated fluororichterite crystals at the Essonville Road site occur very densely packed in calcite, and successfully extracting them is challenging.



The pink feldspars at the Burgess mine yield some nice crystals of blue-gray corundum, some with asterism.



Blocky, light-green diopside crystals are abundant at the Grace Lake road cut.

color, and elongated dodecahedron habit, once visualized, was unmistakable. Though the hike back to the van was formidable, we took many good specimens. This was the high point of our trip that year, and when we returned home, we found the calcite also fluoresced red under shortwave ultraviolet light.

Our follow-up venture to Silver Crater in 2006 was quite different. My husband and son and I paid our fee and began the drive in, but soon had to abandon the vehicle. The road had not been maintained and numerous large trees had fallen completely across it. This meant a long hike, but memories of the specimens from our first experience made the walk bearable. The bugs were particularly tenacious and feasted on both us and the insect repellent mercilessly. Still, we pushed on until we reached the small pit. But this pit had clearly had no new activity in several years, maybe even since our last visit, and had become overgrown. The wall of calcite with the large apatite crystal was a patchwork of mosses and vines and general weathering, but one could vaguely make out the apatite-shaped

impression that once held that exceptional crystal. The calcite, apatite and biotite on the ground had been worked and weathered to coarse humus.

Clearly, collecting this time required a change of strategy. Since there were no hand pieces to be had, we settled down to digging in the humus. I sorely wished we had brought the screens with us. After about an hour, the three of us had managed to sift out four rather nice betafites, each 2 to 3 centimeters long. These crystals had crisp edges and classic form, with minimal damage, likely because they had weathered out intact and had been thus spared the rock hammer. The larger pit a bit farther down the path was not as weathered, but did not present apatites or betafites. Here, the biotite books were huge and were spread throughout the wall like chocolate chips in a cookie. We spent a little time here, searching for the zircons that had been reported in the literature, but came up empty. The insects were ruthless, so we called it a day. We had to admit that we were a bit disappointed, yet we did not come away emptyhanded.

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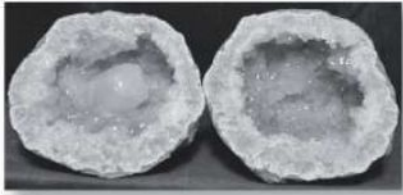
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BANCROFT'S Lesser-Known Collecting Spots from page 24



Interesting combination pieces of yellowish scapolite and dark-green pyroxenes can be extracted from Bancroft-area road cuts.

BURGESS CORUNDUM MINE

Corundum was first discovered at this site, located in Carlow Township, in 1896. The presence of corundum in syenitic gneisses and syenitic pegmatites throughout the area supported a reasonably profitable corundum industry from 1900 to 1918. The dumps from these long-silent workings can still produce corundum specimens for the collector. The Burgess mine site hosts an adit that is impressive, but not productive, and dumps along and within some marshy wetlands. The beavers were very active when we visited here in 1998.

The corundum here is rather stubby and bluish to greenish gray, with occasional flashes of asterism. Once your eyes are trained to the luster of the specimens, it is fairly easy to pick them out among the abundant pink feldspar tailings. Some magnetite is also present, though distinct crystals are hard to come by. We found several corundum crystals here. A claw for digging through the tailings is helpful. I would not advise taking small children here, as the water could be a hazard.

GUTZ FARM

This location is private; obtain permission and pay a nominal fee at the Chamber of Commerce. It is a working farm, and the site consists of some corundum-bearing outcrops and small pits in the horse pasture. The corundum is locally known as "rat's tail" corundum. We visited in 2001 and found some representative samples of the blue-gray corundum in long, thin, tapering, hexagonal crystals about the size of a pencil. The host rock is a tenacious granite pegmatite and does not give up the specimens readily. Matrix pieces were the best we could do, and that with a lot of effort. We also found a small area of pale-blue sodalite and a few white sprays of natrolite in massive pink cancrinite.

GOLDING KEENE QUARRY & DUMP

Directly across the York River from the skarn outcrop is a totally different geological environment, a nepheline plagioclase pegmatite known as the Golding Keene

quarry. This site was intermittently mined for nepheline syenite from 1937 until 1942. The quarry itself is part of the Provincial Park and is thus off limits. However, a large dump of rocks from this quarry is situated behind the Chamber of Commerce building in downtown Bancroft, along the old railroad track bed, now a walking trail. This great mound was allegedly left here line long ago, when the company that had ordered it hit financial hard times and could not pay for the shipping. Bad luck for them meant good luck for future collectors.

When we visited here in 1998, we arrived about an hour before dusk to search for any sodalite and plagioclase we could find. After sunset, we broke out the ultraviolet lights and searched for the fluorescent minerals noted to be here. Unfortunately, the abundant lighting along the walking trail tends to wash out the effects of the UV lights. Nevertheless, we still found a few pieces of moderately fluorescent mineral that exhibited in the red-orange range. It appeared to be calcite. The convenience of this dump offers the beginning collector a taste of the opportunities in the area.

This is, of course, not a comprehensive list of Bancroft's collecting sites, but it does reflect some of the sites that are often passed over in favor of the world-famous Bear Lake Diggings, where we have also collected very successfully on numerous occasions. To truly appreciate the variety of Bancroft minerals, these less-storied sites deserve a visit.

The annual Rockhound Gemboree is held in Bancroft in late July or early August and is billed as Canada's largest gem and mineral show. While there, be sure to visit the local museums and area mineral shops, using the Chamber of Commerce as a starting point. And even though Bancroft designs a segment of its economy around the field collecting hobby, recent changes in access show that good collecting sites may diminish over time as ownership changes hands or government intervention occurs. Still, it is an area that should be visited by any serious field collector. ♡

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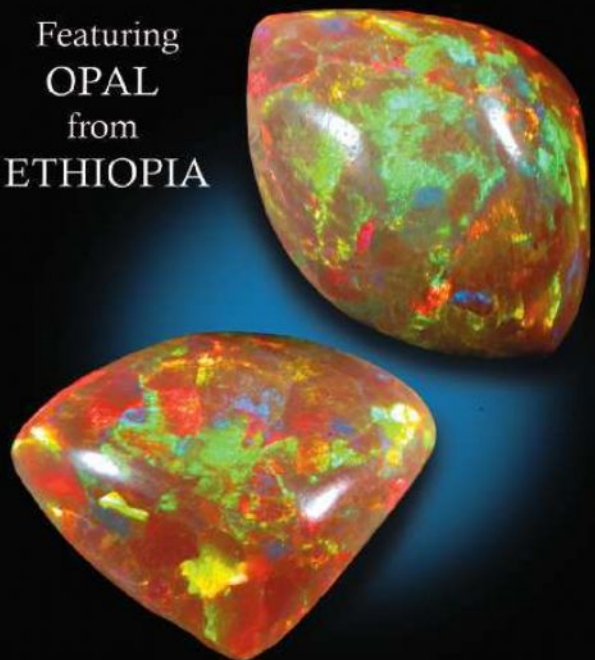
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ROCK SCIENCE

by Steve Voynick

The Two Sides of Gypsum

Mineral resources like volcanic rock, limestone, and soda ash, which fall under the category of "industrial rocks and minerals", rarely produce collectible specimens. A notable exception, however, is gypsum. On one hand, it is a resource that is mined in huge quantities as a drab, earthy ore, but on the other hand, it is a superb sculpting medium, a beautiful chatoyant gem, and the world's largest mineral crystals.

Gypsum, or hydrous calcium sulfate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), is by far the most abundant of the sulfate minerals. It is quite soft (Mohs 2), has a low density (specific gravity 2.3), and crystallizes in the monoclinic system as prisms and flat blades with a vitreous luster. Gypsum usually occurs in stratified evaporite deposits left behind by ancient seas.

Gypsum's industrial value lies in its ability to partially dehydrate. Heating, or calcining, crushed gypsum to 300 degrees F drives off 75 percent of its water content to yield calcined gypsum, a white, hemihydrated powder with a chemical formula of $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$. Adding water to calcined gypsum creates a workable paste called plaster of Paris, named for the enormous gypsum beds of France's Paris Basin. Upon drying, the hemihydrated calcium sulfate crystals in plaster of Paris lock together into a solid, durable plaster of great strength.

Today, 135 million metric tons of crude gypsum, worth \$1.2 billion, are mined worldwide each year. Gypsum ore is either gypsum rock, a massive form that is 90 percent pure, or gypsite, a lower-grade ore that is about 50 percent gypsum. Both ores are a dull gray to grayish-brown, crumbly, dirtlike material. Another 10 million tons of gypsum are synthesized each year utilizing sulfur obtained from the desulfurization of coal-fired power-plant flue gasses. Gypsum serves as a setting retardant in cement, an agricultural soil conditioner, a flux in certain smelting processes, and filler in paints and paper. Most gypsum, however, goes into the manufacture of fire-retardant drywall products, mostly the familiar "wallboard" panels used in residential and industrial construction.

But while gypsum rock and gypsite are distinctly unremarkable in appearance, other forms of gypsum are attractive collectibles. Among them is alabaster, a dense, nearly pure, fine-grained, massive form



called "poor man's marble". Its colors range from a near-translucent, snowy white to soft pinks and browns, sometimes with pleasing mottled patterns. Because alabaster is easily carved, it is widely used as a sculpting medium. Despite its softness, alabaster takes an excellent polish that, combined with its slight translucency, produces a soft glow much like that of fine marble.

Satin spar, the fibrous variety of gypsum, is even more eye catching. Its dense, parallel alignment of fiberlike prisms interacts with light to produce chatoyancy, a silky luster, and even occasional opalescence. Even inexpensive specimens of satin spar make beautiful display pieces. Although soft and somewhat fragile, satin spar is occasionally used in pendants and earrings.

The transparent, colorless crystalline variety of gypsum is selenite, named after the Greek *selenites*, or "moon," in allusion to the soft, moonlike luster of its crystal faces. Flat selenite blades, sometimes more than a foot long, are popular items in rock shops. Unusual forms, such as spiraled "ram's horn" crystals and "fishtail" and "swallowtail" twins, are especially popular among collectors. The most celebrated selenite crystals are those at Naica, Mexico. These well-developed, water-clear crystals, up to 4 feet in diameter and 36 feet in length, may be the largest mineral crystals ever found.

Such collectible varieties as alabaster, satin spar, and selenite make gypsum an exception to the usually mundane world of industrial rocks and minerals. ♡

Steve Voynick is a science writer, mineral collector, former hardrock miner, and the author of books like *Colorado Rockhounding* and *New Mexico Rockhounding*.



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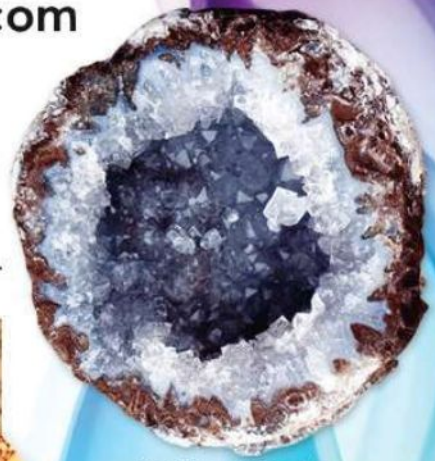
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Show Dates from page 17

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16-17—PLACERVILLE, CALIFORNIA: Show, "All That Glitters"; El Dorado County Mineral & Gem Society; El Dorado County Fairgrounds, 100 Placerville Dr.; Sat. 10-5, Sun. 10-5; adults \$3, children free; more than 40 dealers, case displays, special petrified wood exhibit, demonstrations, kids' activities, silent auction, presentations, prizes; contact Karen Newlin, 4232 Gailey Circle, Cameron Park, CA 95682, (530) 676-1643; e-mail: info@rockandgemshow.org; Web site: www.rockandgemshow.org

16-17—SANTA ROSA, CALIFORNIA: 34th annual show; Santa Rosa Mineral & Gem Society; Sonoma County Veterans Memorial Bldg., 1351 Maple Ave.; Sat. 10-6, Sun. 10-5; admission \$5, coupon on Web site; contact Debbie Granat, (707) 542-1651; or Erica Tanner; e-mail: santarosarockshow@hotmail.com; Web site: www.srmgs.org

16-17—SEDONA, ARIZONA: Show; Sedona Gem & Mineral Club; Sedona Red Rock High School Cafeteria, 995 Upper Red Rock Loop Rd.; Sat. 10-5, Sun. 10-4; free admission; guest speakers, slide shows, Kids' Corner, displays, demonstrations, raffle, gemstones, minerals, crystals, fossils, beads, jewelry; contact Gayle Macklin, P.O. Box 3932, Sedona, AZ 86340, (928) 399-9588; e-mail: gayleis@gmail.com

16-17—SOUTH CHARLESTON, WEST VIRGINIA: 37th show and sale; Kanawha Rock & Gem Club, South Charleston Lions Club; South Charleston Community Center, 601 Jefferson Rd., next to McDonald's; Sat. 9-6, Sun. 10-5; adults \$3.50, children 12 and under free; dealers, gems, minerals, jewelry, beads, metaphysical stuff, kids' corner, lapidary demonstrations, wire-wrapping; contact Kanawha Rock & Gem Club, P.O. Box 252, Farmington, WV 26571, (304) 825-6845; e-mail: frankoz@juno.com

16-17—SPRINGFIELD, MISSOURI: 43rd annual show; Ozark Mountain Gem & Mineral Society; Expo Center, 635 E. St. Louis; Sat. 10-6, Sun. 10-4; adults \$3.50, youth 50 cents, children under 12 free; public auction Sat.; contact Eddie Maples, (417) 725-3001; e-mail: OMGandMS@gmail.com

16-17—WALNUT CREEK, CALIFORNIA: Show, "Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr. at Broadway; Sat. 10-6, Sun. 10-4; admission \$6; contact Jerry Tomlinson, (415) 383-7837; e-mail: sfxtd@earthlink.net; Web site: www.crystalair.com

17—MOUNT VERNON, WASHINGTON: Show, "Rings & Things BeadTour"; Rings & Things; Best Western Cotton Tree Inn (Cascade Ballroom), 2300 Market St.; Sun. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobotson@rings-things.com; Web site: www.rings-things.com

21-23—HARRISONBURG, VIRGINIA: 9th annual show, "Harrisonburg Bead, Gem, Mineral & Jewelry Show"; Treasures Of The Earth Gem & Jewelry Shows; Rockingham County Fairgrounds - Commercial Exhibits Bldg., 4808 S. Valley Pike, between I-81 exits 240 and 243; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$3 (good all 3 days), children under 16 free; silversmiths and goldsmiths create original jewelry from customer selected gems, stones or crystals, make repairs, wire sculpture, wire wrap, bead stringing, bead and mineral dealers; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

22-24—AUSTIN, TEXAS: Show, "Gem Capers 2010"; Austin Gem & Mineral Society; Palmer Events Center, 900 Barton Springs Rd.; Fri. 9-5, Sat. 10-6, Sun. 10-5; adults \$5 (all three days), seniors \$4, children 13-18 \$1, 6-12 50 cents, 5 and under free; more than 30 vendors, displays, Rock Food Table, touch table of rocks and fossils, demonstrations of cabbing, wire wrapping, faceting, polymer clay, fossil cleaning, kids' day Fri., Wheel of Fortune, Gem Mine, jewelry making, rocks that glow in the dark, grand prize; contact Brian Wetzig, 6719 Burnet Ln., Austin, TX 78757, (512) 458-9546; e-mail: [ShowChairman@AustinGemAndMineral.org](mailto>ShowChairman@AustinGemAndMineral.org); Web site: www.GemCapers.com

22-24—HARRISONBURG, VIRGINIA: 8th annual Harrisonburg Bead, Gem, Mineral & Jewelry Show; Treasures Of The Earth Gem & Jewelry Shows; Rockingham County Fairgrounds, Commercial Exhibits Bldg., 4808 S. Valley Pike, between I-81 exits 240 and 243; Fri. 10-6, Sat. 10-6, Sun. 11-5; adults \$3 (3-day ticket), children under 16 free; silversmiths and goldsmiths create original jewelry from customer selected gems, stones or crystals or make repairs while you wait, wire sculpture, wire wrap, bead stringing, bead and mineral dealers; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

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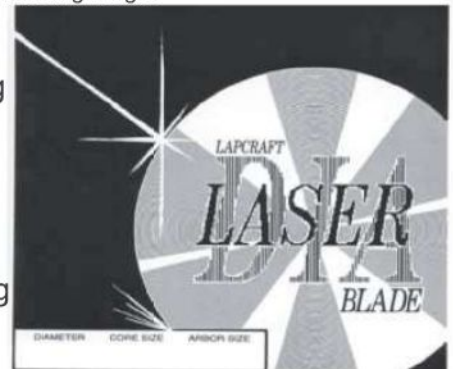
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Story by Dave Fisk

One of the key pieces of equipment in any good lapidary shop is the slab saw. In the Sun City Lincoln Hills Gem & Mineral Society workshop, we have a kit-made 18-inch saw that is probably at least 30 years old. After three different owners that we know of, no one remembers when or where the kit was purchased, but what we do know is that someone built one sweet saw. The slabs usually come off looking like their sides have been polished with 400 grit sandpaper. That is, until the vise isn't tightened enough, or a rock comes apart while being sawed. The resulting kink or bend in the blade can ruin your day, as a new one costs nearly \$400.

A blade that has a very sharp (less than 90 degrees) kink in it may be beyond your ability to fix. You can call the manufacturer and ask if they can repair it. This will require shipping the blade to them. I have had to ship blades like this a few times, and have generally been happy with the results. Sometimes, however, they will not give you much hope.

Our club is lucky to have Wally Hobson, a blade repairer extraordinaire. With a few simple tools, Wally works his magic. Fixing the blades saves us a fortune in blade replacement costs. The following steps may help you save a blade that has no kinks tighter than about 90 degrees and no tears in the metal of the blade:

First, check the saw vise base and jaws for damage. Sometimes, a blade mishap will induce burrs that will need to be smoothed out. Use a portable drill with an abrasive wheel to accomplish this.

Sometimes, the blade itself will have burrs, as well. These may interfere with measuring and marking the problem area(s). Sand and file these smooth or use a ball peen hammer to flatten them. Do this gently, holding a block of wood to the back side of the blade so as not to make the problem worse.

A blade that is bent or lightly kinked will create grooves on the face of the rock be-



DAVE POLSON PHOTO

Dress the edge of the saw vise with an abrasive wheel to remove any burrs.

Tools and Materials:

- Dial indicator gauge with magnetic base
- Chalk or a marking pen
- Two 3-inch x 3-inch x 12-inch boards
- Two C clamps
- Soft towel
- Ball peen hammer
- Rubber mallet
- Files and sandpaper
- Wood block
- Heavy metal bar
- Portable drill with abrasive wheel

BELOW: Knock down any lifted metal gouges on the blade by tapping them gently with a hammer.

RIGHT: All measurements are made with a dial indicator gauge that is mounted to a magnetic base.

CENTER: Check the blade with a dial indicator gauge, looking for the start, center and end of the bend.

BOTTOM: Mark the start, center, and the end of the bend with a marking pen or a piece of chalk.



DAVE POLSON PHOTO

DAVE POLSON PHOTO



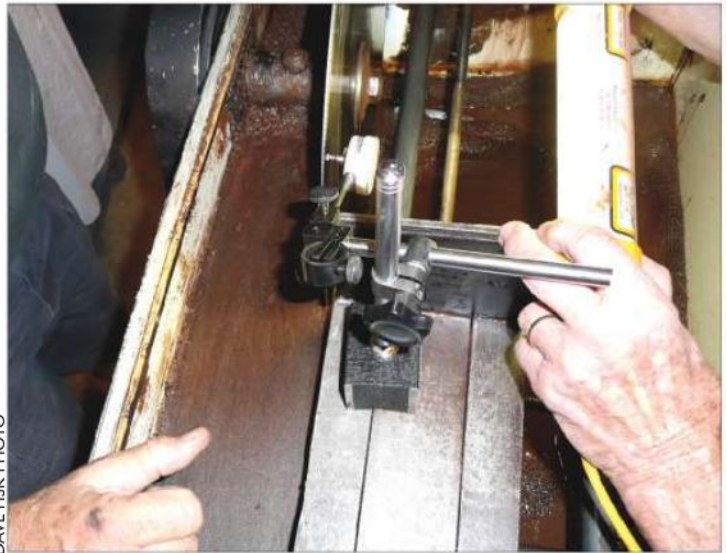
ing cut. These defects can usually be corrected with the blade still mounted in the saw. First, drain or siphon coolant to below the blade level. Mount the dial indicator gauge on the base of the vise with the moving pressure sensor against the blade about 1 inch from the rim. As you turn the blade manually, or as you slide the vise to which the dial indicator gauge is magnetically attached forward and backward, the dial will show you the changing distance in thousandths of an inch. This is the variance in the blade from being totally flat.

Turn the blade slowly to determine how much bend is in the blade and where. Look at the blade and determine which way it is bent. With a marking pen or chalk, mark the point at which the gauge first shows a significant bend and mark the place at which the bend is back to normal. Also, mark the center point of the bend.

Place a piece of board (Wally recommends hardwood boards measuring 3 inches by 3 inches by 12 inches) on each side of the bent section of the blade, close to the rim. Place a C clamp on either end of the boards and tighten them down, applying pressure to the warped surface. Wait a few minutes to allow the metal to flatten, then move the C clamps, or add more clamps, closer to the center of the boards. After a few more minutes, remove the clamps and wood and recheck the blade tolerance with the gauge. This process should have taken out a lot of the kink.

Now, note how many thousandths of variance there is across the bend. If it is still over $\frac{5}{1000}$ inch, move the gauge away from the blade. Hold a soft towel on the concave side of the blade above the collar and gently tap the convex side of the blade about 1 inch to 3 inches from the rim with a hammer or rubber mallet. Experience and judgment will help you determine how gentle that tap should be. Next, put the gauge back in place and turn the blade, noting the change. If it doesn't change, repeat the above step and tap harder. It may take several tries before you get it to $\frac{5}{1000}$ inch or less.

When you are within about $\frac{5}{1000}$ inch, hold the blade still, move the vise from front to back, and note any change on the gauge. If the rim is bent in or out at the edge of the blade (sometimes called



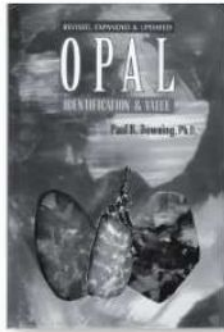
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Slab Saw Blade Repair from page 33



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Clamp two 3-inch by 3-inch boards across the bent area and gradually move the clamps or add clamps toward the center of the bend to flatten the blade.

"dished"), you may need to hold a heavy steel bar flush with the concave surface of the dent and hammer the convex side of the dent sharply with the rubber mallet to reduce the size of the bend.

Once the dishing has been addressed, recheck the blade both by turning it to ensure it is true and sliding the vise and gauge forward while the blade is stationary. If the dial indicator shows flatness within $5/1000$ inch and the blade doesn't seem to be wobbling, you should be in business. If you cut a few slabs and there is a noticeable roughness in the slab surface or the slab cuts are not parallel, some other adjustment to the saw may be required. Check whether the vise mounting or saw arbor can be adjusted and make changes as needed. This last step is almost never necessary.

Persons who implement the advice given in this article assume responsibility for all risk to their personal safety. Take all reasonable safety precautions and follow manufacturers' recommendations.



DAVE POLSON PHOTO

Hammer the bend starting at the center and working toward the outsides until the blade is flat.



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With a block of wood behind, hammer close to the edge of the blade to remove any small bulges.

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Show Dates from page 30

OCTOBER 2010

22-24—INDIANAPOLIS, INDIANA: 9th annual show, "GeoFest"; Indiana State Museum; 650 W. Washington St.; Fri. 9-5, Sat. 9-5, Sun. 11-4; adults \$7, seniors \$6.50, children \$4, group rates available; dealers, regional clubs, and adult and kids' activities; contact Peggy Fisher-Keller, 650 W. Washington St., Indianapolis, IN 46204, (317) 232-7172; e-mail: pfisher-keller@dnr.in.gov; Web site: www.indianamuseum.org

22-24—MASON, MICHIGAN: 45th annual show; Central Michigan Lapidary & Mineral Society; Ingham County Fairgrounds, 700 E. Ash St.; Fri. 6-9, Sat. 10-7, Sun. 11-5; adults \$3, students \$1; door prizes, raffle, flint knapping, Petoskey stone polishing, gold panning; contact Lyle Laylin, 204 E. Grand River Ave., Lansing, MI 48906, (517) 485-7908; e-mail: lyle18@gmail.com; Web site: www.microcks.org

23—BELLEVUE, WASHINGTON: Show, "Rings & Things BeadTour"; Rings & Things; Bellevue Community College (Cafeteria), 3000 Landerholm Circle SE; Sat. 11-3; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

23—SEATTLE, WASHINGTON: Show, "Rings & Things BeadTour"; Rings & Things; Seattle Center (San Juan Rooms), 305 Harrison St.; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

23-24—BELLEVUE, WASHINGTON: Show; Bellevue Rock Club; Vasa Park, 3560 W. Lake Sammamish Blvd. SE; Sat. 10-5, Sun. 10-5; contact Marjorie McKinley, P.O. Box 1851, Bellevue, WA 98009-1851; e-mail: Bellevuerockclub@comcast.net

23-24—CANBY, OREGON: 46th annual show, "Harvest of Gems in 2010"; Clackamette Mineral & Gem; Clackamas County Fairgrounds, Main Pavilion Bldg., 694 NE 4th Ave.; Sat. 9-6, Sun. 10-5; free admission; door prizes, demonstrations, Kids' Korner, fluorescent show, displays, dealers, silent auction; contact Bea Settle, (503) 631-3128, Rick Mauer, (503) 691-6395; e-mail: tallerlicardo@juno.com

23-24—CUYAHOGA FALLS, OHIO: Show, "Gemboree"; Summit Lapidary Club, Akron Mineral Society; Emidio & Sons Expo Center; 48 E. Bath Rd.; Sat. 10-6, Sun. 10-6; adults \$5, students and seniors \$4, children \$1; lapidary demonstrations, art and educational displays, gem identification, geode cracking, gem mine, make-and-take projects for children, dealers, door prizes, silent auction; contact Evelyn Tryon, 2028 Tallmadge Rd., Kent, OH 44240, (330) 673-9664; e-mail: etjtryon@juno.com; Web site: www.LapidaryClubofOhio.org

23-24—GURNEE, ILLINOIS: Show, "Lake County Gem & Mineral Show"; Key Lime Cove Water Resort; 1700 Nations Dr.; Sat. 10-6, Sun. 10-4; free admission; door prizes, dealers, silver jewelry, opals, gemstones, jewelry, wire-wrapped jewelry demonstrations, geode cutting, amber, fossils, minerals, quartz crystals, faceted stones, custom jewelry and cabochons; contact Gere Bunnell, (847) 336-1270; e-mail: gere@cgbunnell.com

23-24—RIVERVIEW, FLORIDA: 51st annual show; Tampa Bay Mineral & Science Club; International Independent Showmen's Club, 6915 Riverview Dr.; Sat. 10-5, Sun. 10-5; adults \$5, students (K-12) \$4, children under 5 free with adult; touch table, classes; contact Greg Stephenson, P.O. Box 89146, Tampa, FL 33689, (813) 626-3593; e-mail: gstephe4@tampabay.rr.com

23-24—ROCHESTER, NEW YORK: 41st annual show; Rochester Academy of Science Mineral Section, Rochester Lapidary Society; Monroe County Fair & Expo Center, 2695 E. Henrietta Rd.; Sat. 10-6, Sun. 10-5; adults \$5, children under 12 free; demonstrations, displays, kids' activities, minerals, beads, mineral carvings, crystals, fossils, jewelry, hourly drawing, raffle; e-mail: show@rasny.org; Web site: www.rasny.org/show

23-24—WARWICK, RHODE ISLAND: Show, "Dinosaurs & Crystals"; Rhode Island Mineral Hunters; Community College of Rhode Island - Knight Campus, Rte. 113, 400 East Ave.; Sat. 10-6, Sun. 10-5; adults \$6, seniors \$5, children under 10 years free; dealers, minerals, fossils, fine gems, jewelry, educational exhibits, silent auction, kids' corner, door prizes, grand prize, "Mister Dinosaur"; contact Tony Cesana, 85 St. Paul St., North Smithfield, RI 02896, (401) 766-9076; e-mail: a_cesana@cox.net; Web site: www.rimh.us

24—TIGARD (PORTLAND), OREGON: Show, "Rings & Things BeadTour"; Rings & Things; Embassy Suites Hotel - Washington Square (Embassy Ballroom), 9000 S.W. Washington Square Rd.; Sun. 12-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

26-27—ASHEVILLE, NORTH CAROLINA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Asheville Civic Center, 87 Haywood St. (I-240, downtown); Tue. 10-6, Wed. 10-3; contact G&LW, P.O. Box 98, Flora, MS 39071-0098, (601) 879-8832; e-mail: info@glwshows.com; Web site: glwshows.com

27—SANDY, UTAH: Show, "Rings & Things BeadTour"; Rings & Things; Salt Lake City Community College - Miller Campus, Karen Gail Miller Conference Center (Deercreek, Lone Peak, Copper, Rose, Cottonwood and Wasatch rooms), 9750 South 300 West; Wed. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

29—HENDERSON (LAS VEGAS), NEVADA: Show, "Rings & Things BeadTour"; Rings & Things; Henderson Convention Center (Ballroom A/B), 200 S. Water St.; Fri. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: <http://www.rings-things.com>

29-31—KISSIMMEE (ORLANDO), FLORIDA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Osceola Heritage Park, 1875 Silver Spur Ln.; Fri. 10-6, Sat. 10-6, Sun. 10-3; contact G&LW, P.O. Box 98, Flora, MS 39071-0098, (601) 879-8832; e-mail: info@glwshows.com; Web site: glwshows.com

29-31—MARTINSVILLE, VIRGINIA: 3rd annual Fall Martinsville Gem, Mineral & Jewelry Show; Treasures Of The Earth Gem & Jewelry Shows; Martinsville National Guard Armory, 315 Commonwealth Blvd. W (across from Liberty Fair Mall); Fri. 10-6, Sat. 10-6, Sun. 11-5; free admission; jewelry makers, U.S. goldsmiths and silversmiths, gem trees, wire wrap, wire sculpture, pearls, stone beads, stone setting, amber, opal, mineral and fossil dealers, door prizes, grand prize, classes, Rockingham County Mineral Club sluice; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: vawimmer@verizon.net; Web site: www.toteshows.com

29-31—SANTA ROSA, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Sonoma County Fairgrounds/Grace Pavilion, 1350 Bennett Valley Rd.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

30—FAIRLESS HILLS, PENNSYLVANIA: 21st annual fluorescent mineral show, "Ultraviolation"; Rock & Mineral Club of Lower Bucks County; First United Methodist Church, 840 Trenton Rd.; Sat. 9-4; adults \$2, children free; contact Chuck O'Loughlin, 130 Maple Terrace, Merchantville, NJ 08109, (856) 663-1383; e-mail: ultraviolation@yahoo.com

30-31—EVANSVILLE, INDIANA: 44th annual show; Evansville Lapidary Society; Washington Square Mall, Green River Rd. and Washington Ave.; Sat. 10-9, Sun. 10-5; free admission; gems, jewelry, minerals, fossils, geodes, silent auction; contact Ruth Reisinger, (812) 424-7618

30-31—FREEPORT, NEW YORK: Show; Freeport Recreation Center; 130 E. Merrick Rd., Meadowbrook Pkwy. exit M9 west; Sat. 10-5, Sun. 10-5; adults \$5.50, children under 12 free with adult; dealers, minerals, gems, jewelry, fossils, beads, hourly door prize, save 50 cents with this ad; contact Ralph Gose, (631) 271-8411; e-mail: kaleidoscopegemshows@yahoo.com

30-31—LAKESIDE, CALIFORNIA: Show, "Rock and Gem Roundup"; El Cajon Valley Gem & Mineral Society; Lakeside Rodeo Grounds, 12584 Mapleview Rd.; Sat. 10-5, Sun. 10-5; free admission; jewelry, gemstones, arts, crafts, beads, lapidary supplies, demonstrations, junior activities, raffles; contact Patrick Smock, 10852 S. Samuel Rd., Hereford, AZ 85615, (619) 719-3444; e-mail: cprpsm@yahoo.com

31—SCOTTSDALE, ARIZONA: Show, "Rings & Things BeadTour"; Rings & Things; Chaparral Suites Resort Scottsdale (Conference Center), 5001 N. Scottsdale Rd.; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

NOVEMBER 2010

2—SAN DIEGO, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things: Mission Valley Resort Hotel, 875 Hotel Circle S.; Tue. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

3—BUENA PARK, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things: Knott's Berry Farm Resort Hotel, 7675 Crescent Ave.; Wed. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

5-7—BLACK CANYON CITY, ARIZONA: Annual show, "Rock-A-Rama"; Braggin' Rock Club; High Desert Park, Jacie St.; free admission; minerals, lapidary supplies, displays, fossils, rough slabs, crystals, beads, tailgaters welcome; contact Phyllis, (623) 374-5451

5-7—EUGENE, OREGON: Show, "Gem Faire"; Gem Faire Inc.; Lane County Events Center/Exhibit Hall, 796 W. 13th Ave.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yoo Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

5-7—EUREKA, CALIFORNIA: 56th annual show; Humboldt Gem & Mineral Society; Redwood Acres Fairgrounds, 3750 Harris St.; Fri. 9-6, Sat. 10-6, Sun. 10-5; dealers, gems, minerals, fossils, kids' games, live demonstrations (lapidary, jewelry making, lampwork beads, flint knapping); contact Steven V. Johnson, (707) 476-8393; e-mail: humboldtcave man@att.net

5-7—GOLDEN, COLORADO: Annual show; Denver Area Mineral Dealers; Exhibition Hall, Jefferson County Fairgrounds, 15200 W. 6th Ave.; Fri. 10-6, Sat. 10-6, Sun. 11-4; free admission; minerals, fossils, gemstones, jewelry, beads, carvings; Pat Tucci, GEOdysey LLC, P.O. Box 16339, Golden, CO 80402, (303) 279-5504; e-mail: ptucci@sprint mail.com; Web site: www.geodysey-rocks.com

6—TUCSON, ARIZONA: 9th annual silent auction; Old Pueblo Lapidary Club; 3118 N. Dale; Sat. 9-2; free admission; contact Danny V. Harmsen, (520) 323-9154

6-7—AMARILLO, TEXAS: Show; Golden Spread Gem & Mineral Society; Amarillo Civic Center, 401 S. Buchanan St., Regency Room; Sat. 10-6, Sun. 10-5; adults \$2 (good for both days), children under 12 free; silversmithing, wire wrapping, Wheel of Fortune, silent auction, dealers, jewelry, fossils, gemstones, beads, prospecting equipment, flint knapping, demonstrations, hourly drawings, grand prize; contact Roy or Wanda Finley, 9170 FM 1151, Claude, TX 79019, (806) 944-5464; e-mail: finfran@midplains.coop

6-7—ANAHEIM, CALIFORNIA: 43rd annual show; American Opal Society; White House/West Wing Event Center, Hobby City, 1238 S. Beach Blvd.; Sat. 10-6, Sun. 10-5; adults \$3, children under 15 free; opal and gem dealers from the USA and Australia, rough and cut opals, gemstones, jewelry, supplies, raffle, free seminars, free gem cutting and jewelry making demonstrations; contact Pete Goetz, (714) 530-3530, e-mail: mpg1022@aol.com; Web site: http://opalsociety.org

6-7—EDMONDS, WASHINGTON: Annual fall show; Maplewood Rock & Gem Club; Maplewood Clubhouse, 8802 196th St. SW; Sat. 9-5, Sun. 9-4; free admission; raffles, displays, demonstrators, sales; contact Bev Ryder, 4625 Strumme Rd., Bothell, WA 98012, (425) 338-4184; e-mail: famryd@aol.com; Web site: www.maplewoodrockclub.com

6-7—EXTON, PENNSYLVANIA: 41st annual show, "Gemarama 2010"; Tuscarora Lapidary Society; CFS, The School at Church Farm, 1001 E. Lincoln Hwy.; Sat. 10-6, Sun. 10-5; adults \$6, children under \$2; demonstrations, exhibits, dealers, children's activities; contact James Johnston, 1309 Cedar Rd., Ambler, PA 19002, (215) 542-7753; e-mail: j19b43j@msn.com; Web site: www.lapidary.org

6-7—MIDLAND, MICHIGAN: Show and sale; Mid Michigan Gemcraft & Mineral Society; Midland Resort Hotel Convention Center, 1500 W. Wackerly St.; Sat. 10-6, Sun. 10-4; free admission; rocks, gems, minerals, fossils, jewelry, beads, Scout patches, photo op. with T. rex skull, demonstrations, presentations; contact Deb Acord, 55 Star Rd., Sanford, MI 48657, (989) 430-4471; e-mail: jackdanred1@aol.com; Web site: http://midlandrockclub.com/

6-7—MIDLAND, TEXAS: 48th annual show; Midland Gem & Mineral Society; Midland Center, 105 N. Main St., corner of Wall and Main; Sat. 9-6, Sun. 10-5; adults \$4, students (6-18) \$1, children 5 and under free; dealers, demonstrations, exhibits, silent auction, kids' corner, geode cutting,

fluorescent mineral room; contact Craig Tellinghuisen, (432) 697-7668; e-mail: mgmstx@gmail.com

6-7—SAN DIEGO, CALIFORNIA: Show, "The GemDiego Show"; San Diego Mineral & Gem Society; The Al Bahr Shrine, 5440 Kearny Mesa Rd.; Sat. 10-5, Sun. 10-4; free admission; dealers, gems, minerals, beads, jewelry, lapidary equipment and supplies, demonstrations, wire wrapping, faceting, lost wax casting, silver chainmaking, intarsia, spheremaking, gemstone identification, Junior Booth, Club Booth; contact Bob Hancock, (619) 889-6886; e-mail: rhob hancock@cs.com

6—SAN MATEO, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things, San Mateo Co. Event Center (Event Center Meeting Pavilion), 2495 S. Delaware St.; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

6-7—CONCORD, CALIFORNIA: 51st anniversary show; Contra Costa Mineral & Gem Society; Centre Concord, Clayton Fair Shopping Center, 5298 Clayton Rd. (near Ygnacio Valley Rd.); Sat. 10-5, Sun. 10-5; adults \$5, 20 percent discount at Web site, under 16 and Scouts in uniform free with adult; fluorescent room displays, 21 vendors, minerals, fossils, gems, crystals, jewelry, books, tools, equipment, lapidary supplies, 60 exhibitors, 12 demonstrators, beading, wire-wrapping, faceting, stone carving, youth activities, silent auction, prizes, raffle, woolly mammoth skull, giant jade, giant cave bear, giant auction; contact Harry Nicholas, P.O. Box 4667, Walnut Creek, CA 94596, (925) 289-0454; e-mail: bob@ccmgs.org; Web site: http://ccmgs.org

6-7—EXTON, PENNSYLVANIA: Show, "Gemarama 2010"; Tuscarora Lapidary Society; School at Church Farm, Bus. Rte. 30 and Rte. 202; Sat. 10-6, Sun. 10-5; adults and students \$6, seniors \$5, children \$1, see Web site for discount; dealers, finished jewelry, cut and uncut stones, fossils, beads, tools, lapidary supplies, demonstrations of jewelry and lapidary arts, exhibits, children's activities, door prizes, silent auction; contact Jim Johnston, (215) 542-7753; e-mail: information@lapidary.org; Web site: www.lapidary.org

6-7—LANCASTER, CALIFORNIA: Show, "Rock 'N' Gem Roundup"; Palmdale Gem & Mineral Club; Antelope Valley Fairgrounds, 2551 W. Ave. H; Sat. 9-5, Sun. 9-5; free admission; petrified wood seminars by Walt Wright, dinosaur programs by Richard Wade; children's area with interactive games, silent auction, Country Store, more than 25 vendors, more than 30 lapidary displays; contact Susan Chaisson-Walbiom, 42122 52nd St. W, Quartz Hill, CA 93536, (661) 406-0143; e-mail: slchaisson@yahoo.com; Web site: www.palmdalegemandmineral.com

6-7—MELBOURNE, FLORIDA: Show, "Parade of Gems"; Canaveral Mineral & Gem Society; Melbourne Auditorium, 625 E. Hibiscus Ave.; Sat. 10-5, Sun. 10-5; adults \$4; contact Don McLamb, (321) 723-2592; email: ldjmc@aol.com; Web site: www.canaveral-mgs.com

6-7—RIDGECREST, CALIFORNIA: 55th annual show; Indian Wells Gem & Mineral Society; Desert Empire Fairgrounds, 520 S. Richmond Rd.; Sat. 9-5, Sun. 9-5; free admission; contact John DeRosa, (760) 375-7905

7—McCLELLAN (SACRAMENTO) CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Garden Pavilion, 5640 Dudley Blvd.; Sun. 11-3; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

12-14—EDISON, NEW JERSEY: Show; MalicJewels Jewelry & Gift Show; New Jersey Convention & Expo Center at Raritan Center, Hall D, 97 Sunfield Ave.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

12-14—HAMBURG, NEW YORK: Show and sale; GemStreet USA; The Erie County Fairgrounds, The Grange Bldg., 5600 McKinley Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 11-5; fine gems, jewelry, beads, fossils, minerals; contact Jane Strieter Smith, (216) 521-4367; Web site: www.gemstreetusa.com

12-14—HUMBLE, TEXAS: 57th annual show; Houston Gem & Mineral Society; Humble Civic Center, 8233 Will Clayton Pkwy.; Fri. 9-6, Sat. 9-6, Sun. 10-6; adults \$7, seniors and students \$6, children under 12 free; displays, work-

continued on page 50

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ROCK & GEM KIDS

Staurolite



Staurolite is a silicate mineral with stubby, prismatic crystals that occur embedded in matrix rather than free-standing in cavities or pockets. The crystals are often less than an inch long and come in shades of brown, from nearly black to nearly yellow. They produce a white streak on a streak plate. Although some specimens may be translucent, most I've seen are fairly opaque with a vitreous (glassy) luster that's often on the dull side.

Metamorphic rocks have been altered by heat and/or pressure, and there are two basic sorts: regional (those associated with large-scale events, like mountain building) and contact (rocks near an igneous zone that have basically been baked). Staurolite forms in regionally metamorphosed rocks, including gneiss and mica schist. It forms in a specific temperature



JIM BRACE-THOMPSON PHOTO

More than a third of staurolite crystals are twinned, at either a 90-degree (left) or 60-degree angle (right).

and pressure range, making it useful in determining conditions under which its host rock formed. In the United States, famous staurolite deposits are in Tennessee, New Mexico, and especially Georgia, where staurolite is the state mineral.

Collectors like staurolite for its tendency to "twin", or grow in pairs or multiples. Two types of simple mineral twins are contact and penetration twins. Contact twins grow side by side, producing crystals that are mirror images of one another. Penetration twins look like two crystals growing through each other. In staurolite, this produces cruciform twins, or little crosses.

"Staurolite" comes from Greek words *stauros* (cross) and *lihos* (stone). The arms of the cross may be right-angled (90 degrees) or oblique-angled (60 degrees). Right-angled twins are called "fairy crosses" and are valued as good-luck charms.

—Jim Brace-Thompson

SPECIAL EFFECTS:

Fluorescence

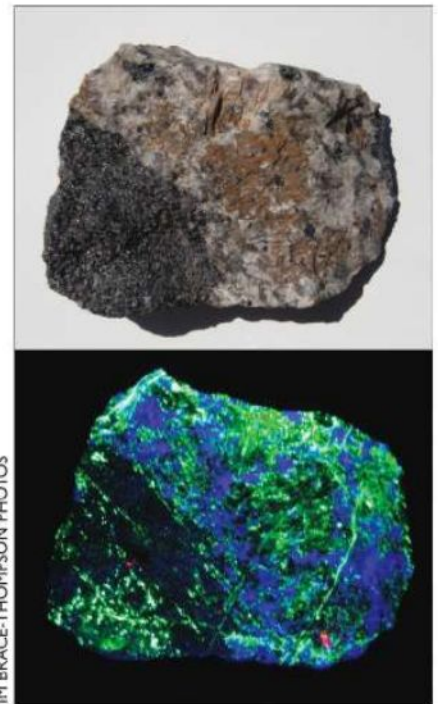
Light (actually electromagnetic radiation) moves in waves and is given different names (infrared, visible, ultraviolet, etc.) according to its wavelength. We're most familiar with visible light. Ultraviolet (UV) light moves in waves too short for human eyes to detect, but we can see its effects upon certain minerals. What appears to be a gray rock in visible light may glow orange or green under UV light, or a mineral of one bright color under visible light may appear a different color under UV. For instance, green fluorite may turn blue. Still other minerals, like ruby, may stay the same color, but appear more vivid. In all these cases, under UV light the minerals seem to glow from within.

The first person to describe this phenomenon was English scientist Sir George Stokes in 1852. He was working with fluorite, so he called the effect "fluorescence". Certain mineral impurities will absorb UV light and convert it to longer, visible light waves, which are then reflected to the viewer as colors. At the atomic level, UV light causes electrons in some molecules to jump to a higher energy level. In falling back to their normal level, they give off the extra energy in the form of visible light.

UV light is a spectrum, or range, of wavelengths that is divided into shortwave and longwave UV. Most fluorescent minerals will respond with a color change under shortwave, and some will change color as you switch from shortwave to longwave. A great book for learning more is Harry C. Wain's *The Story of Fluorescence* (Raytech Equipment Co., 1965).

Of 3,600 minerals, only 500 fluoresce. To build a fluorescent collection, look for specimens of calcite, zircon, opal, ruby, scheelite, willemite, celestite, hydrozincite, barite, scapolite, aragonite and halite. A warning: Don't look into a fluorescent lamp. While longwave UV light is relatively harmless, shortwave UV can "sunburn" your skin and eyes. Although protective glasses can shield you from harm, you should limit time spent with UV light. Be safe, not sorry!

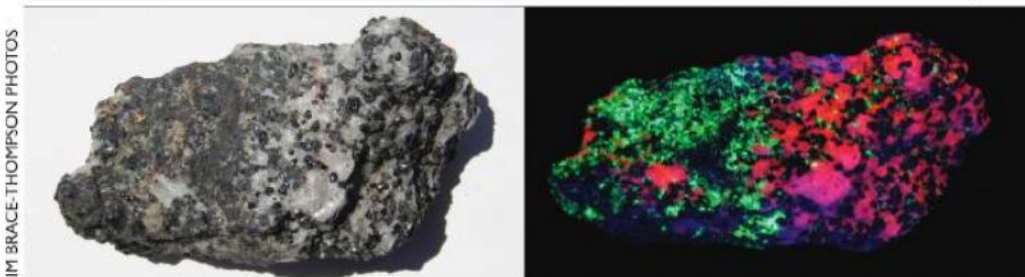
—Jim Brace-Thompson



JIM BRACE-THOMPSON PHOTOS

ABOVE: A sample of plain brown, black and white calcite, willemite, franklinite and hardy-stonite fluoresces a beautiful green and blue.

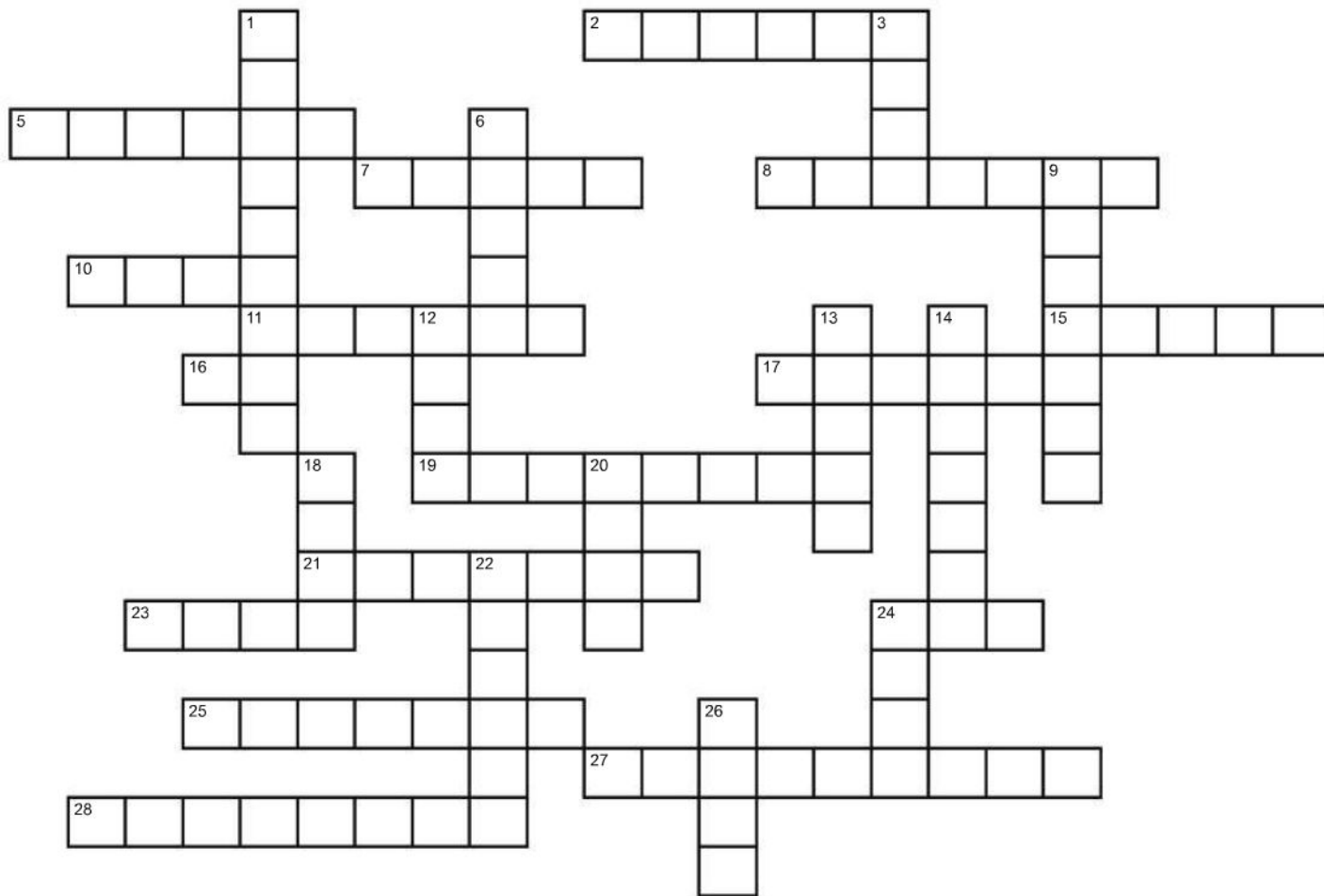
LEFT: Dull gray, black and white calcite, willemite and franklinite from Sterling Hill, New Jersey, turns vivid green and orange under ultraviolet light.



JIM BRACE-THOMPSON PHOTOS

FLUORESCENCE CROSSWORD

Refer to the article on fluorescence for answers to the clues



Across

2. English scientist
5. Fluorescent mineral ($ZrSiO_4$)
7. Lacking length
8. Effect of UV light on skin
10. Radiate light
11. Effect of mineral impurities on light
15. Electromagnetic radiation
16. Ultraviolet abbr.
17. Fluorescent barium mineral
19. High end of UV

21. Animal, vegetable, _____
23. Electron movement
24. Detect light
25. Change form
27. React to UV light
28. UV light absorber

Down

1. Low end of UV
3. Sunburn victim
6. Changes under UV light

9. Bounce back
12. Fluorescent silica mineral
13. Manner of light movement
14. Able to be seen
18. Shiner of light
20. Color of rock in visible light
22. Power
24. Better than sorry
26. Fluorescent corundum gem

Take the Quiz, Win a Prize!

The Quiz is open to U.S. residents 17 and younger. All the questions can be answered by carefully reading *Rock & Gem Kids*. Mail your answers to **October Quiz, Rock & Gem magazine, P.O. Box 6925, Ventura, CA 93006-9899**. Five winners will be drawn from the valid entries received by **Oct. 31, 2010**. Valid entries must include the correct answers, the entrant's name, age and address, and the signature of a parent or guardian. This month's prize is a copy of *Agates: Inside Out* and a Lake Superior agate, generously donated by the Gitche Gumee Agate Museum (www.agatelady.com; see ad on page 67).

1. Staurolite forms _____, _____ crystals embedded in matrix.
2. Staurolite is the state mineral of _____.
3. Two types of simple mineral twins are _____ and _____ twins.
4. _____ metamorphic rocks are associated with large-scale events, like mountain building.
5. The name "staurolite" comes from Greek words that mean _____ and _____.





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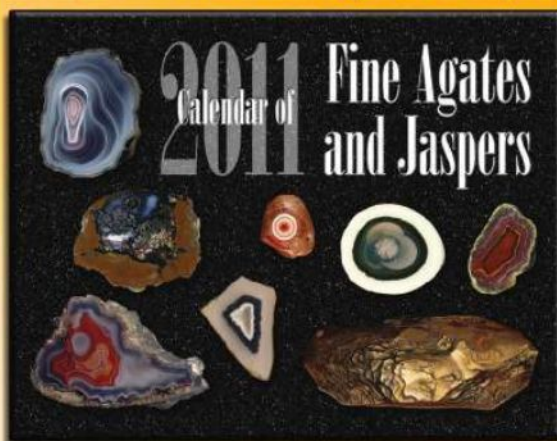


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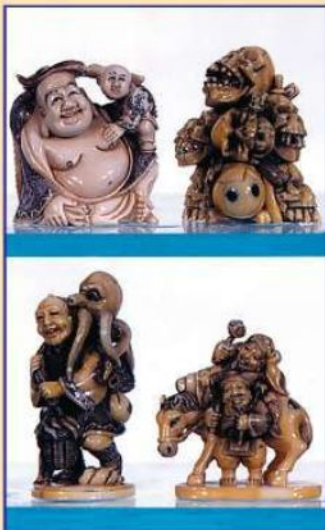
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October 3, Fallbrook, CA; Fallbrook Gem & Mineral Show, 123 West Alvarado St.
October 16-17, Placerville, CA; El Dorado County Mineral & Gem Society Rock & Gem Show; County Fairgrounds,
 100 Placerville Drive
October 30-31, Lakeside, CA; "Rock and Gem Roundup" El Cajon Valley Gem & Mineral Society;
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New Mineral Museum

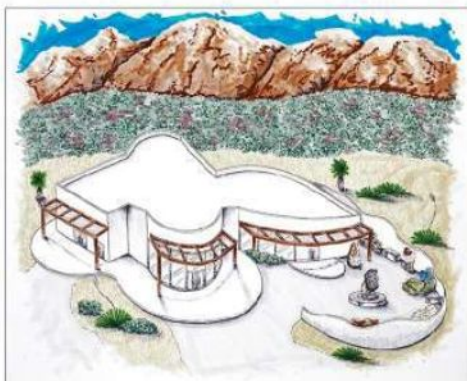
A new mineral museum project is planned to commence in rural New Mexico in late 2010. The John H. Eicher Mineral Museum will be constructed at Granite Gap, a short distance north of Animas, New Mexico, 8 miles south of Interstate 10 and 29 miles southwest of Lordsburg. The location is about 2½ hours southeast of Tucson, just over the New Mexico border. The area has become an important destination for amateur astronomers seeking dark skies from which to observe the stars.

Developer and astronomy enthusiast Gene Turner previously created the Arizona Sky Village and Rancho Hidalgo, two communities for skygazers, near the Granite Gap site. There, amateur astronomers have purchased land and built houses to gain access to an inky black, "dream" dark sky for their telescopes. Now the Granite Gap development, which amounts to 700 acres, will offer a low-cost community and "year-long star and rock party" for amateur astronomers and mineral collectors. The museum will be a part of the educational vision planned for many on-site and on-line activities.

The museum is named for John Harold Eicher (1921–), emeritus professor of organic chemistry at Miami University, Manhattan Project scientist, and longtime mineral collector and enthusiast. Eicher's son, David J. Eicher, is editor of *Astronomy* magazine, which maintains an observatory at Rancho Hidalgo and is an active partner in the educational activities planned for Granite Gap. Other partners in the project include Celestron (the world's largest manufacturer of telescopes), the Astronomical League, and Vanderbilt University.

Eicher and Turner have seen a growing trend of crossover interest between amateur astronomers and rock and mineral collectors, in part due to the interest in meteorites from astronomy buffs. "We see fascination from astronomy buffs not only with meteorites, but also from pure minerals," says Eicher, "when they realize that chemistry in the universe operates on a common plane and that mineral specimens held in their hands may approximate the kinds of crystals and minerals that are scattered across planets throughout the cosmos." Conversely, they believe many rock and mineral collectors such as those who frequent the nearby Tucson Gem & Mineral Show will be fascinated with observing treasures of the night sky through telescopes.

At Granite Gap, science enthusiasts can buy 1/3-acre plots for their RVs, complete with water, septic, electricity, and high-



speed Internet, or furnished cabin packages. Turner's vision of combining astronomy, mineralogy, archeology, mining history, birding and equestrian activities with a large lake for recreation will promote a new blend of educational activities.

A Web site, www.granitegap.com, will promote the educational vision of the science recreation site, highlighting in simple terms about 500 mineral species with photographs, data, and a summary explanation of each mineral for beginners and intermediate collectors by David Eicher, who is a highly enthusiastic mineral collector.

The Eicher Mineral Museum building will be built beside a planetarium and will contain eight galleries, including a species gallery, meteorite gallery, special/changing exhibits gallery, minerals of Arizona and New Mexico gallery, laboratory gallery (with microscopes for study), history of mining gallery, an outdoor gallery with large specimens, and a lapidary gallery. David Eicher will serve as director of the museum.

A feature article in the September 2010 issue of *Astronomy* describes the project in more detail. Go to <http://cs.astronomy.com/asycs/blogs/astronomy/2010/07/23/a-revolutionary-observing-opportunity-and-more.aspx> and follow the link near the bottom of the blog to download a PDF of the full article.

The organizers of the Eicher Mineral Museum project welcome mineral enthusiasts to get involved with the museum project and seek cooperation with other museums and donations of specimens from dealers or collectors who may feel it is appropriate to help the effort. Helping to bring mineral collecting to a new generation of young science-minded people will be a primary goal as the project moves forward. For questions on the Granite Gap development, contact Gene Turner at et423@aol.com or (575) 548-0065. For questions on the Eicher Mineral Museum, contact David J. Eicher at deicher@astronomy.com or (262) 798-6603.

Show Dates: View the complete list of upcoming shows, including those we didn't have room to print in this issue.

Back Issues: Search our available back issues by key word and order copies using our secure shopping cart.

Club Listing: Find a rockhounding or lapidary club in your area and get involved in the Earth's oldest hobby!

Golden Celebration

Brides and grooms of 1960 can enter The Field Museum free of charge on Dec. 4, 2010 by showing proof they have been married for 50 years. They can celebrate with a champagne toast and gold-dusted wedding cake at a reception held in Stanley Field Hall from 10 a.m. to 2 p.m. During the reception, couples will have the opportunity to renew their wedding vows. There will be a raffle to win romantic prizes, including passes to the John Hancock Observatory and dinner at Lawry's. Proof of a 1960 marriage, such as a marriage certificate, an old wedding invitation, or a dated newspaper clipping, is required to participate.

The Golden Anniversary Celebration is held in honor of The Field Museum's new exhibition "Gold", which will be open through Mar. 6, 2011. For a small fee, guests will view more than 1 ton of gold artifacts and can compare their wedding bands to golden rings of the past. A highlight of the exhibition is a Mixtec bell, crafted more than 500 years ago. It is thought to depict Xiutecuhtli, the Aztec god of fire. Byzantine coins, a Chavin Stirrup Spout Bottle, and a golden Tiffany and Co. baby rattle showcase the versatile uses of gold throughout history.

Guests are also encouraged to visit the newly refurbished Grainger Hall of Gems, which is a permanent exhibition. On display is the famed 5,899.5-carat Chalmer's topaz, as well as exquisite crystallized gold nuggets.

"Gold" is organized by the American Museum of Natural History, New York, in cooperation with The Houston Museum of Natural Science. For more information about The Field Museum, visit fieldmuseum.org

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Modern Mineral Classics

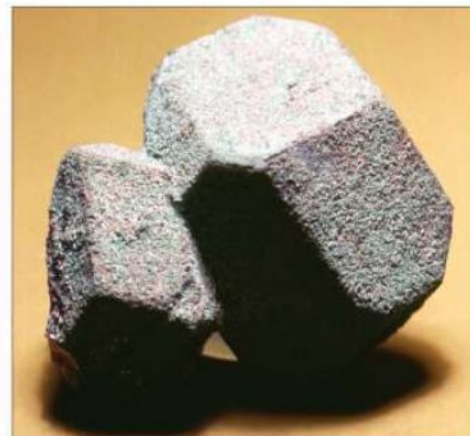
PART V: Choice Vanadinite, Smithsonite, Pyrite, Crocoite, Cerussite and Cuprite

Story and Photos by Bob Jones



The bright-red, hoppered, hexagonal vanadinite crystals from the Acif mine in Morocco were often found stacked on one another and completely covering their matrix.

Several readers have asked why I have not included certain minerals in this "Modern Classics" series. As I've stated, I can't describe them all, but I do invite readers to make suggestions. Among the species suggested as potential classics are Moroccan vanadinite, Kelly mine (New Mexico) smithsonite, Spanish pyrites, Tasmanian crocoite, Tsumeb cerussite, and Emke mine (Namibia) cuprite. I will bring the "Modern Mineral Classics" series—incomplete though it is—to a close by discussing these six, which will always be high on the list of much-sought minerals. They span the globe, representing different countries and species. Just don't forget that China is emerging as a source of fine minerals and will eventually add its species to the classics list.



The malachite coating on these 2-inch cuprite crystals from Namibia hides their gemmy red interior.

Vanadinite from Morocco is the world's finest, so there is little doubt it qualifies as a classic now and will do so in the future. The remarkably bright-red, simply hexagonal crystals, often stacked one on another in piles while completely covering their matrix, make these vanadinites both colorful and exceptionally superb.

Moroccan vanadinites of quality began showing up in this country about 25 years ago when mineral dealer Victor Yount left his base in Spain and headed into that North African country. The vanadinites he brought back from Mibladen were superb, simple tabular hexagons in clusters, often without matrix. Their color varies from red-brown to bright red. Some of the clusters had an almost flowerlike radial crystal arrangement.

Yount's frequent trips to Morocco brought huge quantities of vanadinite to the mineral market. With time, the quality got even better, and the quantity of superb vanadinite seemed endless. Some of the most attractive display specimens consist of matrix covered with a black mineral, probably mottramite, and individual 1/2-inch bright-red vanadinites all over the contrasting black surface. On other specimens, the crystals are stacked, like stalactites sticking up from a well-crystallized matrix.

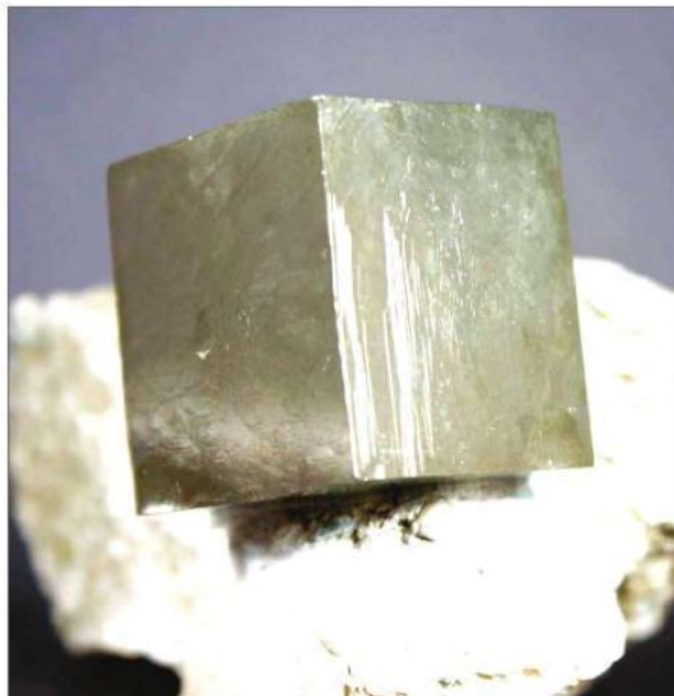
Local Moroccan miners finally recognized the market for their mineral specimens and began attending major shows in the United States, bringing quantities of specimens with them.

Not all the vanadinite from Morocco is bright red. Some of it, including some of the largest crystals, is tan and is considered to be arsenian vanadinite. As would be expected, the red crystals are far more popular than the very fine tan hexagons. Moroccan vanadinites are the world's best and are already considered classics!

Another specimen source in Africa is Tsumeb, Namibia. The remarkable and varied suite of species found there puts Tsumeb in the same class as Bisbee, Arizona, the De Mix quarry at Mont Saint-Hilaire, Canada, Franklin/Sterling Hill, New Jersey, and one or two other localities that have produced hundreds of different species, many of them of superb quality and others unique to the locality.



This outstanding example of grapelike clusters of blue smithsonite hails from the Kelly mine at Magdalena, New Mexico.



Lightly striated cubes of pyrite from La Rioja and Soria, Spain, sometimes grow as large as several inches on an edge.

Of the many showy species Tsumeb produced, cerussite is certainly a worthy representative of the locality. The sheer abundance of specimens mined there, coupled with the mineral's common habit of forming twinned crystal clusters, have made it possible for all collectors to own a specimen of this colorless to white lead carbonate.

Cerussite almost always occurs in twinned crystals; fine single crystals are the exception, not the rule. It typically forms "V" twins, two crystals set at nearly 60 degrees to each other. Simple "V" twins are common and sometimes more than one set of twins are attached to each other. The two finest examples of this twinning are the reticulated, or "herringbone", clusters that resemble a fish skeleton. Even more remarkable are what collectors call "snowflake" twins, which are very highly prized. They are pseudo-hexagonal dipyrnidal clusters of cerussites that strongly resemble a snowflake shape. They involve six sets of twins forming a complete six-sided, or sixling, shape. Incomplete snowflake twins are often fan shaped; these are also very showy and much prized.

Cerussite is one of the most common species at Tsumeb, so it is frequently found with and on other popular species. Given the huge quantity and remarkable variety of Tsumeb's cerussite, it will always be very popular and readily available for most collectors, and therefore a modern classic.

To single out one pyrite locality for consideration may seem a bit arrogant, as there are dozens of prolific sources. Yet, for sheer quantity and showy crystal form, the provinces of La Rioja and Soria (formerly Logrono) in Spain have undoubtedly produced the greater abundance of textbook crystals that rank among the world's finest pyrite cubes! I doubt anyone can put a number on the quantity of perfect cubes from these areas. Production has been reported in tons!



This lightly smoky cluster of fine tabular cerussite crystals shows some twins, as is typical of the species.

What I find remarkable is that these Spanish pyrites have been known since the 1500s, though serious mining did not commence in modern times until the 1970s.

The several deposits are mainly sandstone-marl formations. Under heat and pressure, the marl recrystallized into a white matrix containing calcite veins in which the pyrites formed. Specimens are notable for their bright white matrix, which has been carefully shaped by dealers to hold the pyrites to best display advantage. Since there is no significant bonding between the pyrite crystals

and the matrix, nearly all such specimens have been reassembled, very much like the quartz groups seen from the Herkimer region of New York. Sometimes, a series of pyrite crystals develops. The crystals are simply reattached without matrix, creating quite spectacular clusters of up to 20 crystals that can stand a foot or more high.

Single Spanish pyrite cubes tend to range about an inch or two on an edge to 5 inches on an edge. Some, however, have been found in generous sizes of nearly 10 inches on an edge.



This matrix of black-coated barite provides a fine contrasting background for vanadinites from Morocco.



This is a fine example of a botryoidal mass of blue-green smithsonite from the Kelly mine at Magdalena, New Mexico.

A word of caution is necessary here: Almost all the Spanish pyrites I have examined are perfect, sharp, clean, and well formed, but some are found with a defect like a small hole or a chipped edge. Dealers may attempt to mask these defects by using a brass-colored paste to fill them in. Careful examination of any crystal will reveal this treatment.

For sheer quantity and aesthetic appeal, these pyrites surely are among the finest ever found anywhere. Their perfect textbook cube shape, good luster, and excellent size qualify these Spanish iron sulfides as modern classic species.

In the Southern Hemisphere of the globe is the Australian island-state of Tasmania, known to mineral collectors for its fantastic lead chromate species crocoite. This remarkable mineral rivals all other crocoites for sheer brilliance of color, which ranges from a fiery red to orange-red thanks to its chromium ions.

The discovery of the Zeehan-Dundas lead deposits in Western Tasmania in 1882 eventually led to the discovery of crocoite at the Adelaide mine in 1891. The ores, primarily crocoite, from this small but rich deposit were mainly silver-lead. It seems that in the initial haste to make a profit, everything went to the smelter! Eventually,

of course, the inherent beauty of crocoite caught the eye of collectors and specimen miners began saving fine example of this red mineral. Mining for ore in the region ceased about 1915, but specimen mining was carried on by locals, mainly former miners. Good finds have been made right up to recent times.

Crocoite is actually found in several mines in the area including the Adellaide, Red Lead, and Kapi. The Kapi produced crocoite associated with yellow cerussite, an attractive combination of color and crystals.

Crocoite is offered for sale in three basic forms. First are large single crystals that are strawlike and hollow. Few of these show terminations, but their size—upwards of 6 inches—and good color make them a nice addition to a collection.

Second and most common are the tangled masses of red crystals that range in diameter from toothpick size to $\frac{1}{8}$ inch or a bit better. These crystals seem to have been tossed onto the matrix helter-skelter and are intergrown in all directions. They vary in thickness and length, are brittle and often hollow, and have crystal terminations that are quite ragged. Within this tangle of crystals, you often see geometrically arranged, reticulated clusters of twinned crystals. Many of these groups were seam

fillings with myriad points of attachment. Any visible, minor damage has become accepted by the collecting community as inevitable and seldom detracts from the overall beauty of the specimen.

The third type, matrix specimens, are less common but highly attractive. The matrix is the typical reddish-brown iron gossan resulting from the decomposition of the iron minerals in a weathered oxide zone. These crocoites stand freely like myriad sentinels. Some crystals can be upwards of 5 inches, though early reports describe crystals over 6 inches long. They are often strawlike and hollow. Matrix crystals may tend to be more or less parallel in arrangement, unlike the tangled masses of crystals described above. Good matrix specimens are prized because they are the showier specimens.

Crocoite from Tasmania is well represented in every major museum. One of the larger and more interesting specimens, a quite spectacular plate about 10 inches across, resides in the Harvard University collection. It came out of the ground in the last quarter-century and was transported to the United States sitting in the lap of a California collector, from whom Harvard acquired the piece. The toothpick-size crystals are only an inch or two long, but completely cover the large plate!

Since Tasmania's crocoites are far and above the finest examples of this species ever found and rank high as a very showy and uncommon species, they are certainly modern classics.

The Southwestern United States is riddled with mines, many of which have produced choice collector species. New Mexico is noted for the superb wulfenite and exceptional cerussites from the Organ Mountains, choice smoky quartz Japan Law twins from Lincoln County, and fine copper species from the Santa Rita operation near Silver City. Leading the pack of superb minerals from New Mexico, however, is smithsonite from the Kelly mine and other nearby mines in the Magdalena district (Socorro County).

Minerals were first reported from this district in the late 1800s. Mining commenced immediately and continued into the early 1900s. After that, collectors and retired miners regularly dug there, producing superb blue to blue-green botryoidal smithsonite and making the deposit world famous.

The Magdalena smithsonite occurred as massive linings and cavity fillings as replacements of the limestone host rock. The limestone produced the necessary carbonate, while the breakdown of zinc sulfide (sphalerite) provided the zinc needed to form smithsonite, a mineral named after James Smithson, who gave the initial funds to build the Smithsonian Institution.

This smithsonite comes in almost any color, including white, tan, yellow, brown,

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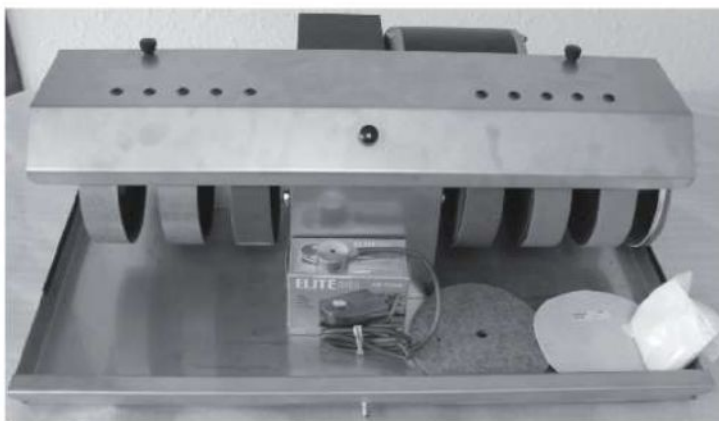
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Modern Mineral Classics from page 46

apple green, blue-green, to sky blue. The blue specimens are the more highly prized. The color in smithsonite is due to various metallic ions: cadmium produces yellow “turkey-fat” smithsonite, iron colors the tan to brown variety, and copper ions create the various shades of blue.

The various forms of smithsonite from the Kelly mine make it even more appealing. Few crystals have been found, and those that have occurred are more like rice grains than discrete crystals. The typical form is botryoidal ranging into mammillary, the different being the size of the “bumps” on the slabs. Some of these slabs were up to 4 inches thick. Other forms include small bow-tie shapes and grapelike knobs in clusters. Less common and seldom seen nowadays are stalactitic forms. Very uncommon and much sought are blue aurichalcite-smithsonite groups that are very attractive.

Kelly smithsonite was once so common that it was used domestically. A friend who was born and grew up in the nearby town of Magdalena told me that a miner who died on the job might be buried with a huge slab of smithsonite as his tombstone! He also reported that the bar at a local tavern was topped with slabs of smithsonite at one time!

The finest Kelly mine smithsonite is translucent and a lovely sky blue and is suitable for cabbing. As a soft mineral (Mohs 4.5), it cannot be mounted in rings or bracelets, but it is most appealing as a pendant stone if used in a protected shadow-box mount.

New Mexico’s blue smithsonite is highly regarded and comes to the fore in any discussion of that state’s minerals. As the best smithsonite found in America, while rivaling any zinc carbonate found elsewhere, Kelly mine smithsonite certainly should be considered a modern classic and is destined to be a highly regarded classic in the future.

Finally, a small copper mine called the Emke mine, in Oganja, Namibia, has given us the world’s finest gem cuprite crystals in a small but significant quantity. Unfortunately, such cuprites did not occur in quantity again, so there are not as many of the large, mainly single crystals around these days as collectors would like.

Prosper Williams, a South African mineral dealer told me that the miners reported that the crystals were exposed on a wall of calcite during blasting for copper ore. Many crystals were shaken loose from their matrix. Far fewer were collected still in place on crystallized calcite.

Cuprite is normally dark red with a metallic luster. Oddly, the Emke mine crystals are green, sporting a shallow 1-millimeter to 2-millimeter malachite alteration on each crystal face. Initially, this alteration masked the cuprite’s gemminess, which was only revealed along broken surfaces. When the gemminess was realized, it meant a new



Fingers of a black manganese mineral provide a lovely perch for Morocco’s bright-red vanadinite crystals.

gem material was available to faceters. Any damaged crystals were collected, had the malachite soaked off with hydrochloric acid, and were made available for faceting.

Cuprite is soft and develops only in small crystals—until this find! These giant crystals posed a challenge for faceters, who have produced lovely faceted cuprites up to and over 300 carats. Once faceted, the gems develop the usual metallic sheen, but the unprecedented size and gemminess of these red beauties made them very popular as collector gems.

The crystal form taken by these giant cuprites was not a simple cube, but cuprite’s more common form, the dodecahedron. In a few cases, the dodecahedral shape developed in an elongate form, a few rare examples of which were mined on matrix. Other specimens consist of two or sometimes three dodecahedrons, each interlocking in a group.

Fortunately, few of the cuprites were cleaned with acid because it caused them to lose some of their appeal. The malachite had penetrated into the crystal faces, pitting them, sometimes quite badly. Much more popular are the crystals still sporting the green malachite overcoat!

Though the number of these Emke mine cuprites is limited, their sheer crystal size and gemminess causes them to be much sought and considered classic in every sense of the word.

This in no way completes a listing of currently available minerals that are worthy to be considered modern classics. There are many more species coming forth now that have the potential to become true classics in the distant future. As a collector, if you carefully observe the market and attend mineral shows, you can devise your own list and collect minerals you feel have the potential of becoming classics. That is part of the fun of collecting, especially when your judgment is proved right! ♦



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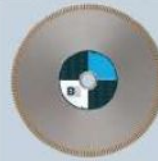

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ing exhibits, demonstrations, fluorescent mineral exhibit, swap area, more than 40 dealers, minerals, fossils, jewelry, spheres, meteorites; contact Rick Rexroad, HGMS Clubhouse, 10805 Brooklet, Houston, TX 77099, (281) 530-0942; e-mail: rrexroad@sbcglobal.net; Web site: www.hgms.org

12-14—KINGSPORT, TENNESSEE: 1st annual fall show; Prehistoric Exhibits; 321 Broad St.; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$3, children under 12 free; special fossil exhibits, full-scale T. rex skeleton, geology, fossil and archaeology lectures, door prizes, mineral and gem identification; contact Jerry Jacene, (423) 765-9633; e-mail: jjacene@hotmail.com

12-14—LOUISVILLE, KENTUCKY: Show; KYANA Geological Society; Resurrection Lutheran Church gym, 4205 Gardiner View Ave.; Fri. 10-7, Sat. 10-7, Sun. 12-6; free admission; local and national dealers, minerals, fossils, hand-crafted jewelry, slabs, geodes, polished gemstones, lapidary supplies, door prizes, kids' starter collections, demonstrations and activities; contact Mike Whitehouse, (502) 905-4988; e-mail: kyanashowchair@gmail.com; Web site: www.kyanageo.org

12-14—MORGANTON, NORTH CAROLINA: Show; Morganton Parks and Recreation; Collett Street Recreation Center, 300 Collett St.; Fri. 10-6, Sat. 10-6, Sun. 12-5; adults \$3, students \$2; door prizes, interactive gem mining booth; contact Gary Leonhardt, 300 Collett St., P.O. Box 3448, Morganton, NC 28680; (828) 439-1866; e-mail: gleonhardt@ci.morganton.nc.us; Web site: www.ci.morganton.nc.us

12-14—POMONA, CALIFORNIA: Show, "West Coast Gem, Mineral & Fossil Show"; Martin Zinn Expositions; the Fairplex in Pomona, 1101 W. McKinley Ave.; Fri. 10-6, Sat. 10-6, Sun. 10-5; admission \$5, parking \$9; exhibits, guest lecturers, 100 wholesale and retail dealers; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax: (303) 223-3478; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

12-14—PUYALLUP, WASHINGTON: 6th annual show, "South Sound Gem, Opal & Mineral Show"; Boeing Employee Mineralogical Society, Northwest Opal Association; Washington State Fairgrounds, Meridian St. S and 9th Ave. SW; Fri. 10-5, Sat. 10-5, Sun. 10-4; contact Lyle Jorgensen, (425) 483-0557; e-mail: mechanix@comcast.net

12-14—SACRAMENTO, CALIFORNIA: Show, "Golden Harvest Of Gems, Mineral, and Jewelry Show"; Sacramento Mineral Society; Scottish Rite Center, 6151 H St.; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$5, children (6-12) \$1; dealers, rock slabs, beads, findings, fossils, gold and silver jewelry, mineral specimens, rock carvings, gemstones, jade, indian, meteorites, tools, wire wrapping, kids' activities; contact Sacramento Mineral Society, P.O. Box 160544, Sacramento, CA 95816, or Tarance Beguhl; e-mail: tarance@sacramento.mineralsociety.org; Web site: www.sacramentomineral.society.org

12-14—SARASOTA, FLORIDA: Show; Frank Cox Productions; Municipal Auditorium, 801 N. Tamiami Trail (Hwy. 41); Fri. 10-5, Sat. 10-5, Sun. 10-5; gems, jewelry, beads; contact Frank Cox Productions, 755 S. Palm Ave. #203, Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

12-14—TACOMA, WASHINGTON: Show, "Gem Faire"; Tacoma Dome/Exhibition Hall, 2727 E. "D" St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

13—RICHMOND, VIRGINIA: 19th annual fall rock swap; Richmond Gem & Mineral Society; Ridge Baptist Church Meeting Hall, 1515 East Ridge Rd.; Sat. 9-3; free admission; swap and purchase mineral specimens, fossils, shells, gems, lapidary specimens; contact Carl Miller, (804) 310-8762; e-mail: kobold1@erols.com

13—VALLEJO, CALIFORNIA: Show, "Christmas Gift show and sale"; Vallejo Gem & Mineral Society; Vallejo Veterans Memorial Bldg., 420 Admiral Callaghan Ln.; Sat. 9-5; admission \$1; beads, jewelry, minerals, jade, crystals, gems, door prizes, club member sales, lapidary crafts, silver casting work, beading; contact Dan Wolke, P.O. Box 706, Vallejo, CA 94590, (707) 334-2950; e-mail: dncwolke@sbcglobal.net; Web site: www.iwired.org

13-14—FREEPORT, ILLINOIS: Show, "Holiday Jewelry, Gem & Mineral Show 2010"; North West Illinois Rock Club; Highland Community College Student/Conference Center, 2998 W. Pearl City Rd.; Sat. 9-5, Sun. 10-4; free admission; five speakers, demonstrators, kids' games, club displays;



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13-14—NEW YORK, NEW YORK: Show and sale; New York Mineralogical Club; Holiday Inn - Midtown, 440 W. 57th St.; adults \$6, children under 12 free with adult; minerals, gemstones, unique jewelry, fossils, meteorites, lectures, displays, free children's minerals; contact Tony Nikischer, (914) 739-1134

13-14—SEDRO WOOLLEY, WASHINGTON: Show, "Treasures of the Earth"; Skagit Rock & Gem Club; Sedro Woolley Community Center, 720 State St.; Sat. 9-5, Sun. 10-5; free admission; hourly door prizes, dealers, demonstrations, children's activities; contact Vi Jones, (360) 424-8340; e-mail: rocks1x1vi.george@verizon.net

13-14—VICTORVILLE, CALIFORNIA: Show; Victor Valley Gem & Mineral Club; San Bernardino Co. Fair Grounds, 14800 7th St.; Sat. 9-5, Sun. 9-4; free admission; exhibits, silent auction, demonstrations, vendors, grab bags, spin the wheel, free polished rocks, displays; contact Lois Papner, 14625 Cashew St., Hesperia, CA 92345; e-mail: lpapner@citruscollege.edu; or VVGMS, (760) 243-2330; Web site: www.vvgmc.org

13-14—YUBA CITY, CALIFORNIA: 19th annual show, "Festival of Gems and Minerals"; Sutter Buttes Gem & Mineral Society; Franklin Hall, Yuba-Sutter Fairgrounds, 442 Franklin Ave.; contact Inez Berg; e-mail: inez_brg@yahoo.com; or Eric Anspaugh, (916) 567-9750

19-21—MARIETTA, GEORGIA: 25th annual show; Cobb County Gem & Mineral Society; Cobb County Civic Center, 548 S. Marietta Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; rocks, gemstones, crystals, fossils, beads, jewelry, jewelry supplies, door prizes; contact Toby Stewart, 2587 Kenwood Dr., Duluth, GA 30096, (678) 315-8009; e-mail: toby_stewart@hotmail.com; Web site: www.cobbcountymineral.org

19-21—PORTLAND, OREGON: Show, "Gem Faire"; Oregon Convention Center/Exhibit Hall E, 777 NE MLK Jr. Blvd.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

20—CLACKAMAS, OREGON: 37th annual auction; Columbia-Willamette Faceters' Guild; Monarch Hotel, 12566 SE 93rd Ave.; preview 5:30, auction 7-10; contact Gail Lough, (971) 678-2862; e-mail: glough7@gmail.com

20-21—BREMERTON, WASHINGTON: Show, "2010 Fall Festival of Gems"; Kitsap Mineral & Gem Society; The President's Hall, Kitsap County Fairgrounds, 1200 N.W. Fairgrounds Rd.; Sat. 10-5, Sun. 10-5; free admission; club displays, junior events, silent auction, raffle prizes, dealers, demonstrations; contact Jim McClure, (253) 265-3011; e-mail: pogy2@centurytel.net

20-21—FAIRFAX, VIRGINIA: 19th annual show; Northern Virginia Mineral Club; George Mason University, Student Union Bldg. II, Rte. 123 and Braddock Rd.; Sat. 10-6, Sun. 10-4; adults \$5, seniors \$3, teens (13-17) \$3, children (12 and under) and Scouts in uniform free, GMU students with valid ID free; more than 20 dealers, minerals, fossils, crystals, gems, jewelry, carvings, meteorites, demonstrations, exhibits, door prizes, kids' mini-mines and fossil dig, silent auction Sun.; contact Tom Taaffe, (703) 281-3767; e-mail: rockclctr@aol.com; Web site: www.novamineralclub.org/

20-21—LEBANON, PENNSYLVANIA: Show and sale, "Gem Miner's Holiday Festival"; Lebanon Expo Center, Rte. 72 and Rocherty Rd.; Sat. 10-5, Sun. 11-4; adults \$5, children under 12 free; gems, jewelry, minerals, fossils, beads; contact MAGMA, (301) 565-0487; Web site: www.gem-show.com

20-21—MADISON, WISCONSIN: Show, "Rockin' Madison 50 Years"; Madison Gem & Mineral Club; Alliant Energy Center, 1919 Alliant Energy Center Way; Sat. 9:30-5, Sun. 10-5; adults \$3, children free; flintknapping and rock carving demonstrations, panning for gold and sapphires; contact Nevin Franke, Burnie's Rock Shop, 901 E. Johnson St., Madison, WI 53703, (608) 251-2601; e-mail: burniesrockshop@gmail.com; Web site: www.madisonrockclub.org

continued on page 71



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FIELD TRIP



Sacramento Mountains

AZURITE

Colorful Copper Minerals in the High Rolls Mining District

Story and Photos by Robert Beard

Azurite almost always generates interest among rockhounds. Its deep blue is impressive, and rocks with azurite make great collectibles. Another important feature, especially with respect to rockhounding, is that there is usually little doubt about whether or not you have found azurite. If you are in a known copper-mining district and you find deep-blue minerals or coatings on the rocks, you have almost certainly found azurite.



If you find deep-blue minerals or coatings in a known copper-mining district, they are almost certainly azurite.

The former copper mines of the High Rolls mining district (Otero County) in southern New Mexico offer the opportunity to find azurite, as well as malachite. The district, which also produced lead, is on the west flank of the Sacramento Mountains, south of the small town of High Rolls, New Mexico. The district is considered to extend from Red Hill, which is approximately 0.5 mile north of High Rolls, to Alamo Canyon, which is seven miles south of High Rolls.

The mines of the High Rolls district fall within the Lincoln National Forest. As in nearly all other national forests, permits or fees are not required to take a handful of rocks or minerals from the surface of Lincoln National Forest lands as long as the specimens are for personal use, not for commercial gain, and significant surface disturbance does not occur. No mechanical equipment may be used and any collection must not conflict with existing mineral permits, leases, claims or sales. Based on this information, collectors can visit the High Rolls district for surface collecting, but you must stay out of any areas that are fenced or clearly marked for closure.

The district is described in "Geology and Ore Deposits of the Sacramento (High Rolls) Mining District, Otero County, New Mexico" (Bulletin 86, New Mexico Bureau of Mines and Mineral Resources). A summary of this bulletin is available at <http://geoinfo.nmt.edu/publications/bulletins/86/home.cfm> and the entire publication can be purchased for \$12.50. Judging from my hard copy of this publication, the number of large maps and figures makes it difficult to provide the document electronically, at least at this time.

According to Bulletin 86, the mines in the High Rolls district operated from 1908 through 1962 and produced 1,915,500 pounds of lead and 260,570 pounds of copper. The lead ore was estimated to grade approximately 5 percent to 11 percent lead, and the copper ore was estimated to grade 2 percent to 7 percent copper. The copper and lead ores of the district are in the Permian-age Abo Formation, which is generally a brown-red sedimentary rock. The mineralization consists primarily of small, irregular deposits of copper and lead minerals that occur in discontinuous light-colored arkose (feldspar-rich sandstone) beds sandwiched between red shales.

Rock & Gem gives locality information for reference purposes only. Readers should never attempt to visit any of the sites described in this publication without first verifying that the location is open to collecting and obtaining the permission of the land and/or mineral rights holders.



The ground near the dump of the former Warnock mine has lots of broken rock with azurite and malachite.



The azurite and malachite formed within arkose, which is feldspar-rich sandstone.



Many of the loose rocks found at the former Warnock mine site are loaded with azurite and malachite.



The recommended parking area for accessing the former Warnock mine is not marked, so I recommend using the GPS coordinates to find it.

In 1948, the New Jersey Zinc Co. became interested in the district and further evaluated the lead and copper ore bodies. The purpose of the company's investigations was to determine whether the ore bodies were hydrothermal in origin. If they were, the potential for similar mineralization could be present in the limestone beds that were both above and under the Abo Formation. If such a hydrothermal deposit was present and had not been discovered by the previous miners in the district, it might be buried at depth and could only be located by deep drilling or geophysics. The miners who first explored the district did not miss much, but even they could not find a deeply buried deposit without the technology that was only becoming available during the second half of the 20th century.

Unfortunately, the evaluations showed no clear evidence of hydrothermal action, and a detailed geologic review of the area did not reveal any intermediate intrusive rocks that could have been a source for hydrothermal fluids. Intermediate intrusive rocks, which range between the very dark, silica-deficient igneous rocks, such as gabbro, and the lighter-colored, silica-rich rocks, such as granite, are often a source for mineralizing fluids. The igneous rocks in the area were limited to andesite dikes and sills; no significant alteration, which is generally formed by hydrothermal fluids, was observed along the dike contacts with the host rocks.

The origin of the copper minerals was believed to be semisyngenetic, which means that the ores were formed at approximately the same time the sediments were deposited. The ores were later oxidized by groundwater, which resulted in greater concentrations of oxidized lead and copper minerals near the surface. The authors of Bulletin 86 concluded that the ores would be confined to the Abo Formation. While this was a disappointing result, the origin of the High Rolls district minerals was certainly worth evaluating. Stratiform mineral deposits, which are those that form along a distinct rock layer, have proved to be among the most significant mineral

deposits in the world, and a hydrothermal origin for the ores could have indicated that the area had the potential to become a major copper district.

I visited the High Rolls district for the first time in August 2009. I was lucky to have perfect weather. August in southern New Mexico can be unpredictable, and while you can often conduct field work in the mornings, you will often be faced with severe thunderstorms by the afternoon. I had a copy of Bulletin 86 as a guide, as well as a copy of *The Roads of New Mexico*, by William H. Burdett (Shearer Publishing, 1990). (Shearer was recently purchased by Mapsco, www.mapsco.com.) The road to the mines is labeled as "West Side Road" in Bulletin 86, and I was able to find it fairly easily.

I thought it would be a cinch to find the mines, as I had my maps and could easily trace the curves of the road. According to Bulletin 86, the area had several mines, including the Courtney, North Acente, South Sacramento Gulch, Alamo, and Warnock mines. I also had my car GPS and could trace my progress. I arrived at the approximate spot of the Courtney mine and got out for a short hike. I came across some small depressions that appeared to be prospect pits, but I did not find any copper or lead mineralization.

I soon headed farther south and found some large cuts adjacent to the road. These appeared to have been made for road fill and aggregate, and while they did not have any copper minerals, I thought I could at least find some calcite or quartz mineralization that could yield some crystals. I found a couple of very small vugs with calcite, but they were not very interesting. I soon gave up and continued south down the road.

I stopped at many other spots and did not find anything, despite my maps showing the mine locations. I soon focused on finding an area in which I could look out over the valley for signs of roads or mine dumps.

I soon came to an area in the southern end of the district that appeared to have some paths leading out to an open area. I grabbed my pack and hammer and walked

into this open area. I looked to the north, and I finally saw what I was looking for: a mine dump! This had to be part of the district. Based on the information from Bulletin 86, this was the Warnock mine area. It would be quite a walk, but at least I'd be able to see a mine in this district up close.

I walked down the hill and soon came across a rough cut along the site of the hill. A lot of straw was strewn about the cut, which appeared to be a reclamation project. I then saw a green-and-blue rock, and picked it up. It was an arkosic rock with abundant malachite, and I saw that it had deep-blue azurite throughout. I knew I had finally found a copper mine area.

When collecting in a mining district, it is often useful to understand the chemistry behind the minerals you are collecting. Azurite and malachite are not primary copper minerals, but are secondary minerals formed from the oxidizing of primary ores. The most important primary copper mineral is chalcopyrite (CuFeS_2), which has copper, iron and sulfur. When chalcopyrite is exposed or near the surface, groundwater and surface processes will oxidize it and secondary minerals like malachite ($\text{Cu}_2\text{CO}_3(\text{OH})_2$) and azurite ($\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$) will form. These same processes will also turn primary lead minerals, such as galena (PbS) into secondary minerals such as cerussite (PbCO_3) and anglesite (PbSO_4). Based on what I already knew about the district, the presence of azurite and malachite indicated that most of the primary copper and lead minerals had already been oxidized to secondary minerals, so I was unlikely to see any primary copper or lead sulfides.

I continued walking down the road, looking for more showings of blue and green. I was particularly interested in finding more blue rocks, as I knew this was azurite. Most of the copper mines that I have visited have some malachite, but I have found azurite to be relatively uncommon.

The ground was quite broken up, and no vehicle could go down this road. The 'dozer work seemed relatively recent, but it is hard to tell in the desert, as the scars will last for



The straw adjacent to this shallow wash by the Warnock mine appears to show that some attempt has been made at reclaiming the mine area, though I have my doubts about its effectiveness.

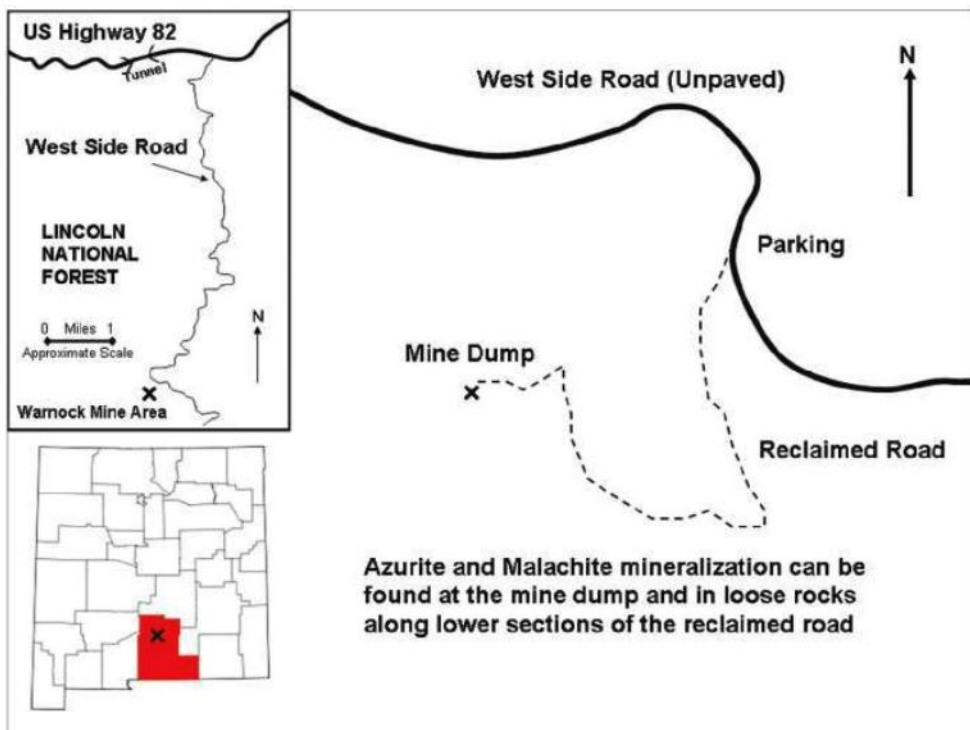
decades. I soon came across a shallow gulch and found more pieces of blue and green minerals. I also noticed more straw. I was not certain of the purpose of the straw, as grass does not really grow well in this area. If you tried a similar reclamation in a wet climate, you could grow grass to help stabilize a hillside, but you cannot grow grass simply with straw and seed in the desert.

I soon reached the dump. Although it appeared to be a long hike, it only took about 10 minutes. The dump was mainly arkosic sandstone, red sandstone, and siltstone. The dump appeared to be from a horizontal tunnel that had been driven into the hillside, but this had caved in and not accessible. The dump itself did not have many rocks with azurite and malachite, but I was able to find some nice pieces by watching the ground near the dump. I found that the best pieces were in coarse, orange arkosic sediments, and many of these were covered with red mud. I scanned the ground for indications of blue and green minerals

and focused on finding large pieces, from which I trimmed off the excess non-mineralized sections.

This was relatively easy collecting, once you found the right location. Not all the rocks have copper minerals, and you have to carefully scan the ground surface for rocks that are mineralized. However, the blue of the azurite makes the best specimens relatively easy to spot.

Although the district had lead mineralization, I did not see any indications of galena in any of the rocks I found. Since the rocks were obviously oxidized, I was not surprised that I did not see any galena. Most of the galena, if it had been present, was likely now either cerussite or anglesite, two typically unattractive white or gray minerals that often occur as crusts or powders on rocks. Galena, on the other hand, has a bright, metallic luster and often occurs as distinct cubic crystals. I did not see any minerals that I could conclusively say were cerussite or anglesite, but these



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AZURITE from page 55



The best way to find azurite is to look for blue mineralization on the loose rocks and then crack the rocks open.



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minerals are often difficult to identify conclusively in the field. Based on the reports of lead in the district, I am sure they are present, but they are apparently only distinguishable with either chemical testing or a microscope.

My trip out of the district was uneventful. I later found out why I could not find the other mines. An Internet search revealed an article on removing the mine dumps from the district (www.fs.fed.us/fstoday/090508/03.0About_Us/mine_dumps.html). The Lincoln National Forest Web site (www.fs.fed.us/r3/lincoln/) also had a news release about the dump removal dated June 11, 2009. In the summer of 2008, the dumps at the Courtney, North Acente, South Sacramento Gulch, Alamo, Warnock, and East Warnock mines were moved to an excavated repository established north of the Warnock mine. The dump material was placed in this pit and covered with a minimum of 3 feet of topsoil. The area was then seeded and mulched and fenced with barbed wire. The article also stated that the roads were then graded to natural contours.

During my site visit, I saw no barbed wire or Forest Service signs indicating that the area was either off limits or the site of a recent reclamation project. The only indication that I saw of reclamation was the straw on some of the roads and the gulches. I called Lincoln National Forest (575-434-7200) to find out whether there were any restrictions on visiting and collecting rocks in the area. The person I spoke with said she was not aware of any closures in the area, and if it was closed, the information would be posted on the Lincoln National Forest Web site. She referred me to the recreational prospecting page (www.fs.fed.us/r3/lincoln/maps/Recreational-Prospecting.pdf), which she said would also apply to the High Rolls district.

To get to the site, take U.S. Highway 82 east from Alamogordo, New Mexico. This road climbs into the Sacramento Mountains and passes through a tunnel. Approximately one mile east of the tunnel is the turnoff for West Side Road, which is on the south

MINERAL AND GEM ID TOOLS



Breaking the rocks with your hammer and wetting their surfaces brings out the color of the azurite.

side of the highway. Follow this road to the recommended parking area for the former Warnock mine. Unfortunately, that parking area is not marked, so I recommend using GPS coordinates to find the site.

I collected the following coordinates in the field and later checked them using aerial photographs from Google Earth (www.google.com), and for some reason my field coordinates were shifted slightly to the west. I estimate that the shift is only about 50 feet, so my field coordinates should still enable you to find the site. All coordinates are referenced using the North American 83 and World Geodetic System 84 (NAD83/WGS84) datum, and are in the degree-minutes-seconds format:

Parking Area: 32° 52' 55.1"N, 105° 50' 54.8"W

Mine Dump (presumed Warnock Mine): 32° 52' 50.9"N, 105° 51' 03.5"W
Turnoff from U.S. Highway 82 to West Side Road: 32° 56' 55.7"N, 105° 50' 17.6"W

I also checked the site for active mining claims using the GeoCommunicator database (www.geocommunicator.gov). The site and surrounding area did not contain any active mining claims.

National forest conditions are subject to change. Readers who want specific information on the area should contact the Alamogordo office at (575) 434-7200. Readers are also encouraged to review the Lincoln National Forest Web site before attempting to enter the area to verify that road access has not been closed due to weather, fire hazards, or other unforeseen conditions.

While this site has been reclaimed, it still offers an excellent opportunity to find some nice azurite. Providing the Forest Service does not close the site, the High Rolls district should remain open to recreational collectors, as it is highly unlikely that anyone will stake new claims on the mines due to the reclamation and environmental restrictions in the district. It is relatively easy to find, once you have the coordinates, and you will almost certainly come back with azurite if you are diligent in scanning the ground for that distinct blue.💎

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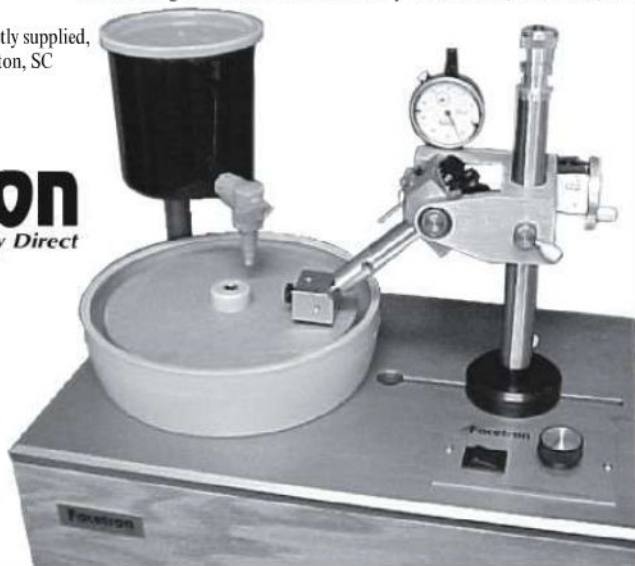
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by Jim Perkins

OFF THE DOP

Faceting Precious Ethiopian Opal

Not too long ago, opal from the Welo Province of Ethiopia began to show up in dealer booths at the Tucson shows from a discovery that had been made in 2000. I bought an Ethiopian opal this year from a dealer in Athens, Greece, who in turn connected me with Steve at The Village Smithy Opals, Inc. in Billings, Montana (www.vilagesmithyopals.com). Steve is a dealer who specializes in quality opal rough. Steve sent me a few samples and asked me to facet them and report back on how I did it, as information on opal dopping and faceting techniques seems to be scarce.

Ethiopian opal is hydrophane opal, meaning it will quickly absorb water. This makes the opal's body color change and may cause the fire to disappear. When it has been air dried for several days, however, the opal will return to its original appearance. Faceted and cabbed opals in large sizes (above 4 carats) are priced starting at \$100 per carat, while 4-carat and smaller stones start at \$60 per carat, depending on the vendor.

Opal has a critical angle of approximately 43.6 degrees, but all the professional cutters I know have advised me to cut it using quartz angles. Otherwise, the stones become so deep they are difficult to set. Primarily, the cutters want to show the stone's color.

When dopping, it is important not to heat the stone because opal is heat sensitive, as I learned on my first attempt to cut one of the opals. On my second attempt, I used cyanoacrylate glue, also known as "super-glue", followed by a coat of fingernail polish to protect the bond from the water drip. I did my initial grinding using a 600 grit diamond electro-bonded lap and followed with a 1200 lap to pre-polish the stone. Polishing was done using a Spectra Ultra-Lap held in place on my Master lap with water. I transferred my stone to a cone dop using cyanoacrylate glue and painted the stone and dop with fingernail polish to seal the bond. Then I carefully sawed the stone free from the flat dop using my 6-inch diamond trim saw. One has to be careful not to remove too much stone and not to cut the dop stick.

I finished cutting the crown on a 600 diamond lap and pre-polished the stone with a 1200 diamond lap, then polished the stone using the Ultra-Lap again. To remove the stone without heating it, I simply soaked the dop and the stone in a sealed jar of acetone. After lunch, the acetone was pink from the nail polish and the stone was free of the dop.



I had to let the stone soak a while longer to clean away residual glue. The stone was perfectly clear with no apparent fire; however, I let the stone air dry and, by the evening, some color began to return. After a couple days all the color and fire returned and the stone is simply breathtaking, in my opinion.

According to the Gemological Institute of America, unlike agates and other colored stones, opal has no regular structure at the atomic level. Two Australian scientists, John V. Sanders and Peter J. Darragh, discovered this in the 1960s using electron microscopy at more than 30,000X magnification. They discovered that opal is made up of billions of uniform submicroscopic silica spheres stacked together in a regular three-dimensional grid, like oranges in a crate. As light travels among the spheres, it diffracts and breaks up into its spectral colors.

Currently, the most popular opal for faceting is Mexican fire opal, which ranges from cherry red to yellow. We have also faceted opals from Idaho and Oregon in our shop. Ethiopian opal cuts more like Mexican and Brazilian crystal opal. Ethiopian opals come in a range of colors and transparencies, which allows you to cut them either as cabochons or as faceted gems. As long as I didn't use any heat to dop and transfer my stone, I found the opal very easy to cut and polish. I feel the results were worth the effort, as it certainly produced a beautiful gem. I am anxious to cut more of this material in the future. 💎

Send your comments and questions about any of my columns to Off the Dop, P.O. Box 1041, Medina, OH 44258, or e-mail me at jimperkins@zoominternet.net.



2010

Lapidary Article of the YEAR CONTEST

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WHO IS ELIGIBLE

U.S. residents only, age 18 and older.

HOW TO ENTER

Submit a step-by-step lapidary project article to *Rock & Gem*. For submission guidelines, visit www.rockngem.com/submissions.asp or write to *Rock & Gem* Writers' Guidelines, P.O. Box 6925, Ventura, CA 93006-9899.

"Lapidary" is defined as the working of precious or semiprecious gem materials or metals into an ornament to be worn or decoratively displayed. How-to stories dealing with the building of lapidary tools, display paraphernalia, and other items are welcome, but are not eligible for the contest.

Authors must complete and return a Contributor Agreement and W-9 form before their entry will be considered for publication. Contact Managing Editor Lynn Varon at (805) 644-3824 ext. 129 or editor@rockngem.com for these forms.

All conditions and requirements of the writers' guidelines and the Contributor Agreement apply.

All step-by-step lapidary projects published in 2010 cover date issues of *Rock*

& *Gem* are eligible for the 2010 contest, regardless of the year of submission, and will be automatically judged.

The number of lapidary project submissions received may exceed the available space. *Rock & Gem* publishes approximately 6 to 12 project article per year.

The authors of all published articles will receive normal payment for the article, as determined by the editor.

If a winning entry was contributed by a separate author and photographer or by multiple authors, one prize will be awarded to the contributors, to be divided as they see fit.

JUDGING

Articles will be judged by a combination of reader response and editorial merit. Readers should send a brief explanation of why a project deserves the big prize to 2010 Lapidary Article of the Year Contest, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003 or to editor@rockngem.com.

Don't wait to send in your vote! The deadline for 2010 votes is January 1, 2011. The winner will be notified by January 17, 2011.

Readers may vote for more than one article per year, but are limited to one vote per article.

The final decision will be made by the Managing Editor of *Rock & Gem*.

THE PRIZE

The winner will receive a complete faceting package from Lapcraft Inc. that includes four 8-inch faceting laps (a 360 Islander, a 1200 standard, a 3000 standard, and a Finalap with 50000 diamond slurry), a bottle of 50000 diamond spray, an 8-ounce bottle of Tool Cool, and a Dialaser diamond saw blade in the winner's choice of size (4 to 8 inches). It is valued at \$550.



Lapcraft Faceting Package

Colorado YULE MARBLE

Famous White Rock from a Forgotten Mine

Story by Barbara L. Miller



BARBARA L. MILLER PHOTO

Snowy white marble has been mined from inside Treasure Mountain on the west side of Yule Creek.

The white stone from near Marble, Colorado, has been used in buildings and monuments since its discovery in the 1890s. Marble mined in 1895 on the east side of Yule Creek made its architectural debut as steps in the Denver Capitol Building. Mining later began on the west side of the creek inside Treasure Mountain. Because of its snowy white beauty, Yule marble was chosen for the facing, columns and detailing of the Lincoln Memorial in our nation's capital. In 1931, a 56-ton block—the largest block quarried up to that time—became the Tomb of the Unknown Soldier in Arlington Cemetery.



BARBARA L. MILLER PHOTO

Many white blocks of Colorado's Yule marble were stored on the slopes of Treasure Mountain in the 1920s.



BARBARA L. MILLER PHOTO

After leaving Marble, Colorado, we drove along the winding road that follows Yule Creek to the marble mine.

My husband, Keith, and I went to the quarry in the West Elk Mountains to learn more about its stone. We were fortunate to meet Gary Bascom, the development coordinator for the mine. Gary drove us to the mine on a Saturday, when work was not taking place. The modern-day road to the quarry was merely a path during the days of the electric train, which carried the marble to the storage area in town and miners between the quarry and town.

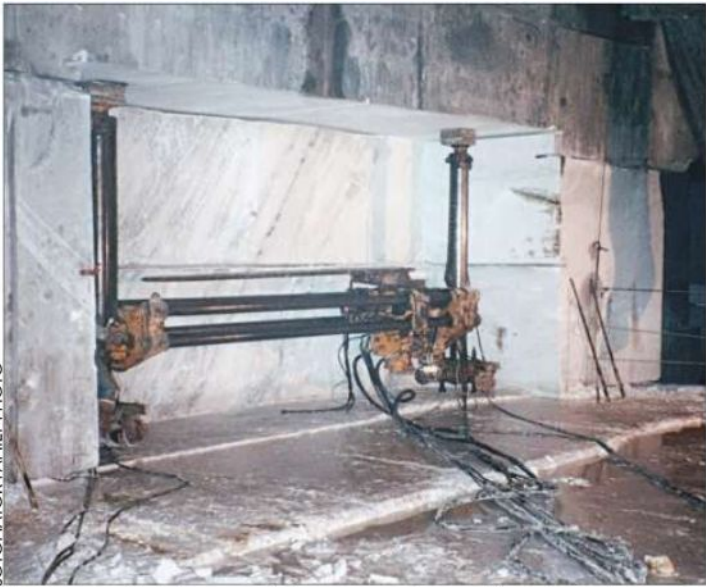
Gary told us a bit of the history of the marble operations: Quality marble was discovered by prospectors searching for gold and silver in the Crystal River Valley in the late 1870s. In the 1890s, mining engineer George Yule discovered the quality marble inside Treasure Mountain, named it "Yule marble", and began mining it. Boom years for the quarry were from 1905 to 1915. Colonel Channing Meek operated the mine until 1912.

Gary told us about Colonel Meek's tragedy when I questioned him about the block of white marble I had spotted at the side of the road upon which the engraved letters "Col" were vaguely legible. In 1912, he said,



BARBARA L. MILLER PHOTO

In the middle room of the subterranean quarry, the circa 1925 stairway is still attached to the wall and a large marble pillar supports the ceiling.



SOTOMAYOR FAMILY PHOTO

A 14-foot saw blade is mounted above two crossbars and is used to make an opening cut in the marble wall of the quarry.



BARBARA L. MILLER PHOTO

The storage yard is located near the town of Marble where pre-ordered blocks await the customer's arrival.

Meek, three miners, and that block of marble were on board the electric train going downhill along the Yule Creek bed to Marble. The connecting post to the power line popped loose and the train began traveling rapidly. The four men jumped off; the miners landed unhurt, but Colonel Meek suffered internal injuries and died three days later. The marble block fell where it rests today. Ironically, all the men would have arrived safely in Marble if they had stayed on board the train, which slowed and glided into town. Meek had provided one of the most profitable periods for the company and the town, so as an honorarium to him, the marble block was engraved with his name and other information. Perhaps someone will restore the block's original engraving to provide an interesting portion of mining history.

Next, the Vermont Marble Co. bought the land and, a few days before the attack on Pearl Harbor in December 1941, closed the Yule marble operation. The Colorado Yule Marble Co. re-opened the mine in 1990. Polycor Inc. (www.polycor.com) of Quebec, Canada, the second largest stone company in North America, purchased the operation in April 2004 and named it Polycor Colorado Stone Quarries.

There are those who call the marble operation a "quarry". Gary said some call it a "mine" because the stone is removed from inside Treasure Mountain. We entered the north room of the workings via the huge portal built in 1990. The three rooms from which marble has been removed are immense. Large marble pillars remain in strategic positions to support the ceiling. It was early July when we visited and 82 degrees outdoors, but only 40 degrees inside the quarry. Gary told us the miners use heaters to keep warm during the winter.

Inside the middle room, we were standing at an elevation of 9,316 feet on a portion of the floor that had been cut in 1941. We looked up at the ceiling, which was over 300 feet above us, and saw the original portals that were used in the early years of mining here. One of the tunnels near the portal had been cut in 1911; another, about halfway down the wall, had been cut in 1925. An old stairway built in 1925 was still in view on the wall near the old tunnels.

When Gary showed us a newer stairway, he was reminded of "learning the ropes" in 1990 from a 60-year-old Italian marble master. The older gentleman worked near the portal while hanging from a rope with no safety harness. He drilled holes in the wall and inserted rods to continue building the stairway. It was obvious that Gary was in awe of the man's courage and ability.

The saw used to open the vertical cuts in the mine wall has a 14-foot-long blade with carbide bits mounted above two large horizontal bars and is capable of making a 10-foot-penetration into the rock. This cutting unit and others used in the mine are lubricated (or cooled) with water during operation, which also controls dust pollution. The saw blades would be destroyed by the heat they generate if they weren't kept cool.

A water saw is generally used for cutting softer rock (Mohs 5 and under) because oil will penetrate "soft" rock, causing discoloration. The newly cut, 60-ton blocks are gently tipped outward by spreaders, balanced on the front tires of the loader, and slid to the padded floor. Blocks are sometimes cut into smaller sizes before they are moved from the mine. Trucks haul the blocks four miles downhill to the storage yard in Marble, to await pickup.

A documentary film titled "The Colorado Yule Marble Quarry: Our National Treasure", by Ron Bailey Photography, is available for purchase on DVD from <http://ronbaileyphotography.wordpress.com>. It covers the history of marble mining in Treasure Mountain, includes the final tour of the property before it was closed to the public, and documents the search for a replacement block of marble for the Tomb of the Unknowns. The almost 80-year old tomb has cracked and is in need of replacement. A 60-ton block has been cut and moved to the storage yard, and is ready to ship when requested.

Sculptors, including Francisco Sotomayor of Woodland Park, Colorado, realize the quality of Yule marble. Its weight of 170 pounds per cubic foot denotes its fine grain composition, which enables Sotomayor to carve eyelashes and other delicate features. The mine operators reportedly searched for three months to locate the perfect block of Yule marble for his life-size "American Woman" sculpture. It had to be pure white, without colored marbling inclusions, with the grain lying the right direction. To see more about the completed sculpture and the Yule Mine operation, visit www.franciscosfineart.com.

On the west wall of the back room of the quarry, we saw where Sotomayor's 21-ton block had originated. He hopes the marble block directly under it will be of the same high quality and can be used for a follow-up sculpture called "American Man".

Marble became Colorado's official state rock on Mar. 9, 2004. Girl Scout Troop 357 of Lakewood, Colorado, introduced the bill and Governor Bill Owens signed it into law. Beautiful white Yule marble has been used in many parts of North America and the world to beautify buildings, fabricate monuments, and supply sculptors and carvers. 💎

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MANY FACETS

by Guest Faceters

Faceters are welcome to submit their original designs for publication. Mail materials to Many Facets Submissions, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003.

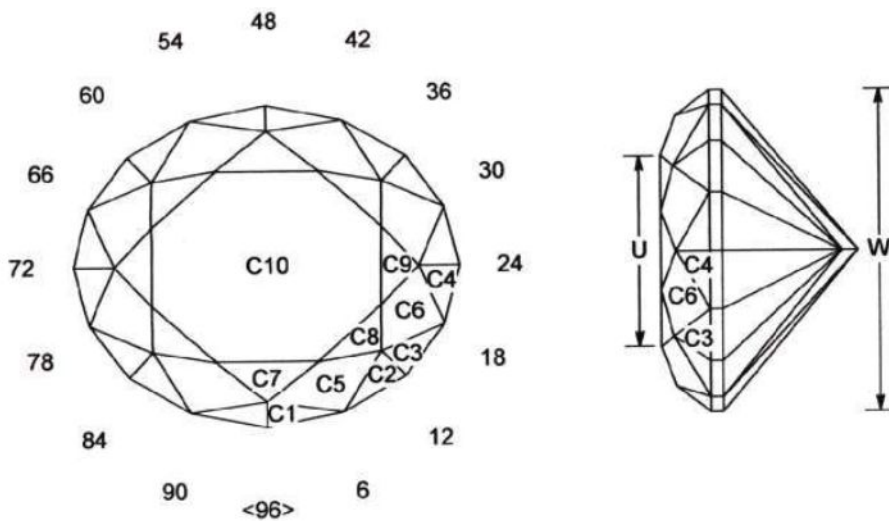
I created this design to be cut in tourmaline. Like spinel, tourmaline is seldom seen in commercial jewelry stores, but I don't understand why. Both seem to be available in large quantities and both come in an array of colors. Both are easy to cut and polish.

The design features what is called a "French tip", indicating that there is no main facet on the end of the oval. This creates a stronger cut stone that is less likely to become chipped or damaged during wear in jewelry. From a design point of view, I especially like the shape of the table.

The design is easy to cut and produces an accurately sized stone. A ray trace of this design produces no "bow-tie" effect, which is undesirable but common in ovals. It also displays very little extinction, but does exhibit good brilliance, contrast and dispersion, which I strive for in my designs.

This 12-millimeter by 10-millimeter oval was cut from Nigerian rubelite tourmaline I purchased in 2001 at the Tucson show. I finally got around to cutting it this year for my wife's birthday. I set it in a 14k gold ring I purchased.

-Jim Perkins



TOURMALINE OVAL WITH FRENCH TIP

CAD by Jim Perkins, jimperkins@zoominternet.net

© June 2010

Angles for R.I. = 1.620

53 + 16 girdles = 69 facets

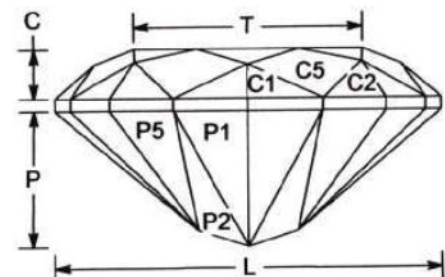
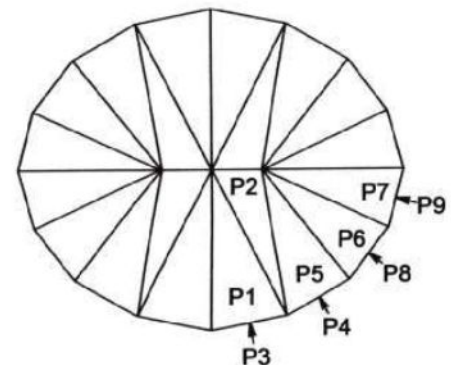
2-fold, mirror-image symmetry

96 index

L/W = 1.200 T/W = 0.712 U/W = 0.590

P/W = 0.421 C/W = 0.153

Vol./W³ = 0.269



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P1	40.60°	03-45-51-93	Create a center point.
P2	39.60°	06-42-54-90	MP @ center point.
P3	90.00°	03-45-51-93	Set width.
P5	40.70°	08-40-56-88	Girdle meet point.
P4	90.00°	08-40-56-88	MP @ P2 - P3
P6	41.20°	14-34-62-82	MP @ P2 - P4
P7	40.90°	20-28-68-76	MP @ P2 - P4
P8	90.00°	14-34-62-82	MP @ P4 - P5
P9	90.00°	20-28-68-76	MP @ P6 - P8

CROWN

C1	53.50°	03-45-51-93	Set girdle height.
C2	47.40°	08-40-56-88	Set girdle height.
C3	46.90°	14-34-62-82	Set girdle height.
C4	41.10°	20-28-68-76	Set girdle height.
C5	41.30°	06-42-54-90	Girdle meet point (GMP)
C6	37.00°	18-30-66-78	GMP
C7	20.80°	96-48	MP @ C1 - C1
C8	20.50°	11-37-59-85	MP @ C2 - C3
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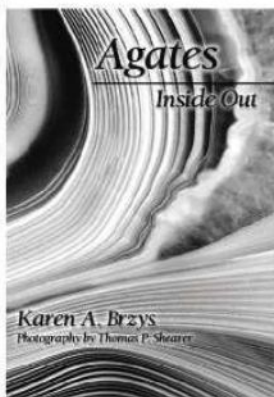
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Index to Advertisers

Ackley's Rocks.....	40	Kristalle.....	25, 65
Amateur Geologist.....	40	Lamberton Rake.....	60
Amberwerx.....	65	Lapcraft, Inc.....	31, 59
American Opal Society.....	50	Lasco Diamond Products.....	23
Arizona Global Gem & Jewelry.....	43	Lehigh Mineral Auction.....	65
Arrowhead Lapidary & Supply.....	36	Daniel Lopacki Co.....	71
Au-Rus Wax Patterns.....	59	Lortone, Inc.....	27
AZ Timeless Treasures.....	65	Majestic Press, Inc.....	34
B&J Enterprise/Joyce Emerson.....	59	MarZee Lapidary Tutorial DVDs.....	58
Barranca Diamond.....	19, 49	Metalliferous.....	49
Beautiful Agates.....	65	Midland Gems.....	58
John Betts — Fine Minerals.....	27	The Mineral Gallery.....	58, 65
Bonanza Opal Mines, Inc.....	65	Mineralab.....	57
Cabstar Professional.....	37	Mineralman.....	65
Capistrano Mining.....	65	Minerals Unlimited.....	49
CarTopCampers.com.....	58	Miner's Keepers.....	56
Cloud's Jamboree.....	25, 59	Minertown.....	65
Collectorscabz.com.....	28	Minnesota Lapidary Supply Corp.....	37
J S Copti.....	59	Nature's Outback.....	65
Covington Engineering.....	43	New Era Gems.....	55
Crystal Cave.....	58	North Carolina Mineral Collection.....	67
Crystal Grove.....	65	Northwest Distributors.....	56
Crystal Moon Gallery.....	59	Oakrocks.net.....	65
Deepak Gems.....	65	On the Rocks Gems, Jewelry & More, Inc.....	59
Diamond Pacific Tool Corp.....	03	Optima Gem.....	34, 65
Dragonsaye Auctions.....	65	Oxy Rocks.....	58
Earthworks.....	34	Phoenix Orion.....	65
Easy Steps Video.....	48	Pickens Minerals.....	59
Bill Egleston.....	41	Pioneer Gem Corp.....	60
Eloxite Corp.....	43	Polaris Tool & Machine.....	35
Facet Shoppe.....	60	Polymetric Instruments, Inc.....	59
Fac-ETTE Manufacturing, Inc.....	04	Pretty Rock.....	59
Feather River Lapidary & Mineral Society.....	50	Raytech Industries.....	51
Fall Creek Rock Shop.....	58	Blaine Reed.....	58
Fine Mineral Show.....	59	Research Unlimited.....	58
Fire Mountain Gems.....	9, 59	Rockaway Opals.....	65
The Frugal Collector.....	41	Rock Your World Gem & Mineral Show.....	31
John E. Garsow Gems & Minerals.....	40	Rocks & Minerals.....	65
Gem & Lapidary Wholesalers, Inc.....	16	Rockstar Jewelry Design.....	65
Gem Center USA Inc.....	29	Ross Metals.....	3, 5
Gem Faire, Inc.....	10	Sapphire Mining.....	65
Gem-Fare.....	28	Search4Gems.....	59
The Gem Shop.....	40, 65	Shipwreck Beads.....	31
Gemological Institute of America.....	65	Shows of Integrity.....	18
Gems by John, LLC.....	58	South Pacific Wholesale Co.....	30
The Geode Gallery.....	26	Spencer Opal Mines.....	56
Geological Wonders.....	65	Joseph P. Stachura Co., Inc.....	48
Gilman's.....	48	Steve's Rocks & Gifts.....	60
Gitchee Gumees Museum.....	67	Super Agates.....	65
Great South Gem & Minerals, Inc.....	67	Sylmar Displays.....	26
William Holland School of Lapidary Arts.....	57	Tagit.....	50
Hughes Associates.....	36	Treasure Chest.....	41
Imperial Manufacturing.....	58	Tru-Square Metal Products.....	51
Indian Jeweler Supply.....	19	Tucson Electric Park RV Gem Show.....	29
Inland Lapidary.....	17, 71	U.S. Geological Supply.....	27
JS Gems Lapidary.....	56, 59	Ultra Tec.....	02
Jarvi Tool Co.....	57	Unique Tool.....	55
Jeanne's Rock & Jewelry.....	58	The Universe Collection.....	26
Jesco Products, Inc.....	28	VR Gem Cutters.....	17
Johnson Brothers.....	47	The Village Smithy Opals, Inc.....	11
Katy Rock Shop.....	65	Whittmore Durgin Glass Co.....	58
Kingsley North, Inc.....	7, 30	Wright's Rock Shop.....	19, 65
Kino Rocks & Minerals.....	58	Martin Zinn Expositions, LLC.....	15
Knight's.....	58		

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Contact Brian Roberts, Advertising Director: BRoberts@JMillerMedia.com (623) 327-3525

Show Dates from page 51

20-21—WEST PALM BEACH, FLORIDA: 43rd annual show; Gem & Mineral Society of the Palm Beaches; South Florida Fairgrounds, 9067 Southern Blvd.; Sat. 9-6, Sun. 10-5; adults \$7, children free; gem mining, fossil dig, exhibits, demonstration area, hourly door prizes, scholarship fundraiser; contact Barbara Ringhiser, (561) 588-5458; e-mail: bar5678@aol.com

26-28—CALGARY, ALBERTA, CANADA: Show; Alex Kuznetsov; Calgary Chinese Cultural Centre, 197 1st St. SW; Fri. 4-9, Sat. 9-7, Sun. 9-5; adults \$7, seniors and students \$5, children free; lectures, demonstrations, door prizes; contact Alex Kuznetsov, (403) 202-1971; e-mail: calgarygemshow@gmail.com; Web site: www.calgarygemshow.com

26-28—COLUMBIA, SOUTH CAROLINA: 43rd annual show; Columbia Gem & Mineral Society; South Carolina State Fairgrounds, 1200 Rosewood Dr.; Fri. 10-6, Sat. 10-6, Sun. 12-5; adults \$4, children 12 and under free, military and dependants free Sun.; 24 retail vendors, jewelry, beads, loose stones, fossils, minerals, gold, silver, tools, geode cutting, club member collection exhibits, lapidary demonstrations; contact Susan Shrader, P.O. Box 633, Columbia, SC 29060, (803) 736-9317; e-mail: ashreader@mindspring.com; Web site: www.cgams.org

26-28—LYNDEN, WASHINGTON: Show, "Gem Faire"; Gem Faire Inc.; NW Washington Fair & Events Center, 1775 Front St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

26-28—MOBILE, ALABAMA: Annual show; Mobile Rock & Gem Society; Greater Gulf State Fairgrounds, Cody Rd. and Zeigler Blvd.; Fri. 2-7, Sat. 9-6, Sun. 10-5; adults \$3, children under 12 free; contact Jerry Shirey, 2911 Pretty Branch Dr. W, Mobile, AL 26618, (251) 786-4777; e-mail: Rockhoundjs@aol.com; Web site: www.mobilerockandgem@yahoo.com

26-28—SALEM, VIRGINIA: 31st annual show; Roanoke Valley Mineral & Gem Society; Salem Civic Center, 1001 Roanoke Blvd.; Fri. 2-7, Sat. 10-6, Sun. 12-5; adults \$3 (3-day ticket), children under 16 free; door prizes, grand prize; contact Jeff McFalls, 1031 Broadhill Dr., Vinton, VA 24179; e-mail: rocky@rvmg.com; Web site: www.rvmg.com

26-28—ST. PETERSBURG, FLORIDA: Show; Frank Cox Productions; The Coliseum, 535 4th Ave. N; Fri. 10-5, Sat. 10-5, Sun. 10-5; gems, jewelry, beads; contact Frank Cox Productions, 755 S. Palm Ave. #203, Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

27-28—MONTEREY, CALIFORNIA: Show, "Gem Faire"; Monterey County Fairgrounds, 2004 Fairground Rd.; Sat. 10-6, Sun. 10-5; free admission; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

27-28—WICKENBURG, ARIZONA: Show, "Wickenburg Gem & Mineral Show"; Wickenburg Gem & Mineral Society; Community Center, 160 N. Valentine St.; Sat. 9-5, Sun. 9-5; free admission; more than 40 vendors, gems, minerals, jewelry, door prizes, grab bags, spinning wheel, raffle; contact Beth Myerson, P.O. Box 20375, Wickenburg, AZ 85358, (928) 684-0380; e-mail: myerbd@gmail.com

29-30—SAN FRANCISCO, CALIFORNIA: Show, "San Francisco Crystal Fair"; Pacific Crystal Guild; 99 Marina Blvd.; Sat. 10-6, Sun. 10-4; admission \$6; contact Jerry Tomlinson, (415) 383-7837; e-mail: sfxtl@earthlink.net; Web site: www.crystalfair.com

DECEMBER 2010

3-5—EL PASO, TEXAS: El Paso Mineral & Gem Society; El Maida Auditorium, 6331 Alabama; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$3, seniors \$2, under 12 free; gems, minerals, fossils, beads, jewelry, tools, books, equipment, geode cutting, silent auction, demonstrations; contact Jeannette Carrillo, 4100 Alameda Ave., El Paso, TX 79905, (877) 533-7153; e-mail: gemcenter@aol.com

3-5—HUACHUCA CITY, ARIZONA: 2nd annual show, "Miner's Mania Gem Show"; Tombstone Gem Show; Tombstone Territories RV Resort, 2111 E. Hwy. 82; Fri. 10-6, Sat. 10-6, Sun. 10-4; free admission; Arizona lapidary artists, miners and collectors, many local minerals, Arizona mining history displays, prizes, special raffle; contact Betty Krug, P.O. Box 414, Tombstone, AZ 85638, (520) 457-9505; e-mail: rockwranglers@gmail.com; Web site: www.tombstonegemshow.info

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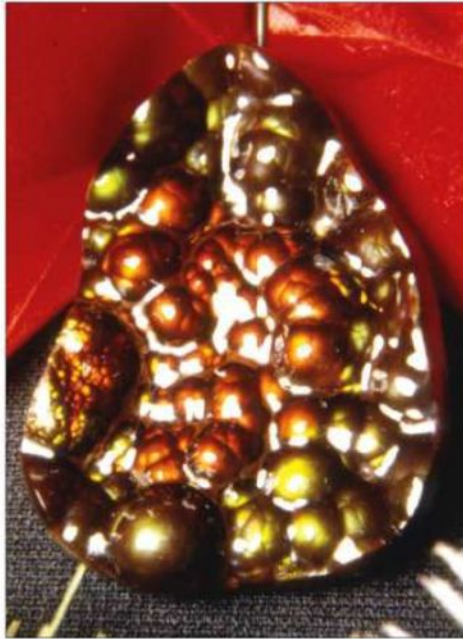
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O N THE ROCKS

The Shan Hai King



Fire agate is mentioned in the 4,000-year-old *Shan Hai King*. The gem often occurs in the Western United States.

I enjoy reading odd bits of information that stir my imagination and curiosity. Here's one such item that will certainly pique your curiosity. There is a direct link between the earth's geographical features and our hobby. Who has not gone exploring in search of good rocks? Modern rockhounds are not the first to enjoy the spirit of exploration. Here's a geographical reference you might find intriguing!

I came across this little item because, when the summer temperatures here in Arizona hit the 110 degree F mark day after day, we tend to get cabin fever. Either you collect underground during Arizona's summer or you don't collect! Summer is when I fish around for interesting reading material while trying to stay cool.

This interesting tidbit of information will certainly give you something to puzzle over on a cold winter night or a hot summer day! You don't even need to buy a book, just turn to the Internet.

Go to your Web browser and type in "Shan Hai King" or "Shan Hai Jing". This is the title of a whole series of volumes written in Chinese that were compiled about 4,000 years ago. Originally, more than 30 volumes were written, but only 18 have survived the centuries. The surviving volumes have been re-written, revised, condensed, and generally rehashed, but the core of these ancient works is considered the oldest known written geography. If you are a rockhound, you have a natural interest in geography, so check these writings out.

What I found exciting is that these volumes describe rivers, mountains and geographical regions that are easily recognized from the writings. Rockhounds will find it interesting that such things as fire agate, opal, gold, quartz crystals, green jade, and other minerals with which we are familiar today are mentioned in *Shan Hai King*, as well as forms of life we know today. True, these things are only mentioned in a casual way, but enough geographical data is given to enable researchers to figure out where the described land forms are located, which gives us a good idea of where the gems and minerals described are located. The really exciting, and very mysterious, part of all this is that the land forms and minerals

described in *Shan Hai King* have been identified in modern times. And you'll never guess where the areas and land forms described by the ancient writers are located!

The problem with translating these volumes is that the original writers were not too specific in details and the areas they described certainly did not have names we would now recognize. The writers also embellished their "tales" with mythical beings like monsters and spirits. However, researchers have still been able to identify with considerable certainty exact landmarks and specific features, thanks to details given by the explorers in their travels. The distances they recorded can now be converted to miles and match what was reported. Using known sites and calculating the recorded distances given in the texts, we are quite sure we know where those explorers traveled.

Once researchers could match the writings to a known land mark or feature—a certain mountain, for instance—they were able to convert the distances given in the Chinese text to reach a second identified site and a third and so on. Such research was able to trace thousands of miles of travels made by those intrepid Chinese explorers. And we are now quite certain we have pinpointed where they journeyed! I'll give you a clue: These Chinese journals do not describe land features in China!

When these early texts were translated centuries ago, they were thought to be so

much nonsense and given little credence. This is because the travelers loved to exaggerate and embellish. They must have felt people would not read dry geographical reporting, so they jazzed it up with wild tales of monsters, multiheaded creatures, and the like. In a way, we do the same when telling or writing a narrative! It wasn't until modern times that researchers ignored these fairy tales and applied the factual information given to locate where the travelers had been.

Shan Hai King was compiled by a fellow named Yu, Minister to Chinese Emperor Shun, who ruled about 4,000 years ago. The emperor had decided to document all the travel stories in hand and Yu had to do the task!

The volumes were obviously compiled from the stories and reports of travelers over a long period of time. Yu incorporated the adventures and travels of many different groups of explorers. Imagine the time it took to write so many pieces of work by hand. And imagine the time it took to travel thousands of miles on foot!

These ancient Chinese travelers and explorers were not rockhounds, but they certainly had a keen eye and managed to notice things like fire agate, green jadelike rocks, gold nuggets, precious opal, and varieties of plant and animal life, describing them in some detail! And that's where it gets interesting because the land forms described and the locations of the gems and gold reported are not in China or Asia. That's another reason the original readers of these texts thought the whole thing was a fairy tale!

The writings are now known to be accurate, as they have enough factual information about rivers and their direction of flow, mountains and their surrounding areas, land features, and plant life, all of which allowed researchers to identify the explored regions.

So where is this mysterious land traveled and so carefully documented by Chinese travelers 4,000 years ago? Would you believe many of you can look out your window and see these "mysterious lands"? That's right! The Chinese explored the good old USA.



A 4,000-year-old Chinese geography book describes mountains like Mount Baker in the North Cascades of Washington.

How is that possible? you ask! Remember, the Chinese invented the compass and were skilled ocean navigators. Remember, too, that if you leave China and sail north, you eventually enter the Kamchatka Ocean Current, which will carry you north until you can pick up the Japan Current. These currents will sweep sailing ships north then east across the Pacific Ocean. As the Japan Current turns south, it ends up flowing south along the Coast of California! These south-flowing currents are what make the ocean waters off California downright chilly! It is not inconceivable that Chinese explorers and adventurers could have sailed off into the unknown, ending up in the Western Hemisphere.

How do we know they explored America? Would you believe *Shan Hai King* perfectly describes land forms along the West Coast of America and even land forms, rivers, and other surface features in the American West? They even describe precious black opal that occurs in Virgin Valley, Nevada! Nonsense, you say. How could they describe Nevada's opal almost 4,000 years ago when Columbus didn't find the Americas until 1492?

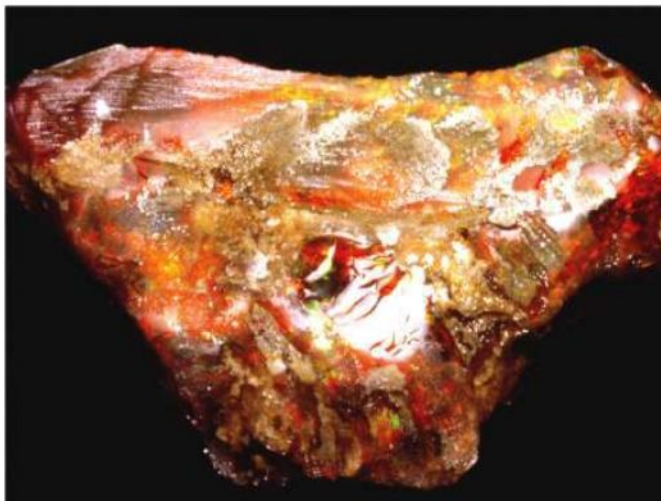
By comparing the land forms described in the text to those of the current landscape, we can recognize a description of the Cascade Mountains in the text. The volumes accurately describe Mount Rainier, Mount Shasta, Mount Hood, and a whole string of others, showing that these features existed much as they do today when the Chinese arrived. The Chinese explorers recorded the directions and distances they traveled so precisely that we can tell they ended up in the part of northern Nevada in which Virgin Valley is located. They also described finding opal!

Another familiar geographic location the Chinese described is a place they called the "Great Luminous Canyon". According to Chinese legend, this is where the nine of the 10 suns were buried. Given the distances recorded in the texts, researchers are sure the only place the Chinese could have been describing is the Grand Canyon!

The books also describe plants which they called something like "trees in which birds live". That description exactly fits the Saguaro cactus of the Southwest Desert, the only place this type of plant life is found! Also note that two edible plants that are indigenous to the Western Hemisphere,

maize (early corn) and peanuts, suddenly appeared in China about 3,000 years ago. How could that have happened?

One of the birds they describe is certainly familiar. The bird had a white head, was the size of a domestic fowl, and had tiger's claws. Sound familiar? It's our national bird, the bald eagle! And on the subject of animals, the text that places the Chinese in the Northwest also describes the fish they saw,



Calculating the route of the ancient Chinese explorers suggests their reports of precious opal could refer to Virgin Valley, Nevada.

fish with red flesh. That same text places the explorers in the region where a chain of mountains runs for hundreds of miles near a coastline. Sounds like the Great Northwest and its resident Cascade Mountains and river salmon to me!

The most interesting interpretation of the *Shan Hai King* writings I found is *Pale Ink*, by Henriette Mertz. It was originally published in 1953, with a second printing in 1972 (Swallow Press). It can also be read online at www.sacredtexts.com.

As for subjects of interest to rockhounds in *Shan Hai King*, there are frequent mentions of quartz crystals, gems, green jade, and things like "colorful stones". Could they be agates? The descriptions are placed in geographic settings that fit discoveries of such minerals in modern times! The text describes the explorers' travel to a place about where Wyoming

is now, where they found green jade-like stones. Who has not admired the lovely apple-green jade from Wyoming?

The traveling Chinese even got as far south as Mexico and recorded finding opal there. They were undoubtedly writing about Queratero! To get there they would have encountered the Rio Grande, and sure enough, the text

describes just such a river.

On another journey, these doughty explorers traveled along California's coast. By computing the miles they reported to have traveled, you can speculate they were in the San Francisco Bay area, where they describe animals that could be seals. On that same journey, they report finding gold nuggets in abundance. Could they have beaten John Sutter and James Marshall of '49er fame by thousands of years?

As impossible and remarkable as it seems, the best scholars have now decided that these fantasy musings of ancient Chinese travelers weren't fantasies at all, but are loaded with identifiable land forms, plants and animals, all of which we find in the Western and Central United States.

Some writers dispute the idea that the Chinese writings are factual and describe our country. Others are of an opposite opinion and are sure this is the world's oldest geographical writing which accurately describes our western lands. It makes for cold winter, or oppressively hot weather, fun reading! Enjoy!

FOR SALE

While we're on the subject of volumes and reading, I received an e-mail from long-time subscriber Gary Jackson. He has a complete set of *Rock & Gem* issues (1971-2010), as well as other popular magazines. He says he has finally reached the saturation point and would like to sell his magazine collections. If you are interested in his collection, contact Gary at jacksonlwr@bellsouth.net.

Bob Jones holds the Carnegie Mineralogical Award, is a member of the Rockhound Hall of Fame, and has been writing for *Rock & Gem* since its inception. He lectures about minerals, and has written several books and video scripts.



Field Notes submissions are subject to editing. Address questions to "Editor" for a private response or to "Readers" and provide the contact information you'd like published. Send to Field Notes, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003.

Roadside Regulations

A fossil collector and subscriber to your publication brought the April 2010 article on state Route 37 roadside Archimedes collecting by Robert Beard ("Indiana Archimedes", page 56) to my attention. It is important for you to know that an Indiana Department of Transportation (INDOT) edict issued and reported in many Indiana newspapers in May of 2009 (including the Bloomington *Herald Times*, www.heraldtimesonline.com/stories/2009/05/27/news.qp-0518370.stol) firmly declared all roadside fossil, geode, and other rock collecting "illegal". All rocks on the roadside right of way are considered Indiana state property, according to an INDOT spokeswoman. This edict may supersede the National Forest regulations (mentioned by Mr. Beard), as the roadside is Indiana state property. This had actually been the law previously, but had largely been ignored; now, according to INDOT, it would be more strictly enforced. The police agencies now have the power to impound any cars and arrest violators! For all practical purposes, they don't arrest collectors, but do ask them to promptly leave the site (my experience to date).

—Bob Harman
President, Midwest Chapter,
Friends of Mineralogy

Thank you for bringing up this issue regarding rock collecting within the right-of-way (ROW) of Indiana State highways. Many states have similar laws and various degrees of enforcement. The Indiana State Police have reportedly started to seriously enforce this restriction in areas along state highways near Bloomington and in Monroe County, especially on state Route 37. I have not been there but I have heard that the highway is narrow there and parking along the highway may be dangerous.

According to information from INDOT, the highway ROW generally extends 30, 40 or 55 feet from both sides, measured perpendicular from the center of the highway. It is not possible to know the actual ROW without a survey or specific INDOT maps. Assuming that the ROW is 55 feet from the center line, this still places much of the collecting area of the area referenced in the "Indiana Archimedes" article out of the ROW.

It is important to note that the Indiana State Police, not INDOT, enforce parking restrictions on state highways. The State Police confirmed that you can park within the ROW, providing you are parked in

a safe area and your vehicle is clearly visible within 200 feet. Parking at the "Indiana Archimedes" site generally will meet this description.

However, another issue came up when reviewing the INDOT and State Police issues. Despite the fact that the site referenced in the "Indiana Archimedes" article is clearly shown as being within Hoosier National Forest in my Rand McNally road atlas and the Indiana State Highway map, much of the area along state Route 37 is not within the National Forest. None of the land at the collecting site was posted as private, which would also tend to give collectors the impression that this is Forest Service land. A representative of Hoosier National Forest said that this is often a problem, as the Hoosier Forest lands are often not contiguous, although it is shown this way on many maps. The Forest Service suggested that anyone with questions about Forest Service lands contact them at (812) 275-5987 or toll-free at (866) 302-4173.

In summary, if you do collect at this site, be aware of the INDOT restrictions on the ROW and Forest Service land status, and always pay attention to news releases that may be relevant to site access and collecting.

—Robert Beard
Contributing Editor

Mineral ID

I am a subscriber to *Rock & Gem*, compliments of my daughter. I have enjoyed looking at rocks and collecting them for many years. I live in Alaska and found this rock last week along the Nenana River, a couple miles north of Healy, near Denali National Park. Can anyone identify this rock for me or put me in contact with someone who can?

—Tony Mueller
a4km@mtaonline.net



TONY MUELLER PHOTO

Cutting Oils

The article titled "Dangerous Dust", by Douglas Hamilton (August 2010 *Rock & Gem*), was extremely interesting. As a "casual" lapidarist, I have and do often violate the recommendations for properly ventilating my workspace. Mr. Hamilton provided me with several ideas that will be implemented in my workspace.

In the article (p. 29), Mr. Hamilton said that he uses mineral oil and a P respirator cartridge when cutting slabs. For some time, I have been asking rockhounds what they use for cutting oil and have received many different ideas ... from purchasing oils through catalogs, diesel fuel, kerosene, and vegetable oils. The recommendation by Mr. Hamilton is mineral oil. Where does he acquire mineral oil, is it a special kind, and how much does it cost?

—Jerry Gehre
Johnson City, TN

I had a hard time finding good quality mineral oil for a reasonable price until I checked with our local veterinary/animal feed store. Mineral oil, derived from crude petroleum, has been traditionally used as a laxative for horses for years My jug is not marked as "special", just "Mineral Oil— for veterinary use only". It costs about \$30 a gallon in Canada and less in the US. It is readily available on the Internet, but is expensive to ship.

—Douglas Hamilton
Rock & Gem Contributor

I would recommend you get the cheapest mineral oil you can find. For cutting purposes, there are no differences. As for kerosene and diesel, they are both flammable and smell terrible. Stay away from them.

—William A. Kappele
Shop Talk columnist

Thank You

Thanks to Bob Jones for the great, concise overview of lost wax casting ("Cire Perdue", July 2010 *Rock & Gem*). He certainly hits the nail on the head when he says "once you've successfully completed a project, you'll be hooked". The high you get is really hard to beat.

My husband and I look forward to each issue of *Rock & Gem* and are two of Bob Jones' biggest fans, both for his knowledge of rocks and his associations with artists like Lee Epperson and Carol Sues.

—Lucy Groenke
Payson, AZ



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