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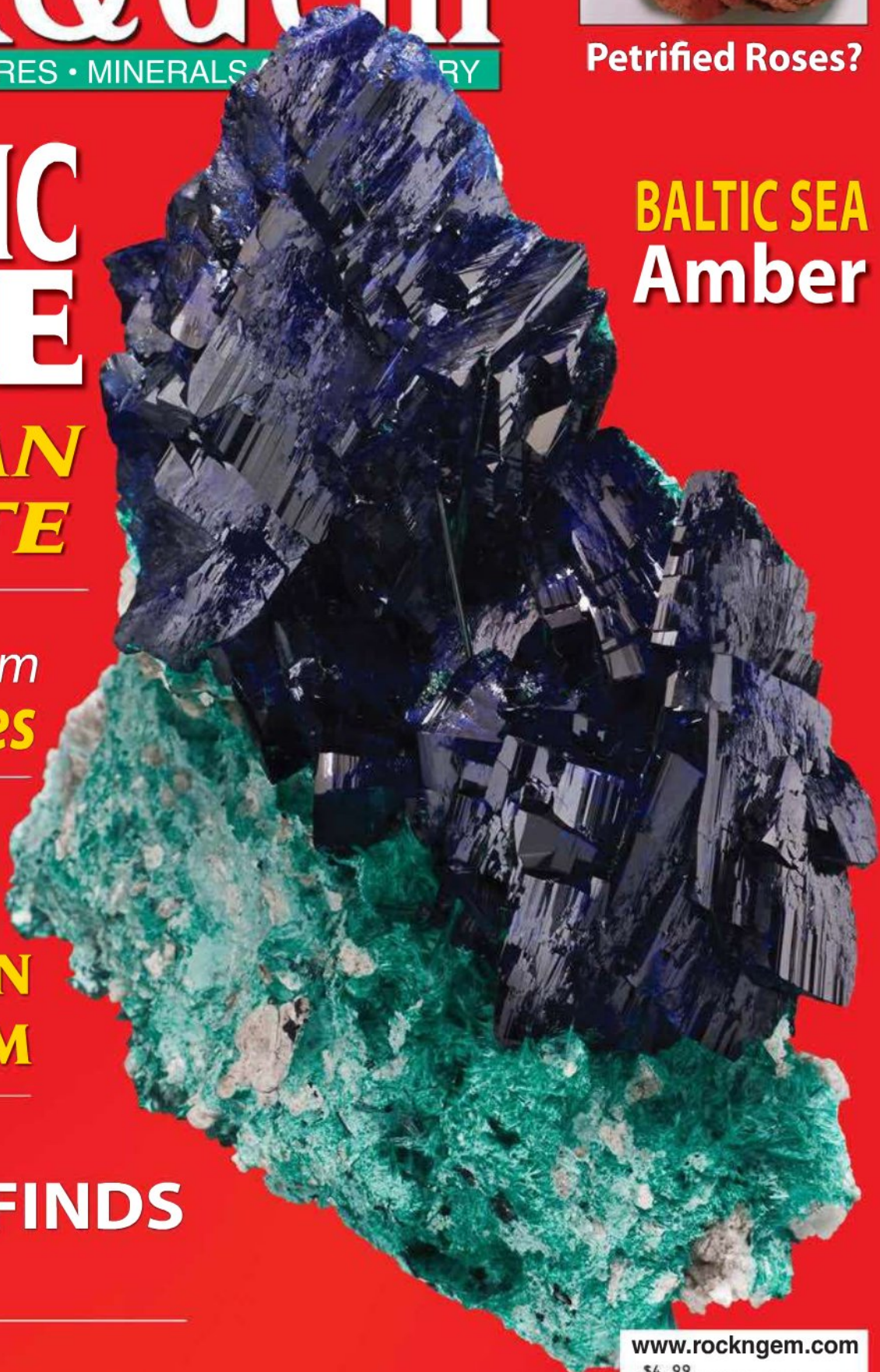
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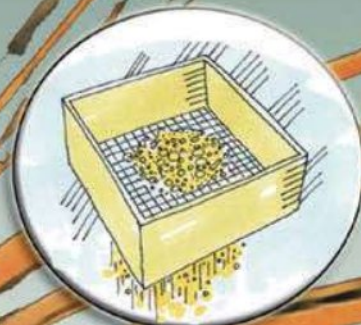
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Rock & Gem

Volume 41, Number 04

April 2011

ON THE COVER

Crystals of azurite coming from the Milpillas mine in Sonora, Mexico, show flashes of electric blue. This specimen stands 10.2 centimeters high. (Jeff Scovil photo/E. Jones and M. Miterman collection)

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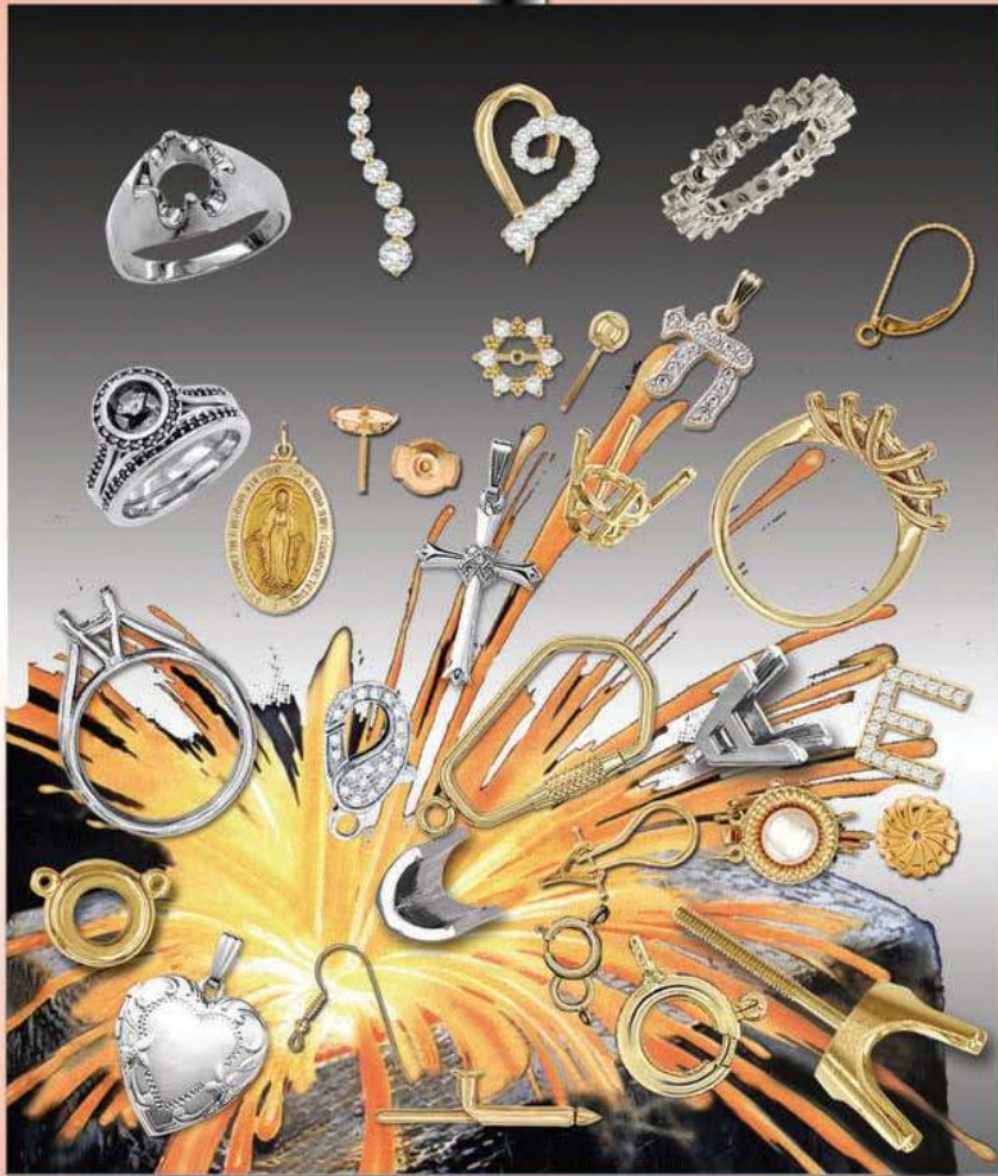
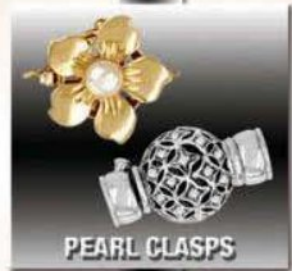
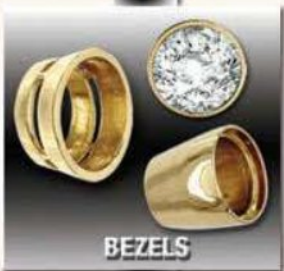
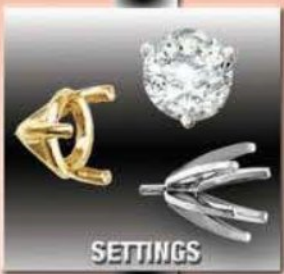
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Mineral Artists Show \$24.95

Long before the development of mineral photography, specimens were depicted in drawings and paintings, and they continue to be popular subjects among some modern artists. The 2010 Westward Look Show was unique among Tucson, Arizona, shows in putting the spotlight on mineral art.

The 70-minute "Mineral Artists Show" DVD documents the Feb. 7 Sunday Evening Program during which four acclaimed artists, Eberhard Equit, Hildegard Könighofer, Wendell Wilson and Susan Robinson, were invited to present their work to an audience. A gallery of mineral artwork by a number of artists was on display beforehand.

Equit, from Germany, has an extensive background in art and scientific illustration. Könighofer specializes in documenting minerals from her native Austria. Robinson holds degrees in geology and art and employs a rigorously realistic style. Wilson, who is best known as the editor of the *Mineralogical Record*, is also a lifelong artist. See <http://minrec.org/labelarchive.asp> for artist biographies.

The program begins with a presentation by Wilson on the history of mineral art, beginning with the earliest known mineral drawing, circa 1491. Next, each artist narrates a brief slideshow of his or her works. The slideshow images, with captions, can also be played without the narration. **(BlueCap Productions, 2010)**

—Lynn Varon



World Jade Symposium

Brian Matheson and Karen Stark of Pagodastone Creations Ltd. have organized a World Jade Symposium that will culminate on Sept. 15-30, 2011. The intent of the symposium is to showcase all the amazing jade artistry from around the world and to encourage and educate newcomers to this legendary "stone of heaven".

"There is a great renaissance occurring in the jade world," says Matheson, "and this event is an extension of all the energy invested by all the carvers, miners, jade hunters, patrons and enthusiasts."

The symposium consists of an online forum and a jade carving competition. Many of the world's finest jade carvers are participating and there will be many postings on tips, techniques, and workshop setups to inspire and teach. In an online forum, participants will be able to meet and chat with other artists, ask questions, and offer answers.

Artists must register and pay the \$200 entry fee by May 15, 2011 to receive their block of jade by June 1. They will have until Sept. 1 to turn their block of jade into whatever shape or form they like. Carvers will submit images of their finished artwork to the Web site gallery of the finished works for judging.

More than 7,000 art enthusiasts will be invited to register to view these works and vote for their favorite jade piece. Each voter will be automatically entered into a drawing to win Matheson's jade carving. Artists have the option to sell their finished work after the symposium. **(www.jadesymposium.com)**



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CRAFTSMAN OF THE MONTH

My project originated from the need to do something creative with the beautiful rocks my husband has been tumbling and collecting for many years," writes April Craftsman of the Month Peg Otto, of Rayland, Ohio. "This project has two phases. The first began when we remodeled our kitchen.

"My daughter (the art major) and I decided to utilize some of the stones to make the border in the tile backsplash become something special. It was a rather time-consuming job, but at the same time quite easy.

"We measured the space between the cabinets and the countertop and lined up our 4-inch tile squares. Then we decided to make the stones work for us by making them fill in the gap between the squares, becoming the border within the tile rows. We glued the tiles in place, let the glue dry, and grouted them. Next, we glued the stones in place randomly, using white pre-mixed glue for tile, making sure we filled in any places we missed to keep the border consistent.

"When the glue was dry, the stones were grouted with the same grout as the tile. We were careful to remove as much grout as possible to show more stone. This step was somewhat tedious because the grout could take away from the attractiveness of the polished stones, and we couldn't have that! We sealed the grout with tile grout sealer. We liked it so much that I decided to make a stone rooster for a larger space between the cupboard and counter in my husband's wine prep area. This became phase two.



"I had a rather large metal mold of a rooster, so I used it for the shape. I cut a piece of cement board 1/4 inch bigger than the mold so I could work with my project lying flat instead of creating it on the wall itself. The hard part was finding the stones to make the rooster come alive. My husband has bowls of pretty tumbled rocks sitting all around the house, so I had plenty to pick from. I started with dalmatian stone, ocean jasper, red jasper, and Ohio flint. I also picked from random stones we have tumbled and collected from our

favorite vacation spot on the ocean, the Outer Banks, North Carolina. They were nice and small and helped fill in gaps.

"Next, I glued the stones in the shape of the rooster to the cement board with pre-mixed tile glue and let it dry. I then removed the metal mold and grouted the piece. When the grout was dry, I glued on more stones as needed to cover the grout, which gave the piece more depth. Once it was finished, I screwed the project to the wall. I framed in the space with a metallic tile border and filled in the area around the rooster with pieces of cracked tile in neutral colors. This gave the tile a mosaic look and complemented my rooster. Grouting the tile with premixed mosaic grout and sealing the grout completed my project.

"Everyone who comes into my kitchen thinks it looks great. It makes me proud that I took something my husband loves to do and combined it with what I enjoy so much, making something totally unique and unusual." 💎



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. Save it as a document file.
- Take least one sharp, close-up, color photo of the finished project. Photographic prints (no laser prints) or high-resolution (300 dpi at 4 inches by 5 inches) digital photos are acceptable.
- Burn your document file and digital photo (.tif or .jpg) to a CD.
- Mail your CD, photo, and a printed copy of your manuscript, along with your name and street address (required for prize 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. Contact the editor at (805) 644-3824 ext. 129 or editor@rockngem.com with any questions about these requirements.

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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1-2—COLVILLE, WASHINGTON: Annual spring show; Panorama Gem & Mineral Club; Fort Colville Grange Hall, Hwy. 20; Fri. 8:30-6, Sat. 9-5; contact Bill Allen, (509) 935-8779; e-mail: sago@theofficenet.com

1-3—EUGENE, OREGON: Show; Gem Faire Inc.; Lane County Events Center/Exhibit Hall, 796 W. 13th Ave.; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yoo Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

2-3—GRESHAM, OREGON: Show, "The Rock, Gem and Craft Show"; Mount Hood Rock Club; Mount Hood Community College Gym, 2600 SE Stark; Sat. 10-6, Sun. 10-5; free admission; free Easter Thunders egg Hunt Sat., Auction Sun.; contact Mary Jean Dowell, (360) 721-9095; e-mail: mjdowell@fs.fed.us

2-3—HELENA, MONTANA: 64th annual show; Helena Mineral Society; Helena Civic Center, corner of Neill Ave. and Park Ave.; Sat. 9-6, Sun. 10-5; adults \$1, children 12 and under free with adult; 25 dealers, jewelry, mineral specimens, rough and faceted gemstones, fossils, cutting rough, beads, equipment, children's activities (garnet hunt, ball toss, grab bags, silent auction), fluorescent mineral display, 20 showcases; contact Gary Parisi, PO Box 736, Helena, MT 59624, (406) 442-1226; e-mail: gjparisi72@yahoo.com; Web site: www.helenamineralsociety.org

2-3—LANCASTER, CALIFORNIA: Annual show; Antelope Valley Gem & Mineral Club; Lancaster High School, 44701 32nd St. W.; Sat. 9-5, Sun. 9-5; free admission; dealers, auction table, demonstrations, displays, games, raffle, grand prize drawing; contact Susan (Chaisson) Walblom, 42122 52nd St., West Quartz Hill, CA 93534, (661) 943-1861; e-mail: av_gem@yahoo.com; Web site: www.avgem.weebly.com

2-3—LEMOORE, CALIFORNIA: Show; Lemoore Gem & Mineral Club; Lemoore Trinity Hall, 470 Champion St.; Sat. 10-6, Sun. 10-6; free admission; contact Judy Pereira, (559) 924-4052

2-3—LINCOLN, NEBRASKA: 53rd annual show, "Wonders of the Earth"; Lincoln Gem & Mineral Club, Nebraska Association of Earth Sciences Clubs; Lancaster Event Center, 84th and Havelock; Sat. 9-6, Sun. 10-5; adults \$5, children 11 and under free with adult; contact James Marburger, Box 64, Hickman, NE 68372; Web site: www.lincolngemmineralclub.org

2-3—MIAMI, FLORIDA: Retail show; Intergalactic Bead & Jewelry Shows; Mahi Shriners, 1480 NW North River Dr.; Sat. 10-5, Sun. 10-5; adults \$5 Sat., \$4 Sun., children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicacies; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

2-3—PARIS, ONTARIO, CANADA: 39th annual show; Brantford Lapidary & Mineral Society; Paris Fairgrounds, 139 Silver St.; Sat. 10-5, Sun. 10-5; adults \$5, children 12 and under free; dealers, gems, minerals, fossils, stone, lapidary equipment, supplies, fine jewelry, supplies, beads, demonstrations, exhibits, silent auction, "Mine for Gems" display; contact Robert Parry, 138 Sugar Maple Rd., St. George, ONT, N0E 1N0, (519) 448-1236; e-mail: robert@roberthalloriginals.com; Web site: www.brantfordlapidarymineral.ca

2-3—PLYMOUTH MEETING, PENNSYLVANIA: Show, "Mineral Treasures and Fossil Fair"; Philadelphia Mineralogical Society, Delaware Valley Paleontological Society; Lulu Temple, 5140 Butler Pike; Sat. 10-5, Sun. 10-4; adults \$5, children under 12 \$1, uniformed Scouts free; fossils, minerals, gems, speakers, exhibits, Fossil Dig, Kid's Corner, door prizes, Scouting merit badge information; contact Douglas Klieger, 26 Cabot Ct., Wayne, PA 19087, (610) 644-2492; e-mail: dklieger@verizon.net; Web site: <http://pms.moonfruit.com>

2-3—POCATELLO, IDAHO: 54th annual show; South East Idaho Gem & Mineral Society; Bannock County Fairgrounds, Commercial Bldg.; Sat. 10-5, Sun. 10-4; contact Kevin B. Taylor, 246 Washington Ave., Pocatello, ID 83201, (208) 232-4269

2-3—SILOAM SPRINGS, ARKANSAS: Spring show; Northwest Arkansas Gem & Mineral Society; Community Bldg., Mt. Olive Rd.; Sat. 9-5, Sun. 10-4; adults \$3, students \$1, children free; contact Charlotte Leininger, (479) 721-3882; e-mail: TheSwankyStone@aol.com; Web site: www.nwarockhounds.org

3—BOISE, IDAHO: Show; Rings & Things; Best Western Vista Inn at the Airport, 2645 Airport Way; Sun. 11-3; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com>Show/index.html

7-9—WYOMING, MICHIGAN: Show, "Unburied Ancient Treasures"; Indian Mounds Rock & Mineral Club; Rogers Plaza Town Center, 972 28th St., 0.25 mile west of US 131; Thu. 9:30-9, Fri. 9:30-9, Sat. 9:30-8; free admission; Science Museum of Minnesota display, museum-quality exhibits, mineral and fossil identification, club sales, children's collectibles, demonstrations, dealers, micromounts, crystals, stone beads, carvings, meteorites, jewelry, specimens; contact Don Van Dyke, 4296 Oakview, Hudsonville, MI 49426, (616) 669-6932; e-mail: donvandyke@tm.net; Web site: <http://indianmoundsrockclub.com/index.htm>

8-10—ABBOTSFORD, BRITISH COLUMBIA, CANADA: Show, "Shades of Jade"; B.C. Lapidary Society; Ag-Rec Bldg., CFV Fairgrounds, 32470 Haida Dr.; Fri. 10-8, Sat. 10-6, Sun. 10-5; adults \$6, students \$2, children under 6 or Boy Scouts and Girl Guides with ID free with adult; displays and demonstrations by jade sculptor Deborah Wilson; contact Jennifer Moore, (604) 328-9766; e-mail: Jenmac02@telus.net

8-10—EUREKA, CALIFORNIA: 10th annual wholesale and retail show, "Lost Coast Jewelry, Gem, Bead and Mineral Show"; Kasey Enterprises; Redwood Acres Fairgrounds, 3750 Harris St.; Fri. 12-7, Sat. 10-7, Sun. 10-5; adults \$3, seniors and students \$1.50 (free on Fri.), children 12 and under free with adult; minerals, gemstones, crystals, beads, pearls, gold nuggets, fine jewelry, gold and quartz, fossils, tools, door prizes; contact Diana, Kasey Enterprises, PO Box 2927, McKinleyville, CA 95519-2927, (707) 839-1358; e-mail: kaseyent@sbcglobal.net

8-10—OGDEN, UTAH: Show; Golden Spike Gem & Mineral Society; Golden Spike Event Center, Weber County Fairgrounds, 1000 N. 1200 W.; Fri. 9-6, Sat. 10-6, Sun. 10-6; adults \$2, children free; Mr. Bones, demonstrators, dealers; Cindy Blanchard, (801) 648-5060; e-mail: cindy@creativemetals.com; Web site: <http://goldenspikegem.org>

8-10—SPOKANE, WASHINGTON: 52nd annual show; Rock Rollers Club; Spokane County Fair & Expo Center, North 604 Havana at Broadway; Fri. 10-6, Sat. 10-6, Sun. 10-5; adults \$6, seniors \$5, children 12 and under free; more than 40 dealers, 60 display cases, fossils, gemstones, mineral specimens, handcrafted jewelry, lapidary supplies and demonstrations, hourly door prizes, youth activities, grand prize; contact Gerry Pfeiffer, (509) 294-1927; e-mail: pfeiffer@webband.com

continued on page 24

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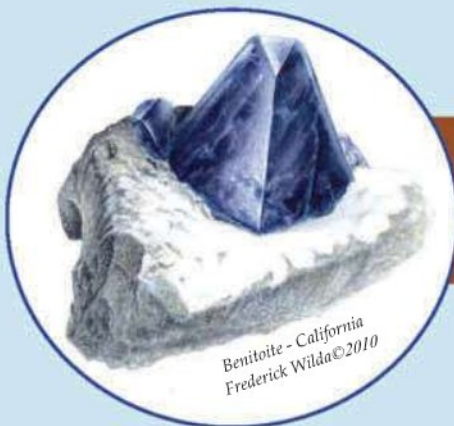
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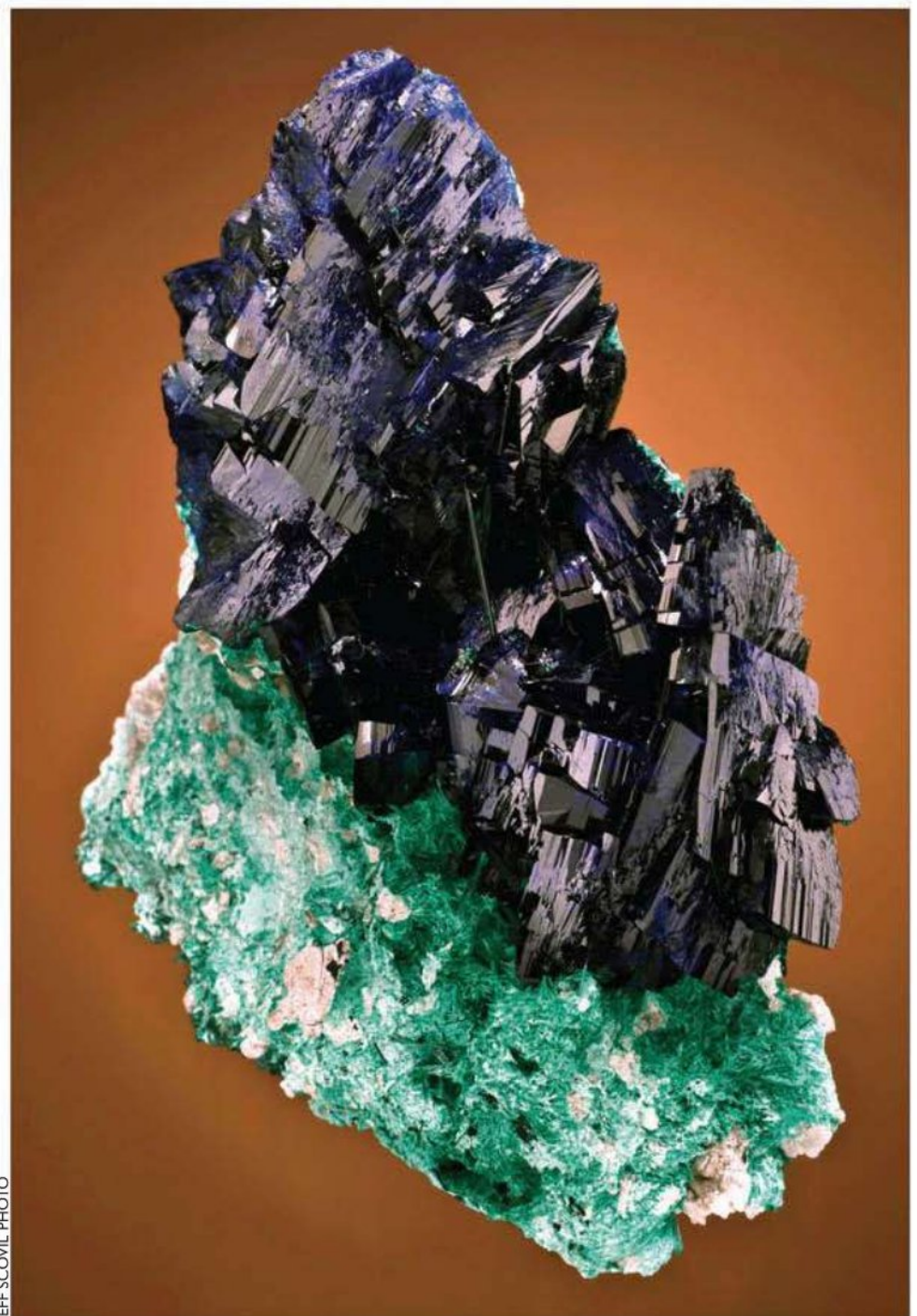
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MEXICO'S Electric Blue Azurites

The Milpillas Mine Produces Beautiful Crystal Specimens

Story and Photos by Bob Jones

I have written about the Milpillas mine in Sonora, Mexico, before. It has become the most important producer of copper mineral species in North America. And now it is producing some of the most beautiful azurite crystal specimens ever mined in Mexico and perhaps throughout the world. With the closing of mines at Bisbee and Ajo and the spotty mining of specimens from Morenci, Arizona, the Milpillas mine has emerged as the most important source of fine azurites and malachites in North America.



JEFF SCOVIL PHOTO
This crystal group, measuring 6 inches across, is a marvelous example of the azurite with malachite specimens that are currently coming out of the Milpillas mine in Sonora, Mexico.



A closeup of a cabinet specimen shows the superb blue flashes coming from the azurite crystals.

In spite of some trepidation about safety in Mexico, my son Evan and I made a trip into Mexico to find out more about this latest specimen-rich copper mine. That was before travel near the border got really scary. We arranged to be met at the border and we convoyed down and back, making a specimen purchase while in the mine area.

Since the Milpillas mine began producing fine copper specimens in 2006, it has yielded marvelous malachite pseudomorphs after azurite that most collectors agree are the best ever found in Mexico. Evan can be seen exhibiting these velvety, shimmering pseudomorphs on the excellent DVD "What's Hot in Tucson, 2010" (BlueCap Productions) and I wrote about them in *Rock & Gem* (April 2010).

The mine had previously produced superb cutting-grade red cuprite-green chrysocolla in ton lots. This bicolor lapidary material is still available, though production seems to have been blocked by the mine operators. The mine officials take a dim view of workers digging specimen rock when they are supposed to be mining ore, so anything coming from Milpillas has to be given lunch bucket transport!

Early in 2010, fine brochantite crystal groups began to appear. These are emerald-green needles that shimmer beautifully and develop in hedgehoglike clusters of radiating crystals that can run as long as 4 inches each. The Milpillas brochantite specimens are also thought to be the best ever from Mexico.

Given all this, the Milpillas mine already ranks as one of Mexico's better specimen sources. In addition to the aforementioned species, very nice crystal groups of bright, lustrous azurite have also been coming out in a steady stream. Some of the azurite is a delicate, velvety light blue that contrasts nicely with green malachite. Most azurite, however, is found in nice, sharp crystal clusters whose color is usually such an intense blue as to appear black except in transmitted light.

A few specimens of azurite have even been found associated with pale blue plancheite, a rare hydrous hydrate of copper silicate. It is the azurites, however, that are in the collector spotlight right now.



In this fine specimen from the Milpillas mine, a sharp, monoclinic, third-generation azurite crystal perches on malachite pseudomorphs after azurite crystals.



This specimen is being held so that the three-dimensional crystals of the azurite rose show clearly.

Milpillas azurites top all contenders for Mexico's finest, for they are large and brilliant, and are being found in quantity in startlingly attractive, colorful groups.

Some months ago, azurite crystals large enough to cover the palm of your hand were being found. Among these was a single crystal about 3 inches wide and 5 inches long, perfectly terminated and lustrous. It rivaled any azurite ever found in

Mexico. Other azurites, not quite that large, were also found. As mining proceeded, the types of azurite changed both in color and crystal habit.

As the quantity of malachite pseudomorphs being recovered tapered off, the supply of azurites increased, albeit slowly. The majority of these azurites are very lustrous and deep blue. Most crystals are under an inch and in tightly grouped clusters.

But the crystals show a variety of crystal habits: they are prismatic, tabular or monoclinic. Many crystals have wedge-shaped terminations, while others are quite bluntly terminated. Some crystals are simple in form, but the majority are complex and multifaceted.

The most exciting azurites to come from Milpillas are the azurite roses, clusters of radiating blades that look like gorgeous dark-blue flowers. The crystals in these clusters are an inch or more across, beautifully terminated, bright and sharp. The overall size of an azurite rose can be 3 to 4 inches across. They are found on contrasting gray-white rhyolite and are breathtaking in their appearance. Not many of these superb azurite roses have been found, but we can always hope they will continue to appear.

Because of the nature of azurite development at the Milpillas mine, many specimens show minor dings and incidental damage. The azurites form in very narrow cracks and openings in the rhyolite host rock. The open seams are not very wide—a matter of inches at most—and rhyolite is one of the more difficult rocks to break, especially under tight circumstances. And it is not uncommon for the azurite crystals to grow across the vein openings; sometimes, the crystal terminations touch the opposite wall of the seam.

Also, some azurite crystals grow around little bits and pieces of crumbling rhyolite, which become embedded in the prism faces. Careful cleaning and the use of power abrasive tools do much to remove the offending rhyolite. Yet, the brilliant luster of the crystals and the superb crystallization of these azurites overcome any minor defects that may be seen on some specimens.

A big contributor to damaged specimens and the limited number of specimens retrieved is the mining company's policy against mineral collecting by the miners, which is strictly enforced. When native copper was being found in the mine, for example, the company installed a metal detector gate so miners could not bring out metal specimens. The restricted space in which the azurites grow necessitates careful removal, but the company policy against collecting creates the need for secrecy and haste by the miners. Thus, the damage is done.

While the Milpillas mine has produced some of Mexico's finest copper species, we are hopeful there is more to come. Those of us who have handled a lot of these beauties have come to realize that this mine may not have reached its greatest specimen potential.



BOB JONES PHOTO

Some of the Milpillas azurite crystals are of a good size, like this 3-inch by 5-inch single beauty.

The latest crystal pockets found and being retrieved support that opinion! These pockets have produced some of the most amazingly colorful azurites ever found! The new azurites are so exceptional and colorful we quickly named the new specimens "the electric blues".

The crystal specimens, when held in strong sunlight or any strong light, though lustrous and dark blue on the surface, sud-

denly give off flashes of light blue color like electric sparks. The flashes do not come from the surface of the crystals, but are internal, waxing and waning as the specimen is rocked and rotated and the angle of the sun's rays on the crystals changes. To see a specimen 5 or 6 inches across completely covered with azurite crystals that are giving off flashes of blue color is a real kick!

The electric blue azurites coming from Milpillas range in size from miniatures to large cabinet specimens. The crystals themselves are brilliantly lustrous. The blue flashes simply add to the overall beauty of each specimen.

So what makes an azurite an "electric blue"? The internal bright blue "lights" are obviously a function of light penetrating the blue crystals when the specimen is rocked under a bright light. But what's going on inside the crystals to make that happen? No one has really investigated this phenomenon, but I have an idea that makes sense to me.

Consider, if you will, that most azurites are a dark, intense blue, sometimes almost black. They may be a lighter shade of blue along crystal edges or in paper thin sections. But flashes of light blue are simply not seen



BOB JONES PHOTO

Evan Jones had to hold this Milpillas mine azurite specimen with both hands to get the sun at the right angle to show the amazing, bright, electric blue flashes from the crystals.

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MEXICO'S Electric Blue Azurites *from page 14*

in thick, stubby, dark blue, nearly black azurites.

Thin crystals of azurite do show their lovely blue color with transmitted light. This is a clue to the electric blue azurites from Milpillias: Transmitted light is a factor.

I can recall the lovely, slender azurites from Concepción del Oro, Mexico, that are a lovely light blue due to transmitted light passing through paper-thin crystals. During recent years, a few specimens of azurite have come from Morenci, Arizona, that show a lovely electric blue color, but they were few in number. Considered a curiosity, they did not have a major impact on the collector market.

These latest azurites from Milpillias are unique for several reasons. No mine has produced such a quantity of this type of electric blue azurite. They are the result of a sequence of crystallizations from several different mineralized solutions. This causes the color variation and beauty that makes them exceptional collector specimens. Fortunately, the quantity of these electric blues from Milpillias is enough to excite and supply the market.

The difference between the Milpillias electric blues and ordinary azurites is that they show a color change in bright light! These internal flashes of light blue emanate from inside the azurite crystals because the azurites are not just single crystals. They developed in three generational growth stages.

First, azurite crystals developed. Once crystal growth had stopped, conditions in the crystal-forming environment changed and the primary azurite slowly altered, forming pseudomorphs of malachite after azurite. This is a fairly common occurrence given the fact that azurite is less stable than malachite. This is evident when you realize that there are far more malachite-after-azurite specimens in the world than azurites after malachite.

Normally, when a malachite pseudomorph forms, the crystal growth pattern ceases. The Milpillias mine azurites usually follow this pattern, as we have seen in a quantity of excellent malachite pseudomorph specimens. In the case of the electric blue azurites, however, the second-generation pseudomorphs were later subjected to another solution rich in copper salts. This third-



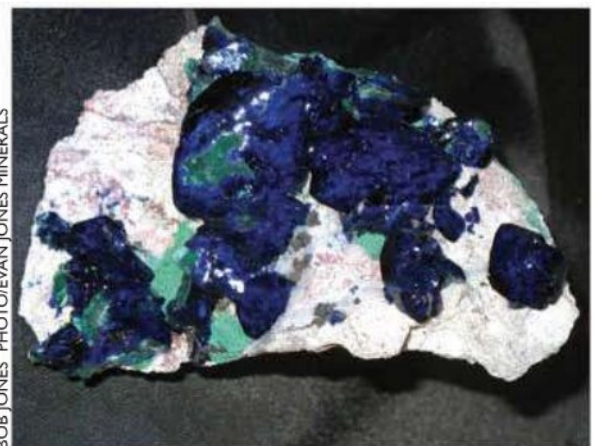
BOB JONES PHOTO

The green malachite showing around the perimeter of these azurites is evidence of the underlying malachite pseudomorphs.

event solution deposited a very thin layer of brilliantly lustrous azurite on the malachite pseudomorphs, completely coating them in most cases. Some of the azurites being found now are only partially coated with this third-stage overlay, and sometimes the green malachite is seen exposed through small openings in the coating of azurite.

This third and final phase of azurite crystallization is so thin that light can penetrate to the malachite pseudomorph surface underneath. It is my opinion that the shimmering electric blue flashes of color are caused by light bouncing off the surface of the malachite and back through that thin outer azurite layer.

In my opinion, these electric blue azurites are among the most beautiful azurites ever found anywhere. They are a marvel to behold and add immeasurably to any private



BOB JONES PHOTO/EVAN JONES MINERALS

Snow-white rhyolite serves as the matrix for this choice grouping of electric blue azurite crystals.

collection or museum display. They are a wonderful reminder of the ever-changing natural phenomenon we call mineralogy!

We can only hope the flow of electric blue azurites from Milpillias will continue so that it satisfies the growing demand as people get more and more familiar with these unique azurites. ♡

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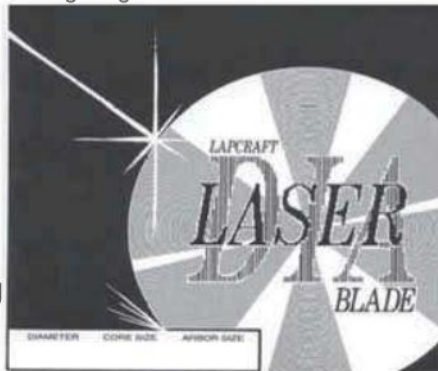
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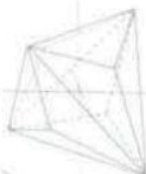
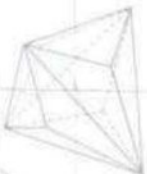
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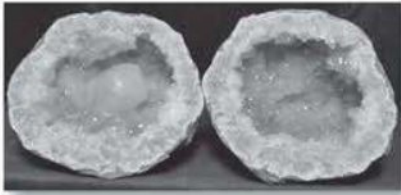
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SHOP TALK

by William A. Kappeler

Cabbing on the Cheap

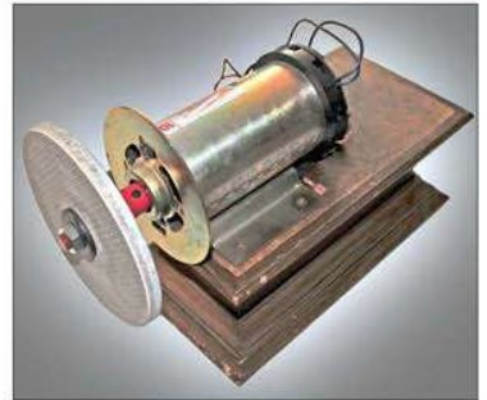
Way back in olden times, when I first got interested in lapidary, I remember that I wanted a cabbing machine but, as usual, money was in short supply. My answer to the problem was to build my own cabber. I couldn't find any plans for such a machine, but I studied the catalogs, books and machines at shows. It did not appear to be an insurmountable task to put together a machine that would do the job for me.

Back then, as they do now, cabbing machines came in two flavors: the wheel-type machine and the disk machine. Either kind would do the job and each had its pros and cons. I decided to make the disk-type machine because the arbor would be a lot cheaper to buy than the long ones for the wheel machine. In addition, I would not need pulleys and a belt or a dual-shaft motor.

I had a single-shaft motor that my father had taken off an old washing machine when I was just a kid. It was old then, and it is still running today. I bought an arbor from a rock shop, built a platform from some scrap lumber, and mounted the arbor at the front edge and the motor behind. The two were connected with a piece of automobile heater hose that I had left over from a car repair. The hose was a nice, snug fit on both shafts. My biggest purchase was a pair of diamond disks that fit the arbor.

I was just about ready to start cabbing, but I did need a coolant system and some splash protection. The latter was made from an old plastic carpet protector that office chairs roll on. A flat piece went up behind the disk and a curved piece of the same material was cemented to the flat piece and covered the edge of the disk. A couple of Rubbermaid® trays from the supermarket held the coolant and the overflow. A piece of plastic hose let water drip onto the center of the disk. It isn't gorgeous, but it has cut a lot of cabs. I have made a few modifications along the way, but I still use it today, well over 40 years later.

The purpose of this illustration is to show that anyone who wants to get into cabbing can do it without mortgaging the house or spending the baby's milk money. An added advantage is that, if someone decides that cabbing is not that much fun, he or she is not stuck with a \$2,000 machine gathering dust.



Anyone who would like to make his own cabber today has a lot more sources for parts and instructions. Here are a few Internet resources.

Motors (even variable speed) can be found at Surplus Center. They also have a free catalog:
www.surpluscenter.com

This is a good source for the arbor that is needed for a disk-type machine:
lapidarydiscounts.com

Covington Engineering has been around forever. They have quality arbors, saw kits, motors, and more:
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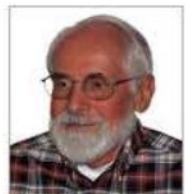
This site based in Great Britain has a great pictorial on building a wheel-type cabbing machine:
www.roughrocks.co.uk/2009/02/28/our-home-made-cabachon-machine

The DVD "Cabochons: Make a Fast, Easy DIY Cab Cutting Machine", by Gerald L. Wykoff, G.G. (Adamas Publishers, 2007) includes plans to build a one-station machine. It is available for \$19.95:
www.amazon.com/Cabochons-Cutting-Machine-Master-Gemology/dp/B000M1EKK8

The International Gem Society offers this information to help you get started cutting cabochons on your machine:
www.gemsociety.org/info/lap23.htm

Inland Lapidary's Web site has this cabcon-making tutorial:
www.inlandcraft.com/howto/cabbing/cabbing.htm

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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YELLOW WATER RESERVOIR FOSSILS

Collecting Cretaceous Creatures in Montana

Story and Photos by Kenneth H. Rohn



This rock is made of numerous snails and a few oyster fragments, cemented together in one conglomerate mass.

It was early on a midsummer morning in Minnesota when I made ready for another collecting field trip in Montana. I had been invited by Donnie Sexton of Travel Montana to investigate and explore some most interesting historic and collecting sites in the Treasure State. I must say, it was an exciting adventure.

Travel Montana (www.travelmt.com) has divided the state into six "tourism countries". My destination on this trip was Yellow Water Reservoir in Russell Country (central Montana). Russell Country was named after that famous Western artist Charlie Russell. You can view some of his artwork at the C.M. Russell Museum Complex (406-727-8787) in Great Falls. Although it would be my first visit to this particular collecting site, I hoped to find a variety of invertebrate fossils in the area.

I turned on my GPS and set it for my first destination. The unit also gives me an accurate rate of speed. I always carry my hand-held GPS, as well. I can go anywhere in the field on foot without the worry of getting lost. These modern navigational instruments are quite phenomenal.

As I traveled westward, the scenery gradually changed from dense pine forests crowding the shoulders of the highway in northern Minnesota to open prairie as I approached North Dakota. I was now in what I like to call "wide-open spaces". The prairie country in midsummer is a sea of green. Crops of corn, wheat, barley, oats and soybeans dominate the landscape from horizon to horizon. I broke my trip in Ray, North Dakota, camping in the city park and campground, and crossed the state line into Montana the next morning.

Since it was right on my route, I just had to stop at one of my favorite collecting sites. I turned off state Route 16 at Crane and made my way to the Yellowstone River via a boat landing off Maple Ave. Of course, I hadn't taken into consideration the latest weather conditions. When I walked over to the edge of the river, I could not believe my eyes: There were no gravel bars in sight. The river was flowing from bank to bank. Those magnificent gravel bars on which I had searched for so many years were completely underwater due to an abundance of rainfall. There would be no moss agate collecting this trip. It'll be interesting to see how many wonderful agates have been transported and deposited on those bars, later this summer when the water recedes.

I have never seen the water this high in the Yellowstone. In past years, as an example, one could walk across the river at this point and never get wet above the waist. Not so this year!

I was soon traveling west on state Route 200 to Winnett, a quaint Western town. From there, I took state Route 244 seven and a half miles south to the Yellow Water Reservoir road. It's the first gravel road you approach (approximately seven miles on your odometer) from Winnett. One clue is the stop sign, indicating a public road. You'll see this gravel road leading off to the right on a diagonal just before state Route 244 makes a gradual, climbing turn. If you reach mile marker 17 on state Route 244,



Yellow Water Reservoir is like a blue jewel set in a tranquil, green valley, with rolling hills and bluffs making up the shoreline. Angus cattle graze on private pastureland in the distance.



A ledge composed of layers of fossiliferous Colorado shale, 12 feet high and several hundred yards long, on the shore of Yellow Water Reservoir is a great place to find the fossils.



Fossilized oyster shells are quite obvious in this slab of shale, while smaller snail fossils are scattered throughout.

you've gone too far. Turn around and go back about a half-mile to the turnoff.

I drove another five and a half miles west on the reservoir road to my destination. This is a bit tricky because there is no sign indicating the site. This road wasn't designed or built for speed; however, it's in good condition compared to some sec-

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.

ondary roads I've been on. A word of caution: In wet weather or after a rainstorm, it will be muddy in places, which could cause a bit of anxiety. It was very dry when I was there and I had no trouble. I saw a few places where ruts had been made due to previous wet conditions. As you approach the reservoir, you won't be able to see it until you're about a quarter-mile away.

Another tricky place you'll encounter is a two-rut road leading off to the left in a most inconspicuous way, very near the dam. I drove straight ahead on the better road. It was a mistake. I came to a hill and saw the manmade lake off in the distance. The two-rut road was the correct one. I drove back and made the necessary correction.

A short drive on the two-rut road brought me to the hill overlooking the lake and boat landing. The road is solid and, when dry, should accommodate even the largest motorhome, but it may be difficult to turn around when pulling a fifth wheel. I wouldn't advise it.

I arrived early enough in the afternoon to have plenty of time to investigate the surroundings and do some quality collecting. The lake is like a blue jewel, set in a tranquil green valley with rolling hills and bluffs that make up the shoreline. There are no trees to speak of for miles in every direction, only green foliage and mustard flowers in bloom. I don't know why they named it Yellow Water, because the water is quite clear.

Whenever I visit a new site, it always takes a few minutes of searching before I'm able to identify what I'm looking for. There are often a few surprises along the way, such as other minerals that weren't expected.

I parked the pickup in a level area high above the water, next to a rock ledge that makes up the shoreline. Looking out my camper picture window, I saw a very colorful landscape, a large herd of black Angus cattle feeding in the distance, and youngsters romping in and out of the water. The lake appears to be a mile or so wide and twice as long. Several bays and points of land hide the true length of the reservoir.

It was a short walk down to the water's edge, where I began my search for invertebrates. The ledge is composed of layers of fossiliferous Colorado shale. It's about 12 feet high at its highest point and stretches several hundred yards before tapering off to a grassy knoll in the distance. This ledge is a great place to find the remains of those ancient sea creatures.

A vast area of land surrounding Yellow Water Reservoir is designated a Wildlife



Numerous petroglyphs are etched into this pictograph of a warrior holding his club and shield.

Refuge on my road map. I am assuming that this is part of the National Refuge system. The eastern and western shores are private land; the local county courthouse should have a map of the area. We have access to the shoreline on private land, so long as we do not cross over private land without permission to get there. The immediate area of the boat landing and earth-filled dam is public domain.

I walked along the shoreline, near the water, for several yards before I saw something that caught my attention. Wavelets were splashing over a nice, flat, rectangular rock loaded with *Pseudomelania hendriksoni*. This is a species of an ancient snail that died sometime during the Cretaceous Period, between 125 million and 60 million years ago. These fossils, although three-dimensional, are locked solidly in the rock, with only the tops of the shells exposed. However, they are well formed and make nice cabinet specimens. The smallest intact one

on this 9-inch by 6-inch by 3-inch rock is 1/2 inch long and 3/16 inch wide. The largest snail is close to 1 inch long and better than 1/4 inch wide. They are off-white in color and contrast with the gray Colorado shale. The entire rock, top, bottom and sides, is covered with these snails.

I soon picked up another rock that was literally covered with snails in a conglomerate mass. They were so close together in death that there is little space between them. As is so often the case, many of the shells have been broken and battered over the ages. Often, only fragments remain, mixed in with the whole ones and cemented solidly in the matrix. It never ceases to amaze me that they have survived at all over so many millions of years.

Next, my attention was drawn to the rock ledge. I found several pretty, golden-colored *Gryphaea* oyster shell casts, showing the concave inner side of the shells,



A 700-year-old handprint, indelibly marked on a smooth rock face, looks as though it may have been put there recently.

embedded in slabs of shale. I found another flat slab with several well-formed oysters from the family *Gryphaea* in the surface. These are a dark, shiny gray, in contrast with the lighter gray host rock. The largest ones are 2 inches in diameter. Why the members of the same species are two different colors is probably due to the infiltration of various chemical elements during their formation.

While I wandered that day, I discovered a flat rock 9 inches in diameter and only 1 inch thick in which several well-formed clams were embedded. I searched for separate, intact fossils, but found very few.

Upon researching the area, I learned that shark teeth, crinoid stems and pieces, and ammonites have been found here, though search as I did, I didn't find any. I would assume that by spending more time here and searching diligently, I may find some. I learned that large, well-preserved ammonites have been found here in the past and are now in the U.S. Geological Survey collection.

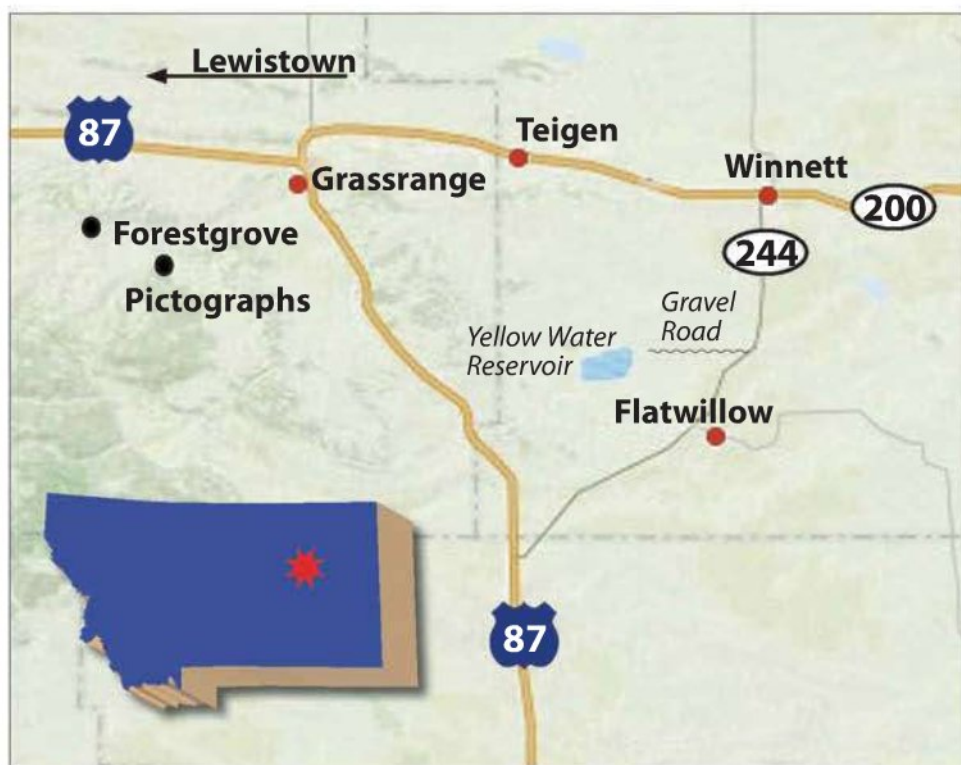
The *Gryphaea* and snail fossils seem to be plentiful enough to supply collectors for some time, and as the rock ledge erodes, more will be exposed, so I suggest you leave your rock hammer in your vehicle.

I was surprised to find a number of blade-shaped selenite crystals lying loose in the dirt of the ledge. They are not gem quality, but are quite interesting. Some are around 2 inches long and water clear.

Another most interesting find was the small, tightly clustered, reddish-purple crystals on several fist-size loose pieces of limestone matrix. They are quite similar in structure to amethyst. Some have almost perfectly square faces and their shapes indicate to me that they are fluorite. Some of these are quite beautiful and will make interesting cabinet specimens.

I talked with two fishermen at the boat ramp. They told me that the water was higher that year than they have ever seen it before. This leads me to believe that as the water recedes, more fossils are bound to be exposed on the lake bed, quite possibly including large, museum-quality ammonites, and maybe even agates.

The area surrounding Yellow Water has great potential for collecting. The lone butte and eroded flats off in the distance could yield agates. There are no fences here because this is open range; cattle are free to roam at will. Despite the fact that there aren't any "No Trespassing" signs, however, much of the surrounding land is private. Permission to enter must



be granted by the landowners. Often, the owners live far away, so this could present a problem.

In this wildlife preserve, you are liable to encounter one or more creatures from time to time. As an example, I was collecting some distance from my camper when I saw movement in the grass below the ledge. A skunk was making its way directly toward me. It was unhurried, as skunks habitually are, though I'm certain it was aware of my presence. I took a photo of it and slowly departed.

Rocky areas, especially near water, are a prime environment for crawling creatures. Always watch where you step, and do not reach down and pick up anything before first investigating the area carefully. Play it safe and make a little noise when walking.

I spent several enjoyable hours collecting at Yellow Water Reservoir and left with some very nice cabinet specimens of sea creatures that lived when Earth was young. I then was off to another exciting adventure the next day.

BEAR GULCH PICTOGRAPHS

After leaving Yellow Water Reservoir, I took a scenic drive to the site of the Bear Gulch pictographs. Back on state Route 200, I drove west 24 miles to the town of Grassrange. From there, it's approximately 12 miles by Forest Grove Road, a well-maintained gravel road, to the Fairview Road turnoff, just before the historic community of Forestgrove. Turn left at the Fairview Road intersection (a sign points the way) and drive another three miles.

The pictograph site is a family owned and operated enterprise. For a very reasonable fee, you can be taken on a personal

tour of this historic site by Ray Vodicka, manager of the pictographs. Ray is a most knowledgeable, charismatic guide. During the tour, he explains in great detail what the symbols are and what they have been deciphered to mean.

We followed a 4X4 road to the site in Ray's pickup. When the road ended, we walked a short distance to the high stone wall upon which the images were painted. As near as scientists can determine, these pictographs were a means of communication being used by native Americans approximately 700 years ago—an early newspaper, if you will. With a mixture of red ochre and animal fat, they painted symbols in vivid color on the smooth, gray limestone wall. The pictures depicted what game was in the vicinity, who killed it, who passed by recently, a birth, a death of a loved one, a slaying, etc.

Other images on the wall include warriors carrying clubs with sharp-pointed sabers attached to the ends and a handprint that looks as though it may have been put there recently, despite the fact that it is seven centuries old. Throughout the image of a warrior, petroglyphs are etched deeply into the stone wall. They include images of animals, people of both sexes, shields with crosses, and symbols that have not been identified as yet.

It's amazing that this paint has withstood the ravages of time. Although some pictographs are faded and a few are mere shadows, the majority are brilliant. The people whose lives they depict have vanished long ago, yet the symbols remain in all their splendor. For more information about the pictographs, call (406) 428-2185 or (406) 366-2835 or visit www.beargulch.net.



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Show Dates from page 10

APRIL 2011

8-10—TACOMA, WASHINGTON: Show; Gem Faire Inc.; Tacoma Dome/Exhibition Hall, 2727 E. "D" St.; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

8-10—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

8-10—VISTA, CALIFORNIA: Annual show; San Diego County Council; Antique Gas and Steam Engine Museum, 2040 N. Santa Fe Ave.; free admission; Fri. 9-5, Sat. 9-5, Sun. 9-4; more than 40 dealers, gems, minerals, slabs, jewelry, raffle; contact Ray Pearce, (760) 726-7570

9—LITTLE ROCK, ARKANSAS: Annual swap; Central Arkansas Gem, Mineral & Geology Society; Sat. 9-5; Burns Park, Elder Johnson Pavilion, I-40 exit 150 (Military Dr.) north, take the first road to the west; free admission; rocks, minerals, fossils; contact Mike Austen, (501) 868-4553; e-mail: steelpony@aol.com

9—SEATTLE, WASHINGTON: Show; Rings & Things; Seattle Center Pavilion, 305 Harrison St.; Sat. 12-4; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

9-10—ABILENE, TEXAS: Show and sale; Central Texas Gem & Mineral Society; Abilene Civic Center, 1100 N. 6th; Sat. 10-6, Sun. 10-5; adults \$3, children \$1.50; geode cracking, fossils, minerals, gems, jewelry, lapidary demonstrations, findings, beads, tools, supplies, rough; contact Betty Scarborough, 422 CR 606, Tuscola, TX 79562, (325) 668-2374; e-mail: waltswife1029@yahoo.com; Web site: www.txol.net/rockclub

9-10—BELLINGHAM, WASHINGTON: 50th anniversary show, "A Golden Family Affair"; Mt. Baker Rock & Gem Club; Bloedel Donovan Park, 2214 Electric Ave.; Sat. 10-6, Sun. 10-5; free admission; raffle, exhibits, rocks, fossils, gems, jewelry, dealers, door prizes, silent auction, lapidary, gold panning, black light, gem cutting, demonstrations, kids' activities; contact Wes Gannaway, (360) 384-4209; e-mail: debnws@comcast.net

9-10—CANTON, ILLINOIS: 51st annual show; Fulton County Rockhounds; Wallace Park; Sat. 10-5, Sun. 10-5; free admission; contact Steven Holley, (309) 231-8861; e-mail: ilfossil@hotmail.com; or Deb Coursey, (309) 368-8451; e-mail: courseyfarm@gmail.com

9-10—DES PLAINES, ILLINOIS: 46th annual show; Des Plaines Valley Geological Society; Des Plaines Park District Leisure Center, 2222 Birch St.; Sat. 9:30-5, Sun. 10-4; adults \$3, seniors \$2, students \$1, children under 12 free; dealers, gems, jewelry, fossils, minerals, Kids' Room, demonstrations, exhibits, door prizes, raffles, silent auction; contact Frank Lavin, 9942 Montrose Ave., Schiller Park, IL 60176, (815) 298-9178; e-mail: nival42@hotmail.com; Web site: www.desplainesgeologyclub.org

9-10—DOTHAN, ALABAMA: 4th annual show; Dothan Gem & Mineral Club; Westgate Park, James Grant Recreation Center gym, 501 Recreation Rd.; Sat. 9-5, Sun. 10-4; free admission; door prizes, silent auction, mineral display, flintknapping demonstration; contact Arnie Lambert, (334) 792-7116; e-mail: arlambert@comcast.net

9-10—DOVER, NEW HAMPSHIRE: 5th annual show; Southeastern New Hampshire Mineral Club; Veterans Community Center, 156 Back River Rd.; Sat. 9-4, Sun. 10-3; adults \$3, seniors \$2, children 12 and under free; silent auction, dealers, kids' corner, fluorescent mineral room, finished jewelry, gemstones; contact Earl Packard, 20 Anita St., Rochester, NH 03867, (603) 332-3988; e-mail: espmineral@myfairpoint.com; Web site: http://senhmineralclub.org/

9-10—JOHNSON CITY, NEW YORK: 42nd annual show; New York Southern Tier Geology Club; Johnson City Senior Center, 30 Brocton Ave.; Sat. 9-5, Sun. 10-4; adults \$3, children under 12 free; dealers, minerals, fossils, beads, jewelry, exhibits, door prizes, ultraviolet display; contact Al Conklin, 187 Forest Hill Rd., Apalachin, NY 13732, (607) 625-4140; e-mail: allanconklin@aol.com

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9-10—KINGMAN, ARIZONA: Show and sale; Mohave County Gemstoners; Kingman Academy of Learning, 3420 N Burbank; Sat. 9-5, Sun. 9-4; free admission; rough rock, slabs, cabs, jewelry, wire wrapping, silver and gold smithing, lapidary and jewelry fabrication equipment and supplies, demonstrations, raffles, prizes, children's activities, educational information, displays, crafts, fossils, minerals, silent auction, door prizes, cash raffle prizes; contact Mary Gann, PO Box 3992, Kingman, AZ 86402; e-mail: quadpol@aol.com; Web site: www.gemstoners.org

9-10—MARION, ILLINOIS: Show; Southern Illinois Earth Science Club; Williamson County Pavilion, 1602 Sioux Dr.; Sat. 10-6, Sun. 10-5; adults \$2, ages 18 and under free; gems, minerals, fossils, lapidary, shells, silent auctions, door prizes, fluorescent demonstrations; contact Mike Chontofalsky, 1019 E. Broadway, Centralia, IL 62801, (618) 532-0455; e-mail: chontofalsky@att.net

9-10—MARIPOSA, CALIFORNIA: 11th annual show, "Mountains of Minerals"; California State Mining & Mineral Museum; Mariposa County Fairgrounds, Hwy. 49, 2 mi. south of Mariposa; Sat. 10-6, Sun. 10-4; free admission; vendors, mineral specimens, jewelry, lapidary, mineral exhibits, demonstrations, children's activities, speakers, raffles, silent auctions; contact Randy J. Bolt, (209) 742-7625; e-mail: rockmuseum@sti.net

9-10—PARADISE, CALIFORNIA: Show and sale, "Paradise of Gems"; Paradise Gem & Mineral Club; Elk Lodge 6309 Clark Rd.; Sat. 10-5, Sun. 10-4; adults \$2, seniors \$1, under 16 free; contact Manuel Garcia, 5659 Foster Rd., Paradise, CA 95969, (530) 877-7324; e-mail: mmpg@earthlink.net; Web site: www.Paradisegem.org

9-10—RICHARDSON, TEXAS: Wholesale and retail show; The Bead Market; Richardson Civic Center, 411 W. Arapaho; Sat. 10-5, Sun. 10-4; free admission; dealers, gemstones, pearls, glass, lampwork, PMC, findings, silver, tools, books; contact Rebekah Wills, (903) 240-7198; e-mail: rebekah@thebeadmarket.net; Web site: www.thebeadmarket.net

9-10—RICHMOND, VIRGINIA: Retail show; Intergalactic Bead & Jewelry Shows; Richmond Raceway Complex, Colonial Bldg., 600 E. Laburnum Ave.; Sat. 10-5, Sun. 10-5; Saturday \$5, Sunday \$4, children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicats; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

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—WAUKESHA, WISCONSIN: 49th annual show; Kettle Moraine Geological Society; Waukesha County Expo Center, 1000 Northview Rd.; Sat. 10-5, Sun. 10-4; adults \$2.50, children 50 cents; demonstrations, displays, sales; contact Richard Rosenberger, (262) 691-3130; e-mail: rosenber.w@sbcglobal.net

10—MOUNT VERNON, WASHINGTON: Show; Rings & Things; Best Western Cotton Tree Inn, 2300 Market St.; Sun. 12-4; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

15-17—ALPINE, TEXAS: Show, "Alpine Agate Festival"; Chihuahuan Desert Gem & Mineral Club; Alpine Civic Center, Hwy. 90W and 13th St. N; Fri. 9-6, Sat. 9-6, Sun. 11-5; free admission; South Central Federation convention, grand prize, door prizes, silent auctions, field trips, kids' corner, demo dealers; contact Mary Brogan, PO Box 1111, Alpine, TX 79831, (432) 386-2340; e-mail: marybrogan@rocketmail.com; Web site: www.cdgmcc.org

15-17—RICKREALL, OREGON: 56th annual show; Willamette Agate Mineral Society; Polk County Fairgrounds, 520 S. Pacific Hwy. W; Fri. 9-6, Sat. 10-6, Sun. 10-4:30; contact Kristi Edwards, (541) 738-6811; e-mail: edwardskk@gmail.com

15-17—ROSEVILLE, MICHIGAN: Annual show; Macomb/Mt Clemens Gem & Lapidary Society; Roseville Recreation Center, 18185 Sycamore; Fri. 9-7, Sat. 10-7, Sun. 11-4; adults \$3, students \$1, children free; dealers, lectures, display area, demonstrations, raffle, kids' area, raffle; contact Jacq Swain, 44314 Macomb Industrial Dr., Clinton Township, MI 48036, (313) 469-7868; e-mail: jacswain018@aol.com

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SILVER TOPAZ, fine cut, 3 mm round brilliant cut, \$0.75 each, 6 mm round	\$3.60 each
SKY BLUE TOPAZ, fine cut, 3 mm round	\$2.00 each
AMETHYST, dark purple, fine cut, 3 mm, round brilliant cut	\$1.25
CITRINE, Madiera, fine cut, 3.5 mm round	\$1.50 each
GARNET, fine cut, 4 mm round	6 pcs for \$7.50
RHODOLITE GARNET, fine cut, 4 mm round, \$2.50 each, 2.5 mm	round \$.80 each
HESSONITE, 3 mm, round brilliant, root beer color	\$1.75 each
MEXICAN OPAL, fine cut, orange, 4x6 mm oval	\$3.00 each
PERIDOT, Arizona, fine cut, green 3 mm round	\$1.25 each
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Some People Make It Look So Easy

Story by Glenn W. Worthington

When I first learned that there was a state park in southwest Arkansas where you could find diamonds in 1978, I did the only reasonable thing: I quit my job in Kansas and drove to Arkansas to camp out for seven weeks and see if I could find some diamonds of my own. I dug holes and washed gravel 10 hours a day, six days a week, for three weeks, but I did not find a single diamond. At that point in my quest, I watched the Crater of Diamonds State Park bulldozer plow the field. A first-time visitor who was following the plow picked up a white diamond that weighed over 1 carat. The next day, I found my first diamond. It was a lovely 0.75-carat gem that made me forget my previous disappointments.



GLENN W. WORTHINGTON PHOTO

At The Crater of Diamonds State Park in 2009, I found this 2.04-carat, flawless yellow diamond the hard way—by persistent digging and washing.

I called my brother in Kansas and told him I had found a beautiful diamond. I promised to show him what I had learned about diamond digging if he would come down and join the hunt. He showed up at my campsite the very next day. As we talked, I laid a huge mound of my freshly washed gravel out on a picnic table to dry. He reached over and picked up a 1.2-carat diamond out of my pile. That was a quick and easy start at diamond finding for him.



The next morning, my brother began digging at the park in a spot I suggested. He washed gravel from it for two weeks and only found one ugly, little diamond. He got discouraged and decided to go back home. Before he left, he offered his open hole to me. I declined his offer because it had not produced anything significant for him and I was still finding diamonds in my hole 30 feet away.

A week later, an Oklahoma farmer got into my brother's old hole. He dug up some dirt and threw it into a little, red wagon. His children pulled it over to the spot where his wife was ready to wash it. They flipped the wagon over to unload it so they could return and dig some more. When they did, there on top of that little mound of dirt, the farmer's wife found a *huge* diamond without washing a cupful of ore! This brown beauty tipped the scales at an impressive



GLENN W. WORTHINGTON PHOTO

This 8.61-carat, light-brown diamond was found in my brother's abandoned hole in 1978 by a woman who had not even started washing any gravel.

The Arkansas Diamond Mine. In 1963, the Rogers family from Pine Bluff, Arkansas, visited. They laid out a small blanket on the search field and placed their 14-month-old daughter, Mary, on it. The parents began searching for diamonds nearby. When they came back to check on their baby, they discovered she had something in her mouth. When she spit it out, they found she had been sucking on an 11.92-carat brown diamond as if it were a piece of candy.

Jewell Jernigan had visited The Arkansas Diamond Mine several times, but had never found a diamond. Just 15 minutes after arriving on Sept. 22, 1963, however, she found a 4.51-carat white diamond that was named "The Jewell Gem".

Before the site became a state park, the owners used to allow visitors to drive out onto the search field. One day, a busload of students arrived. The bus was driven



GLENN W. WORTHINGTON PHOTO

Bob Wehle found his 5.47-carat fancy yellow Arkansas "Sunshine Diamond" in October 2006 after washing just 14 buckets of gravel.

8.61 carats. It has remained the third largest diamond ever reported since The Crater became a state park.

When I told my brother about the farmer's find, he regretted giving up before washing a little more gravel from that hole. And I regretted not taking his offer to dig there. But that is the agony, as well as the allure and thrill, of diamond searching. You never know when or where one of these "retirement rocks" will surface. Sometimes, when the digging, hauling, washing, and sorting begins to get monotonous, you have to tell yourself, "That big one could be in this next shovelful. So don't give up too soon."

While my experience is more the norm, some people find diamonds easily, as if they were strolling around picking up pecans. Since the initial discovery of diamonds in 1906, there have been numerous instances in which seekers have found big diamonds on their first visit to the park or after just a few minutes of searching. Before The Crater became a state park in 1972, it was privately operated as a tourist attraction called



JEFF SCOVIL PHOTO

Although it may not be very pretty, this 6.35-carat dark-brown diamond was the largest find of 2006 and the eighth largest find since 1972.

out onto the field and the teacher was the first one to step out. Before her feet hit the ground, she saw something glistening in the dirt. She stooped over and picked up a diamond before any of her students had even stepped off the bus.

On Aug. 25, 1975, William W. Johnson of Amarillo, Texas, arrived at The Crater of Diamonds State Park and walked around surface searching for about two hours. He saw something he thought was a piece of glass and walked on past it. There had been a terrific downpour the day before, so when the walking got pretty muddy, he turned around and retraced his steps. Once again, he spotted the tiny glimmer from about 30 feet away. Walking over to the spot without removing his eyes from the object, he observed a glittering speck in the soil. Reaching down, he found it to be the "tip of an iceberg" so to speak. The oblong object was still about 95 percent covered by soil. With his fingers, he dug out a huge gem almost 1 inch long and 1/2 inch wide. He finally realized that it was not glass, but figured it was just an average-sized diamond.

Johnson took it to the visitor's center. The park superintendent knew immediately that it was a diamond, and an exceptionally large one at that. He was more excited than Johnson when he weighed and registered the gem. It was a clean, white diamond that tipped the scales at a whopping 16.37 carats! Johnson named it "The Amarillo Starlight". More than three decades later, his diamond continues to hold the record for being the largest one found since The Crater became a state park.



JEFF SCOVIL PHOTO

Marvin Culver found this 4.21-carat, golden yellow diamond in 2006 after washing just one-and-a-half buckets of gravel.

Bob named his *ball of sunlight* "The Sunshine Diamond" and it beamed up at me when he placed it in my hand. It is *flawless and breathtakingly beautiful.*

Oklahoma State Highway Patrol Trooper Marvin Culver had wanted to visit The Crater of Diamonds for 10 years, but had just never made the trip. On Mar. 11, 2006, he was watching a television special about The Crater on The Travel Channel. Since his niece and nephew were on spring break, he decided on the spur of the moment to take them and his wife to Arkansas' unique state park.

They arrived the very next day. Marvin's wife, Lyndall, made several purchases at the park's gift shop, including a copy of my book *Genuine Diamonds Found in Arkansas*. Marvin jokingly commented, "I'm going to have to find a big diamond to come out ahead on this deal."

The foursome attended the park's introductory course, "Diamond Mining 101", at the new Diamond Discovery Center. Then they went out onto The Crater's search field. Marvin picked a spot, dug a little of the lamproite, and carried it to one of the pavilions to wash it. After washing just one-and-a-half buckets of ore, this first-time visitor found a 4.21-carat, flawless, golden, canary diamond. Its size has been compared to a peanut M&M®, and let me say it is real eye candy, too. At the time, it was the largest diamond found at the park in six years.

A press release went out and numerous radio and television stations and newspapers picked up the story. The Culvers even got phone calls from the media in Canada. NBC wanted Marvin, Lyndall, and their niece and nephew all to appear on its "Today" program that very week. A gem expert from Sotheby's Auction House appeared with them and valued the diamond at between \$15,000 and \$60,000. During the live broadcast, the hostess, Katie Couric, accidentally dropped the valuable diamond two different times, and viewers could hear it "ping, ping, ping" across the glass tabletop.

Just 12 days after Marvin's big find, a woman and her son from Derby, Kansas, were searching the north end of the Crater's field near the old mine shaft building. The 12-year-old boy was just playing while his mother was seriously searching. The boy threw a rock and hit a dirt clod. It broke open to reveal a lovely 2.12-carat yellow diamond.

Several months later, on Sept. 23, Donald and Brenda Roden of Point, Texas, were surface searching at The Crater. They walked along looking at the gravel in the east drainage ditch area and saw a shiny rock. Brenda picked it up and knew it was a diamond, but Donald was not so sure, so they asked the park staff to verify and weigh their find. Not only was it a genuine diamond, but a big one. Weighing in at 6.35 carats, it was the largest find of 2006 and the eighth-largest found since the site had become a state park in 1972. Unfortunately, the imperfect, dark coffee-brown diamond is not very pretty, but it is an interesting specimen.

One month later, Bob Wehle made a return trip to The Crater from Ripon, Wisconsin. He had visited the park six or seven times in the past and found four relatively small diamonds. When he and his wife saw the news coverage on Culver's 4.21-carat diamond in March, she said, "Why don't you find one like that?" Taking the challenge, Bob went to the state park in October 2006 determined to find a big, beautiful diamond.

While he was washing his fourteenth bucket, a woman walked up and asked him to explain what he was doing. He said, "I



JEFF SCOVIL PHOTO

The 4.51-carat white "Jewell Gem" was found by Jewell Jernigan in September 1963 after just 15 minutes of surface searching.



The two largest diamonds I have ever found at The Crater are the 2.13-carat brown on the left and the 2.04-carat yellow on the right.



Oklahoma State Trooper Marvin Culver found this 4.21-carat, golden yellow diamond in 2006 after washing just one-and-a-half buckets of gravel.

have two screens stacked on top of each other in this vat of water. I dump gravel in and scrub it across the coarser screen on top. All of the smaller rocks drop through the holes into the finer screen below." Then he lifted the top screen out of the muddy water and said, "Usually, your diamonds will be small enough to fall through to the lower screen. But you want to be sure to look through the rocks on the top screen just in case you might have a big diamond in it ... like that one." Bob reached in and picked a 5.47-carat, canary-yellow diamond off his top screen. Now *that* is what I call a diamond demonstration.

News of Bob's big diamond literally spread around the world. Although he did not get the live television coverage that Marvin did, news agencies across the United States and in England and China carried the story of his fabulous find. Its size has been compared to a lemon drop. Bob named his ball of sunlight "The Sunshine Diamond" and it beamed up at me when he placed it in my hand. It is flawless and breathtakingly beautiful.

On Mar. 15, 2008, while I was digging and washing hundreds of buckets of gravel, Barbara Daniels from Mesquite, Texas, visited The Crater. She was surface searching with her 29-year-old grandson when she saw something shiny right next to some footprints in the dirt. She reached down and picked up a perfect 1.01-carat, yellow, triangular diamond.

Barbara took her diamond to a jeweler in Dallas to see about selling it. She explained to him that it was an uncut diamond she had found in Arkansas. He was dumbfounded. He thought it had already been faceted because its shape was so beautiful and symmetrical. Fortunately for me, he did not buy it from her. She and her grandson contacted me to see what the diamond might be worth. I made them an offer,

and they met me at my bank the next day to get the money. My wife and I are very pleased to have this gorgeous diamond in our personal collection.

On July 12, 2008, Matthew Smith, a 9-year-old boy from Dallas, Texas, visited The Crater with his family. *Seven minutes* after arriving, he picked up a shiny rock and showed it to his mother. "Is this a diamond?" he asked.

"No," she replied, because it was really too big, and they had only been there for a few minutes. Finding a real diamond just couldn't be that easy. But they held onto that shiny pebble for three hours and had it sitting on a bucket with other rocks at the wash pavilion.

Finally, Matthew's aunt said, "You ought to take that to the Diamond Discovery Center and have it checked to see if it is a diamond. He did, and it was! That brown diamond weighed 2.75 carats, and they had just left it lying around for three hours while they searched for diamonds.

In early September 2008, Hurricane Gustov came up from the Gulf of Mexico and dumped 8 inches of rain on the Crater of Diamonds search field. I was convinced that all that hard, heavy rain would have washed silt away from some large diamonds and left them sitting there to be picked up, so I went into the park the next day determined to find my first diamond by surface searching. I felt like I had covered the entire 37.5-acre field that day, but I did not find a single diamond. Two days later, Sept. 6, 2008, *three* lucky surface searchers picked up diamonds weighing over a carat from The Crater. Never before in the history of the park had so many large diamonds been found in a single day. There was a 1.16-carat white, a 1.20-carat brown, and a 1.30-carat white. Those big diamonds must have been there when I walked around, but I didn't see any of them. My theory did prove true, though.

Michael Burns of Arab, Alabama, was surface searching in the park's west drainage area behind Canary Hill at 10:15 on the morning of Apr. 28, 2009, when he saw something shiny in the mud. He picked up a 5.75-carat white diamond. It was the largest diamond that had been found at the park in the past two-and-a-half years, since the 6.35-carat Roden Diamond.


On Mar. 31, 2010, Patti Kubli visited The Crater from Pennsylvania for the first time. Within a half-hour of paying her entrance fee, she kicked some loose rocks with the toe of her shoe. Out rolled a gorgeous 3.17-carat yellow diamond.

Less than two weeks later, on Apr. 9, 2010, Brandon Phipps stepped out onto The Crater's search field around noon. He walked down the well-worn path that hundreds of other people had already taken that day. There, in the middle of the walkway, he found a 1.01-carat, white diamond after spending just *ten minutes* on the search field.

I have found hundreds of diamonds at the park since my first visit in 1978, but none of them have come easily. All were found while digging and washing thousands of buckets of gravel. My two largest finds so far have been a 2.04-carat yellow (2009) and a 2.13-carat brown (2010) diamond. Those of us who do not have beginner's luck must resort to stubborn determination and hard work. But, either way, there are still genuine, valuable diamonds to be found at Arkansas' Crater of Diamonds State Park (www.craterofdiamondsstatepark.com). 💎

Glenn Worthington is the host of the DVD "How to Find Genuine Diamonds in Arkansas" and the author of the book *Genuine Diamonds Found in Arkansas*, both available through his Web site, www.DiamondsInAR.com.

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ROCK SCIENCE

by Steve Voynick

Observations on Obsidian

Collectors of lithic artifacts especially prize points and blades fashioned from obsidian, and for good reason: A properly flaked obsidian edge may be the sharpest known mineral material.

Obsidian is not a mineral, but a mineraloid—a noncrystalline, minerallike material with an indefinite chemical composition. It is a natural volcanic glass that forms from the very rapid solidification of rhyolitic (silica-rich) magma that consists primarily of silica, with lesser amounts of feldspar and ferromagnesian minerals. Obsidian is somewhat softer and less dense than quartz, and its typical dark color is caused by traces of the essential elements iron and magnesium. Like man-made glass, obsidian is amorphous (lacks a crystalline structure) and has a pronounced conchoidal fracture.

Science only became aware of the remarkable sharpness of properly flaked obsidian edges in the early 1970s, when Idaho resident Dr. Don E. Crabtree, one of the greatest of all modern flint knappers, recreated an ancient obsidian-flaking technique. He shaped a cylindrical “core” of obsidian, then knapped it in a manner that produced inch-long “microblades”, or elongated, conchoidal flakes. The sharpness of these flakes so amazed Crabtree that he brought it to the attention of medical researchers.

At the time, stainless-steel surgical scalpels were thought to have the sharpest cutting edges. But under 10,000-power electron microscope magnification, the cutting edges of scalpels were found to be squared, while those of flaked obsidian were wedge-shaped, which made them sharper. Researchers explained that the blocky crystalline structure of the steel limits the edge's ability to sharpen, while the amorphous structure of obsidian makes it possible to flake conchoidal cutting edges of nearly molecular thinness.

Today, clinical tests have shown that surgical incisions made with obsidian scalpels produce less scar and granulation tissue and heal more quickly. Obsidian scalpels are now used in specialized procedures, mainly in eye surgery and neurosurgery.

Although mankind has used obsidian for at least 100,000 years, we are still learning its secrets. The age of flaked obsidian artifacts can now be geochemically determined by the technique of obsidian-hydration dating. Newly solidified or unexposed obsidian contains about 0.2 percent water. But atmospheric water slowly diffuses into obsidian through a network of fine cracks



to create a hydrated surface “rind” that contains about 3.5 percent water.

The precise boundary between the hydrated rind and unhydrated obsidian is marked by an abrupt change in refractive index. When obsidian is cut in thin sections, the precise thickness of this rind can be microscopically measured. Hydration begins with the exposure of a fresh surface, such as when obsidian is flaked. Because hydration-rind thickness in obsidian grows over time, it is possible to accurately date the manufacture of an obsidian artifact.

Obsidian from different lava flows also has a slightly different trace metal content. Using X-ray fluorescence analysis, it is possible to quantify these unique chemical “fingerprints” and thus identify the source of the obsidian in artifacts. As an example, geochemists have determined that much of the obsidian in the artifacts of early Native American cultures in southern Arizona originally came from lava flows more than 1,000 miles to the south in Jalisco, Mexico. And obsidian from Yellowstone National Park's famed Obsidian Cliff has been found in artifact form in cultural sites 400 miles to the north and east. This ability to “source” obsidian is helping anthropologists to reconstruct production, distribution, and trade systems of ancient cultures worldwide.

Even though obsidian does not qualify as a mineral, its sharp cutting edges, hydration dating, and geochemical sourcing make it a remarkable material. ♥

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





Photo: Jeff Scovil

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Photo: Joe Budd



FIELD TRIP



COLLECTING BADLANDS "BRAIN CORAL" COBBLES

Exotic Quartzite from Wyoming's Bighorn Basin

Story and Photos by Carl F. Brink, G.G.



Translucent black quartzite cobbles with burgundy streaks are quite rare in the badlands gravel beds.

The Bighorn Basin in north-central Wyoming is typical of many intermontane basins found throughout the Western United States. The basins are filled with Tertiary sediments shed from the surrounding mountain ranges during the Laramide uplifts. The sediments are commonly composed of flat-lying or gently dipping fluvial and lacustrine conglomerates, sandstones, siltstones and shales. Erosion has uncovered and exposed the layers of sedimentary strata, and the vivid, multicolored exposures have enchanted tourists, photographers and artists for many years.



The gravel accumulations that stretch over the floor of Bighorn Basin are prime hunting areas for "brain coral" quartzite cobbles.



A yellowish patina, caused by iron staining, emphasizes the "brain coral" texture caused by weathering on the surface of this blue-grey quartzite cobble.

Geological exploration of the badlands revealed other delights, among them abundant exposures of richly fossiliferous layers of plant and animal remains. The abundant and beautifully preserved fossil fish of the huge, ancient Lake Gosiute in the Green River Basin of southwestern Wyoming are perhaps the best known examples of such a record; the Green River fish are world renowned. In contrast, the Bighorn Basin sediments were deposited in a predominantly shallow-water environment rather than a large lake, and the many alluvial fans, streams and swamps that existed in that densely vegetated, hot and humid climate preserved what has been called one of the most complete fossil collections of early mammalian evolution through the Paleocene and early Eocene ("History of Early Cenozoic Vertebrate Paleontology in the Bighorn Basin", Philip D. Gingerich, Papers on Paleontology, No. 24, 1997).

The geologists, archaeologists and paleontologists working in the basin also noted the seemingly incongruous occurrence of large, well-rounded, multicolored cobbles and clasts of hard quartzite scattered along the tops and meandering down the gullies of dissected badlands ridges. The cobbles posed an interesting question to the explorers, namely, where was the source? None of the surrounding mountain ranges contained outcrops or exposures of such quartzite. Searching farther afield, they failed to locate unequivocal source rocks, and they finally reached the conclusion that the cobbles were transported remnants of an ancestral Rocky Mountain range far to the west that



An iron-oxide patina forms a light-brown rind over the polished surface of this white quartzite cobble.

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.



This impact cone is a textbook example of an exhumed remnant percussion feature. It became exposed when the surrounding quartzite completely weathered away.

had now completely eroded away. Possible sources as far away as Idaho were suggested, and some scientists believe that the quartzite had traveled more than 600 kilometers to the basin ("Flood Transported Quartzites", Parts 1, 2 and 3, M. Oard, J. Hergenrather, P. Klevberg, *Journal of Creation* 19 (3), 2005, pp. 76-90)!

The extended geologic duration suggested there were many episodes of reworking of the quartzites and gravels during their travel from their source to their present-day exposure as conglomerates or detrital lag gravel deposits on badlands ridges. The cobbles themselves provided supporting evidence for their distant sources in their extremely rounded shapes, polished surfaces, and abundant surface features indicative of violent transport, such as percussion marks, pressure solution marks, chatter marks, and iron patinas. The varied colors and rounded shapes of the cobbles resulted in the aptly descriptive term "multihued roundstones" being applied to them ("Late Cretaceous, Paleocene, and Early Eocene Paleogeography of the Bighorn Basin and Northwestern Wyoming", David Seeland, *Wyoming Geological Association 49th Guidebook*, 1998, pp. 137-165).

Weathering on some of these cobbles has resulted in a surface effect that superficially resembles the convoluted swirls, grooves and dimples seen in the spheroidal warm-water corals found in shallow, tropical seas and known as "brain corals". Brain corals are quite fittingly named due to their visual resemblance to animal brains. The brain coral features—varied colors, extreme rounding, and the often textbook quality of the surface percussion features—on the Bighorn Basin quartzites make these rocks an exotic addition to any rock hound's collection.

LOCATION AND ACCESS

Excellent exposures of these roundstone gravel deposits containing exotic "brain coral" quartzite cobbles can be found in the badlands of the Eocene-age Willwood Formation west of the town of Worland, Wyoming. Worland is an agricultural town located on the banks of the Bighorn River in the south-central part of the Bighorn Basin. Lush, green, irrigated fields lying along the banks of the Bighorn River contrast sharply with the red, purple, grey and brown bare expanses of rock forming the badlands. You will need a high-clearance or four-wheel-drive vehicles to access the collecting site.



Two intersecting percussion marks on this cobble form a figure eight.

U.S. Highway 20 is the major entry route into the basin from the south. I drove into Worland along this road, which passes through the spectacular Wind River Canyon. As I followed the river through the canyon, I passed through almost 3 billion years of the earth's history, exposed for over 10 miles in



Percussion marks coalesce to form a "brain coral" texture on this fractured white quartzite cobble from Bighorn Basin.

the walls of the canyon, which the river cut through the Owl Creek Range. The canyon is an example of a superimposed river, and the southern end exposes pink Precambrian granite and black-and-white contorted gneiss that is approximately 2.9 billion years old. Farther along, Cambrian, Ordovician and Mississippian limestone, dolomite and shale form cliffs that are up to 2,500 feet high. Sections of Permian and Pennsylvanian strata follow, terminating with bright-red Triassic Chugwater Formation sandstone as the highway exits the canyon.

Informational signs at roadside turnoffs allow visitors to stop and study the geology and investigate the exposures in detail. The outcrops along the length of the canyon are a delight to any rockhound and could be the subject of many exciting collecting trips in themselves; however, I was on a mission into the Eocene, so it was onward past the hot spot and thermal baths at Thermopolis and finally into Worland some 40 miles farther north.

Directly after you cross the Bighorn River, take state Route 433 west. Less than a mile farther along the highway, there is a BLM sign indicating Fifteen Mile Road 1429. Take this dirt road, which follows Fifteen Mile Creek west into the badlands. Approximately five miles along 1429 from the BLM sign, you will see a track traversing a low ridge and heading generally northward.

Gravels can be found amongst the sagebrush all along this ridge; however, I prefer to continue north along the road for about a mile to where the landscape changes into proper badlands. Here, there is little or no vegetation obscuring the bare exposures. Gravel fields that are exposed and strewn along the bare sediments and down the flanks of the ridges make hunting for brain coral quartzite roundstones relatively easy.

THE FOSSIL RECORD

The Eocene Willwood Formation occupies the central part of the Bighorn Basin and its sedimentary layers are well dissected and exposed by erosion. The exposures reveal the beautiful red, orange, purple and grey badlands formations that fill the basin floor. The red, orange and purple bands have been shown to be paleosols (former soils that have been preserved by burial) from times during which climatic conditions alternated between dry and wet periods, whereas the grey and brown sections represent long wet periods. Sandstone and mudstone comprise most of the badlands formations, while minor conglomerates can be found in the bottom-most sections.

Mammalian fossils are common in most of the sedimentary layers, and examples of early rodents, pigs, camels, tapirs, horses and, importantly, primates such as lemurs show the diversity of life supported by the hot and damp climate. The dramatic and sudden appearance of these early mammals coincided with a worldwide increase in temperature known as the Paleocene-Eocene Thermal Maximum (PETM), which was interpreted to have been caused by a significant rise in global carbon dioxide levels. The excellent exposures of the fossil-bearing beds throughout the basin are highly valued by geologists and paleontologists because their persistent lateral continuity allows the physical tracking of similar geological formations, as well as the fossils' evolutionary trends over time ("Geology and Mammalian Paleontology of the Sand Creek Facies, Lower Willwood Formation

(Lower Eocene), Washakie County, Wyoming”, Thomas M. Brown, The Geological Survey of Wyoming, Memoir No. 2, 1979).

The occurrence of extensive residual beds of well-rounded quartzite boulders, which show clear evidence of long and violent transport, on sediments that were deposited in quiet swamps and lagoons, which once swarmed with earth’s newest inhabitants, provides an enigmatic picture of the geological history of the Bighorn Basin.

It is important to note that the collecting of vertebrate fossils such as bones or teeth is specifically restricted, and since the Willwood Formation is so rich in these types of fossils, it is quite possible the rock collector may come across them. I did not find any fossils during my collecting forays; however, my mind was focused on searching for large, exotic quartzite cobbles and I probably walked over many fossils without recognizing them!

If you do find any fossils or evidence of historical anthropological activities or artifacts, do not disturb the site, but be sure to report the location to the BLM Field Office in Worland.

COLLECTING COBBLES

Proceeding north along the dusty trail off BLM Fifteen Mile Road 1429 in your high-clearance or four-wheel-drive vehicle, you will soon start to notice scattered quartzite boulders lying amongst the sagebrush. I recommend continuing along the track for another mile or so. The track eventually descends off the ridge and down into the badlands proper where there is little or no vegetation and the red, orange and grey sediments are fully exposed. Extensive tracts of gravel can easily be found just a few yards off the road, flowing down the erosion slopes and spilling into little gullies and washes. You may even see them in the distance, pouring down from badlands ridges over the bright red, orange and purple paleosol deposits of the Willwood Formation. I preferred to search the larger lag gravel deposits, anticipating that I would have the best luck for finding exotic brain coral quartzite among the more plentiful accumulations of gravels.

You should have sturdy boots on, carry plenty of water, and wear adequate protection from the sun before you set out on your search for a likely gravel lag deposit. Temperatures in the badlands easily exceed 100°F in July and August. There is no shade and no water, so don’t stray too far from your vehicle! I like walking the



Iron staining on the surface of this white “brain coral” quartzite almost camouflages the cobble against the brown badlands clay.

gravel lags in a crisscross grid pattern on a 3- or 4-yard interval. Keeping this distance between your traverses will allow you to cover lots of ground while ensuring you don’t miss seeing any prospective brain coral cobbles!



The superficial “brain coral” effect is manifested by the partially weathered, percussion-marked surface of this grey-blue quartzite cobble.

While the gravel lag deposits may be quite extensive and searching for suitable cobbles involves little more than walking and looking down at the gravel, locating actual specimens of brain coral cobbles is not all that easy. After completing a few traverses, all the cobbles start to look the same, and once you lose your concentration you may walk for five minutes before you realize you don’t remember what you just passed over! It’s best to limit your traverses to 20 yards or so at a time, then stop and rest your eyes by looking off into the distance. I really enjoy the views to the west; even from down in the gullies you can often see the majestic purple snow-capped Bighorn Mountains towering in the distance.

The quartzite cobbles show varied colors, including predominantly pale grey and light blue-grey, with considerable white, brown and orange, and minor black and red-purple clasts. The pale grey and blue-grey cobbles have a delightful surface polish or veneer that appears almost waxy and translucent.

The translucency is concentrated in the swirls and convolutions of the brain coral ridges and hollows, and slowly turning the roundstones in the light enhances the appearance of the dimples and ridges. The best examples of brain coral features and textures are found on the blue-grey quartzite. One specimen I discovered even displayed the classic ovoid shape that brains exhibit!

White cobbles are common, but they usually have a more sugary texture and don’t demonstrate as good a polish as the blue-grey quartzite.

White cobbles also appear to be more susceptible to fracture. The brown and orange stones are actually white quartzite tinted with an iron-oxide patina that sometimes extends a few millimeters into the stone. Again, it seems the more porous, sugary quartzite is more often iron-stained; the orange patinas are not often observed on the blue-grey cobbles. Black clasts are rare, but I did find a few stones with polished semitranslucent surface textures that showed some resemblance to brain coral, although the examples were poor compared to the blue-grey clasts.

All the quartzite cobbles show various degrees of rounding and many have textbook examples of surface features indicative of extremely violent transport. The rounding and polishing in some examples is so profound that the cobbles almost resemble billiard balls! Features such as percussion marks, chatter marks, and conchoidal fractures attest to the ferocious pounding these clasts

have endured during their long journey to their resting place on the gently-deposited Eocene badlands sediments. Percussion marks vary in intensity from shallow crescentic surface cracks demarking the edges of incipient impact cones to partly-exposed cones to beautiful examples of exhumed remnant impact cones after the complete removal of the surrounding quartzite by subsequent weathering processes.

The cones are formed when the quartzite surrounding the radial and conchoidal fracture halos emanating into the quartzite from the bulb of percussion (the actual clast-against-clast impact point) is removed by weathering (freeze-thaw cycles), leaving behind the unimpacted quartzite in the form of cones. The coalescing of abundant and adjoining partially-exhumed percussion halos causes the surface textures that bear a superficial resemblance to actual marine brain corals. Rare cobbles also show faint areas of local staining and shallow dimpling; these marks are prob-

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"Brain Coral" Cobbles from page 35



This bright-orange quartzite cobble stands out against the white sedimentary badlands soil.

ably pressure solution marks caused by extended contact with other cobbles while they were buried under intense pressure ("The Surface Features of 'Pristine' Flood Transported Boulders", M.C. Bourke, J.A. Brearley, R. Hass, H.A. Viles, Lunar and Planetary Science XXXVI, 2005).

Most of the badlands areas in which the gravels occur are administered by the Federal Bureau of Land Management, and researching the BLM GeoCommunicator Web site (www.geocommunicator.gov) did not show any active mining claims in the area. Oil and gas exploration is actively occurring around the margins of the Bighorn Basin, but the area west of Worland is quite undisturbed. The BLM recognizes rockhounding as a legitimate recreational activity on lands it administers, and collecting for noncommercial purposes is not restricted.

Hunting for quartzite reminiscent of brain coral in the badlands is relatively easy compared to some rockhounding. Large gravel collections are within close reach of your vehicle, and walking the badlands is physically undemanding. The easy collecting and simple identification of the exotic cobbles make a badlands outing an excellent adventure for children, as well as an educational experience with respect to learning about and identifying the various percussion features seen on the cobbles. In addition, the recently opened Washakie Museum and Cultural Center (www.washakiemuseum.org) in Worland has interesting geology exhibits, plus displays of Eocene mammal fossils, and reconstructions of the animals they represent.

Spending a day wandering around the gravel beds scattered over the bright red and purple badlands, enjoying the absolute peace under a stunningly blue Wyoming sky, and occasionally discovering an exotic brain coral quartzite for one's collection would be a joy for any rockhound. ♥

Carl F. Brink is a Graduate Gemologist of the Gemological Institute of America and an avid rock and mineral photographer. He enjoys rockhounding and exploring the geological wonders of the Western United States.

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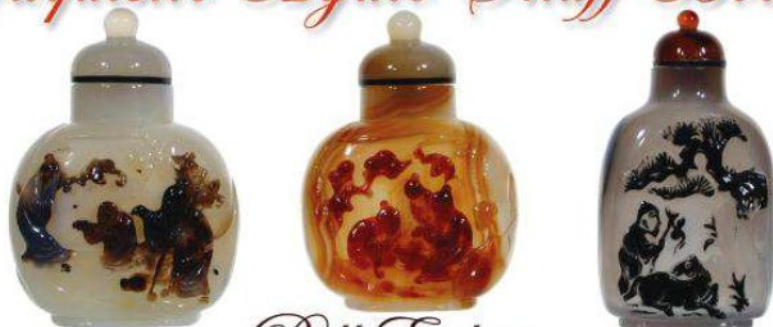
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April 2-3, Antelope Valley, CA; Antelope Valley Gem & Mineral Club; Lancaster High School, 44701 32nd St. W., Lancaster, CA

April 15-17, Santa Clara, CA; Santa Clara Valley Gem And Mineral Society 56th Annual Show; Santa Clara County Fairgrounds; 344 Tully Rd., San Jose, CA 95111; Friday 9am - 5pm, Saturday & Sunday 10am - 5pm

April 22 - 24, Denver, CO; Colorado Mineral & Fossil Show - Spring; Holiday Inn Denver Central; 4849 Bannock St., Denver, CO; Fri & Sat. 10am - 6pm, Sun. 10am - 5pm.

April 30-May 1, Anaheim, CA; Searchers Gem & Mineral Society Gem Show; Brookhurst Community Center; 2271 W. Crescent Ave., Anaheim, CA; Sat. 10am - 5pm, Sun. 10am - 4:30pm

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Crinoids

The word "crinoid" means "lily-shaped" or "flowerlike." Although they are often called "sea lilies," crinoids are animals in the phylum *Echinodermata*. Echinoderms are divided into two subphyla: Eleutherozoa (starfish, sand dollars, sea urchins) and Pelmatozoa (crinoids and blastoids). Eleutherozoans creep along the seafloor, but many pelmatozoans are anchored by a stem with a holdfast at the bottom and cuplike calyx on top. The calyx is surrounded by feathery arms and, as it bobs in ocean currents, these arms fan water to capture meals of plankton and guide them to the mouth in the center of the calyx.

Crinoids have graced earth's seas since Ordovician times, nearly 500 million years ago. They were most common 340 million years ago during the Mississippian Period, also called the Age of Crinoids. Today, there are only 600 living species, compared to the 6,000 known fossil species. They crowded so closely together that some Mississippian limestone is made up almost entirely of crinoid fragments and is called "crinoidal limestone".

Crinoid calyces are composed of platelets that are firmly knit together in life. The calyx typically falls apart after death, and ocean currents scatter the platelets and arms. The stems consist of disk-shaped plates stacked like poker chips. Like the calyx, stems usually fall apart into individual discs. In Illinois, when I was growing up, folks called these "Indian beads." While such stem fragments are among the most abundant fossils in parts of the Midwest, entire calyces attached to complete stems are rarities to be treasured.

—Jim Brace-Thompson



Pronunciation Guide:

calyx (cā'liks), **calyces** (cā'lə sēz')

crinoid (crī'noid)

Echinoderm (ē kī'nō durm)

phylum (fī'ləm), **phyla** (fī'lə)

The Quiz is open to U.S. residents 17 and younger. Mail your answers to **April Quiz, Rock & Gem magazine, P.O. Box 6925, Ventura, CA 93006-9899**. Five winners will be drawn from the valid entries received by **Apr. 30, 2011**. 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 set of three fossil stamps and a washable-ink pad generously donated by Geodite Minerals (www.geodite.com).

The Quiz

1. Crinoids are echinoderms belonging to the subphylum _____.
2. Crinoids use their arms to capture _____ from the ocean currents.
3. Some Mississippian _____ is made up almost entirely of crinoid fragments.
4. You are most likely to find fossils in _____ rock.
5. True or False: Barite roses are petrified red roses.



Check your answers at www.rockngem.com beginning May 1.

Barite Roses

by Dr. Barry I. Trose

For nearly 20 years now, my lab partners and I have been studying a mineralogical oddity known by mineral collectors as "Barite Roses." In these years, we collected specimens and studied their formation and have come to the conclusion that "Barite Roses" are without question *petrified roses*! Of course, the first clue that led to this conclusion is their shape. They do look like flowers. Their red color is also a hint that they were originally red roses. As you can see in the drawing, barite roses indeed look like flowers!

But a good scientist doesn't just look at a sample and come to a conclusion. One must also test the sample in a variety of ways.

We did the smell test but, unfortunately, discovered that barite roses do not smell like roses. The reason for this is that the smell disappeared when the flowers turned into rock, in this case the mineral barite. In a similar way, petrified dinosaur doo-doo (scientifically called "coprolites") doesn't smell, which is a very good thing. Therefore, we shouldn't expect petrified roses to have any smell, either.

The next test we did was bring a dozen barite roses home to our wives. They were very, very happy to receive them (they are all mineral collectors, anyway) and responded by smiling, saying "Thank you" and giving us hugs and kisses. This is the same reaction we get when we bring home real roses. You can already see that barite roses must be related in some way to real roses.

The last step was to observe the dirt and soil above the barite rose deposits. In the general area, gardeners are able to grow very



nice rose plants. Since roses can grow there now, we conclude they must have grown there thousands of years ago.

To be thorough, we compared barite roses with hematite roses from Austria. Hematite roses are definitely only hematite. They never were roses. We looked and looked and couldn't find a single rose bush growing high in the Alps. This leads to the obvious conclusion that roses have never grown in the Alps and therefore could not become petrified there.

Well, there you have it, scientific proof that barite roses are petrified red roses. We are amazed that scientists never figured this out before now.

And if you believe all of this, all I have to say to you is "April Fools"!

Where to Find Fossils

Fossils are where you find them, but finding them is only half the problem. Knowing where to start looking for them is the other half of the equation. So where do you start?

Fossils are the remains or traces of life that are generally 10,000 years old or older. That means that most of what you see lying about outside—chicken bones, dead leaves, or your brother's sneakers—are not fossils. Fossils are found in sedimentary layers, that is, layers of tiny particles such as sand, mud or silt that are deposited by wind and rain over time. These layers may still be loose, like sand or mud, or they may be solid rocks, like sandstone or shale. If you find sedimentary rocks, then you are on the right track to begin finding fossils.

Learning where not to look for fossils is almost as important. Fossils are not found in rocks that are igneous (formed from molten rock, like lava or granite) or metamorphic rock (rock that has been changed by high temperature or pressure, like gneiss and quartzite). If you learn what the three groups of rocks look like, you can quickly narrow down where to start looking and where not to.

Once you have found sedimentary layers or rocks, you need to find areas exposed by nature or by people. These places might include stream banks, eroded hillsides, beaches, or places where people have dug up material. Any of these places can be dangerous if you are not careful, and it is important to have your parents or another adult help you when you look.

Fossil hunting can be a dirty business. You're not going to see much standing up, so get closer to the ground and see what's there. It is tricky at first, but fossils look different than a regular stone or piece of gravel. Fossils have definite texture or shape that is different from a normal stone. You may get it wrong the first few times, but don't worry. After you have seen a few, you will be able to start picking them out. If you want to compare what you find to other fossils, ask your parents to help you visit <http://MyFossilFind.com>.

—Scott Stepanski



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Show Dates from page 25

APRIL 2011

15-17—SAN DIEGO, CALIFORNIA: Gem Faire—Scottish Rite Event Center, 1895 Camino del Rio S. Gem Faire hours: Fri. 12pm-6pm, Sat. 10am-6pm, Sun. 10am-5pm. Admission \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

15-17—SAN JOSE, CALIFORNIA: 56th annual show, "The Art of Stone"; Santa Clara Valley Gem & Mineral Society; Santa Clara County Fairgrounds, 344 Tully Rd.; Fri. 9-5, Sat. 10-5, Sun. 10-5; adults \$6, children under 12 free, coupon on Web site; 50 dealers, kids' area, demonstrations, speakers, fluorescent display, gold panning, displays; contact Marc Mullaney, (408) 265-1422; e-mail: info@scvgms.org; Web site: www.scvgms.org

15-17—SARASOTA, FLORIDA: Show; Frank Cox Productions; Municipal Auditorium, 801 N. Tamiami Tr. (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

15-17—WICHITA, KANSAS: Show and sale, "World of Wonders"; Cessna Activity Center, 2744 George Washington Blvd.; adults \$5, ages 12-17 \$1, children under 12 free with adult; gemstone jewelry, gems, crystals, beads, agates, polished stones, fossils, rocks, minerals, children's programs; contact Gene Maggard, (316) 742-3746; e-mail: gandpmagard@wildblue.net

16—BELLEVUE, WASHINGTON: Show; Rings & Things; Bellevue Community College, 3000 Landerholm Circle SE; Sat. 11-3; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

16—WOODBURY, MINNESOTA: Show; St. Croix Valley Rock Hounds; Valley Creek Mall, 175 Weir Dr.; Sat. 9-3; free admission; educational show, no vendors, rock and mineral identification; contact Bill Cordua, (715) 425-3139; e-mail: william.s.cordua@uwr.edu

16-17—BENTON HARBOR, MICHIGAN: Show and sale; Blossomland Gem & Mineral Society; Orchards Mall, 1800 Pipestone Rd.; Sat. 10-7, Sun. 11-4; free admission; special presentations on gem faceting and gold panning in Michigan; contact Nancy Wolff, 2816 Thayer Dr., St. Joseph, MI 49085, (269) 983-4900; nancyswolff@hotmail.com

16-17—COLUMBUS, OHIO: Show, "Many Facets of Quartz"; Columbus Rock & Mineral Society, Licking County Rock & Mineral Society; Veterans Memorial, 300 W. Broad St.; Sat. 10-6, Sun. 11-5; adults \$7 (2-day pass \$12), ages 6-16 \$3, under 6, Scouts in uniform, and 4-H free; 27 retail dealers, demonstrations, educational and display exhibits, ID booth, demonstrations, swap area, silent auction, speakers, children's games, free specimens for children, gold panning; contact Ken Harsh, (614) 433-9778 e-mail: karmakenha@aol.com

16-17—EAU CLAIRE, WISCONSIN: 48th annual show; Chippewa Valley Gem & Mineral Society; Eau Claire County Expo Center, Lorch Ave., corner of Hwy. 93 and I94; Sat. 9-5, Sun. 10-4; free admission; silent auction, minerals, fossils, crystals, gems, rocks, artifacts, jewelry, demonstrations, hands-on booth for kids; contact Mike Schoenfeess, (715) 456-0664

16-17—IDAHO FALLS, IDAHO: 46th annual show; Idaho Falls Gem & Mineral Society; Idaho Falls Recreation Center, Memorial St. and B St.; Sat. 10-6, Sun. 10-5; adults \$2, children under 12 free; contact Kevin Landon, (208) 357-3847; e-mail: sklandon@bridgemail.com

16-17—KENNEWICK, WASHINGTON: Annual show; Lakeside Gem & Mineral Club; Benton County Fairgrounds, 1500 S. Oak; Sat. 10-5, Sun. 10-4; adults \$5, children 14 and under free; door prizes, exhibits, dealers, fluorescent display, Kids' Corner, silent auction, geode cracker, demonstrations, gold panning, cabbing, faceting, intarsia, sphere making, wire wrapping; contact Dom Cataldo, PO Box 6652, Kennewick, WA 99336; e-mail: dac@bioguardtech.com

16-17—LOUISVILLE, KENTUCKY: Retail show; Intergalactic Bead & Jewelry Shows; Louisville Executive Hotel & Suites, Grande Belle Hall, 9700 Bluegrass Pkwy.; Sat. 10-5, Sun. 10-5; adults \$5 Sat., \$4 Sun., children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicats; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

16-17—NEWBURY PARK, CALIFORNIA: Show; 37th annual show, "Pageant of a Thousand Gems"; Conejo Gem & Mineral Club; Borchard Park Community Center, 190 Reino Rd., corner of Reino Rd. and Borchard Rd.; Sat. 10-5, Sun. 10-5; free admission; club member exhibits and sales, gems, jewelry, rocks, minerals, fossils, youth activities, lapidary and jewelry-making demonstrations; silent auction, door prizes; contact Richard or Mary Pat Weber, 4290 Misty Meadow St., Moorpark, CA 93021, (805)529-2524; e-mail: rewnews@sbcglobal.net; Web site: www.cgmc.org

16-17—PORTLAND, MAINE: Show and sale; Maine Mineralogical & Geological Society; University of Southern Maine, Sullivan Gymnasium, 96 Falmouth St.; Sat. 10-5, Sun. 10-4; adults \$4, seniors and students \$3, children under 12 free; gold panning, gem cutting, microscope table, silent auctions, kids' mini-mine and spin table, door prizes, grand prize; contact Chad Cramer, (207) 324-8610; e-mail: rocks0102@myfairpoint.net; Web site: www.maine mineralclub.org

16-17—WACO, TEXAS: Annual show; Waco Gem & Mineral Club; Texas State Technical College, Industrial Tech. Bldg., Crest Dr., off I-35, north of Waco; Sat. 10-6, Sun. 11-5; adults \$5 (both days); contact Karen Wood, 2315 Colcord, Waco, TX 76707, (254) 755-7274; e-mail: kwood@hot.rr.com; Web site: www.wacogemandmineral.org

16-17—WALNUT CREEK, CALIFORNIA: Show, "Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, PO Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

16-17—YAKIMA, WASHINGTON: 50th annual show, "Parade of Gems"; Yakima Rock & Mineral Club; Yakima National Guard Armory, 2501 Airport Ln.; Sat. 10-6, Sun. 10-4; adults \$3, kids 12 and under free with adult, military free with uniform and military ID; dealers, demonstrations, gold panning, silent auction, junior activities, grab bag, door prizes, raffle, spin-a-wheel; contact Marti Sondgeroth, 55 W. Washington Ave. #89, Yakima, WA 98903, (509) 248-6401 or (509) 910-3484; e-mail: marthms@q.com

17—WATERLOO, IOWA: Show, "Geodes: Iowa's Rolling Stones"; Black Hawk Gem & Mineral Society; Waterloo Center For The Arts, 225 Commercial St.; Sun. 12-5; free admission; demonstrations, silversmithing, rock tumbling, sphere making, faceting, cab making, silent auction, special displays, dealers, crystals, agates, geodes, fossils, handcrafted jewelry, minerals, fossil plaster casting, pebble pit, fish pond; contact Dave Malm, (319) 266-6433; e-mail: davidmalm@cfu.net

22-24—DECATUR, ILLINOIS: 59th annual show; Central Illinois Gem & Mineral Club; Macon County Fair Grounds, 3700 Westlawn Ave.; Fri. 11-6, Sat. 9-6, Sun. 10-4; adults \$5, seniors (59+) \$2, children under 15 and Scouts or Armed Forces in uniform free; school groups and home schoolers admitted free Sat. 9-3; exhibitors, dealers, demonstrators, Running Water Sluice, door prizes, exhibits, silent auctions; contact Tony Kapta, (217) 233-1164; e-mail: cigmc@comcast.net; or Larry Albro, (217) 520-3394

22-24—DENVER, COLORADO: 2011 spring wholesale/retail show, "Colorado Mineral & Fossil Show"; Martin Zinn Expositions; Holiday Inn - Denver Central, 4849 Bannock St.; Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; 80 wholesale and retail dealers, minerals, fossils, gems, jewelry; contact Martin Zinn Expositions, PO Box 665, Bernalillo, NM 87004-0665; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

22-24—GRANTS PASS, OREGON: Show; Rogue Gem & Geology Club; Josephine County Fairgrounds, 1451 Fairgrounds Rd.; Fri. 9-5, Sat. 9-5, Sun. 9-4; adults \$1, children free; dealers, silent auction, door prizes, displays, demonstrations, kids' games; contact Mary Blankeship, PO Box 1224, Grants Pass, OR 97528, (541) 862-2989; e-mail: rockhoundclub@yahoo.com; Web site: www.roguegemandgeology.com

23-24—CUYAHOGA FALLS, OHIO: Show and sale, "Gemboree: A Celebration of Spring"; Akron Mineral Society, Summit Lapidary Club; Emidio & Sons Expo Center, 48 E. Bath Rd.; Sat. 10-6, Sun. 10-6; adults \$5, seniors and students \$4, children \$1; vendors, door prizes, silent auction, lapidary demonstrations, Gem Mine, make-and-take crafts for children, Easter Egg display; contact Evelyn Tryon, 2028 Tallmadge Rd., Kent, OH 44240, (330) 673-9664; e-mail: gemboree76@yahoo.com; Web site: www.lapidary clubofohio.org

23-24—ELMA, WASHINGTON: Show, "Earth's Treasures"; Grays Harbor Gem & Geology Society; Grays

Harbor County Fairgrounds, 32 Elma/McCleary Rd.; Sat. 10-5, Sun. 10-4; contact Gary Emberly, 624 Fairmont Place, Aberdeen, WA 98520, (360) 533-6196; e-mail: Melissa624@hotmail.com

23-24—JACKSON, MISSISSIPPI: Show and sale, "Greater Southern Event"; Mobile Rock & Mineral Society, Mississippi Gulf Coast Gem & Mineral Society, Nature's Society of Majestic Arts; Trademart Bldg., Mississippi Fairgrounds; Sat. 9-6, Sun. 10-5; dealers, gemstones, minerals, fossils, beads, crystals, rare coins, rough and cut stones, finished jewelry, tools, lapidary supplies, stone carvings, loose precious stones, pearls, gem and gold mining, knapping, faceting, opals, jewelry repairs, demonstrators; contact Sharon McClellan or Stan Bennett, (601) 898-0407; e-mail: stan@tompkinsdesigngrp.com

23-24—MEMPHIS, TENNESSEE: 32nd show; Memphis Archaeological & Geological Society; Memphis International Agrcenter, 7777 Walnut Grove Rd.; Sat. 9-6, Sun. 10-5; adults \$5, children 12 and under \$2, Scouts free; dealers, exhibits, kids' area, speakers; contact W.C. McDaniel, (901) 274-7706; e-mail: info@theearthwideopen.com; Web site: www.TheEarthWideOpen.com

23-24—TROY, OHIO: Show; Brukner Center Gem & Mineral Club; Miami County Fairgrounds, North End Activity Bldg., County Road 25-A; Sat. 10-6, Sun. 10-4; adults \$1, children free; dealers, specimens, gems, jewelry, demonstrations, displays, silent auction, door prizes, free rock for children, mineral identification, children's activities; contact Gene Davis, (937) 667-4160

APRIL-MAY 2011

29-1—IRVINE, KENTUCKY: 4th annual show; City of Irvine, Mountain Mushroom Festival Committee, Blue Grass Gem & Mineral Club; Estill County School's Central Office, 253 Main St.; Fri. 9-3, Sat. 9-7, Sun. 10-5; free admission; Kentucky agate display, fossil and mineral sales, Kentucky agate field trips (register online), 21st Annual Mountain Mushroom Festival; contact Jane Volk, 3133 Dale Hollow Dr., Lexington, KY 40515, (859) 263-9879; e-mail: Jane.volk@insightbb.com; Web site: http://mountainmushroomfestival.org/

29-1—SANTA ROSA, CALIFORNIA: Show; Gem Faire Inc.; Sonoma County Fairgrounds/Grace Pavilion, 1350 Bennett Valley Rd.; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

30-1—ANAHEIM, CALIFORNIA: Show; Searchers Gem & Mineral Society; Brookhurst Community Center, 2271 W. Crescent Ave.; Sat. 10-5, Sun. 10-4:30; free admission; special exhibit, gold panning, jewelry making for kids, silent auction, gemstones, hobby supplies, books, demonstrations, displays, door prizes; contact Beth Pelfrey, (714) 774-2754; e-mail: martin.swiderski@jacobs.com; Web site: www.searchersrocks.org

30-1—CHARLESTON, SOUTH CAROLINA: 20th annual show; Lowcountry Gem & Mineral Society; North Charleston Convention Center Complex Exhibit Hall A, 5001 Coliseum Dr.; Sat. 10-5, Sun. 10-5; free admission; contact Karen Havenstein, 518 Woodland Shores Dr., Charleston, SC 29412, (843) 795-2956; e-mail: fossils@comcast.net

30-1—FRANKLIN, NEW JERSEY: 39th annual show and swap; New Jersey Earth Science Assn., Franklin-Ogdensburg Mineralogical Society, Sterling Hill Mining Museum; Franklin School, 50 Washington Ave.; Sat. 9-5:30, Sun. 10-5; adults \$5, children under 14 free with adult; contact Sterling Hill Mining Museum, (973) 209-7212

30-1—HAMPTON ROADS, VIRGINIA: Retail show; Intergalactic Bead & Jewelry Shows; Howard Johnson, 1815 W. Mercury Blvd.; Sat. 10-5, Sun. 10-5; adults \$5 Sat., \$4 Sun., children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicacies; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

30-1—LUBBOCK, TEXAS: 53rd annual gem and mineral show; Lubbock Gem & Mineral Society; Lubbock Memorial Civic Center, 1501 Mac Davis Ln.; Sat. 10-6, Sun. 10-5; adults (13+) \$4, seniors (65+) \$3, ages 6-12 \$2, under 6 free with adult; wire-wrapped stones, precious stones, jewelry, minerals, fossils, rough rock, dealers, demonstrators, exhibits, hourly door prizes, silent auction, grand prizes; contact Archie Scott, 2709 Belvedere Rd., Levelland, TX 79336, (806) 894-1584; e-mail: archie.scott73@yahoo.com

continued on page 48

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Mineral Collecting Northern Vietnam

Treasures from the Luc Yên Mining District

Story and Photos by David Bright

A few years ago, I purchased two mineral specimens in Ho Chi Minh City (Saigon), Vietnam, while I was passing through after a quick visit to a pearl farm in Nha Trang. One of the specimens consists of well-formed ruby crystals in a mica matrix. The other specimen has red spinel, green pargasite, and brown humite in a marble matrix. I was told by the owner of the rock shop that they came from northern Vietnam. Since that time, I have noticed more and more of these specimens on the market and have learned that the source is the Luc Yên mining district northwest of Hanoi.

In May 2009, I had the opportunity to visit Luc Yên with Vincent Pardieu of the Gemological Institute of America (GIA) laboratory in Bangkok, Dr. Pham Van Long of the Centre for Gem and Gold Research and Identification in Hanoi, and other gemologists. The goal of the trip was to visit as many mining localities as possible and collect samples on the spot.

Our trip began in Hanoi and we arrived two days before our scheduled departure to the Luc Yên mining district. We used our extra time to visit some gem shops in Hanoi, of which there are many, and the gem museum in Ruby Plaza. The gem museum is a private business located on the fourth floor of the Ruby Plaza (44 Le Ngoc Han Road). There are some spectacular pieces in this museum and most of them are available to



Finding ruby and spinel in the eroded conglomerates of the cave at Khoan Thong was an incredible experience!

new owners for the right price! While we were there, we were shown a photo of a 15-ton blue sapphire boulder. Since our visit, this boulder has been placed on display in the museum. Visiting the gem museum or the local gem shops will give you a taste of what is coming from Luc Yên.

For first-time visitors to Vietnam, the chaotic traffic situation may be a little shocking. It is certainly a place where many serious traffic accidents are common. Thankfully, we had rented a van and driver and did not have to deal with the pandemonium ourselves. Once out of Hanoi, the traffic fell away and the ride was a relaxing four hours to Yên Bái. The name Yên Bái refers to both a province and the town that is the administrative center for the province. Luc Yên is a district within the Yên Bái province.

YÊN BÁI

The town of Yên Bái lies approximately 100 miles northwest of Hanoi and marks the beginning of the mining areas. At one time, there was a lively gem market here, but now most dealers have relocated to Hanoi. However, ruby mining is still ongoing around Tan Huang and this area is famous for its star rubies. In 1997, a 2.58 kg ruby was found here that was named the Star of Vietnam. It is a state treasure, but is not currently on public display.

There is also mining on the islands of nearby Thác Bà lake when the water level is low. We visited Tan Huang, but there was no mining activity the day we were there. However, we did walk around the area and we found some small rubies in the windrows along the road. Later, we were shown what



Local miners recover the gold from the ruby sand concentrate of the Bai Chuoy valley. The work is done by hand, and in many places, the activity is not officially sanctioned.



Cut spinel and ruby-sapphire cabochons are a common sight in the Yèn Thé gem market when rain does not drive the dealers away.

the local miners had in stock at that time. Visiting a mine as tourists, we would take a few quick photos, then spend a long time picking through what the miners had to offer.

Once we had our fill of questioning and bargaining with the local miners in Tan Huong, we drove on to Luc Yèn, another 50 miles or so northwest. We made one stop in Truc Lau along the way. This is an area that had been fruitful in the past, and we found one excavation in a rice field. The digging had just started, so the hole had not yet reached a productive depth. Beyond Truc Lau, the mountains began to rise and become more verdant. It was nearly dinnertime when we reached Yèn Thé, the administrative center of the Luc Yèn district. This would be our base for the next few days.

YÈN THÉ (LUC YÈN)

After we checked into our hotel, it was time for dinner. We walked toward a restaurant near the lake, but were distracted by the numerous gem and mineral shops along the way. It seems that nearly every storefront has some marble carvings speckled with ruby, spinel, pargasite and humite. Even after dark, artisans were hard at work on gemstone "paintings". These artists use powdered minerals to make portraits, murals, scenes, and still-life pictures. It was surprising to see these shops open even after we had finished our dinner at about 9 p.m. On the way back to the hotel, I bought a rose carved in marble with spinel and pargasite for about \$20.

The next morning, we woke up early with plans to visit the local gem market and begin our exploration of the mining areas. There had been some heavy rains in the night, which had left the mountains shrouded in fog when we started for breakfast. Light rain continued to fall while we ate. The rain seemed to have scared all the dealers away from the market, so we started to make an orderly visit of every gem shop while we waited for the rain to abate. It did not stop until late after-

noon, however, so we spent the entire day and evening shopping.

We were up at 6 o'clock the next morning to meet for a quick breakfast of noodles. Then we went to see the gem market. It was dry on this day and the dealers were there early. The market is small and it appeared that all the dealers were women. They had their stones displayed on small, low wooden tables and they sat on stools of the same height. The market was busy enough to make it difficult to edge your way in to see what was available. Most of the dealers had cut stones or crystals. The marble carvings had been left back at the shop.

Spinel seemed to be the most common cut stone available, with ruby coming in second. Some sapphires and tourmalines were available, as well. It quickly became clear that the best cut stones were not to be found in the market, but it was fun to look and see what was coming from the surrounding mountains.

An hour in the market was enough and we assembled at a café along the lake for some stout Vietnamese coffee. The taste of it was enough to wake you up, and the caffeine was so concentrated it gave me the feeling that I was ready to fly up any mountain! While we had our drinks, we met some of the important dealers in town, who provided us with a guide for the day. We would start by visiting Bai Chuoy, the closest mining area.

BAI CHUOY

Rubies were discovered in Vietnam in the 1980s. From the late '80s through the '90s, the Vietnamese government and Thai mining companies used heavy equipment to exploit the alluvial deposits. This type of mining ended with the Asian economic crisis of the late 1990s and has not returned. Nowadays, the mining is done by hand and is not officially sanctioned in many places.



Hand specimens with good color and crystal size, like this spinel, are available in Yèn Thé and Hanoi.



The Vietnamese style of imparting artistic flair to mineral specimens can create some striking pieces.



Vietnamese sculptors are skilled at taking advantage of the position and color of minerals in their carvings.



Rubies of bright color are found in a marble matrix at the reclusive Mai Thuong mine.



The area around Tan Huong is famous for its rubies, which have strong color and sharp stars.

Our driver dropped us at the base of a nearby mountain and we began to walk up a road to Bai Chuoy (which means “banana valley” in Vietnamese). The road was steep, but wide and easy to navigate, since it was once used by big trucks and heavy mining equipment. We had an excellent view of the town of Yên Thé and the Bai Lai valley below. At the top of this road, we arrived at the Bai Chuoy valley, where two small mines were being worked (GPS coordinates: 22° 05' 26 N by 104° 46' 05 E).

Just as we arrived at the first mine, the miners plucked a trapiche ruby from the gravel. It was their first find of the day. Their mine was located next to a stream, so they had a ready water source for washing gravel. They excavated by pick and shovel and hauled with a bucket. Our guide was the owner of the second mine and he hurried us to move that way.

The second mine was a bigger operation where several men and boys were working the pit. They had a small water reservoir and pump with a sluice for washing. Their mine was producing ruby, tourmaline, rutile and quartz. We were welcomed with some fresh corn on the cob, which we were eager to consume after our hike up the road.

This was one of the areas that had already been mined by the government, so the stones we saw were small. In this area, even the tiny rubies are marketable, as they are used for gemstone paintings. The concentrate left in the sluice after washing was red sand because of the profusion of ruby grains. Besides the gems, a bit of gold is found here and the concentrate is panned before being sold to the gem painters.

We spent a couple of hours at this mine before heading off to one last spot for the day. Our guide took us up a slope above the mine that would put us on another road. This slope turned out to be a dam that the government mining company had built to create a reservoir for washing the gem-bearing gravel on a large scale. This really made an impression of just how much mining had occurred in this area during the 1990s.

KHOAN THONG

We returned the way we had come until we arrived at an intersection, where we followed another road down a valley to Khoan Thong (GPS coordinates: 22° 05' 33 N by 104° 45' 23 E). Here, a pit created during the excavation with heavy equipment had filled with water, forming a picturesque lake. There were some piles of mine tailings around, but these were mostly hidden by foliage. Across the lake from the road was a small house and a fresh pile of tailings that seemed suspicious, so we decided to investigate.

We had to cross a stream that fed into the lake to get to the tailings pile. As we approached, we could see that the stream was coming from a cave and the tailings were a result of excavating the cave. Once across the stream, it was a scramble up the loose tailings to a position just above the cave entrance. The cave opening was inviting and a shovel and sifting basket were visible from the opening. In the first part of the cave, the ceiling was high enough to allow a man to stand, but it opened up to about 30 feet high farther in. The ceiling had a great hole in it and plenty of light and water rushed in.

The sides and floor of the cave were covered with granules of rock. I scooped up a handful of this material and found one small ruby and spinel. When I looked closely at the walls, I could see more tiny gems imbedded. It looked like this material had been eroded and then deposited as a conglomerate and was once again being eroded. It was not difficult to find these small rubies and spinels all around.

We progressed deeper into the cave, passing under a waterfall and through the open area where the light was entering, then along the stream, past another covered area, and finally to the bottom of another tailings pile. It was a short climb to the ledge of a higher cave where the miners were using pry bars to break away the weathered stone. The temperature outside was hot, but the ruby cave was cool.

On the way out of the cave, I came across a piece conglomerate with a notch eroded

into it. This notch was lined with tiny pieces of ruby and spinel. It was a great specimen, but a bit heavy to carry back, so I reluctantly left it behind. Even though we were running late, we still had time to visit the miner and his wife to buy some stones that they had found. It appeared that they were not finding anything nice over 1 carat or so.

Our group decided to have a quick swim and scratch around in the sand along the lake. Just like in the cave, there were small rubies and spinels to be found in the sand. Our surprise discovery for the day energized us for the hike back down the mountain to our car that was waiting for us below. On the walk back, we realized that it would have been easier and faster had we rented motorcycles, as the road was easily passable for them.

ANH PHU/MINH TIEN

The next morning was a repeat of the previous day: wake up early, eat breakfast, visit the gem market, and stop at the café. We took our van as far as the village of Anh Phu, where we changed to motorcycle

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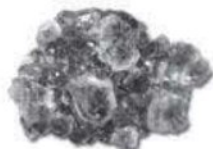
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These men working in a small mine in the Bai Chuoy valley found a trapiche ruby just as we arrived.

transportation. There is a small gem market in the village of Anh Phu and we shopped briefly, but there was not too much to see that morning. Our goal for the day was to make it to the reclusive Mai Thuong mine (GPS coordinates: 22° 02' 04 N by 104° 48' 31 E). This mine is a primary ruby deposit and is the source of most of the ruby-in-matrix carvings available in Vietnam.

Our motorcycles would take us to a group of raised houses at the end of a narrow valley in the Minh Tien commune. From these houses, the white marble cliff of the Cong Truoi mine is visible. Cong Truoi is a primary deposit of spinel. The Mai Thuong mine is on the opposite side of the mountain. One of our motorcycle drivers said he knew a shortcut to Mai Thuong. This is what we really needed, since it was already afternoon before we even started on foot.

From the base, the mountain looks like an inviting hike. The initial approach is gradual, but soon turns steep. Our shortcut would take us over a saddle in the mountain to the far side. Near the top, the steep slope of gravel and soil gave way to eroded marble. As we continued higher, this marble took the form of bladed pinnacles. Some of these were quite pointed, requiring balance and concentration to pass along them safely.

On our way up, we passed two areas in which families were mining for alluvial spinel. The spinel was so abundant that we could just bend over and scoop up handfuls of sand and small spinel crystals in the streambed. Near the miner's house, there were mounds of spinel crystals glistening in the bright sunlight.

As we went farther into the mountain, the marble pinnacles became higher and steeper, with deeper holes below them. Now and then, a tree had been cut in order to form a bridge across the wider gaps. I had never seen such a karst landscape from such a close perspective before, and I can't say that I enjoyed it. We struggled slowly

and carefully behind the guide and finally reached the far side, past the pinnacles.

By now, our local guide was way ahead of us, exploring the area to find the shortest way to Mai Thuong. He looked and looked, but was not able to find a trail. The only people in the bowl between peaks with us were some wood cutters. Our coterie rested and ate some fruit while the guide looked around some more. Finally, he gave up and said that we would have to go back the way we had come.

Crossing back to the other side of the mountain knowing that we had spent a lot of our energy for nothing other than sore backs and legs was frustrating. However, we did make good time and were able to get all the way back to the houses in the valley just as the sun was setting. We were very tired and hungry when we arrived. The family we would stay with that night had a meal of chicken (feet and all), vegetables, rice, and hot tea ready when we arrived.

The family set up mosquito nets for us to sleep under. Space was limited under the nets and the wooden floor was not so soft. To make things a little better, the family laid out some thick blankets for us to sleep on. Sleep was difficult, but the ability to stretch out our weary bodies and rest overnight was enough to recharge our batteries.

Noises from chickens, dogs and cats woke us before 6 a.m. After a large breakfast of rice, fried eggs, vegetables, and hot tea, we began our march to the mountain once again. This morning, we would follow the normal route. Just as the slope began to get steep, we came across an old woman drying vegetables in the sun and a man using a high-pressure hose to wash away the soil in a ravine. We followed his washings downhill to find two men operating a sluice. Beyond the sluice were girls washing gravel in baskets. We visited and rested a while before moving on.

At the top of the steep slope, but below the bare marble of the Cong Truoi mine, sits a congregation of huts covered with blue tarps. This was the base camp for the miners who were busy above, blasting and prying the spinel-bearing marble away from the mountain. The people in the camp welcomed us to have a look at what they had recovered, and later our group had an arm-wrestling competition with the locals. We had our lunch here before moving on again.

Before getting to the most difficult part of the mountain, on the backside, we found miners excavating the pockets between the karst pinnacles. They were finding nice-colored rubies as far as 30 feet down in their narrow holes. One man told us that they had found a fine-quality 10-carat stone within the last month. We were able to purchase what they had on hand for reasonable prices.

The hike to the base of the Mai Thuong mine on the opposite side of the mountain was not as demanding as our hike the previous day, but we did have to negotiate more of the karst pinnacles and log bridges. The explosions from the miners blasting grew louder, so we knew we were on the right track. Mai Thuong means "high clouds" in Vietnamese, and the name is suitable, since the mine is at the top of the mountain. Just like at Cong Truoi, the fresh marble blasted from the mountain is pure white and a sharp contrast to the surrounding green foliage and black weathered marble.

Immediately below the mine is a huge talus slope created by the tailings of the mine. One by one, we climbed up the talus to the ledge where the miners were working. The miners were quite suspicious of us at first, as we may have been the first Westerners to visit this mine. Slowly, they became more comfortable with us and even offered to cook us a lunch of pork and rice.

Even though this mine was quite remote, they had an electric generator and air compressor to power the pneumatic drill they used for blasting. Getting these items so far back in the jungle and up the mountain must have been an unpleasant task. The remoteness and need for lots of food to give the men energy for mining made me wonder how they organized their logistics. The water solution was obvious. They had a pool of rainwater in a tarp supported by a wooden frame. While walking around their hut, I noticed a family of chickens. Animal husbandry seems to be the key to long-term jungle survival.

Our time with the miners only lasted an hour or so, as we had to return the same way we had come. They had plenty of specimens awaiting porters to take them down the mountain. Some of these pieces must have weighed 100 pounds and we did not envy those who had to haul them out. We were free to wander around the active blasting areas and they demonstrated their pneumatic drill for us. However, we did not get to see a



It is common to find cabinet-size crystal specimens of spinel in the gem shops of Yên Thế.

blast or find any rubies still in the marble cliff, as no ruby pockets were exposed.

We made it back to the houses in the valley just at dark. Since we had been successful in seeing all of the mines on that mountain, we decided to ask the motorcycles to come and take us as far as Anh Phu. From Anh Phu we would meet our van to take us back to our air-conditioned hotel in Yên Thế.

The next morning, we set out to visit some more mines in the area near Anh Phu. We only found one active pit in the rice fields and heard of some active and inactive mines in the nearby mountains. The villagers did not have many stones on hand to show us, but we did see that they were finding some rubies and tektites in the Lung Tin valley.

We headed back to Yên Thế for a good overnight rest before leaving for Hanoi the next morning. Even though we had a private car on our tour, it is reasonable to get to Yên Thế by public bus from Hanoi. The buses will not show Yên Thế as their destination. Instead, they will have "Luc Yên" stenciled on them. There are only a few daily buses that run directly from Hanoi to Luc Yên, so it may be easier to take a bus to Yên Bái first and then take the local bus on to Luc Yên (Yên Thế). It is certainly possible to make this trip on a budget, as this is how the locals must do it.

The roads are in good condition all the way to Yên Thế, so a direct bus may take only six hours to get there. The tourist industry is just beginning to grow, so there are not so many people who speak English in the town and no English speakers in the mining areas. It might be a bit cumbersome to not have people understand your every word, but if you're just shopping in the gem market, exact translations are not critical until it comes to the price. One man offered me a nice cabochon for 15,000. I handed him 15,000 Dong and he laughed. He had meant \$15,000! Now it was my turn to laugh. ♥

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Show Dates from page 41

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30-1—MEDFORD, OREGON: 56th annual show, "Diamonds Are Forever"; Roxy Ann Gem & Mineral Society; Medford Armory, 1701 S. Pacific Hwy.; Sat. 9-5:30, Sun. 10-4:30; exhibits, dealers, demonstrations, gold panning, silent auction, children's activities, door prizes; contact Janet Fields, 378 Dexter Way, Grants Pass, OR 97527, (541) 476-8937, or Sandy Roney, 1431 Elaine Way, Medford, OR 97501, (541) 734-0838; e-mail: msroney@prodial.us

30-1—SEATTLE, WASHINGTON: Show; West Seattle Rock Club; Alki Masonic Temple, 4736 40th Ave. SW; Sat. 10-5, Sun. 10-5; contact Audrey Vogelpohl, (206) 932-3292; e-mail: avogelpohl@comcast.net; Web site: www.westseattlerockclub.org

30-1—TOPSFIELD, MASSACHUSETTS: Wholesale and retail show; North Shore Rock & Mineral Club; Topsfield Fairgrounds, Trade Bldg. and Coolidge Hall, Rte. 1 N.; Sat. 9-5, Sun. 10-4; adults \$5, seniors \$3, children under 12 free, coupon on Web site; retail and wholesale dealers, minerals, gemstones, jewelry, beads, lapidary and jewelry supplies, mineral identification, demonstrations, displays, children's gold panning, geode cutting, mineral sifting, spin-a-gem; contact Michele Weisberg, 29 Justin St., Lexington, MA 02420; e-mail: nsmc@verizon.net; Web site: www.nahant.com/nsmc

30-5—JACKSONVILLE, ARKANSAS: Wholesale and retail show; The Bead Market; Jacksonville Community Center, 5 Municipal Dr.; Sat. 10-5, Sun. 10-4; free admission; beads, gemstones, pearls, PMC, seed beads, vintage beads and buttons, glass, lampwork, books, tools, jewelry; contact Rebekah Wills, (903) 240-7198; e-mail: rebekah@thebeadmarket.net; Web site: www.thebeadmarket.net

MAY 2011

1—BLOOMINGTON, MINNESOTA: Show; Rings & Things; Hilton Minneapolis/St. Paul Airport, 3800 American Blvd E.; Sun. 2-7; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

3—GREEN BAY, WISCONSIN: Show; Rings & Things; Suamico Banquet Center, 2310 Lineville Rd.; Tue. 12-4; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

4—MILWAUKEE, WISCONSIN: Show; Rings & Things; Clarion Hotel Airport, 5311 S. Howell Ave.; Wed. 1-5; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

5—SCHILLER PARK, ILLINOIS: Show; Rings & Things; Comfort Suites O'Hare Airport; Wed. 12-4; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

6-8—BISHOP, CALIFORNIA: 10th annual show, "Eastern Sierra Gem & Mineral Show"; Lone Pine Gem & Mineral Society; Tri-County Fairgrounds, Robinson Bldg., Sierra St. and Fair Dr.; Fri. 6-9, Sat. 9:30-5, Sun. 10-3; free admission; field trips, lapidary demonstrations, lampwork beads, flint knapping, sphere making, displays, world's largest fulgurite, local minerals and fossils, spinning wheel, geodes, vendors, door prizes, children's activities; contact Franee Graham, PO Box 667, Lone Pine, CA 93545, (760) 876-4319; e-mail: franceem@qunet.com

6-8—COLUMBIA, MISSOURI: Annual show; Central Missouri Rock & Lapidary Club; Boone County Fairgrounds,

5212 N. Oakland Gravel Rd.; Fri. 1-5, Sat. 10-5, Sun. 10-3; adults \$5, seniors and students \$3, children under 11 free; admission good 3 days, Kidz Mine, demonstrations, mineral exhibits, Midwest dealers; contact Robert McConnell, 1601 N. Earthland Rd., Columbia, MO 65202, (573) 445-5415; e-mail: bobmc@socket.net

6-8—COSTA MESA, CALIFORNIA: Show; Gem Faire Inc.; OC Fair & Event Center/Bldg. 10, 88 Fair Dr.; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

6-8—FRANKLIN, NORTH CAROLINA: Retail show; Franklin Area Chamber of Commerce; Macon County Community Bldg., 1288 Georgia Rd.; Fri. 10-6, Sat. 10-6, Sun. 11-4; adults \$2, under age 16 free; contact Linda Harbuck, 425 Porter St., Franklin, NC 28734, (828) 524-3161; e-mail: lindah@franklin-chamber.com; Web site: www.visitfranklinnc.com

6-8—MARIETTA, GEORGIA: 43rd annual retail show; Georgia Mineral Society; Cobb County Civic Center, 548 Marietta Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 12-5; free admission; more than 30 dealers, door prize for students, auction Sat., demonstrations; contact Tom Batcha, PO Box 15011, Atlanta, GA 30333-5011; e-mail: mayshow@gamineral.org; Web site: www.gamineral.org

6-8—McPHERSON, KANSAS: 19th annual sale and swap; McPherson Gem & Mineral Club; McPherson 4-H Bldg., 710 W. Woodside; Fri. 9-7, Sat. 9-6, Sun. 10:30-3; free admission; buy or swap, rocks, gems, minerals, fossils, jewelry, door prizes, displays, collections, free rock identification, fluorescent mineral exhibit, kid's spin-and-win; contact Jim Nutter, 1611 Jody Ln., McPherson, KS 67460, (620) 241-2433; e-mail: mcphersongemmineral@hotmail.com

7—LANSING, MICHIGAN: Show; Rings & Things; Ramada Lansing Hotel & Conference Center, 7501 W. Saginaw Hwy.; Wed. 12-4; free admission; gemstones not available in our catalog or online store, bead strands, 15% off many gemstone and bead strands, findings and stringing supplies; contact Dave Robertson, PO Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com/Show/index.html

7-8—AITKIN, MINNESOTA: Show and sale, "Cuyuna Agate & Mineral Show"; Cuyuna Rock Club; Aitkin High School, 306 2nd St. NW, three blocks west of spotlight at Hwy. 169 and Hwy. 210; Sat. 9-5, Sun. 10-4; free admission; agates, minerals, jewelry, specimens, mineral art, fossils, fluorescents, lapidary equipment, indoor and outdoor vendors, Ask-the-Wizard-of-Rocks, special Kids' Korner with free prizes, displays, demonstrations, Wheel-of-Rock-Fortune, door prizes; contact Kat Thomas, 45962 Tame Fish Lake Rd., Aitkin, MN 56431, (218) 678-3298; e-mail: katmoose@wildblue.net; Web site: www.cuyunarockclub.org

7-8—BOZEMAN, MONTANA: Show; Bozeman Gem & Mineral Club; Gallatin County Fairgrounds, 901 N. Black; Sat. 10-6, Sun. 10-4; contact Sally Griffin, (406) 451-4362; e-mail: griffin830@yahoo.com; or Dan Carter, (406) 586-4552

7-8—CINCINNATI, OHIO: 46th annual show and sale, "Geofair 2011"; Cincinnati Mineral Society, Cincinnati Dry Dredgers; Cincinnati Gardens, 2250 E. Seymour Ave.; gems, minerals, fossils, jewelry; contact Terry Huizing, 5341 Thrasher Dr., Cincinnati, OH 45247; (513) 574-7142; e-mail: tehuizing@fuse.net; Web site: www.geofair.com

7-8—WASHINGTON, PENNSYLVANIA: Show, "Greater Pittsburg Area Jewelry, Gem, Mineral, Bead & Gift Show; FM Minerals; Washington County Fairgrounds, 2151 N. Main St.; Sat. 10-6, Sun. 10-5; adults \$4, children 12 and under free with an adult; invited dealers, beads, minerals, fossils, metaphysical items, jewelry, gemstones, handmade jewelry, wire wrapping; contact FM Minerals, PO Box 252, Farmington, WV 26571, (304) 825-6845; e-mail: frankoz@juno.com

13-15—ANDERSON, CALIFORNIA: Show, "Northern California Treasures CFMS Show & Convention"; Superior California Gem & Mineral Society; Shasta District Fairgrounds, 1890 Briggs St.; Fri. 9-5, Sat. 9-5, Sun. 10-4; adults \$4, seniors \$3, students \$2, children under 12 free; displays, world-class speakers, auction, demonstrations, raffle, dealers, minerals, fossils, jewelry, gems, beads, supplies, gifts; contact Steve Puderbaugh, 19652 N. Hirsch Court, Anderson, CA 96007, (530) 604-2951; e-mail: steve@applyaline.com; Web site: http://superiorcal.com

13-15—JOPLIN, MISSOURI: 5th annual Outdoor Rock Swap; Tri-State Gem & Mineral Society; Schifferdecker Park, 7th and Schifferdecker Ave.; Fri. 8-6, Sat. 8-6, Sun.

continued on page 62

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Classic Agates



There Are a Handful of Historically Important Sources

Story by Bob Jones

Mineral collectors prize the crystallized forms of quartz as described in “Classic Quartz Crystals” (January 2011). Lapidaries and those who love beautiful stones, on the other hand, enjoy the varieties of quartz that do not develop crystals. The quartz varieties in this category have developed into patterned and colorful hard-stone quartz, from common flint, chalcedony and jasper to the most colorful of all, agate. Each is a useful and attractive form of quartz in its own way. Some are used as weapons, others as tools. Some are decorative stones the amateur lapidary prizes highly.



BOB JONES PHOTO

During the 1800s, German agate hunters found deposits of the colorful, banded silica gems in Brazil virtually by accident, since there was no clear reason for them to search there.

Of all the decorative forms of massive quartz, agate is the most highly prized and is more often used to create objets d’art. Stately homes in America, Russia, England, and many other countries boast a variety of elegant furniture handsomely decorated with slices of colorful agate. While other quartz forms are used in flooring and wall décor, agate is reserved for more elegant and special uses. It is, in a very real sense, the king of cryptocrystalline quartz.

Records show that agate has played an important role throughout the history of jewelry making. It was initially used as ring stones or carved into personal seals. Agate is found in some of the earliest made adornment jewelry. Researchers into the early history of the Near East found decorative jewelry using agates that came from small deposits scattered throughout the Far East and Egypt, deposits no longer known or long since depleted.

It was thought that Sicily was one early source of agate; the gem was named after the Sicilian river Achatés. Recent information contained in an excellent text, however, refutes



BOB JONES PHOTO

Some of the historic, waterwheel-powered agate-grinding mills in Idar-Oberstein, Germany, are still open for tourists to visit.

that claim. *Agates*, by Johann Zenz (Bode-Verlag GmbH, 2009), should be in every reader's library. This text does a superb job of clarifying entire question of Sicilian agate. Zenz also raises an interesting question as to whether agate is really a mineral or actually a rock! It's a subject apart from the theme of this article, but I urge anyone interested in agate as a mineral to obtain a copy of his superbly illustrated text.

Agates were found in various places throughout the world for centuries. The occurrences in Sardinia, Sicily, Egypt, and other Near East lands were local in scope and have not persisted through the centuries or developed into international industries that are ongoing today.

Idar-Oberstein, Germany, on the other hand, is one agate source that has not only survived, but has developed into an internationally famous gem center. These twin cities are at the center of a huge agate-producing area that has yielded a marvelous variety of agates for at least 800 years. There is even plenty of evidence suggesting the Romans knew of and mined agates here. Of all the historic sources we know, Idar-Oberstein was the first to emerge as a major agate producer. It later evolved into a noteworthy classic locality for agates, as well as a leading source of gem-quality objets d'art. Even today, Idar-Oberstein, with satellite industries in the surrounding region, is recognized for its premier position in the gemstone industry.

What I find remarkable is that agates are still being recovered here. Some are collected by rockhounds at some of the area's free digging sites. Other agates come from actual quarrying operations, which



BOB JONES PHOTO

This 6-inch-wide slab of choice Idar-Oberstein agate has been polished to show a variety of "eyes".

are carried on intermittently. On a visit to Idar-Oberstein some years ago, I was able to go underground on tour and actually see agates in the dark-gray Permian rocks, which vary in composition from dacite to andesite. Both are types of volcanic rock. These rocks date to some 250 million to 300 million years ago.

Agates from this area show the full variety of internal features: banding, ruin patterns, escape tubes, eyes, quartz crystal centers, and pseudomorphs after earlier-formed minerals. Banded patterns are mainly fortification designs and the agates include every shade in the spectrum, from

nearly colorless to riotous reds and yellows to delicate blues and violets.

A visit to Idar-Oberstein is a real treat because you can collect agates, visit an old agate mine, and take in several museums including the old waterwheel-powered polishing mill along the Nahe River. A couple of these old water-powered mills, like the Kaulwiesenschleife, are still as they were over 200 years ago. Another, the Weikerschleife, is an old mill and tourist shop!

You can also visit the superb Heimatmuseum or the Deutsches Edelsteinmuseum. These modern museums display superb local agates and objects made from the

colorful, banded gems. A fine collection of mineral specimens complements the agates, but it is the breathtaking examples of the lapidary arts for which Idar-Oberstein is world famous.

Starting with the local agates, the artists of Idar-Oberstein developed their skills in making superb cameos and richly hued bowls whose walls are as thin as paper. Excellent gem carvings featuring animals and natural objects are the hallmark of the area's artists and are among the world's finest!

When the agate source was in full swing, many dozens of workers were employed in the agate industry, either mining or working with the stones. But as supplies diminished in the first quarter of the 1800s, workers were let go and the region's agate industry failed for lack of raw materials.

The discovery of agates of Brazil was a direct result of the depletion of the agate fields in the Idar-Oberstein region. A few adventurous—or desperate—agate workers emigrated to Brazil in the hope of finding new sources of agate for the industry. There is apparently no specific reason they chose Brazil, but remarkably, they found an immense field of agates in the state of Rio Grande do Sul. This resulted in the emergence of what is the largest agate-mining industry today.

The formal discovery of agates in southern Brazil occurred around 1827, though the exact date is not known. The first find was made by a boy who picked up a couple of oddly colored stones on the banks of a river near the town of Soledade. The boy's father recognized what they were and the agate industry of Rio Grande do Sul was born!

The deposit proved to be an enormous one and is still being worked. The region around Soledade along the Rio Jacul is currently producing many tons of agate, which is being shipped around the world. Initially, the bulk of agate from this region was shipped directly to Idar-Oberstein, but most of today's production seems to go everywhere else, with just a fraction ending up in that ancient agate town.

Agates from Brazil occur in every color. Their size exceeds that of any agates found elsewhere; nodules may range well over a foot across, while most agates found elsewhere are seldom more than 6 inches across.

Almost every pattern and color that has been seen before has been found in Brazil's agates. Their fortification bands can be thick or thin, colorless or any color of the rainbow. Some exceptional varieties show an "iris effect" when sliced thin. The bands

in this iris agate organize light like a diffraction grating, creating a rainbow effect that is unique.

While unpacking a 55-gallon drum of sliced agates from Brazil, I noticed that fully 50 percent of the slices that were cut thin enough showed an iris effect. Some pieces were quite intense and others not quite so bright.

Not all Brazilian agate is colorful. Much of it is quite ordinary, with white to gray bands. These agates are not discarded, but are shipped to the town of Lejeado, where a vast agate-dyeing industry has developed. All the pink, blue, green, and riotously colored agate bookends and slices you see in gift shops come from the dyeing sheds around this town.

The Brazilian deposits have produced huge quantities of agate for well over 150 years, sustaining many activities involving agates. The deposits are about 130 million years old and constitute the largest such basalt flow in the world, far exceeding the better known Deccan Plateau in India and the great Northwest volcanic region in the United States. The Brazilian flows cover an area of over 175,000 square miles! No wonder this source is showing no evidence of drying up. For this reason and many more, the Rio Grande do Sul agate beds are surely classic.

Just a little over 100 years after the agate discoveries in Brazil, a very significant find of agates was made in Northern Mexico when Federal Highway 45 was being constructed between El Paso, Texas, and Ciudad Chihuahua in 1945.



BOB JONES PHOTO/LIZZADRO MUSEUM COLLECTION

When Germany's agate sources gave out, the artisans of Idar-Oberstein used Brazilian agate to carve bowls and other decorative objects.

These agates, which are now internationally recognized as being among the best ever found, were actually known over 30 years earlier, but went virtually ignored until they were rediscovered during World War II. Mineral collectors and dealers immediately began surface collecting the agates and, over time, located a half-dozen or more localities, which were usually named for the ranch on which they were found.

The agates from Northern Mexico, which are no longer available in any quantity at all, qualify as classics not only because of when they were found, but because of the quality of their color banding, variety of patterns, and their inclusions.

Unlike the Brazilian agates, which are large as agates go, the Mexican gems are often less than 6 inches across. Regardless of their diminutive size, these agates are a riot of color and a jungle of patterns. The



BOB JONES PHOTO

Many of the agates found in the Idar-Oberstein area, such as this classic beauty, were colored a vivid red.



America's leading quartz gem carver, Harold Van Pelt, carved this rhyton out of choice Brazilian agate.

colors of some are so delicate that some bands appear almost white. Other bands are so intensely colored they dominate the agate. Many have a crystalline quartz center that formed when physical chang-

es caused the internal quartz growth to change from cryptocrystalline agate to rock crystal quartz.

While agates of every color and form are being found all over the world, these

few regions yielded the bulk of what we consider commercially viable quantities of agate. Without Idar-Oberstein, Rio Grande do Sul, and Northern Mexico agate, the agate industry would never have evolved into the major industry it is today. The variety of colors, the remarkable banding, the odd configurations, and the vast quantity of agate from these deposits are the mainstay of talented artists and amateurs alike. Perhaps in the not-too-distant future, we will recognize other sources as being equally important in maintaining the growth and development of agates in the arts and lapidary world.

One such candidate today is Argentina, which has recently emerged as a significant source of choice agate. If the quantity and quality of argentine agates persists, the region will reach classic status as a mainstay of the agate industry. Who knows what the future of the world's agates will bring? 💎

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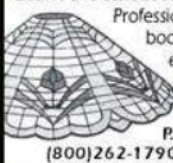
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OFF THE DOP

by Jim Perkins

Aligning the Girdle

Once you have transferred your gem and are ready to cut the crown, you must align the girdle to the master lap; otherwise you may not cut a straight crown girdle line that is parallel to the pavilion girdle line.

No matter how you transfer your stone or what make of machine you have, it is a good idea to check girdle alignment following the transfer process. Many times I find that, after setting the dop into my quill, the girdle is perfectly aligned and I am ready to start grinding. Occasionally, however, I find I need to adjust the alignment slightly and, as the old saying goes, it is better to measure twice and cut once. In my opinion, when the girdle lines of the pavilion and crown are not straight or parallel to each other, they look sloppy and ruin the finished appearance of the gem.

Aligning the girdle is a simple process. Look at the faceting diagram and see what the first girdle facet index is. Set the index to that position and set the angle of inclination to 90°. Place the master lap on the machine and lock it in place with the screw or lap nut that came with your machine. You can lower the stone directly onto the master lap and loosen the screw that holds the rotational movement of the quill. Rock the stone back and forth and feel when the stone's girdle is flat against the master lap, then lock the screw that holds the rotation of the quill back tight.

The other method I prefer is to purchase a girdle alignment tool (part number: 90-067) from The Graves Company in Pompano Beach, Florida. This seldom-advertised accessory is a very handy tool for faceters, in my opinion. It allows you to raise the stone up off the master lap and see that the stone is aligned. I paint the girdle facet with a Sharpie® marker for contrast and, while the stone is resting on the top edge of the girdle aligner, I swipe it back and forth to make a mark on the stone. When the ink is rubbed away across the entire length of the girdle facet, you can be sure it is aligned. If the mark is only on one side of the girdle, you must rotate the quill. This can be done, as stated previously, by loosening a binding screw or simply by using the radial cheater. If you use the cheater, as I usually do, the new position of the cheater becomes zero regardless of the number on the cheater wheel.

After I have aligned the girdle facet parallel to the girdle aligner, which sits on top of my master lap, I put the stone in position to



cut the first crown girdle facet and install my grinding lap. I cut just enough depth all the way around the stone to verify my crown girdle line is straight and parallel. If it is, I go on and set the height of my girdle.

Speaking of girdle height, when cutting the girdle facets with the rough lap or the 600 lap, leave enough material to remove when you revisit them with subsequent laps prior to reaching the polishing stage. Generally, I leave 1 to 2 millimeters of height with the 600 lap and reduce the height to about 0.7 millimeter with the 1200 lap. This results in a medium to medium-thick girdle (between 0.7 millimeter and 0.5 millimeter), which I prefer for jewelry. Thinner girdles are used in competition cutting, as the judges can see mistakes very easily when the girdle is 0.3 millimeter to 0.4 millimeter thick. However, one must be very careful when setting stones with such thin girdles.

Many beginning faceters are as confused about girdle thickness as they are about wax dopping and aligning stones, so these are all important issues to discuss. Once you have mastered wax dopping, girdle alignment, and setting the girdle height of a stone, you can focus on the more important issues, such as good meet points and polishing, which all take time to learn. All faceters struggle with the same issues initially and progress comes faster with instruction from an experienced teacher. However, anyone who really wants to master the science and art of faceting can do it. ♥

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.

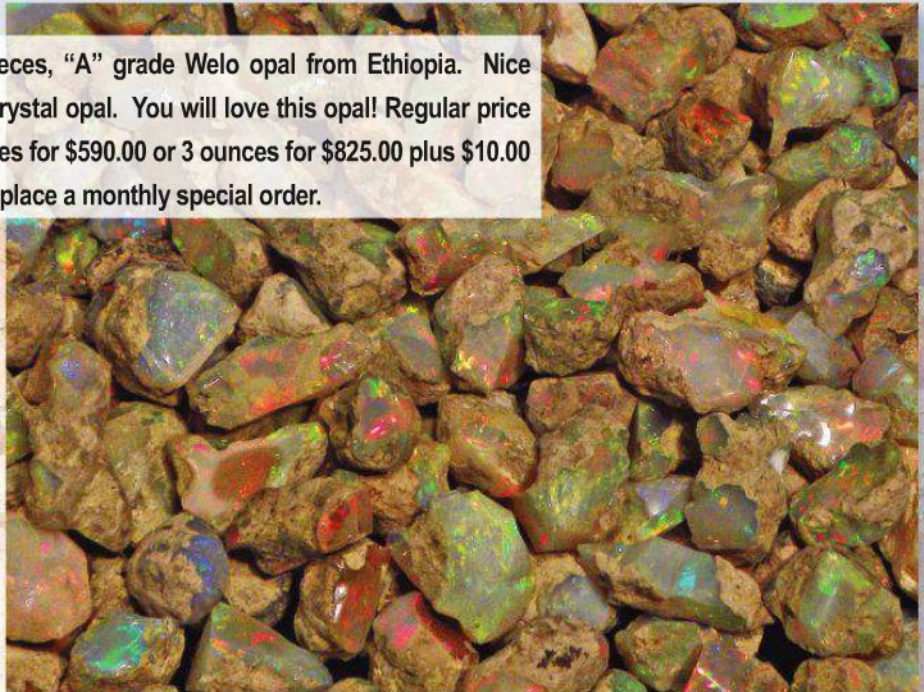


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BALTIC Amber

An Emissary from the Past

Story and Photos by Gaston Lacombe

Look here! In my country, you can find precious stones right on the beach!" said my friend. He was holding a translucent piece of amber about the size of a thimble up to the sun. It was spring of 1992, in Liepaja, Latvia, just a few months after the country had

seceded from the Soviet Union. I was astounded that a gemstone was lying there at our feet for the taking. We continued searching for more amber all afternoon and returned to the tour bus with a small handful of orange nuggets.

It was my first encounter with Baltic amber and it triggered in me a passion that has still not abated. I eventually moved to Latvia, where I lived for 11 years. At every chance I could get, I scoured the country's southwestern beaches for amber. My spouse and I bought a country home in the small seaside village of Jurmalciems, near the Lithuanian border, where, if the wind blows in the right direction and luck is on our side, multiple pieces of the glassy stone glow here and there along the water's edge. When we moved back to North America, a couple of bags filled with amber pieces—about 3 gallons in volume—rattled in our luggage.

AN ORGANIC GEMSTONE

Baltic amber, also known as succinite, is one of the few gemstones (like coral, pearls, ivory and jet) formed by organic materials, in this case fossilized pine resin. When heated, the smell of pine oil still emanates from it. About 90 percent of the world's extractable amber comes from the countries lining the southern and eastern coast of the Baltic Sea. Deposits of amber are also found elsewhere in the world, most notably in the Dominican Republic and Burma, although the material's chemical composition differs slightly from one location to the other.

Around 40 million to 50 million years ago, a vast forest of prehistoric pine trees stood where the Baltic Sea now flows. Through the actions of fluctuating icecaps and tectonic forces, millions of trees were knocked down, carried and buried, and in time, their resin fossilized into amber. The greatest deposits of succinite amber in the world lie in the Russian province of Kaliningrad, a small enclave wedged between Poland and Lithuania. Its mines yield nearly all of the amber now found on the international market. Large reserves of amber also hide at the bottom of the Baltic Sea. Water currents, especially during violent storms, churn up the seabed deposits, and lightweight amber lumps of various sizes float up. The waves and the tides, after having polished these dislodged gemstones into smoothly rounded pebbles, carry them to the surrounding beaches.



The colors of Baltic amber vary widely, from nearly pure white to pale lemon to a dark brick red.

Most amber is translucent and of a clear or reddish orange. However, its colors can range from pale lemon yellow to dark coffee brown, similar to the shades associated with beer. Some pieces of amber are cloudy white or opaque due to numerous air bubbles trapped in the stone. A few exceptionally rare and valuable pieces display blue, green, or even violet tinges. Occasionally, insects, plant particles, or specks of dirt are trapped in the amber, since it once was soft and sticky. Small reptiles have also been encased. These inclusions can help date the amber and allow scientists to study the flora and fauna of prehistoric times. This particular characteristic of the stone became the fanciful premise for the 1990 Michael Crichton novel *Jurassic Park*, which also became a blockbuster movie in 1993. In the story, DNA was extracted from a fly preserved in amber and used to recreate prehistoric life on earth.

AMBER IN HISTORY

Baltic amber played a noticeable role in the history of early humanity, as it was one of the first and most commonly utilized gem



LEFT: On a sunny day, it is easy to spot the glowing pieces of amber on the beaches lining the Baltic Sea.

ABOVE: Amber that contains rare traces of blue is especially valued by collectors and jewelers.

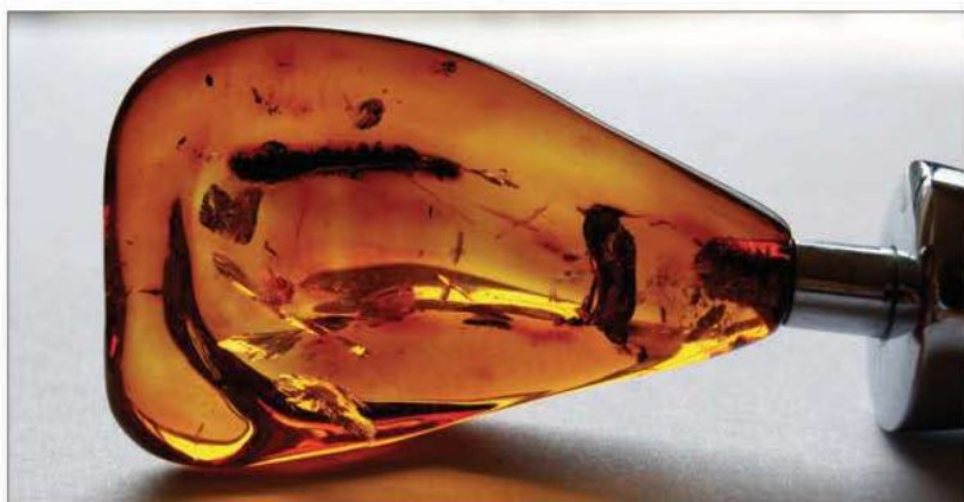
BELOW: Amber that has been heat treated to impose a more uniform color and structure exhibits flat, circular "sun-spangles".

materials. The earliest instances in which humans worked with amber date to as far back as 9000 BCE. Very early on, amber also became a valuable trade currency. The large demand for amber in many ancient civilizations led to the development of thriving commercial routes between the Baltic and Mediterranean seas from roughly 3000 BCE to about the Middle Ages. The circulation of goods along these "amber routes" contributed to an important exchange of cultures, knowledge and technologies throughout the ancient world.

Amber artifacts, mostly jewelry and religious items, appear regularly in archaeological digs in Egypt, Assyria, Greece and Rome, as well as in the Neolithic and Bronze Age sites of Northern Europe. The Egyptians believed that amber protected their mummies from decay and inserted small pieces beneath the wrappings. In Imperial Rome, at the peak in its popularity and value, a piece of amber could be exchanged for a house slave.

The ancient Greeks called amber *elektron*, which means "substance of the sun". They had discovered its ability to become negatively charged when rubbed with a cloth and attract small particles. The word "electricity" is derived from amber's ancient Greek name.

Archeological evidence shows that the ancient Baltic tribes' traditions of extracting and using amber go back more than 5,000 years. The conquest of the eastern Baltic coast by German crusaders in the 13th century, however, radically altered the life of the region's inhabitants. The amber gathering, working and trading customs of local tribes were abruptly brought to an end. The newly established German overlords seized the right to all the amber found on their subjugated territories. For centuries after, teams of serfs were ordered by their masters to gather amber from the beach and the sea, even in



dangerous storm conditions. Stealing amber, owning it without permission, or refusing to surrender it to one's lord was punishable by death on the gallows.

It was at that time, between the 14th and 19th centuries, that large amber-working guilds were established in various parts of Northern Europe and lavish works of amber were created. The most famed masterpiece was the Amber Room in St. Petersburg's Tsarskoye Selo Palace, built in 1713. Dismantled and lost during World War II, it has been recently reconstructed. Only in the 19th century, when the monopoly on amber was lifted, could the coastal people once again collect, own and wear amber.

The Soviet regime, which occupied the Baltic region from 1944 to 1991, also discouraged its citizens from gathering amber. Since the Baltic coast constituted the border of the United Soviet Socialist Republic (USSR), access to the beach and the sea was heavily restricted and only granted in a few specifically designated areas. In addition, for many years the Soviet Army dumped ammunition or detonated bombs around practice

targets in the Baltic Sea, and one of the dangerous chemicals these munitions released in the water was phosphorus, which, in its solid form, can look deceptively similar to amber. Many unlucky gatherers who stuffed a piece of phosphorus in their pockets thinking it was amber were seriously wounded when the toxic material was exposed to air and violently self combusted. On rare occasions, phosphorus is still found on Baltic beaches and amber gatherers have to exert a certain degree of caution.

Today, amber holds a place of immense honor in the Baltic Sea area, including in Latvia, where it is the unofficial "national stone". The name "Dzintars" (Latvian for "amber") graces a large variety of products in Latvia, from cosmetics to a cheese spread, and it is used to designate a number of geographical locations, organizations, concert halls and cultural events. Many Latvians continue to be baptized with the popular names Dzintars (masculine) and Dzintra (feminine). But most visibly, any tourist entering a souvenir shop in Latvia will face an avalanche of amber products, from quality

jewelry to the ubiquitous “amber paintings”, pictures rendered in various colors of amber dust glued to a board.

AMBER ON THE BEACH

Nowadays in Latvia, everyone has legal access to the beach, which is public property in its entirety. There are also no restrictions on beachcombing, gathering or removing washed-up objects, all along the sandy 330-mile coastline. This makes it easy for anyone to look for amber.

The first few years I lived in Latvia, I attempted to extract wisdom on gathering amber from the local inhabitants. Sadly, after half a century behind the Iron Curtain and with limited access to the beaches, few people had any amber knowledge to pass down. Most Latvians were also afraid of encountering phosphorus on the beach, and everyone seemed to know a horror story about some acquaintance getting maimed by an explosion. The advice I received most commonly was to stay away from amber all together.

The one great exception was our neighbor in Jurmalciems, the Latvian poet Olafs Gutmanis. A fist-size piece of amber hangs on a string from the ceiling of his kitchen, and he has been collecting amber longer than anybody else I know. Through the years, he had made friends with the village’s old fishermen, who still remembered the time before World War II when access to the beach and amber was easy. From them, he learned about some of the traditions and collecting techniques associated with amber, which he then wrote about in two books, *Jurmalciems* and *Dzintars*. From Olafs’ wisdom and from my own experience, I soon developed a better understanding of how to find amber on the beaches of southwestern Latvia.

Fortunately, Jurmalciems is located in one of the areas in which amber is most likely to wash up. The nearer the location is to Kaliningrad, where most of the deposits are located, the better the chances of finding sea amber. Since the prevailing marine currents in that part of the Baltic Sea flow north from Kaliningrad toward the Baltic countries, amber readily washes up all along the coast of Lithuania and on the Latvian shore up until approximately the town



Pieces of amber containing millions of air bubbles appear opaque and sometimes have swirling milky patterns. These pieces still have their “bark”, a darker skin that often gets eroded away in the sea.



Amber sometimes contains pieces of organic material that got stuck to the resin in prehistoric times. This piece contains what appears to be a discarded reptile skin.



Rare, large pieces of amber are difficult to find on Baltic beaches, but small nuggets are fairly common and numerous.

of Pavilosta. After Pavilosta, amber is still found, sometimes in great quantities, but the likelihood and the frequency decrease the farther north one goes.

Through ongoing observation, amber collectors can notice patterns in nature that affect the arrival of the gemstone on the shore. Some of the factors include wind directions, currents, the topography of the shore, and the seasons. Although every beachcomber looking for amber would wish for nature’s patterns to be predictable and constant, they are not always so.

Sometimes, perfect weather conditions fail to bring even the smallest shard of amber.

In addition, timing is of utmost importance. You have to be out on the beach by sunrise, hopefully before anybody else has passed, and pray that the night has brought a great amount of debris to sift through. The fickle sea herself sometimes throws strong waves and snatches away her bounty before anybody has had time to reach it. So, taking all of these unpredictable factors into consideration, the most important things when looking for amber are patience and persistence.

A reliable indicator that amber might be coming to the beaches of Latvia is a strong southwesterly wind. Thankfully, this is the dominant wind in the area, and it blows with great strength, especially in the fall. It is extremely unusual for amber to arrive on the shores of Latvia carried by any wind other than a southwesterly. To bring amber to the shore, the wind must have blown with enough force in the preceding few days to churn up larger than usual waves in the sea. Only then will the amber chunks that are sitting on the bottom of the sea or caught in clumps of seaweed be dislodged and sent floating. Amber has a specific gravity of 1.04 to 1.08 and can float in salt water. When it is sent swirling in the waves, it will stay afloat until it hits the shore or will slowly descend back to the bottom if the water’s movement subsides completely.

Usually, while being knocked around in the water, pieces of amber join floating rafts of driftwood, seaweed, and other debris. These floating rafts or clouds of debris may eventually deposit themselves on the shore. Amber is rarely found alone; it nearly always clings to these piles of materials spit out by the sea. To find it, one needs to get down on his or her knees and rake through the debris, a sometimes less than appealing job. The amber contained in these mounds of seashell, seaweed, driftwood, dead fish, and, lately, hardened crude oil will reveal itself, but only until the next strong wave carries everything back to sea.

No special equipment is needed for picking amber on the beaches of Latvia. It is recommended, though, that you deposit your

finds in a plastic container. Then, if you have the bad luck of finding an odd piece of phosphorus, at least it will not start burning in your pocket. Serious collectors should also wear rubber boots in colder weather, since some amber pieces never quite make it to shore and you might have to wade in the shallows. A net with small holes can make it easier to grab floating amber. You can haul the flotsam to shore instead of attempting to sort through it in the water.

Because of its density and buoyancy, amber tends to huddle in the water with certain debris and keep away from other kinds. For example, amber is usually found with small, black mussel shells and almost never with the larger, white clam shells. It often accompanies small pieces of driftwood, but rarely washes up with reeds. Beach debris containing a large proportion of small pebbles seldom includes amber. In the fall, however, when the sea sheds massive, knee-deep heaps of wiry black seaweed for miles on end, few of these rules apply. The seaweed creates a thick lattice over the surface of the sea, trapping all the debris, and amber could be carried anywhere. For centuries, the inhabitants of Jūrmalciems have been harvesting this thick layer of seaweed from the beach in the fall to use as fertilizer. In the process, pounds of amber are discovered every year.

Finding large pieces of amber in the ground in Latvia is possible, but rare. For many centuries, the coast of southwestern Latvia has been advancing on the sea. Places that were thriving seaports less than 1,000 years ago are now five or six miles inland. While receding, the sea left behind large sand dunes, some of which include lumps of amber. There are historical accounts of plows pulling up large chunks of amber from fields and other pieces being found during construction projects. However, amber mines like the ones located in Kaliningrad have not yet been discovered in Latvian territory.

A VERSATILE GEM

The most widespread use of amber today, as in ancient times, is in jewelry. It is highly valued for creating ornaments, since it is soft enough (Mohs 2-2.5) to be carved readily and still takes a high polish. In the Baltic countries, contemporary jewelers often base their designs on folkloric traditions retained by the inhabitants of the coast or on ancient archeological finds, but modern trends using atypical shapes and materials are gaining in favor.

In Latvia, with the nationalist movement of the 1980s and the return to independence in 1991, there was a resurgence in



Baltic Sea amber is most commonly found on the shores of Poland, Kaliningrad, Lithuania and Latvia, deposited by the waves and tides.

the popularity of traditional jewelry, including pieces using amber. This trend is still going strong, but now most of the buyers are tourists. Taking advantage of this profitable business, many private jewelers' workshops nowadays create a wide variety of amber art pieces—anything from key-chains to lamps—which are sold in the capital's many souvenir shops and street stands. While some especially patriotic artists only make use of amber that washed up on Latvia's shores, most others nowadays work with amber that comes from the Kaliningrad mines.

Artisans use a number of techniques to enhance amber when making it into ornaments. The most common one is heating the stone (sometimes while it is immersed in linseed oil) to between 250°F and 350°F. This clarifies the color, giving it a more uniform tone, gets rid of some impurities, and helps conceal small fissures. Other heating methods, using salts and chemicals, are also used to modify the stone's color. Almost always during this heating process, "sun-spangles", small circular fissures, form inside the stone from the explosion of air bubbles. Although some seek the sun-spangles because they give the stone a certain luminosity, buyers who prefer the stone in its raw state stay away from them, since they are a telltale sign that the piece has been enhanced or modified.

Another common modification of amber is pressing together small pieces to create "ambroids" or "pressed amber". When gradually heated, amber becomes soft and malleable, and it can be shaped. Irregular or small pieces and otherwise unusable fragments leftover from working amber, are carefully heated at 280°F to 480°F and compressed into a uniform mass by intense hydraulic pressure (3000 atmospheres) to expel air bubbles. Most often, the resulting stone is cloudy and lacks the brilliance of natural amber. Because pressed amber is harder than intact amber, this product is extensively used in the production of cheap

jewelry and smoking articles like pipes and cigarette holders.

Unfortunately, amber is easy to counterfeit, and buyers need to beware. Even products that are made from true amber can sometimes fool the buyer. Insects and other organic debris can easily be inserted into amber or "pressed amber" during the heating process and the pieces sold as if the inclusion were authentic. Plastic or glass counterfeits also appear for sale, especially in Eastern European street markets, where there is little quality control. The buyer can use various techniques to authenticate the amber, such as touching it with a heated needle

to check for an odor of wood resin or rubbing it with a cloth to verify its electrostatic properties. However, the only sure way to be certain your amber is not counterfeit is to do some research before shopping and to buy only from a reputable jeweler.

Many other industries also make use of amber. For many millennia, amber has been claimed to hold curative properties, because of its high content of succinic acid (3 to 8 percent). The cosmetics industry and homeopathic medicine incorporate the acid distilled from amber or the powdered stone itself into some of their products, such as creams, tonics or pills. Derivatives of amber are also used as electric insulators, as components in some paints and varnishes, and in the creation of certain bonding agents. The optics industry also uses products originating from amber in developing lenses. Suffice it to say that this organic stone has fascinated researchers since ancient times, and its list of real and perceived properties is quite long.

In my opinion, though, the best use one can make of amber is simply to appreciate it in its natural form, unmodified, unpolished and unadorned. I have kept every single piece of amber I have found on the beaches of Latvia with all their impurities, fracture lines, and color variations. They all still have the soft patina they acquired from rocking in the sand at the bottom of the Baltic Sea since time immemorial, and remain the way nature has shaped them. At home, they are part of our household decorations, spread around the apartment in crystal vases and dishes for all to touch and admire.

The Canadian singer-songwriter Jane Siberry wrote, "Holding your amber to the light, I see centuries of you" ("Broken Birds"). These lines express well what I feel toward my collection of amber. For me, every piece is an emissary from the earth's prehistoric past, and each one offers a glimpse into the history of a time we shall never fully understand. 💎

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13-15—SARASOTA, FLORIDA: Show; Frank Cox Productions; Municipal Auditorium, 801 N. Tamiami Tr. (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

14-15—DULUTH, GEORGIA: Retail show; Intergalactic Bead & Jewelry Shows; Gwinnett Center, Hall C, 6400 Sugarloaf Pkwy.; Sat. 10-5, Sun. 10-5; adults \$5 Sat., \$4 Sun., children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicats; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

14-15—FOUNTAIN HILLS, ARIZONA: Retail show; Rick Obermiller; Fountain Hills Community Center, 13001 N. La Montana Dr.; Sat. 10-5, Sun. 10-4; adults \$2, children under 12 free; indoor show, mostly Arizona dealers, gems, minerals, jewelry, fossils, kids' activities, drawings, raffles; contact Rick Obermiller, 1332 N. Jesse St., Chandler, AZ 85225-1598, (602)826-2218; e-mail: obrocks@gmail.com

14-15—HAMILTON, MONTANA: Annual show; Bitterroot Gem & Mineral Society; First Interstate Events Center, Ravalli County Fair Grounds, 100 Old Corvallis Rd.; Sat. 9-5, Sun. 9-4; contact Steve Vieth, (406) 369-5489; e-mail: viethsteve88@gmail.com; or Mike McConnell, (406) 360-4944; e-mail: micker1949@yahoo.com

14-15—LEESPORT, PENNSYLVANIA: 43rd annual show, "World of Gems and Minerals"; Berks Mineralogical Society; Leesport Farmers Market Banquet Hall, Rte. 61; Sat. 10-5, Sun. 10-4; contact Jim Woodeshick, 246 State St., Hamburg, PA 19526; e-mail: brwoodpile@yahoo.com

14-15—WAUWATOSA, WISCONSIN: 54th annual show; Wisconsin Geological Society; Mueller Bldg., Hart Park, 72nd and W. State St.; Sat. 10-5, Sun. 10-4; adults \$3 (2 for \$5), children under 16 free with adult; 22 Midwest dealers, lapidary supplies, tools, books, rough material, slabs, finished specimens, cabochons, jewelry, carvings, fossils, children's activities, exhibits, displays, presentations; contact Paul Schmidt, 8213 Red Arrow Ct., Wauwatosa, WI 53213, (414) 771-8668; e-mail: pvs@wi.rr.com

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20-22—MARTINSVILLE, VIRGINIA: 21st annual show; Treasures Of The Earth Gem & Jewelry Shows; 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, 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, sluice; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

20-22—SANTA ANA, CALIFORNIA: Wholesale/retail show, "Spring West Coast Gem & Mineral Show"; Martin Zinn Expositions; Holiday Inn-Orange County Airport, 2726 S. Grand Ave.; Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; open to the public, more than 80 wholesale and retail dealers, minerals, fossils, gems, jewelry, lapidary supplies; contact Martin Zinn Expositions LLC, PO Box 665, Bernalillo, NM 87004-0665, (505) 867-0425

20-22—SANTA BARBARA, CALIFORNIA: Show; Gem Faire Inc.; Earl Warren Showgrounds/Exhibit Hall, 3400 Calle Real; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

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20-22—SOUTHGATE, MICHIGAN: Show, "Southeastern Michigan Gem & Mineral Show"; Midwest Mineralogical & Lapidary Society of Michigan; Southgate Arena, 14700 Reaume Pkwy.; Fri. 2-7, Sat. 10-6, Sun. 11-5; contact Rich Williams, 15816 DuPage, Taylor, MI 48180, (734) 374-2279; e-mail: Richinmich53@aol.com

21-22—HERMISTON, OREGON: Annual show; Hatrock-hound Gem & Mineral Society; Hermiston Conference Center, 415 S. Hwy. 395; Sat. 10-6, Sun. 10-4; adults \$2, 15 and under free with an adult; contact Mike Filarski, (541) 922-5091; e-mail: stonemorlin1@netscape.net

21-22—JACKSON, CALIFORNIA: 11th annual Tailgate Gemboree; Fossils For Fun Society; Kennedy Gold Mine, 12954 Kennedy Mine Rd.; Sat. 9-5, Sun. 9-5; free admission; indoor exhibits, outdoor dealers, rocks, gems, minerals, fossils, Sat. auctions, surface mine tours, gold panning; contact Debbie Bunn, PO Box 255702, Sacramento, CA 95642, (916) 929-6665; e-mail: fossilsforfun@hotmail.com; Web site: www.fossilsforfun.org

21-22—MURFREESBORO, ARKANSAS: Retail show; Crater of Diamonds State Park; Diamond Discovery Center, 209 State Park Rd.; Sat. 8:30-4:30, Sun. 8:30-4:30; free admission; wire wrapping demonstrations, rock and mineral identification, diamond hunting (adults \$7, children \$4); contact Margi Jenks, 209 State Park Rd., Murfreesboro, AR 71958, (870) 285-3116; e-mail: margaret.jenks@arkansas.gov; Web site: www.craterofdiamondsstatepark.com

21-22—NASHVILLE, TENNESSEE: Retail show; Intergalactic Bead & Jewelry Shows; Al Menah Shrine Temple, 1354 Brick Church Pike; Sat. 10-5, Sun. 10-5; adults \$5 Sat., \$4 Sun., children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicats; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

21-22—PITTSBURGH, PENNSYLVANIA: Annual show; Mineralogical Society of Northeast Pennsylvania; St. Joseph's Oblates Seminary, 1880 Rte. 315; Sat. 10-5, Sun. 10-4; adults \$3, children 12 and under free; Dinosaur Land Children's Corner, UV light show, exhibits, demonstrations, door prizes; contact Linda Williams, 615 E. Grant St., Olyphant, PA 18447, (717) 319-8334; e-mail: lwilliams@excaliburinsmgmt.com

27-29—SALEM, VIRGINIA: 20th annual show, "Roanoke Valley Spring Gem & Mineral Show"; Treasures Of The Earth Gem & Jewelry Shows; Salem Civic Center, 1001 Boulevard; Fri. 10-6, Sat. 10-6, Sun. 11-6; adults \$4 (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, children's gift; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

27-30—SCOTTSDUFF, NEBRASKA: Retail show; Panhandle Rock & Gem Club; Riverside Zoo Campground, 1600 S. Beltline Hwy. W.; Fri. 8-5; Sat. 8-5, Sun. 8-5, Mon. 8-5; free admission; Raffle and Auction Sat.; contact Dale Tikalsky, 523 W. 20th St., Scottsbluff, NE 69361, (308) 631-7814; e-mail: tikalsky21@charter.net

28-29—FORT WORTH, TEXAS: 60th annual show, "Marvelous Minerals"; Fort Worth Gem & Mineral Club; Will Rogers Memorial Center, 3401 W. Lancaster; Sat. 9-6, Sun. 10-5; adults \$5, seniors and students \$4, ages 16 and under free; more than 25 dealers, exhibits, kids' games, door prizes, grand prize, silent auction; contact Steve Hilliard, PO Box 418, Decatur, TX 76234, (817) 925-5760; e-mail: fwgmc@embarqmail.com; Web site: www.fortworthgemandmineralclub.org

28-29—WHEATON, ILLINOIS: 35th annual show and sale; Chicagoland Gems & Minerals Association; Dupage County Fairgrounds, 2015 W. Manchester Rd.; Sat. 10-6, Sun. 10-5; adults \$5, seniors and students \$3, service personnel with ID and children under 13 free; dealers, beads, books, equipment, fossils, gemstones, handcrafted jewelry, minerals, supplies, tools, demonstrations, cabochon cutting, faceting, fossil preparation, gem trees, glass fusing, glass marble making, intarsia, jewelry making, micro mounts, scrimshaw, silver smithing, opal cutting, wire wrapping, exhibits, minerals, fossils, lapidary, gems, silent auctions, door prizes, Kids' Corner; contact Rich Dillon, PO Box 360, Wasco, IL 60183-0360, (630) 377-0197; e-mail: cgma@sbcglobal.net; Web site: www.chicagolandgemshow.org

continued on page 71

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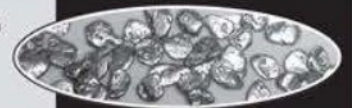


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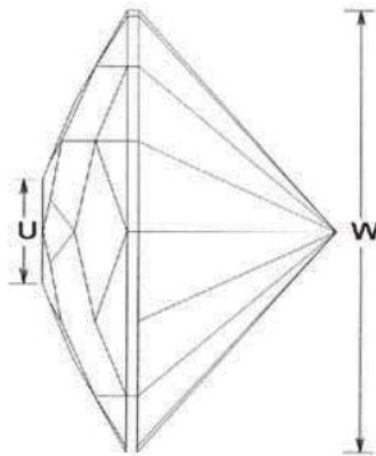
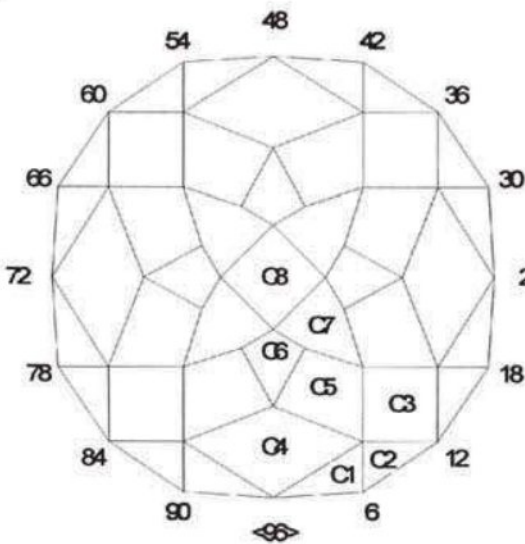
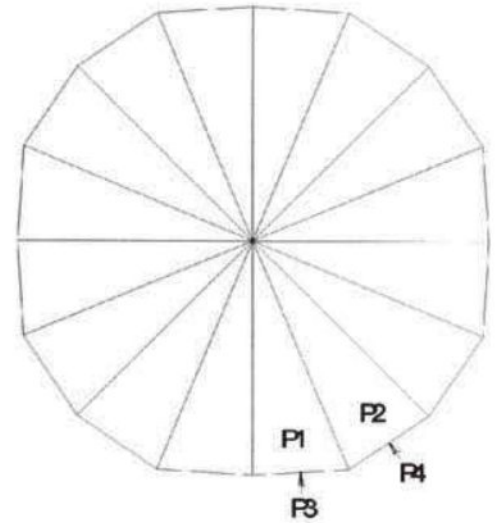
Here is an easy cushion-shaped design for quartz, although it should work well for a variety of materials. Since it is pure meet-point, no pre-form is needed to establish the proper dimensions.

The pavilion is very simple, with the patterning coming from the crown. Take care on the last few crown tiers, as the facets are small and will cut in quickly.

I cut this in a piece of amethyst with a very deep, pretty purple shade. The design produced a pleasing pattern while allowing enough brilliance to show. If you cut this in lighter-colored quartz material, such as light citrine or paler amethyst, you may consider increasing the pavilion angles to both deepen the color and create a slightly better tilt. One such group of angles is 43° for P1 and 42° for P2.

I hope you enjoy cutting this design and I would love to hear from you if you do. Happy faceting!

—David Groncki
djgroncki@comcast.net



DJG Quartz Cushion

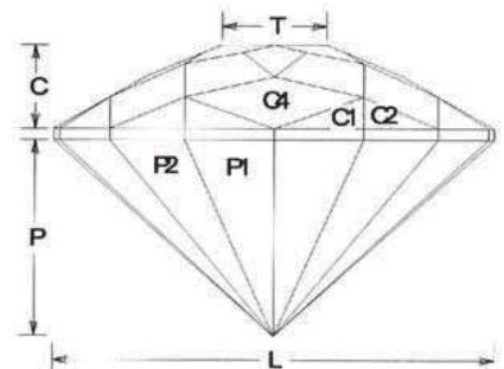
©David Groncki 2010
Angles for R.I. = 1.540
57 + 16 girdles = 73 facets
4-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.240
U/W = 0.240
P/W = 0.446 C/W = 0.190
Vol./W³ = 0.222

PAVILION

P1	41.80°	01-23-25-47-49-71-73-95	PCP
P2	40.80°	09-15-33-39-57-63-81-87	Cut to CP
P3	90.00°	01-23-25-47-49-71-73-95	Establish width
P4	90.00°	09-15-33-39-57-63-81-87	MP @ P1,P2

CROWN

C1	33.00°	01-23-25-47-49-71-73-95	Set girdle height
C2	37.95°	09-15-33-39-57-63-81-87	Level girdle
C3	31.50°	12-36-60-84	GMP
C4	30.15°	96-24-48-72	GMP
C5	23.60°	02-22-26-46-50-70-74-94	MP @ C1,C2
C6	21.95°	96-24-48-72	MP @ C4
C7	11.75°	12-36-60-84	MP @ C3
C8	0.00°	Table	MP @ C6



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Picks & Pans from page 6

Mineral Perspectives: Thumbnails, Vol. 1

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It's never hard to get a collector to talk about his specimens, but rarely are those conversations so well documented as in this DVD. Mineral Perspectives is the title of a new series that takes the viewer into the homes of some of the most respected mineral collectors in the United States to view and discuss significant specimens from their collections.

This first installment examines more than 60 thumbnail-size specimens in the collections of Carolyn Manchester, Wendell Wilson and Rich Olsen. As host James Houran and the collectors narrate, the viewer is treated to a 360-degree close-up view of each piece. Thanks to innovative photography, every detail comes across so clearly it's hard to believe each specimen is only a few centimeters tall.

The goal of the series is education, and hobbyists can certainly gain a lot of insight, as well as enjoyment, from these collectors' comments and from the stories they have to tell about how the various specimens came into their hands. As Wilson says, "part of the fun of having a collection is sharing it with other collectors." (BlueCap Productions, 2011)

—Lynn Varon



Meteorites

by Caroline Smith, Sara Russell and Gretchen Benedix

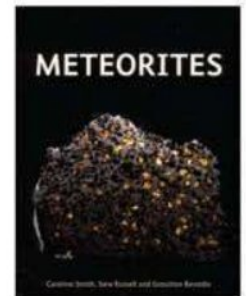
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Humans have long been fascinated by meteorites, but it was not until the 18th century that they became objects of scientific study, recognized and valued for what they can tell us about the heavenly bodies in our solar system.

Meteorites is an introduction to the science surrounding meteorites that incorporates findings from the study of the most recent meteor falls. It discusses the evidence of meteoric impact on the earth and other planets and describes the sources and types of meteorites. A chapter on comets traces the historical interpretations of these natural phenomena, as well as the scientific discoveries that have been made about them. The sources and types of meteorites are the subject of another chapter.

The text is written in clear, uncomplicated language by experts from the Natural History Museum in London, England. Smith is the museum's Curator of Meteorites, Russell is the Head and Benedix is a researcher in Meteoritics and Cosmic Mineralogy. The 112-page softcover book is illustrated with more than 100 photos, drawings and charts. (Firefly Books Ltd., 2011)

—Lynn Varon



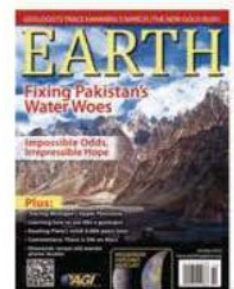
Earth magazine

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There is much to interest the rockhound in the monthly magazine *Earth*. It covers a variety of earth sciences, including geology, mineralogy, paleontology, meteorology and seismology. Study of these sister sciences can give a broader perspective to the study of minerals and their sources.

In the October 2010 issue, history meets geology as geoscientists use ancient descriptions of geological features to map Hannibal's exact route through the Alps to Rome in 218 BCE. The feature "Travels in Geology" examines Michigan's Upper Peninsula, while another story explains how "Eyetrackers Train Students to See Like Geologists". Collectors of the fine gems and mineral specimens coming from Pakistan may be interested in reading about efforts to manage water resources in that country. Short news items cover the value of diamonds in mantle mapping efforts, new fossil discoveries, and book reviews. Monthly columns include a Geologic Column and Mineral Resource of the Month. (American Geological Institute)

—Lynn Varon



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JUNE 2011

3-5—PUYALLUP, WASHINGTON: Annual show; Puyallup Valley Gem & Mineral Club; Fruitland Grange, 11102 86th Ave. E.; Fri. 12-5, Sat. 10-5, Sun. 11-4; contact Nancy LeMay, (253) 952-6212; e-mail: bees2knees@att.net; Web site: www.puyallupgemclub.org

3-5—TULSA, OKLAHOMA: Show; Gem Faire Inc.; Expo Square/Central Park Hall, 4145 E. 21st St.; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

3-5—WOODLAND HILLS, CALIFORNIA: Show; Rockatomics Gem & Mineral Society; Pierce College Farm, 20800 Victory Blvd.; Fri. 9-5, Sat. 9-5, Sun. 9-5; contact Gary Levitt, (818) 993-3802, (818) 321-6290; e-mail: Show@rockatomics.org; Web site: www.Rockatomics.org

4—DELTA, COLORADO: Show; Delta County Rock Wranglers; Heddles Recreation Center, 530 Gunnison River Dr.; Sat. 9-5; free admission; dealers, exhibits, door prizes, family activities; contact Harry Masinton, (970) 856-3861

4-5—GLEN DORA, CALIFORNIA: Show; Glendora GEMS; Goddard Middle School, 859 E. Sierra Madre; Sat. 10-5, Sun. 10-4; contact Bonnie Bidwell, (626) 963-4638; e-mail: Ybidwell2@aol.com

4-5—LA HABRA, CALIFORNIA: Show, "Jubilee of Gems"; North Orange County Gem & Mineral Society, City of La Habra; La Habra Community Center, 101 W. La Habra Blvd.; Sat. 10-5, Sun. 10-5; free admission; dealers, demonstrators, exhibits, youth activities, geode cutting, raffle prizes, lapidary equipment and supplies, handcrafted jewelry; contact Dave Swanston, (626) 912-1531; Web site: www.nocgms.com

4-5—RALEIGH, NORTH CAROLINA: Retail show; Intergalactic Bead & Jewelry Shows; Holiday Inn Brownstone Hotel & Conference Center, Presidential Ballroom, 1707 Hillsborough St.; Sat. 10-5, Sun. 10-5; adults \$5 Sat., \$4 Sun., children under 12 free; dealers, precious and semiprecious gemstone beads, sterling silver, findings, freshwater pearls, hand-blown glass, vintage beads, crystals, delicás; contact Angela Couch, (888) 729-6904; e-mail: angela.couch@beadshows.com; Web site: www.beadshows.com

4-5—SAN FRANCISCO, CALIFORNIA: Show, "San Francisco Crystal Fair"; Pacific Crystal Guild; Fort Mason Center, 99 Marina Blvd.; Sat. 10-6, Sun. 10-4; adults \$6, ages 12 and under free; 30 dealers, minerals, gems, crystals, beads, metaphysical healing tools; contact Jerry Tomlinson, PO Box 1371, Sausalito, CA 94966, (415) 383-7837; e-mail: jerry@crystalfair.com; Web site: www.crystalfair.com

4-5—STAFFORD, TEXAS: Wholesale and retail show; The Bead Market; Stafford Centre, 10505 Cash Rd.; Sat. 10-5, Sun. 10-4; free admission; dealers, gemstones, pearls, glass, lampwork, seed beads, silver, bone beads, findings, tools, books, jewelry; contact Rebekah Wills, (903) 240-7198; e-mail: rebekah@thebeadmarket.net; Web site: www.thebeadmarket.net

10-12—ALBUQUERQUE, NEW MEXICO: Show; Gem Faire Inc.; New Mexico State Fairgrounds, 300 San Pedro NE; Fri. 12-6, Sat. 10-6, Sun. 10-5; \$7 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

10-12—PARK HILLS, MISSOURI: 14th annual swap, show and sale; Mineral Area Gem & Mineral Society; Missouri Mines State Historic Site at St. Joe State Park, south side of Hwy. 32, 1.5 miles west of US Hwy. 67; Fri. 9-6, Sat. 9-6, Sun. 9-4; free admission; swap, sell, buy, rocks, minerals, fossils, rock jewelry, crafts, visit State Historic Site and Mining-Mineral Museum free, auctions, rocks, minerals, rock jewelry; contact Boneta Hensley, PO Box 492, Park Hills, MO 63601, (573) 760-0488; e-mail: mojellybean63@yahoo.com

10-12—RALEIGH, NORTH CAROLINA: Show; Frank Cox Productions; State Fairgrounds, 1025 Blue Ridge Rd.; 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

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Remembering Jeff Kurtzeman

Rock & Gem lost one of its very important early contributors when photographer and writer Jeff Kurtzeman passed away Dec. 22, 2010. Jeff was an expert photographer with whom I worked for years. All my early articles in *Rock & Gem*, beginning in the 1970s, were illustrated with his photographs.

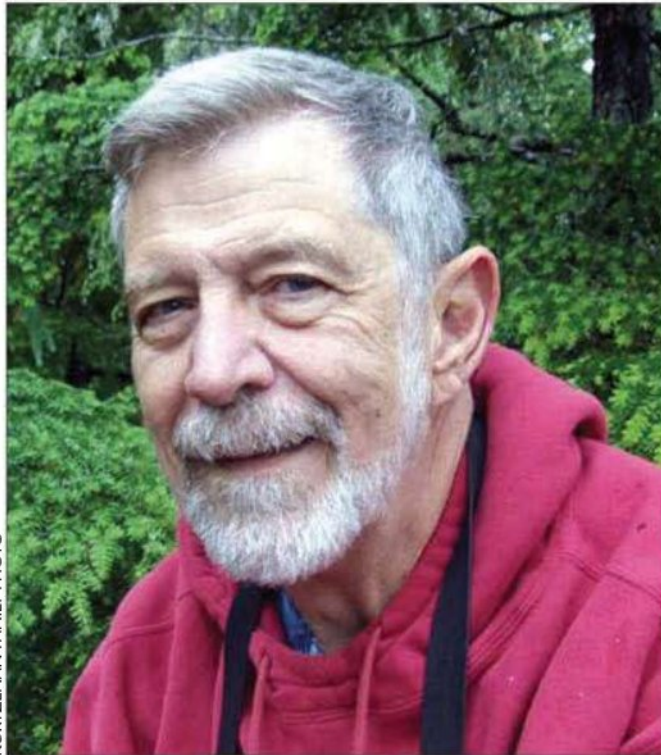
My association with Jeff began in 1972 when Joe Stacey, then editor of *Arizona Highways* magazine, brought us together to do an article on Arizona minerals (May 1972 issue). *Arizona Highways* is that state's major publication and has won countless awards for its superb photography, which often highlights the state's geologic wonders.

That assignment so many years ago was the beginning of a wonderful association that benefited *Rock & Gem* and certainly contributed immensely to its growth. The benefit to me persists to this very day.

When Jeff and I worked on the Arizona mineral article, we enjoyed a number of adventures together. One trip we took was into the open-pit copper mine at Bagdad, Arizona. We were allowed into the pit to photograph a wonderful seam of malachite-chrysocolla that had been exposed during mining operations. Our guide, the mine superintendent, loaded us, along with Jeff's camera equipment, into his pickup truck and drove to the bottom of the pit so we could check out the exposed colorful mineral seam.

Long before we had gotten to the pit, much of the gem-grade malachite-chrysocolla had been exposed by blasting and had been stockpiled in the middle of the pit, where it was off limits to anyone except mine workers. A sign on that huge pile of rock read "No collecting allowed", which was obviously intended to keep miners at bay. That did not stop the mine superintendent from collecting, though. While we were setting up to study and film the mineral occurrence, this pit boss was very busy throwing as many gem rocks into the back of his truck as he could!

Another mine Jeff and I were able to visit is the now-closed underground copper-silver mine at Superior, Arizona. This deep sulfide mine was very rich, which



Jeff Kurtzeman is remembered by his friends as a special guy who gave much to humankind and asked nothing in return!

warranted the more expensive underground effort. The Magma mine was also noted for superb calcites, barites, and other gangue minerals.

The interesting thing about that mine was its depth, about 5,000 feet. To get to the working face, we had to join a work crew going on shift and be dropped to the lowest level of the mine via a very rapid elevator! We had been warned it would be a bit warm down there. That was an understatement. The rock face was 148°F. The entire mine was air conditioned but, that did little to reduce the very heavy humidity. In the main tunnels, it was reasonably bearable, but once we got into side shoots where the ore was being blasted and slushed out, the temperature was at least 110° and the humidity somewhere in the 90 percent range. Taking photographs was a challenge because the camera lens fogged again and again. Our procedure was to give it a quick wipe with a tissue and shoot!

Naturally, turquoise mining was always going on in Arizona, so we had to write about and photograph that mining activity. Arrangements were made for us to go into the Pinto Valley copper mine and record the recovery of that lovely blue gem. The

operation was being done by a private contractor and collecting was done by hand. This method was used because the turquoise occurred in narrow seams in the host rock. Blasting broke up the rock and workers would crawl around the broken rock pile and chip away to expose pieces of turquoise. These went into a bucket to be hauled off in a pickup truck to the treatment plant.

While Jeff was a top-notch photographer, he was also a most helpful and generous person. Once he finally decided to give up photography and follow other pursuits, he knew *Rock & Gem* could still use his work, so he put in my possession his film files and, even today, I dip into them and find something useful. My forthcoming book, *The Frugal Collector, Volume I*, will contain an occasional Kurtzeman photo.

One of the most joyous times I spent with Jeff was when we worked together on the Mark Bandy collection. Mark had been the chief engineer at the silver mines in Llallagua, Bolivia. He had also worked at African diamond mines. Mark and his lovely wife, Jean, now both deceased, moved to Wickenburg, Arizona, when they retired.

While in South America, Mark had supplied museums and professionals with excellent specimens. He also traded with museums, sight unseen. He'd send the museum some nice specimens and they, in turn, would send their trade to his family farm in Iowa. So Mark did not get to see what he had gotten in trade until after he retired. His main joy upon retirement was unpacking all those hundreds of specimens he had never seen.

I got to know Mark and Jean Bandy shortly after they had moved to Wickenburg, where they had their collection housed in a small building on their property. It was a real treat to visit them, not only to see fine minerals, but to hear stories of their adventures. For example, Mark, along with all the mine managers, had been held captive in the Siglo XX mine, Llallagua when the miners went on strike. But the miners held Mark in such high regard they sent him out

to negotiate for them. He did so successfully.

In order to do an article on the Bandy collection, I had Jeff join me for a day of shooting. By that time, Mark had succumbed to cancer and Jean was responsible for the collection. Jeff and I visited Jean several times to get photos. She had also told us there were still boxes of minerals to be unpacked, so we spent more than one Saturday enjoying that task. Jeff also volunteered to photograph the whole Bandy collection for appraisal purposes, so he spent far more time with the collection than I did. He never charged Jean a dime and did a great deal to help her beyond taking photographs. This is just one example of Jeff's very generous nature. His willingness to help anyone was paramount!

The most exciting thing Jeff and I did was photograph special exhibits at the Tucson Show. This was possible when the show was held in the what was then called the "Ex Hall" of the Convention Center. I was on the show committee and Jeff and I were unofficial publicists. I would talk to private and museum exhibitors at the show to get permission to open their displays for the purpose of photographing what they had brought. On Friday evening of the show, after closing time, Bill and Millie Schupp would drive their camper truck into the exhibit hall. Millie would open the display cases we had permission to photograph. Bill would supply the liquid refreshments. Jeff would set up his big tripod and camera, and I would transfer, one at a time, the specimens we wanted to photograph. Sometimes, this would go on until 3 o'clock in the morning!

Eventually, other photographers realized we had this special arrangement and wanted to join us. This was impossible, so we stopped doing late-night photographing! But while it lasted, it was a real treat to handle some of the world's great specimens!

Three years after Jeff and I did the *Arizona Highways* article on Arizona minerals, we did two more articles for the February 1975 issue. The first article was a short one about Arizona's gem peridot, which was being mined on the San Carlos Apache Indian reservation. I wrote the article and Jeff did some shots. A fine shot of an Arizona peridot necklace ended up on the cover of that issue. Remember that fact!

The main article was entitled "An International Affair" and featured the Tucson Gem & Mineral Show™. The year before, the U.S. Post Office had released its first-ever set of mineral stamps, and that event



JEFF KURTZEMAN PHOTO

One of Jeff's favorite minerals was crocoite recovered from the Red Lead mine at Dundas, Tasmania, Australia.

was tied directly to the 1974 Tucson Show, so we could highlight that in the February 1975 issue.

Before we did the article, Jeff and I traveled all over Arizona taking notes on and photographing fine minerals in private collections and museums. Many of the minerals featured in that issue had been photographed the year before on one of our Friday-night sessions!

The impact of that article on the Tucson Show was profound. Thousands of folks who had never been to the Tucson



JEFF KURTZEMAN PHOTO

This faceted goshenite gemstone from Brazil is a fine example of Jeff Kurtzman's excellent photographic work.

Show came because of that one magazine article. Attendance at the show, which had been fairly consistent for years, suddenly doubled! The show was so crowded people were literally wall to wall. The displays were difficult to see and dealers made more money that year than they ever had before! The irony of this was that the show chairman, a very good friend who had made it possible for me to be so involved with the show for years, came to me after the show and said, "Bob, Don't ever do that again!",

meaning releasing an article about the show without giving the show committee fair warning! However, the club was so appreciative of what Jeff and I had done that they gave us each a five-year honorary membership in their society!

Dozens of people came to the show specifically to see the peridot necklace featured on the *Arizona Highways* cover. Not surprisingly, that particular piece was not at the show. It was owned by the *Highways* editor's girlfriend!

On a personal note, I cannot say enough about the impact Jeff had on my writing career. By supplying quality photographs for my articles, he made them far more interesting and topical than I could have done. Sometimes, I'd get an idea and suggest it to Jeff. He'd go out and get photographs, which, in turn, might trigger the idea for a good article topic. I cannot add up the number of days, the thousands of miles, we traveled together in the hunt for good minerals and good articles. With Jeff, I was able to go places and do things I never would have done otherwise. In short, I grew as a writer with Jeff's help!

Being able to work with Jeff taught me enough about photography that, when he finally retired, I was able to carry on and supply my own photographs. Granted, I'm no Jeff Kurtzman behind the camera. He was an award-winning expert recognized by his peers at *Arizona Highways*, and I am simply a writer who takes photos!

As for his impact on *Rock & Gem*, if you take the time to scan through older issues of this magazine, you'll see a fine assortment of Jeff's work, not only with my articles, but with a few he did on his own. He provided cover shots and appropriate photographs for many articles in the magazine.

Among those of us who enjoyed Jeff's friendship and benefited from his generosity and help, he will always be remembered and held in high esteem. He was a special guy who gave much to humankind and asked nothing in return! I hope Jeff, camera in hand,

is still helping others and documenting the beauty of where he is today! 💎

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.

Out-of-Whack Zodiac

I normally enjoy articles by Bob Jones, but was taken aback by the one that was published in the November 2010 issue. It was titled "Gemstones of the Zodiac". I am not into astrology, but noted his poor, outdated choice of references for the article. When listing each of the signs and the associated dates for those signs, many of the dates were incorrect in the sense that they do not match up with what is normally accepted as being the birth dates associated with the signs. (I am not referencing the recent addition of a new sign.) Anyway, although I enjoy his articles, I think that he could have done a better job researching the basics on this one.

—Chris A.
via e-mail

Thanks for your e-mail regarding the out-of-date dates on my article. You're right, of course. What I was using was the ancient charts and info that goes back 100 years or more. Obviously, I did not make myself clear on that. I'm not into astrology, either, and now that the new stuff is out I'm no longer a Virgo! That does not upset me though!

Glad you like my articles, in spite of my goof. Keep on eye out for my book, which will be out sometime this spring.

—Bob Jones
Senior Consulting Editor

Lap Reference

I would like a reference to a good book on using vibrating lap polishers. I have an old Lortone 15-inch.

—Bob Slusher
via e-mail

I don't know of a specific book on vibrating laps, nor one with a good section on them. There are several very good Web sites that deal with the subject, though. Following are a few links that should get you the information you want:

This one is from Lortone and deals with their 15-inch lap: www.lortone.com/pdf/Oscillating_Lap%20_Instructions.pdf

Here is one that deals with the Covington lap, but contains information that applies to most units: www.stoneageindustries.com/covington_instructions_vibrating_laps.html

This one is possibly the best. It is not specific to one machine, but covers the subject extremely well. Just scroll down to Vibrat-

ing Lap Instructions: www.dbrockwerks.com/newtip.html

—William A. Kappel
Shop Talk columnist

Kids' Club Resources

I just recently started a junior rock program for kids ages 5 to 11 and was wondering if your magazine would be appropriate for our kids. I have never seen your magazine and was wondering what type of content was inside and if it contained any experiments to do, etc.

—Ann Onymous
via e-mail



Rock & Gem is a great resource for kids. Our monthly children's feature, "Rock & Gem Kids", is especially appropriate. It has short articles on minerals, gems and fossils, puzzles, and a monthly quiz with chances to win prizes. Answers are posted on our Web site, www.rockngem.com, at the end of the quiz month.

Our field trip articles are perfect for planning family outings that are both fun and educational for children. Our feature articles are full of great photos of minerals, which kids can enjoy and learn from even if they're not yet able to read the text.

If you're looking for a program to implement with the kids in your club, contact the American Federation of Mineralogical Societies (www.amfed.org) for details of its Future Rockhounds of America program. Juniors earn badges by completing a variety of mineral-related activities that can form the basis for club meetings.

The "Mini Miners Monthly" newsletter, mineral activity books, special-topic publications, and a Mineral Bingo game are available from Diamond Dan Publications (www.diamonddanpublications.net). The company also offers an educational Earth Diggers Club badge program.

—Editor

High Mineral Prices

Bob Jones did a super job explaining the issues surrounding our hobby in his February 2011 on the Rocks column titled "Collectors vs. Investors". Actually it tempers my anguish (and anger) at the high prices, which I can't afford, for quality specimens. He said what I have talked about for over a year now with Wendell Wilson, Tom Moore, and several dealers. His article makes sense and I just need to accept that I can still collect, but not have the quality of collection I did in the '70s and not because of natural inflation nor because of lack of money (comparatively speaking).

One thing that I did not hear him allude to is that dealers—especially "high end" dealers—seem to be guilty of greed and setting a price that doesn't reflect their profit line, but is just a high price thrown out there to see if there are any takers. It is really a case of caveat emptor. One can often find a similar specimen (the same size, from the same locale, etc.) for a much reduced price—the botryoidal pyromorphite from the Jersey Vein at the Bunker Hill is a good example. I searched for probably six months and picked up a nice, small cab for \$175 or a third of what I see similar pieces for on dealer sites!

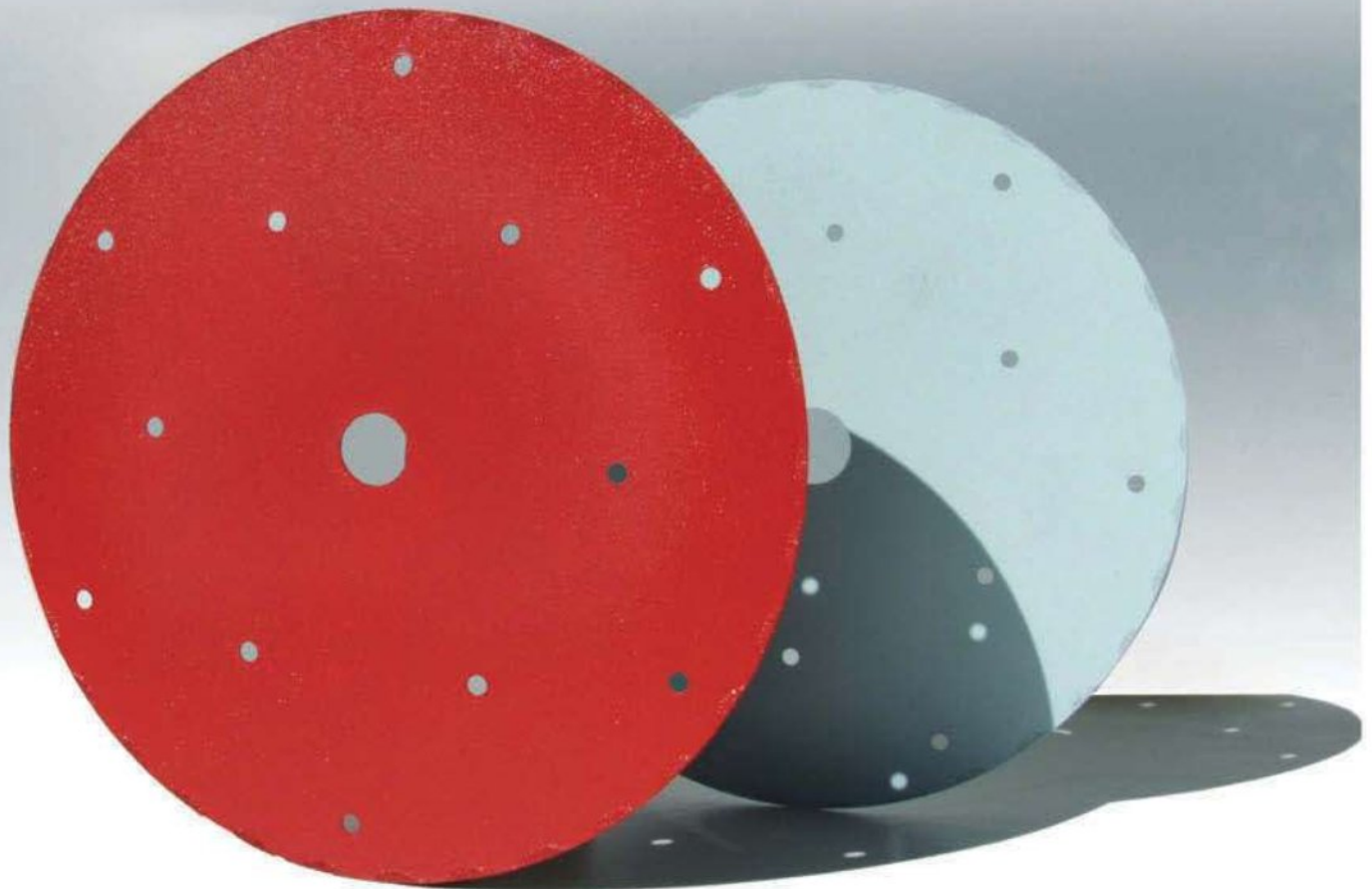
In fact, I have had at least three dealers indicate their displeasure at this type of thing—big dealers with a niche or reputation putting up unrealistically high prices *and* even buying another dealer's merchandise at retail and upping the price! Some may call it capitalism and free enterprise—some may call it greed. I asked one dealer why he started handling big-ticket items after years of being in my price range. He said he makes a bigger profit, sells more, and it is less hassle to have higher end items and people often think that a higher price means a better quality specimen.

—Gary Carter
Sun City West, AZ



LYNNYARON PHOTO

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