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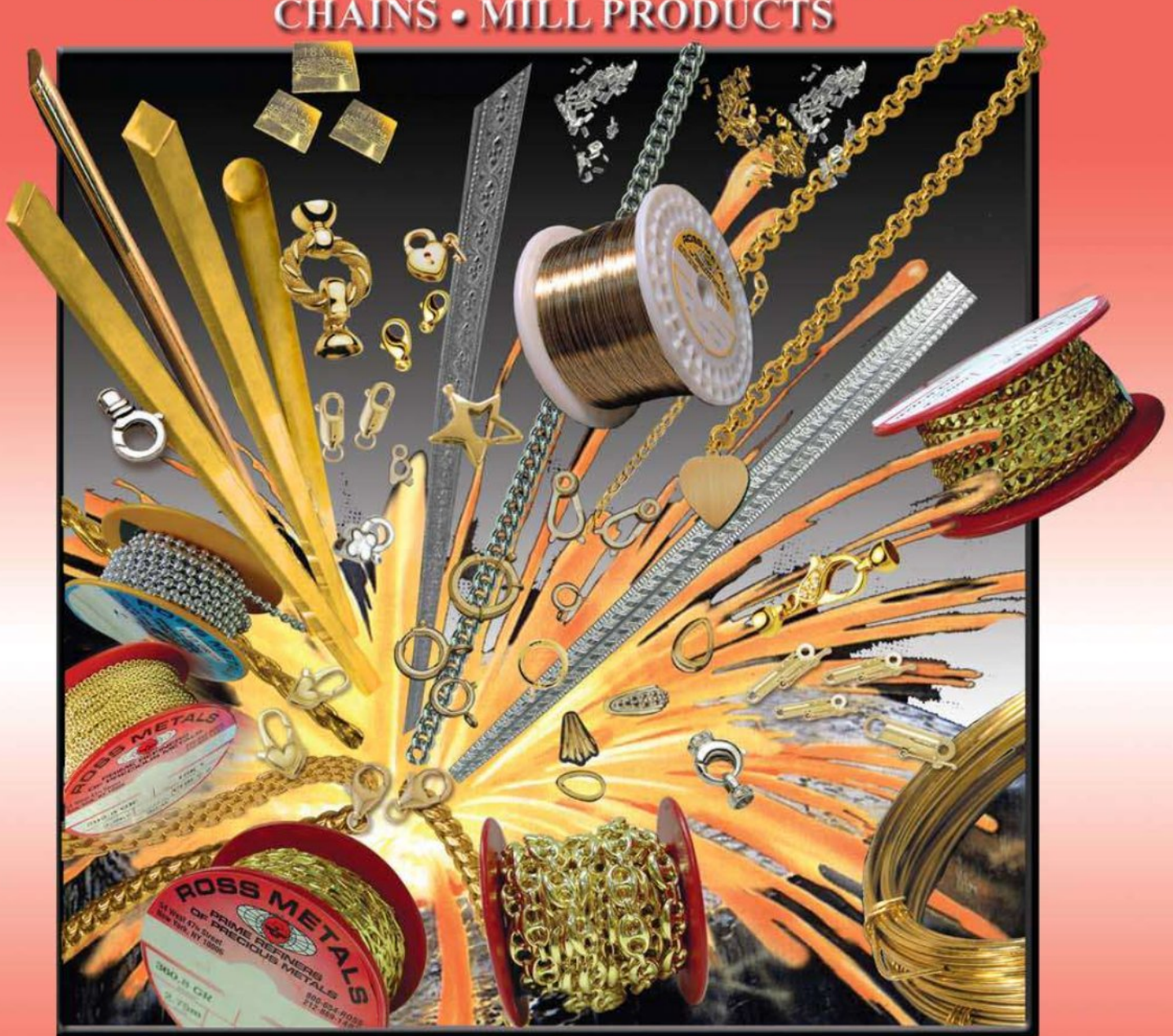


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Rock & Gem

Volume 40, Number 05

May 2010

ON THE COVER

This cerussite specimen from the Tsumeb mine at Tsumeb, Namibia, is a cyclical twin forming a stellate (starlike) aggregate. Tsumeb cerussites are likely to be considered classic specimens in the future. (Jeff Scovil photo/Scott Rudolph collection)

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Lucas Creek Closure

Many readers told me they enjoyed the field trip article "Lucas Creek Carnelian", by Stuart "Tate" Wilson, in the March 2010 issue of *Rock & Gem* (p. 46). Unfortunately, as Washington resident Vicky Roy informed me in a Mar. 4, 2010 e-mail, Weyerhaeuser Timber had closed "the whole area, not just the streams," to rockhounding in July 2009, about a month after the article was submitted.

I regret the inconvenience to our readers, some of whom drove significant distances to visit the site, only to be turned away. This incident underscores the point that, regardless of what you read in *Rock & Gem*, you should do your own research *before* you visit a field trip site to verify that it is currently open, especially when contact information is given in the article. Land status is always subject to change, and we often aren't the first to know.



The large signs that are now posted at the Lucas Creek site state, "These streambanks are being destroyed by rockhounding activities. State regulations protect streams by prohibiting activities that allow sediment to enter open water."

In an e-mail dated Mar. 15, 2010, Washington resident and *Rock & Gem* reader Kristin Sheaffer wrote, "Yesterday ... I was at the site and I saw clear evidence that people were *still* digging away the banks of the creek and exposed outcrops along the gravel road. This alone tells me that the rock collecting community as a whole has no concept of the damage/impact their collecting processes can have on the environment. I think this calls for some sort of public education, because the rock clubs are obviously condoning this type of behavior and bear part of the responsibility."

If what Kristin says is true and club members are the ones ignoring the signs, organized rockhounding is digging its own grave. If it's not true, sadly, it doesn't matter. When damage is done, locals, landowners, and government agencies aren't interested in checking credentials. Whether they're card-carrying rock club members or not, when hobbyists flout restrictions, land closures result.

This leaves responsible hobbyists with a dilemma. How are we going to protect our collecting sites from abusive collectors? How do we educate new or unaffiliated collectors to keep them from destroying the hobby we hold dear? Groups like the American Federation of Mineralogical Societies are working to protect land access through legislative means. How do we keep outsiders—or our own—from sabotaging their efforts?

Rock & Gem is one venue for educating the public. I've set aside our March issue to focus on responsible hobby practices, but you don't have to wait to submit your articles. Preserving collecting sites is a timely topic any day of the year.



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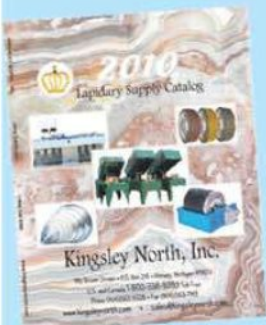


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According to May Craftsman of the Month Carl Burk, of Freeland, Michigan, "The basis for this project is the use of locally gathered rock materials. The end product is a functional light that can be used as an accent or a night light. For this particular work, I chose petrified wood and desert roses found in the vicinity of Quartzsite, Arizona. Other decorative rocks, such as chrysocolla or jasper, or virtually any other rock type can also be used.

"Other materials needed for the lighthouse include a 4-inch-diameter, 12-inch-tall conical Styrofoam™ form; Titebond® and Gorilla® wood glues; a low-wattage night light fixture and cord; a 4-inch-diameter, 3/8-inch-thick piece of plywood with a 1 1/8-inch hole in the center; black walnut shells sliced to 1/4 inch; a 2-inch section of a glass bottle neck (wine bottle, etc.); a 1-inch by 5-inch by 9-inch flat Styrofoam block; and high-gloss lacquer clear coat.

"To assemble the light, arrange rock pieces ranging in size from 1/2 inch to 3 inches in diameter on the conical form so that the spaces between them are minimal, (1/8 inch or less). Start by placing two or three stones on the large end of the Styrofoam form, holding them in place temporarily with straight pins. Apply a small dab of Gorilla glue to the edges of the rock pieces to cement them to one another. Note that enough time (several hours) must be given to allow the wood glue to set up enough prior to adding more stones so that



the rock pieces do not move. Build up the stone structure to a height of 7 inches on the Styrofoam form. After all the stones have been glued together, remove the Styrofoam form and apply Titebond wood glue to all the interior and exterior seams.

"While the wood glue is drying, place the bottle neck on the flat Styrofoam block. To form the upper section of the lighthouse, place sliced walnut shells around the perimeter of the bottle neck to a diameter of approximately 3 inches and glue them with Titebond wood glue. Use cut pieces of walnut shells to build up a railing around the perimeter of the upper section. Apply a dab of glue to each end of a railing section and allow it to dry sufficiently to stand by itself.

"Form the roof section by arranging cut walnut pieces in a circle approximately 2 inches in diameter and gluing them. A crystal or special transparent semiprecious stone through which light can suffuse can be placed in a hole in the center of the roof section. Glue the platform to the top of the conical rock section. Glue the roof section to the bottle top. Glue several sections of walnut shell vertically to the bottle neck to effect window framing.

"Place the night light fixture through the 1 1/8-inch hole in the 4-inch-diameter plywood piece. Place the circular plywood section in the base of the lighthouse and glue it in place. Complete the lighthouse by applying a coat of high-gloss lacquer." ♦



Would you like to be named Craftsman of the Month?

To enter the contest:

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

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

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



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MAY 2010

1—GRAND RAPIDS, MICHIGAN: Show, "Rings & Things BeadTour"; Rings & Things; Stars Room, 3221 Plainfield Ave. NE; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobotson@rings-things.com; Web site: www.rings-things.com

2—NOVI, MICHIGAN: Show, "Rings & Things BeadTour"; Rings & Things; Sheraton Detroit Novi, 21111 Haggerty Rd.; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobotson@rings-things.com; Web site: www.rings-things.com

1-2—AITKIN, MINNESOTA: Show, "Cuyuna Agate & Mineral Show"; Cuyuna Rock Club; Aitkin High School, 306 2nd St. NW, three blocks west of stop light; Sat. 9-5, Sun. 10-4; free admission; agates, minerals, jewelry, specimens, mineral art, fossils, fluorescent, indoor and outdoor vendors, Ask the Wizard, special "Kids' Korner", free prizes, displays, demonstrations, Wheel-of-Rock-Fortune, door prizes; contact Kat Thomas, (218) 678-3298; e-mail: katmoose@wildblue.net

1-2—ANAHEIM, CALIFORNIA: 51st annual show, "Natural Treasures of Planet Earth"; Searchers Gem & Mineral Society; Brookhurst Community Center, 2271 W. Crescent Ave.; Sat. 10-5, Sun. 10-4:30; free admission; gold panning, demonstrations, exhibits, silent auction, hobby supplies, dealers; contact Robert Burson, 11326 Candor St., Cerritos, CA 90703, (562) 860-5938; e-mail: showchair@searchersrocks.org; Web site: www.searchersrocks.org

1-2—CINCINNATI, OHIO: 45th annual show and sale, "Geofair 2010"; Cincinnati Mineral Society, Cincinnati Dry Dredgers; Cincinnati Gardens, 2250 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

1-2—FOUNTAIN HILLS, ARIZONA: Show, "Fountain Hills Gem & Mineral Show"; O.B. Rocks & Minerals; Fountain Hills Community Center, 13001 N. La Montana Dr.; Sat. 10-6, Sun. 10-5; free admission; contact Rick Obermiller, 1332 N. Jesse St., Chandler, AZ 85225, (602) 826-2218; e-mail: obrocks@gmail.com

1-2—LUBBOCK, TEXAS: Show; Lubbock Gem & Mineral Society; Lubbock Civic Center, 1501 Mac Davis Ln.; Sat. 10-6, Sun. 10-5; adults \$4, students (6-12) \$2, children under 6 free with adult; door prizes, children's "Spinning Wheel", demonstrations, sphere making, wire wrapping, silent auction, club displays, dealers, beads, jewelry, minerals, carvings, rough and polished rocks; contact Archie Scott, 2709 Belvedere Rd., Levelland, TX 79336, (806) 894-1584; e-mail: archie.scott73@yahoo.com; Web site: <http://lmgmstx.org>

1-2—MARSHFIELD, WISCONSIN: 37th annual show; Heart of Wisconsin Gem & Mineral Society; Marshfield High School Fieldhouse, 1401 Becker Rd.; Sat. 10-5, Sun. 10-4; free admission; displays, speakers, "Wisconsin Earth Treasurers", dealers, demonstrations, silent auctions, kids' activities; contact Cynthia Kelman, 1403 N. Broadway Ave., Marshfield, WI 54449, (715) 387-8782; e-mail: kelman@tznnet.com; Web site: www.fromtherockroom.com

1-2—MEDFORD, OREGON: 55th annual show; Roxy Ann Gem & Mineral Society; Medford Armory, 1701 S. Pacific Hwy.; Sat. 9-5:30, Sun. 10-4:30; exhibits, dealers, demonstrations, silent auction, children's activities, door prizes; contact Tricia Caulkins, 926 Hopkins Rd., Central Point, OR 97502, (541) 821-0883

1-2—NORTH CHARLESTON, SOUTH CAROLINA: Show; Lowcountry Gem & Mineral Society; Charleston Area Convention Center Complex, 5001 Coliseum Dr.,

Exhibit Hall A; Sat. 10-5, Sun. 10-5; free admission; dealers, lapidary demonstrations, door prizes, fossil dig, geode cracking; contact Karen Havenstein, 518 Woodland Shores Rd., Charleston, SC 29412, (843) 795-2956; e-mail: fos_sils@comcast.net; Web site: www.lowcountrygemandmineralsociety.org

1-2—PITTSBURGH, PENNSYLVANIA: 7th annual show and sale, "Treasures of the Earth"; Mineralogical Society of Northeastern Pennsylvania; Oblates of St. Joseph, 1880 Hwy. 315; admission \$3, children 12 and under and uniformed Scouts free; Sat. 10-5, Sun. 10-4; minerals, fossils, crystals, gems, meteorites, jewelry, beads, geological supplies, kids' activities, door prizes, raffles, programs, demonstrations, exhibits; contact George Walko, (800) 473-3602

1-2—SEATTLE, WASHINGTON: 44th annual show; West Seattle Rock Club; Alki Masonic Temple - West Seattle, 4736 40th Ave. SW; Sat. 10-5, Sun. 10-5; contact Rachel Miller, P.O. Box 16145, Seattle, WA 98116; e-mail: westseattlerockshow@hotmail.com; Web site: www.westseattlerockclub.org

1-2—TOPSFIELD, MASSACHUSETTS: 47th annual show, "New England Mineral & Gem Show"; North Shore Rock & Mineral Club; Topsfield Fairgrounds, Rte. 1; Sat. 9-5, Sun. 10-4; adults \$5 (\$1 off with ad), seniors \$3, children under 12 free; retail and wholesale dealers, door prizes, exhibits, mineral and fossil identification, gold panning, geode cracking, spin-a-gem, mineral sifting; contact Joe Weisberg, 29 Justin St., Lexington, MA 02420, (781) 861-6653; e-mail: nsmrc@verizon.net; Web site: www.nahant.com/nsmrc

1-2—WASHINGTON, PENNSYLVANIA: Annual spring show, "Greater Pittsburgh Area Gem, Mineral, Bead & Jewelry Show"; F.M. Minerals; Washington, County Fairgrounds, 2151 N. Main St.; Sat. 10-6, Sun. 10-5; adults \$4, children 12 and under free with adult; dealers, jewelry, metaphysical minerals, bench jeweler, beads, gemstones, wire wrapping; contact F.M. Minerals, P.O. Box 252, Farmington, WV 26571, (304) 825-6845; e-mail: frankoz@juno.com

4—LOUISVILLE, KENTUCKY: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn Hurstbourne, 1325 S. Hurstbourne Pkwy., at I-64; Tue. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobotson@rings-things.com; Web site: www.rings-things.com

7-9—COLUMBIA, MISSOURI: Show and sale; Central Missouri Rock & Lapidary Club; Boone County Fairgrounds, 5212 N. Oakland Gravel Rd.; Fri. 1-8, Sat. 8-5, Sun. 9-3; adults \$5, students \$3, good all three days, children 11 and under free; demonstrations, mineral exhibits, special kids' mine; contact Robert McConnell, 1601 N. Earthland Rd., Columbia, MO 65202, (573) 445-5415; e-mail: bobmc@socket.net

7-9—COSTA MESA, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; OC Fair & Event Center/Bldg. 10, 88 Fair Dr.; Fri. 12-7, Sat. 10-6, Sun. 10-5; \$5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

7-9—FRANKLIN, NORTH CAROLINA: 9th annual show, "Mother's Day Gemboree"; Franklin Area Chamber of Commerce; Macon County Community Bldg., 1288 Georgia Rd.; Fri. 10-6, Sat. 10-6, Sun. 10-4; adults \$3, under age 16 free; fine gold and silver jewelry, rough and cut gemstones, beads, minerals, lapidary, wire wrapping, custom-made jewelry, jewelry repairs, tools, demonstrations, door prizes; contact Linda Harbuck, 425 Porter St., Franklin, NC 28734, (888) 337-7529; e-mail: lindah@franklin-chamber.com; Web site: www.visitfranklinnc.com

7-9—FRANKLIN, NORTH CAROLINA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Watauga Festival Center, 426 Watauga Rd. (Hwy. 441N);

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SAN FRANCISCO

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The Minerals of Naica, Mexico

This Silver, Lead, Zinc Mine Is an Important Specimen Source

Story and Photos by Bob Jones

The silver, lead, zinc mine at Naica (Chihuahua), Mexico is world famous both for its fine minerals and its amazing, gigantic selenite crystals, recognized as the world's largest free-standing crystals. The mine was a latecomer to silver mining in Mexico. The Spaniards started mining at Puebla in the 1500s, while silver was not found at Naica until the late 1700s.

Problems with local Indians and the advent of the Mexican War delayed actual mining for 35 years after the discovery. Even after the mine opened, there were disruptions in production, such as when the revolutionary general Pancho Villa raided the camp.

There were also fierce raids by the local Indians. According to Bill Panczner's book *Minerals of Mexico* (Van Nostrand Reinhold, 1987), the Indians even kidnapped some of the miners during raids, took them up into the mountains, tortured them, and even ate them! I'd imagine folks would really be discouraged from working at Naica under such conditions. Not until federal troops came in and cleaned up the area could mining proceed unimpeded.

It is remarkable that this silver deposit is still operating. After all, high-grade silver, lead and zinc ore has been mined here for over 200 years! That is an exceptionally long time for any mine to operate. The



This single blade of gray-blue anhydrite from Naica shows faint perfect cleavage lines across the crystal face.

reason for this longevity is that there are an amazing number of ore veins in the Sierra de Naica, the mountain range in which the mine is located.

Though the Naica mine is an excellent producer of silver values, it is much better known among mineral collectors for its fantastic selenite caves, which have occasionally been breached during mining. Some of these openings yield hundreds of nice collector specimens. Other openings are actually vast caverns lined with millions of perfectly formed selenite crystals.

During operations, miners are able to garner, via their lunch buckets, superb green fluorites, choice gray-blue anhydrites, bright crystallized galenas, nice garnets, and of course lovely white to water-clear selenite crystals.

Naica is a hydrothermal replacement deposit in limestone, which is very typical of the many rich silver mines in Mexico. You can easily list these mines, as they are noted for their collector minerals: Mapimi, San Martin, Fresnillo, Santa Eulalia, Guanajuato, Arispe, and more.

Replacement deposits develop when hydrothermal solutions, rich

in dissolved metals, thrust up through the Earth's crust, cool and deposit massive quantities of useful ores. When these rich solutions are trapped by overlying impervious rock, good things happen! Slow cooling allows the metal ores to solidify and crystals form. The normal openings in limestone, both horizontal and vertical, provide avenues for limestone dissolution, ore deposition, and crystal development.

Naica also follows this pattern. Hydrothermal solutions, rich in dissolved metals, surged upward into the rocks that later became the Sierra de Naica. Slowly but inexorably, the solutions attacked and invaded the limestone, creating myriad horizontal manto, or blanket, deposits and vertical chimneys of rich ore.

According to Bill Panczner's book *Minerals of Mexico* (Van Nostrand Reinhold, 1987), the Indians even **kidnapped** some of the miners during raids, took them up into the mountains, **tortured** them, and even **ate them!**



Once in Naica's hot and steamy Cave of Giant Crystals, you are greeted by a forest of 40- and 50-foot selenite crystals.

At Naica, there are about a dozen manto ore zones, some of which are up to 250 feet wide and 30 feet thick, and over 2,000 feet long, and at least 50 ore chimneys. Together, the manto and chimney deposits constitute a large, rich ore body.

As mining proceeded at Naica, enormous cavities were encountered in the limestone. Sometimes, these were filled with nothing but hot—over 100 degrees F—water. Miners were always in danger of being scalded by this water, which could suddenly burst through drill holes.

Hot water and underground heat are constants for miners at Naica. The deeper you go into the Earth, the hotter it gets. Temperatures range from 90 to 95 degrees F at the 2,500-foot level. Couple this with very high humidity, about 90 percent, and mining here is a challenge.

The most common well-crystallized species at Naica is selenite gypsum. It is common knowledge that the Naica deposit is riddled with openings ranging from small cavities to large caves that are lined with this mineral.

In 1976, several large pockets of mineral crystals were breached. These pockets yielded quantities of superb fluorites, often on modified, crystallized galena. The fluorite ranged from colorless to a very delicate green. The crystals were glass clear and usually cubic, but often showed both octahedral and dodecahedral modifications. The crystals often seemed to be small cubes stacked in an octahedral form, which is a very attractive arrangement.

What is interesting about these fluorites is that their cubes faces are glass smooth and lustrous, but their octahedral faces and less common dodecahedral face modifications look slightly etched. Invariably, these lovely fluorites were found with and on lustrous galenas up to an inch or so on an edge. Most of the galena shows nice octahedral modifications. It is rich in silver, so Naica galena specimens should be labeled "argentiferous galena".

Both these crystal types—modified fluorite and modified galena—suggest a high temperature of formation because of the modifications. Simple cubes tend to form at lower temperatures.

Lustrous sphalerite crystals under an inch in size were also commonly found with these fluorites and galenas. The largest fluorites are well over 2 inches on an edge, but the majority tend to be around 1 inch on an edge. Fine fluorites continued to be found at Naica into the 1980s, also with fine galenas. Production of specimen crystals tapered off after that.



A pair of very complex and lustrous galena crystals perches on small dog-tooth calcites in this specimen from Naica.



The faces of these slightly rounded, 2-inch fluorite cubes on galena show evidence of minor acid etching after formation.



This cluster of anhydrites measures 15 centimeters high, an average size for the anhydrites collected at Naica.

Then in 2007, during cut-and-fill mining, a wonderful pocket of green fluorite on sphalerite was opened high in the ceiling of the operating stope. Cut-and-fill mining requires drilling into the ceiling and blasting it down. As the ore crashes to the stope floor, it tends to shatter. Drilling equipment is set on the fresh ore pile and the next set of holes is loaded with blasting gel. Then the fresh ore pile is removed and the next shot is fired. To continually raise the stope floor so miners can drill the ceiling ore, a mixture of crushed rock waste and cement, called slimes, is pumped from the surface mill to the stope floor, forming a very firm, ever-rising working platform.

During one such blasting operation in 2007, a large pocket of superb fluorite was opened. Miners were able to reach the pocket and extract several hundred specimens of choice fluorites. The largest single crystal is a stepped-growth octahedron measuring about 3 inches across the base. This lovely modified crystal rests on a domed base of bright, perfect sphalerite crystals.

The largest specimen from this find weighs nearly 40 pounds and is a slightly domed mound of small sphalerite crystals with dozens of lustrous pale green fluorite crystals bunched over the surface. The overall size of this piece is 15 inches by 8 inches.

Certainly, the cutest specimen from this find is a 2-inch by 2-inch stepped-growth fluorite octahedron that looks like two miniature, stepped pyramids set base to base. The color is a faint green and the entire crystal is transparent.

Andradite garnets were encountered when the Naica mine operators put in an inclined shaft on the west side of the Sierra de Naicas. The ore body this reached was a skarn zone that produced excellent andradite garnets, most of them green. Pyrites, arsenopyrites, and other sulfide species were found there in minor quantities.

The Naica mine was producing wonderful fluorites in the 1980s. In 1981, a watercourse was breached that was lined with thousands of flat, square-tipped, pale blue-gray anhydrite crystals. Most of these uncommon anhydrites are from 2 to 6 inches long. Some of the anhydrites were clusters of six or eight intergrown blades, usually around 6 inches long. The edges of many of the anhydrites were lightly decorated with tiny, clear calcite crystals. In most cases, the tips of the anhydrites showed minor splintering, or "feathering".

Until this find, anhydrites were definitely an uncommon mineral throughout the world. In Naica, many anhydrites are enclosed by selenite, so they may have gone unnoticed. Only by etching or dissolving away the selenite are such anhydrites revealed.

A second reason for the lack of anhydrites was discovered during scientific studies of Naica's giant crystal cave. It has been shown that an abundance of anhydrite formed in that cave, but as temperature conditions changed, it dissolved and selenite gypsum grew instead.



The ceiling of the Cave of Giant Crystals stopped the growth of the big crystals and is decorated with lovely "flowers" of white selenite crystal clusters.



A simple cube of fluorite decorates this fine cluster of lustrous galena crystals, some of which are twinned.



Rich silver ore is hauled to the surface through this entrance, which is also the way to the Cave of Swords and the Cave of Giant Crystals at Naica.



The Smart Choice!

Naica's mineral reputation is steadily maintained by the fluorite, anhydrite, garnet and sulfide minerals it produces. But in the last decade, it was not fine mineral species that caused an uproar. It was the mine's giant selenites.

In 1999, a cave was discovered in the Naica mine that is jammed with giant crystals, some of them as large as 40 feet long and 3 or 4 feet in diameter! These are the largest free-standing crystals known. This massive pocket was originally called the Cueva de los Cristales Gigantis (Cave of Giant Crystals).

Naica gained a great deal of publicity from articles in mineral magazines. I visited the cave just after its discovery, so *Rock & Gem* published the first article on the find! My initial article, "Subterranean Wonders", appeared in the September 2001 issue, and another, "Naica's Selenite Megacrystals", appeared in September 2007. In 2008, an in-depth scientific study was published in the November issue of *National Geographic* (p. 64).

When this cave was broken into, Naica already had a strong reputation for its selenite crystal caves. One cave that was discovered in the 1940s was so spectacular that the mine owners eventually sealed it off with a locked door to preserve it for visiting dignitaries to enjoy. Now known as the Cave of Swords, this treasure was written up in technical journals because it was the most spectacular cave of its type known at the time.

The Cave of Swords is on the 1,300-foot level of the mine. It extends over 325 feet into the heart of the mountain and is some 30 feet or more wide in places. The rock walls are hidden beneath a forest of selenite crystals that average about 6 inches long. The floor sports crystal sprays that measure about 10 feet across from tip to tip, with individual crystals to 8 feet long.

Clearly, at some point eons ago, this cave was filled to the ceiling with hot calcium sulfate-rich waters, from which the crystals grew. For this to happen, the temperature of the cave solution had to drop rather dramatically. If the hydrothermal solutions had cooled slowly over hundreds or thousands of years, crystal growth would have been slow and the majority of individual crystals would have been much larger than they are today. Therefore, a sudden drop in temperature of the solution must have triggered the rapid growth of myriad crystals, none of which would be very large. That fairly large crystals were found on the floor of the cave suggests that there were two separate growth events.

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I have had the fun of going through the steel door into the Cave of Swords and walking the wooden walkway among the myriad crystals, which are lit so that visitors can enjoy the spectacle of being among them.

Some of the selenite crystals at Naica are simply monoclinic singles. Others are clustered, with crystals diverging to form delicate sprays. There is even a nice assortment of ram's horn specimens. Larger specimens were called "swords", and sometimes water-clear monoclinic prisms a foot across were found.

The Cave of Swords continued to be Naica's most impressive selenite cavern until 1999, when two miners charged with drifting a ventilation tunnel on the 2,500-foot level blasted into a cave loaded with exceptionally large selenite crystals. Work stopped immediately so that management could decide what to do. Officials chose to install a steel door to protect this new cave. Few people are allowed to enter, as the cave environment is extremely hot and moist.

This cave discovery soon became known publicly and I was allowed to be guided into the cave on two separate visits. Walking into that cave was an almost scary experience. It was like venturing into a hot, humid oven or blast furnace. The air coming out of the cavern was close to 150 degrees F when the cavern was first breached. It has since cooled to about 140 degrees F. The humidity was smothering. Between the heat and humidity, I could hardly breathe at first. It took an effort to overcome the feeling of being smothered and the strong desire to leave. Eventually, I relaxed a bit and was able to stay for maybe five to ten minutes before bailing out. Taking photographs was difficult because of the humidity.

The cave walls are completely lined with crystals. Masses of 2- and 3-foot monoclinic crystals completely cover the floor and walls. There are even flowerlike clusters of large crystals hanging from the cave ceiling. Individual, practically free-standing monoclinic crystals were as much as 6 feet on an edge. The crystal giants extended from floor to ceiling, tens of feet long and several feet thick. They looked like a forest of slightly canted to severely tipped white tree trunks.

Scientists have theorized that the cave filled with calcium sulfate-rich waters thousands of years ago. The solution temperature, which they estimate was about 175 degrees F, encouraged the growth of anhydrite crystals in huge quantities, which consumed most of the calcium sulfate dissolved in the warm water.

The scientists didn't explain how, but the water temperature then dropped just a few degrees. The anhydrite destabilized and dissolved back into solution. This set the stage for selenite growth in the cooler solution. As crystals started to grow, the solution temperature apparently stabilized and stayed constant for thousands of years. Therefore, the first selenite crystals to grow simply kept growing, ending up looking like a forest of white tree trunks. Instead of the cave being lined with millions of small crystals, like the Cave of Swords, it became the home of giant selenites. Fortunately, the cave is being preserved, although it is closed to the general public.

The development of the world's largest free-standing crystals at Naica is a crowning touch for a mine that has been a fine source of excellent collector minerals, including fluorite, galena, sphalerite, garnet, anhydrite, and selenite. Hopefully, the mine will continue to operate and the Cave of Giant Crystals will be preserved forever.



Naica fluorite often forms in stepped growth cubes on crystals of pyrite and argentiferous galena, as seen in this specimen.



Nice intergrown cubes of fluorite often form on bright galena crystals in the Naica silver, lead, zinc mine.



Fluorite from Naica usually forms complex, multigrowth cubic crystals atop galena crystals, which developed first.



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SHOP TALK

by William A. Kappale

Health and Safety in the Shop

It never ceases to amaze me how human beings with, presumably, the power of reason can engage in activities that put their health and even their lives in danger for the sole purpose of "being macho". This happens in all walks of life, including the lapidary hobby. Impossible as it seems, there are still some hobbyists around who grind and carve rocks dry. This practice was more prevalent in the silicon carbide days, but a few do it with diamond equipment, as well.

An old-time rockhound who lived next to my wife's uncle had spent hours in his shop cutting cabs dry with silicon carbide equipment. His shop was like the inside of a vacuum cleaner. By the time I met the fellow, he was moving around very slowly and had been forbidden by his doctor to go near his beloved shop.

Now in those days, he may not have known the damage he was doing to his lungs, but today we know all about the long-term effects of breathing rock dust, particularly silica. And yet, there are still those out there who persist in grinding dry. For safety's sake, don't do it! In fact, depending on how much spray you generate with your water-cooled unit, you might consider wearing a dust mask or respirator anyway.

Equally foolish are those lapidaries who still refuse to wear safety glasses while they work. Granted, in our hobby there isn't a ton of stuff flying around to get in our eyes, but there is enough. If you wear glasses, don't you have to clean them when you finish at the saw or grinder? Where would all of that gunk have ended up had you not been wearing the glasses? There are so many kinds of safety glasses around today that there is simply no reason not to wear them. They are inexpensive (how much is a new eye?), they are lightweight, and best of all, they work.

Don't forget the danger of chemical damage to the lungs or to the skin. We use saw oils and coolants, acetone, lacquer thinner, fluxes, pickling solutions, epoxies, cyanoacrylates, polishing powders, and many other potentially damaging substances in lapidary work. Most of this stuff, when handled properly, is very safe



for the majority of folks, but some people are sensitive to some of them, so we should use common sense when handling them. Manufacturing Safety Data Sheets (MSDS) are available online for all these things, so it is easy to learn about the dangers, if there are any, of any of the materials we use.

Electrical safety is another issue that is often overlooked. The first precaution you take should be to always ensure that all the electrical outlets in your workshop are outfitted with ground fault circuit interrupters (GFCI). These devices will shut the power down in the case of a short circuit to prevent electrocution and electrical burns and shocks, which can be fatal. If you use a Dremel-type tool for wet carving, you might want to get the flexible shaft attachment to keep the unit away from water splash. The main thing is to keep water and electricity away from each other, since they aren't friends, and you definitely don't want them fighting in your workshop.

Finally, it is a good idea, and not an expensive investment, to have both a fire extinguisher and a first-aid kit handy in your lapidary workshop. You can put out a fire, slap on a band aid, and keep right on cutting that cab. Safe cabbage!♥

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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7-9—HENRIETTA, NEW YORK: Show and sale; GemStreet USA; The Monroe Fair & Expo Center, 2695 East Henrietta Rd.; Fri. 10-6, Sat. 10-6, Sun. 11-5; fine gems, jewelry, beads, fossils, minerals; contact Jane Strietter Smith, (216) 521-4367; Web site: www.gemstreetusa.com

7-9—McPHERSON, KANSAS: 18th annual McPherson Gem & Mineral Club Sale and Swap; McPherson Gem & Mineral Club; McPherson 4-H Bldg., 710 W Woodside; Fri. 9-7, Sat. 8-6, Sun. 10:30-3; free admission; buy or swap rocks, gems, minerals, fossils, jewelry, hourly door prizes, displays, collections, free rock identification, kids' spin-and-win, potluck and rock auction Fri.; contact Jim Nutter, 1611 Jody Ln., McPherson, KS 67460, (620) 241-2433

8-9—BOZEMAN, MONTANA: Show, "Montana's Treasures"; Bozeman Gem & Mineral Club; Gallatin County Fair Grounds, Black and Tamarack (I-90, exit at N. 7th St.); contact Dan Carter, (406) 586-4552, or Sally Griffin, (406) 451-4248; e-mail: griffin830@yahoo.net

8-9—RENO, NEVADA: Show, "Jackpot of Gems"; Reno Gem & Mineral Society; Reno Livestock Events Center Exhibit Hall, 1350 N. Wells Ave.; Sat. 10-5, Sun. 10-4; adults \$5, seniors \$4, children \$3; more than 60 exhibit booths, demonstrations, gold panning booth, silent auction table, door prizes, \$250 Grand Prize raffle; contact Ann Johnson, 6530 Oglala Ct., Sun Valley, NV 89433, (775) 544-4937; e-mail: ann.johnson.e@gmail.com; Web site: www.reno.rockhounds.com

12—McCLELLAN, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Garden Pavilion, 5640 Dudley Blvd.; Wed. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, McClellan, CA 95652, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

13—SAN MATEO, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; San Mateo County Event Center (Event Center Meeting Pavilion), 2495 S. Delaware St.; Thu. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

14-16—ANDERSON, CALIFORNIA: Show, "Northern California Treasures"; Superior California Gem & Mineral Association; Shasta County Fair Grounds, 1890 Biggs St.; Fri. 9-5, Sat. 9-5, Sun. 10-4; free admission; contact Bob Davis, 5810 Olive Rd., Corning, CA 96021, (530) 824-6214; e-mail: rncdavis@hughes.net; Web site: www.superiorcal.com

14-16—ENID, OKLAHOMA: Annual swap; Enid Gem & Mineral Society; Oakwood Mall, 4125 W. Owen K. Garriott Rd.; silent auction, kids' area, lapidary work, rocks, gems, minerals, fossils, jewelry; Fri. 10-8, Sat. 10-8, Sun. 12-5; contact Stan Nowak, (580) 484-2785; e-mail: snowak48@yahoo.com

14-16—POMONA, CALIFORNIA: Spring show, "West Coast Gem, Mineral & Fossil Show"; Martin Zinn Expositions LLC; the Fairplex in Pomona, 1101 W. McKinley Ave.; Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; 20 wholesale and retail dealers; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax (303) 223-3478; e-mail: mzxpos@aol.com; Web site: www.mzxpos.com

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14-16—SOUTHGATE, MICHIGAN: Show; Midwest Mineralogical & Lapidary Society of Michigan; Southgate Arena, 14700 Reaume Pkwy.; Fri. 4-8, Sat. 10-6, Sun. 11-5; contact Mike Bomba, 1419 Gregory, Lincoln Park, MI 48146, (313) 381-8455, or Rich Williams, 15816 DuPage, Taylor, MI 48180, (734) 374-2279

15—BUENA PARK, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Knott's Berry Farm Resort Hotel, 7675 Crescent Ave.; Sat. 10-2; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

15—DANBURY, WISCONSIN: 3rd annual swap meet; Stone Hinge Rock Shop; 4606-26 Lake Rd.; free admission; free tailgating, agates, minerals, fossils, jewelry, Lake Superior agates, kids' agate pit; contact Ella or Mike, 4606-26 Lake Rd., Danbury, WI 54830, (715) 656-4315

15-16—BEREA, OHIO: 42nd annual show; Parma Lapidary Club; Cuyahoga County Fairgrounds, Bagley Rd.; Sat. 9-6, Sun. 10-5; adults \$6, children 12 and under and Scouts in uniform free; live demonstrations, raffles, silent auction, competitive exhibits, Kids' Korner; contact Parma Lapidary Club, 926 Lake Breeze Rd., Sheffield Lake, OH 44054; Web site: www.parmalapidary.com

15-16—CHEYENNE, WYOMING: Show; Cheyenne Mineral & Gem Society; American Legion Post 6, 2001 E. Lincoln Way; Sat. 9-5, Sun. 9-4; adults \$3, children free; door prizes, gold panning, children's activities, exhibits, club store; contact Carroll Schell, 5006 Foxen Court, Cheyenne, WY 82001, (307) 632-7688; e-mail: cschell@bresnan.net

15-16—HAMILTON, MONTANA: Annual show; Bitterroot Gem & Mineral; Ravalli County Fairgrounds, First Interstate Center, 100 Old Corvallis Rd.; contact Steve Vieth, (406) 369-5489; e-mail: viethsteve88@gmail.com

15-16—HERMISTON, OREGON: Annual show; Hat-rockhounds Gem & Mineral Society; Hermiston Conference Center, 4155 Hwy. 395; Sat. 10-6, Sun. 10-5; contact Mike Filarski, (541) 922-5091; e-mail: stonemorlin1@net.scape.net

15-16—LEESPORT, PENNSYLVANIA: 42nd 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

15-16—ORANGE, CONNECTICUT: 37th annual show; The New Haven Mineral Club; Amity Regional Middle School, 100 Ohman Ave., (Sheffield Road off of Rte. 34); Sat. 9:30-5, Sun. 9:30-5; adults \$5, children under 12 free with adult; minerals, gems, jewelry, fossils, exhibits, dealers, door prizes, lectures, demonstrations; contact Lisa Alter, (203) 215-6150; Web Site: www.newhavenmineralclub.org/

15-16—RAPID CITY, SOUTH DAKOTA: 6th annual show, "Fairburn Agate & Rock Swap"; R.C. Parks & Recreation Dept.; Hwy. 44 E., 1/2 mile west of Black Hills Speedway Sat. 8-6, Sun. 8-6; buy, sell, trade, rocks, fossils, minerals; free admission; auction Sat.; contact Jim Hardesty, (605) 393-2163 or (605) 787-2887; e-mail: bigjim57703@peo.plepc.com; or Tom Woodden, (605) 393-1963

15-16—WAUWATOSA (MILWAUKEE), WISCONSIN: 53rd annual show; Wisconsin Geological Society; Sat. 10-5, Sun. 10-5; Mueller Bldg., Hart Park, 72nd and W. State St. (about 6 miles west of downtown Milwaukee and 1 mile north of I-94); 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

16—SAN BERNARDINO, CALIFORNIA: Show, "Rings & Things BeadTour"; Rings & Things; Hilton San Bernardino, The Inland Ballroom, 285 E. Hospitality Ln.; Sun. 10-2; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

18—MESA, ARIZONA: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn & Suites (Superstition Ballroom), 1600 S. Country Club Dr.; Tue. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

20—ALBUQUERQUE, NEW MEXICO: Show, "Rings & Things BeadTour"; Rings & Things; MCM Elegante Hotel, 2020 Menaul NE; Thu. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

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21-23—MARTINSVILLE, VIRGINIA: 20th annual Martinsville Bead, Gem, Mineral & Jewelry Show; Treasures Of The Earth Gem & Jewelry Shows, National Guard Family Support Group; Martinsville National Guard Armory, 315 Commonwealth Blvd. W, across from Liberty Fair Mall; Fri. 10-6, Sat. 10-6, Sun. 11-5; free admission; jewelry makers, goldsmiths and silversmiths from all over the U.S., gem trees, wire wrap, wire sculpture, pearls, stone beads, stone setting, amber, opal, mineral and fossil dealers, hourly door prizes, grand prize, classes, Rockingham County (NC) Mineral Club sluice; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: van@toteshows.com; Web site: www.toteshows.com

21-23—SANTA BARBARA, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Earl Warren Showgrounds/Exhibit Hall, 3400 Calle Real; Fri. 12-7, Sat. 10-6, Sun. 10-5; \$5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

28-30—PENDLETON, OREGON: Show; Jean Miller; Pendleton Convention Center, 1601 West Gate (off Hwy I-84); Fri. 10-6, Sat. 10-6, Sun. 10-4; free admission; free pearls to 100 ladies daily, demonstrations; contact Jean Miller, P.O. Box 136, Molalla, OR 97038, (503) 829-2680; e-mail: shadow92337@molalla.net; Web site: www.ogmshows.com

28-30—SALEM, VIRGINIA: 19th annual show; Treasures Of The Earth Gem & Jewelry Shows; Taliaferro Complex/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, wire wrapping classes; contact Van Wimmer Sr., 5273 Bradshaw Rd., Salem, VA 24153, (540) 384-6047; e-mail: vawimmer@verizon.net; Web site: www.toteshows.com

28-31—SCOTTSBLUFF, NEBRASKA: Rock swap; Panhandle Rock & Gem Club; Riverside Zoo and Campground, 1600 S. Beltline Hwy. W; Fri. 8-5, Sat. 8-5, Sun. 8-5, Mon. 8-5; free admission; public auction Sat., demonstrations, raffle; contact Dale Tikalsky, 523 W. 20th St., Scottsbluff, NE 69361, (308) 632-5574; e-mail: tikal.sky21@charter.net

29-30—CASPER, WYOMING: Show; Natrona County Rockhounds; Natrona County Fairgrounds, Industrial Bldg., 1700 Fairgrounds Rd.; Sat. 9-5, Sun. 9-4; adults \$3, children 12 and under free with adult; displays, demonstrations (flint knapping, wire wrapping, gold panning, faceting), silent auction, raffles, door prizes; contact Randy Sternberg, P.O. Box 123, Mills, WY 82644, (307) 234-6156; e-mail: hnhoff@bresnan.net

29-30—FORT WORTH, TEXAS: 59th annual show, "Fabulous Fossils"; Fort Worth Gem & Mineral Club; Will Rogers Memorial Center, Amon G. Carter Exhibit Bldg., 3401 W. Lancaster; Sat. 9-6, Sun. 10-5; adults \$5, seniors \$4, children under 12 free; 30 dealers, kids' games, hourly door prizes, grand prize, silent auction, exhibits; contact Steve Hilliard, P.O. Box 418, Decatur, TX 76234; (817) 925-5760; e-mail: fwgmc@embarqmail.com; Web site: www.fortworthgemandmineralclub.org

29-30—LAKESIDE, ARIZONA: Annual show; White Mountain Gem & Mineral Club; Blue Ridge Junior High School, 3050 N. Porter Mountain Rd.; Sat. 9-6, Sun. 9-4; adults \$2, students (15 and under) free with paying adult; dealers, gems, minerals, beads, fossils, lapidary equipment, rough and finished rock specimens, silent auction, spinning wheel, kids' activity area, door prizes, raffle prizes, display cases, fluorescent mineral display; contact Larry Legge/Nanz Marshall, (928) 537-2524; e-mail: larrylegge@yahoo.com; Web site: www.whitemountainazrockclub.org

29-30—TONOPAH, NEVADA: 40th annual show, "Jim Butler Days"; Tonopah Rock & Mineral Club; Tonopah Convention Center; Sat. 9:30-5, Sun. 9:30-3; gems, minerals, jewelry, fossils, bottles, in conjunction with the Nevada State Mining Championships; contact Robert Otteson, P.O. Box 3493, Tonopah, NV 89049

continued on page 28

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Interest to Rockhounds

Story and Photos by James R. Ettwein

When I moved to Nebraska from the state of Pennsylvania, I felt I had entered what the early American explorer Stephen H. Long called "the Great American Desert." Leaving the tree-covered mountains, rock exposures, and boulder-lined rivers behind, I entered a land of flat, featureless horizons, exposures of sand and silt, and mud-bottomed lakes and streams. "Where are all the rocks?" I wondered. All I saw was dirt, dirt, and more dirt. Even the road cuts I had been driving through were barren—not a rock in sight. I had entered a rockhounding desert indeed—that is, until I discovered Nebraska's sewer trap.

Almost every system has its sewer trap, so to speak, a place to which odds and ends gravitate and collect. They function much like the circular, stainless steel strainer in the bottom of the kitchen sink, which keeps scraps (not to mention wedding rings) from going down the drain. Another common example is found in the storm sewer systems that drain our streets; called a clean-out trap, it is an engineered low spot that traps heavier elements of water runoff, such as gravel, sludge and debris, and preventing them from entering the drainage system. In a similar way, vast areas of the Great Plains have functioned as nature's sewer trap, collecting a multitude of glacial and alluvial materials. Much of this material is of particular interest to rockhounds.

In the distant past, the volume of water flowing through the rivers of the Great Plains was much greater. Dramatic climate changes and mountain-building upheavals to the west resulted in massive flows of water that carried vast quantities of gravel onto the plains. These alluvial deposits accumulated as gravel bars and terraces along ancient rivers and streams throughout what is now the Midwest. In Nebraska, these deposits are now largely covered by silt and dune sand and visible only where the



A rather abundant type of microcrystalline quartz found in eastern Nebraska is petrified wood.

erosion of rain and river water or the activities of man, such as gravel pit operations or road construction, have exposed them. But when they are exposed, the Great American Desert springs into bloom.

Though all the native rocks and minerals in Nebraska are sedimentary in nature, a host of plutonic, volcanic and metamorphic rocks are also present. These foreign newcomers to the state were transported here by rivers flowing from the Front Range of Colorado, Wyoming, and the Black Hills of South Dakota, and by the movement of glacial ice from the north and northeast. First, let's consider the specimens that comprise the alluvial deposits laid down by hydrologic forces.

ALLUVIAL TREASURE

Among the ingredients that make up the sediments transported into Nebraska are items of particular interest to the rockhound, lapidary, geologist, paleontologist and anthropologist. What we see in these deposits is a conglomeration; a mix of old and new; the altered and unaltered; animal, vegetable and mineral; even the artifacts of ancient man. These elements of the past are all stirred into

RIGHT: As the climate warmed at the end of the last ice age, ancient gravels appeared from beneath the retreating snow and ice.

BOTTOM RIGHT: Lake Superior agates are a common, but not abundant, occurrence in glacial till. The big fellow in the middle weighs over 4 pounds.

BOTTOM LEFT: Mammoth tusk segments, found in alluvial sediments, remind us that giants once thundered across the Great Plains.

BELOW: Large glacial "erratics", transported to Nebraska from distant locations, consist primarily of granite, gneiss or quartzite.



a jumble. Hunting for specimens among these alluvial collections is interesting, like prospecting in a geologic landfill. Unfortunately, these ancient landfills are often difficult to find.

As I mentioned earlier, much of Nebraska's geologic record is blanketed in deposits of dune sand and windblown silt (loess), but there are ways to locate places where this geologic treasure is exposed. One way to scout out these exposures is to look for abrupt changes in elevation, as indicated on a geologic map. Steep gradients indicate the possibility of a cliff or ledge where erosion has kept plant material and soils from accumulating, leaving the geologic record exposed. A standard road map is also helpful in locating exposures by indicating where bridges cross rivers and streams. Since most alluvial deposits can be found near existing water courses, a look up and downstream at bridge crossings will sometimes reveal a gravel bar.

Another possibility is to locate a gravel pit operation. The waste piles at a gravel pit are usually excellent places to prospect. These gangue materials (materials that are contaminated with foreign matter, making them unsuitable for sale) contain a variety of elements of interest to the collector.

Since many sand and gravel operations are located along rivers, the gangue materials from their mining operations can often be found dumped along the riverbank to prevent erosion and to control runoff. This material is easily accessible by simply walking the riverbank. In some states, the land on either side of a river, up to the high-water mark, is public land. In those states, it might be possible to prospect among these gangue piles without trespassing. But regulations vary from state to state, and there are exceptions to this rule, so it is better to simply ask permission before entering an area bordering private land. No doubt, the best way to discover a good prospecting site is by word of mouth, which can save a lot of trial and error and provide more time for searching out the treasures that have been deposited in nature's sewer trap.

In southeast Nebraska, where I live, these deposits contain an abundance of gem and ornamental stones. Of these, the varieties of microcrystalline quartz (quartz comprised of microscopic crystals), such as agate, chert and jasper, are the most common. These forms of chalcedony and chert are found in sorted gravels averaging an 1 1/2 inches in diameter.



Much of Nebraska's geologic record is buried beneath a powdery blanket of wind-blown silt (loess).

At streamside, these gravels are well washed, but where they are still intact, as in undisturbed terraces, they are often found in a jumble of mudrock and sand. When their mud and dirt are removed, we find evidence of a troubled past: they have been kicked around and tumbled, end over end, mile after mile, through the Nebraskan countryside before coming to rest, but their rough treatment has enhanced their beauty. Nature has given them a fine polish, making them collector friendly and ready for display.

As is in many locations throughout the world, jasper is the predominate gem and ornamental form of quartz here. In this part of the state, it comes in many colors and patterns. Shades of brown are predominant, but bright hues of red are common, followed by yellow and various shades of gray, white, and solid black.

Perhaps the most abundant type of collectible microcrystalline quartz to be found here is petrified wood. It can be found on virtually every prospecting trip. Though it is generally not as colorful as that from Arizona, it is every bit as interesting and collectible; it is also a popular medium for lapidary work. Specimens range in color from clear as chalcedony to ones shiny black like obsidian. Like the jasper found in this region, the petrified wood is predominantly shades of brown, with various hues of red and orange also present. The textures of some specimens are intricately detailed, having a structure like actual wood. Others have been tumbled smooth so that only the shrinkage cracks and faint growth rings remain to reveal their identity.

Sometimes, when hydrologic forces have tumbled away the woody features of a piece, making identification difficult, fluorescence can be a valuable identification tool. Since many organic materials fluoresce under a black light, a fluorescent response suggests that the specimen was once actual wood. Most of the petrified wood found in this region is fluorescent. A department

store-variety black light tube will produce a nice response of bright orange and yellow, with some pink, red, blue and green.

The petrified wood in the alluvial deposits of Nebraska comes from a number of sources. Researching the variety of specimens you find would make an interesting project and the information could be incorporated into an educational display. The prevalent occurrence of petrified wood speaks of widespread natural disasters of the past, such as explosive volcanic eruptions, landslides, floods, and violent storms, that account for the rapid burial necessary for plant material to become petrified.

In my years of collecting fossil wood among alluvial sediments, I have never come home from a prospecting trip empty-handed. It is common to find at least five pieces of wood on every trip. Pieces average about 2 inches in length, but 5-inch specimens may be found. Although petrified wood is common in both alluvial and glacial deposits, the wood found among the alluvial sediments transported into the state from the west tends to be more colorful and suitable for cutting and polishing.

One species of petrified wood that is particularly prized among collectors, palm wood, speaks of Northern America's tropical past. Palm wood is easy to identify by its large, tubular cells running longitudinally with the grain. Because palm wood is not as abundant as other siliceous woods, there is always a moment of excitement when a piece is rescued from the mud and silt to be seen by human eyes for the first time.

Identification is one challenge of collecting petrified wood in Nebraska. Since it has come from a number of locations, two or three pieces of wood found within inches of each other may not have exactly the same origin and history. But geologists have successfully identified some of these species of fossil wood and have traced them to their places of origin in the west, where matching specimens are found fossilized in the place in which they actually grew.



As in many locations throughout the world, jasper is the predominant gem and ornamental form of quartz in Nebraska.



These pieces of naturally polished unakite and epidote are a few of the metamorphic foreigners that have been transported into the state of Nebraska from the west.

Because the alluvial deposits of Nebraska have no single source of materials, they are a catchall containing not only rocks and minerals, but plant and animal matter as well, a characteristic that makes for some interesting prospecting surprises.

NOT JUST ROCKS AND MINERALS

While prospecting along the banks of a local river, I noticed a white, cylindrical item sitting on top of a pile of mudrock and gravel. Because so much of it was exposed above the surrounding material, it appeared to be something that had been placed there after the material had been deposited. I walked over to investigate, expecting to find a man-made item like a short length of PVC pipe or a Styrofoam cup. How wrong I was!

As I examined that cylindrical chunk of chalky white material, I saw that it was composed of concentric layers, like the rings of a tree. "Could it be?" I asked myself. "It looks like a piece of elephant tusk!" And so it was.

Although not abundant, pieces of prehistoric elephant tusk (ivory) are not uncommon in alluvial deposits throughout the state. Some of them are suitable for lapidary work. I have found several segments of mammoth tusk through the years, averaging 2¾ inches in diameter and totaling 32 inches in length.

The fact is, ancient elephant tusks, teeth and bones can be found at virtually any exposure throughout the state—not only in ancient alluvial and glacial deposits, but also in more recent deposits of silt and loess. Of



Most of the petrified wood found in the alluvial gravels of eastern Nebraska is fluorescent and shows a nice response under a common department store black light tube (right). When the woody features have been tumbled away, this response aids in identification, since it suggests that the specimen was once actually wood.

the 93 counties in the state of Nebraska, only three have no reported fossilized elephant finds, and that number continues to decline.

Mammoth teeth are perhaps the most likely elephant remains to be found in Nebraska's sewer trap. Because they are composed largely of durable enamel sandwiched between layers of dentine, teeth are able to weather the ravages of time much better than somewhat softer materials like bone. Virtually every hydraulic gravel pit operation has sucked up mammoth teeth in its equipment.

George Corner, collection manager of paleontology at the University of Nebraska State Museum at Lincoln, says that before the advent of modern mining equipment that uses a mechanical auger, or "stinger", which grinds up larger material entering the intake, many nice specimens could be found. Years ago, when pit operators had to manually remove debris from the intake, George and U of N staff were often permitted to search through that debris and fish out bones, teeth, and occasionally complete skulls.

"We'd fill a dozen or more burlap bags with specimens," George recalled. The University of Nebraska State Museum's "Elephant Hall" hosts what is considered the largest display of ancient elephants and mastodons (proboscideans) in the world, including the largest exhibited mammoth, a 14-foot-tall Colombian Mammoth nicknamed "Archie".

Although not every prospecting trip will yield fossil mammoth remains, bison bones and teeth are frequently encountered in the alluvial mix. These relics of the recent past are reminders of the mass extinction that occurred at the end of the last ice age, when the ancient big brother of the bison, *Bison latifrons*, still roamed the plains sporting a 9-foot horn span. Though changing climatic factors may have played a major

part in the extinction of the giant mammals of the plains, man could very well have been the agent of mass extinction, as he was with the near extinction of the modern-day bison.

GLACIAL TREASURE

Most authorities believe it was at the end of the last ice age that man made his appearance in North America. As the last of the great ice sheets were retreating to the north, man was there to ponder the contents appearing from beneath their primeval snows.

The flows of water that inundated Nebraska from the west scattered the rocky materials we now find distributed through the entire state, but the glacial materials that entered the state from the north and northeast cover only its eastern third. The ever-increasing gradient of elevation from east to west delineated the western extent of the glacial edge. The glacial ice, reaching an elevation of 1,650 feet above sea level, could push no farther.

Although the advancing ice scraped away much of eastern Nebraska's geologic record, the presence of glaciers was not without consolation. The glacial till (unsorted deposits of clay, sand, gravel and boulders) left in their wake is but another source of treasure in Nebraska's sewer trap.

Like a child dumping out a box of toys to play with and leaving them for someone else to pick up, the glaciers dumped great deposits of till in eastern Nebraska and then retreated to the north. But our analogy ends there; for a rockhound, picking up the odds and ends left by the retreating glaciers is not a chore. Besides, the glaciers have done much of the pick and shovel work, and within these glacial dumping grounds many nice finds can be made.

Like the alluvial materials we have already considered, most of the glacial ma-

terials are covered with loess, but many of the same methods already mentioned can be used to scout out these deposits. A geologic map showing the distribution and thickness of glacial deposits is a particularly helpful tool for prospecting in glacial till. This type of map may indicate that the deposition of glacial till is over 150 feet thick in one location, while at another place just a short distance away, there is none at all. A map of this kind is available from the U.S. Geological Survey (www.usgs.gov) and is useful in determining where to expect glacial deposits.

At some locations in eastern Nebraska, evidence of ancient glaciers is dramatic. Large glacial "erratics" (boulders that have been transported from a distant location) appear out of nowhere. These erratics consist primarily of granite, gneiss or quartzite.

Quartzite (metamorphosed sandstone) is abundant in the glacial till of Nebraska in colors that are particularly pleasing. Various shades of red predominate, with hues of pink, rose and burgundy. Shades of purple are also common. Some quartzite is banded, with alternating horizons of white and shades of red or purple. Much of the reddish quartzite can be traced to formations near Sioux Falls, South Dakota, a few hundred miles to the north. The quartzite found in the glacial tills is prized as ornamental landscaping stone.

Agates are perhaps the most sought after form of chalcedony. They are present, but not abundant, in the alluvial gravels of southeast Nebraska. When scouring through glacial till, the eye of the Nebraskan prospector is tuned to the red color of Lake Superior agates (also called Lakers). As their name implies, Lakers originate in the vicinity of Lake Superior. They can be found anytime and anywhere when prospecting glacial till.

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PROSPECTING NEBRASKA'S "Sewer Trap" from page 25



Ancient deposits of alluvial gravel are often found in a jumble of silt, mudrock, and sand.

For the most part, there are no mineralogical hot spots for agates or any other specific gem in glacial till; everything is mixed together. However, research indicates that Lakers may be most concentrated in the till deposited during the second Kansan glaciation event, one of several glaciation epochs to affect Nebraska.

Because the glacial ice that moved through Nebraska came primarily from the northeast, one can expect to find rocks and minerals that reflect the geology of Minnesota and Lake Superior. The region surrounding Lake Superior is iron country. Iron and iron-rich minerals are evident in the till left by glaciers, manifested in the rust-brown horizon often found in stratified layers of till and in the makeup of the materials themselves. Lakers owe their red color to iron. Several other rocks and minerals present in glacial till also have iron-rich beginnings. One of these is limonite.

Like the glacial material it is found in, limonite is not a mineral but a mix of different minerals, predominately goethite. It is a noncrystalline iron hydroxide that is interesting to collect because it has so many forms, shades and textures. It can be oolitic, botryoidal, stalactitic, nodular, or simply a crust or varnish on other materials; it may be powdery yellow (ochre), earthy brown, reddish, light chocolate, or shiny dark brown. It is abundant in the glacial tills of Nebraska in all its many forms.

Magnetite and hematite are a few more iron-rich ingredients in the glacial stew. Because of its magnetic properties, a nice specimen of magnetite makes an interesting addition to a collection.

Large septarian concretions can also be found in the glacial mix. Because they are often harder than the rocks in which they formed—shale, limestone and sandstone—they weather out or are bulldozed out by the advancing glacial ice and transported along unscathed. However, some of the septarians present in glacial till may have formed locally.

Some other local formations found in till are sand concretions and chalk. These sedimentary deposits result from the precipitation of calcareous (calcium) solutions. Sheets of chalk, a half inch or more thick, can be seen where calcium deposits have filled shrinkage cracks in the glacial till

itself. In some exposures, where the silt and soil material surrounding them have eroded away, these sheets can be seen sticking out of the till both vertically and horizontally.

Unlike the durable surfaces of a rock face or cliff, exposures of both glacial and alluvial sediments erode rapidly. Prospecting in an area that was examined only a month before may reveal entirely new discoveries that were just millimeters below the surface on the previous prospecting trip.

Of the many aspects of prospecting among the sediments of Nebraska, one that I haven't yet mentioned is probably the most practical of all: accessibility. Few things these days can be enjoyed without paying an admission fee or making a large initial investment. There are prospecting sites that are readily accessible and available to the general public if one takes the time to search them out. In addition, prospecting among glacial till and along riverbanks is usually not too physically demanding, making it agreeable to the elderly and handicapped and small children, and most of the sites are close to well-maintained roads. Thankfully, some things in this world are still free and available to whomever has an inquisitive mind and a taste for adventure and is eager to discover the treasure that nature has deposited in Nebraska's sewer trap. ♡



The sand concretions and chalk found in glacial till are primarily local formations.

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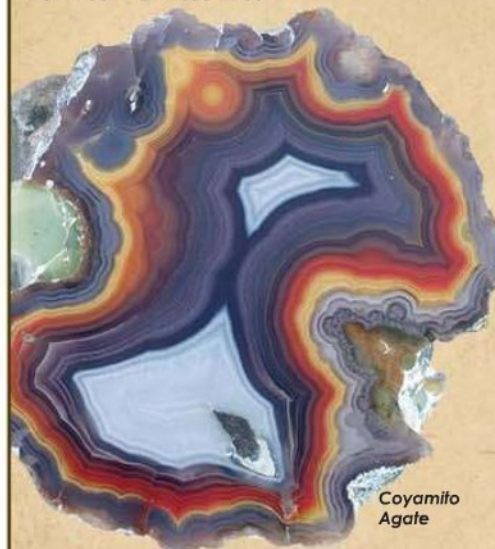
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Show Dates from page 21

JUNE 2010

4-6—LAS VEGAS, NEVADA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Bally's Las Vegas Hotel & Casino, Pacific Ballroom, 3645 Las Vegas Blvd. S; Fri. 10-6, Sat. 10-6, Sun. 10-3; contact G&LW, P.O. Box 98, Flora, MS 39071-0098, (601) 879-8832; e-mail: info@glwshows.com; Web site: glwshows.com

4-6—PUYALLUP, WASHINGTON: Show; Puyallup Valley Gem & Mineral Club; Fruitland Grange, 112th St. and 86th Ave. E; Fri. 12-6, Sat. 10-6, Sun. 11-4; contact Mark Baumann, (253) 756-8636; e-mail: djbmeb@earthlink.net

4-6—TULSA, OKLAHOMA: Show, "Gem Faire"; Gem Faire Inc.; Expo Square/Central Park Hall, 4145 E. 21st St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; \$5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

4-6—WAUSEON, OHIO: Show; State Line Gem & Mineral Society; Fulton County (Ohio) Fair Grounds, 8514 SR 108, Ohio Turnpike Exit 34; Fri. 12-7, Sat. 10-7, Sun. 11-4; free admission; MSHA mine safety class Sat., (\$30 includes book), soapstone carving class (\$15 includes soapstone), beaded jewelry class, demonstrations (cabochon cutting and polishing, flint knapping, silver casting), micro mounts and sand, fluorescent minerals, wire wrapping, spool knitting, faceting, glass fusing, kids' grab bags, silent auctions, door prizes, raffle; contact Doris Brzezicki, 419 N. Broad St., Adrian, MI 49221, (517) 263-1669; e-mail: rychard@tc3net.com; Web site: www.angelfire.com/mac/rock-club/

5—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 W. Masinton, (970) 856-3861

5—MURFREESBORO, ARKANSAS: Show, "Crater Gem & Mineral Show"; Crater of Diamonds State Park, 209 State Park Rd.; Sat. 8-4; free admission; gems, minerals, jewelry, diamond search area 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

5-6—BIRMINGHAM, ALABAMA: 37th annual show, "Tannehill Gem, Mineral, Fossil, & Jewelry Show"; Alabama Mineral & Lapidary Society; Tannehill Ironworks Historical State Park, 12632 Confederate Pkwy.; Sat. 9-5, Sun. 9-5; adults \$3, seniors and ages 6-12 \$2, kids under 6 free; door prizes, children's activities, educational exhibits, demonstrations; contact Gene Blackerby, 155 Hwy. 69, Chelsea, AL 35043, (205) 807-6777; e-mail: gene@lapidaryclub.com; Web site: <http://lapidaryclub.com>

5-6—COEUR D'ALENE, IDAHO: Show; North Idaho Mineral Club; Kootenai Co. Fairgrounds and Event Center, Kathleen and Government Way; Sat. 9-5, Sun. 10-4; contact Warren Price, P.O. Box 1643, Hayden, ID 83835; e-mail: genuniegems@gmail.com

5-6—GLEN DORA, CALIFORNIA: Show; Glendora GEMS; Goddard Middle School; 859 E. Sierra Madre; Sat. 10-5, Sun. 10-4; free admission; dealers, demonstrations, displays, door prizes; contact Bonnie Bidwell, 1010 E. Mountain View, Glendora, CA 91741, (626) 963-4638; e-mail: ybidwell2@aol.com

5-6—MARION, KENTUCKY: Show; Ben E. Clement Mineral Museum, Fohs Hall, Walker St.; Sat. 9-5, Sun. 11-5; free admission; mineral digs, museum tours, vendors, speakers, silent auctions, door prizes, children's activities; contact Tina Walker, P.O. Box 391, Marion, KY 42064, (270) 965-4263; e-mail: beclement@kynet.biz; Web site: <http://clementmineralmuseum.org>

6—FT. LAUDERDALE, FLORIDA: Show, "Rings & Things BeadTour"; Rings & Things; Sheraton - Cypress Creek, 555 NW 62nd St.; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

8—TAMPA, FLORIDA: Show, "Rings & Things BeadTour"; Rings & Things; Clarion, 2701 E. Fowler Ave.; Tue. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

10—JACKSONVILLE, FLORIDA: Show, "Rings & Things BeadTour"; Rings & Things; Clarion Hotel Airport Conference Center (Ballroom), 2101 Dixie Clipper Rd.; Thu. 1-5; free admission; gemstones, bead strands, wholesale prices, find-

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10-12—PARK HILLS, MISSOURI: 13th annual swap and sale; Mineral Area Gem & Mineral Society; Greater St. Louis Association of Earth Science Clubs; Missouri Mines State Historic Site, Hwy. 32; Fri. 9-6, Sat. 9-6, Sun. 9-5; free admission; rocks, minerals, fossils, lapidary; contact Lloyd E. Marler, (573) 431-2951, or Missouri Mines State Historic Site, P.O. box 492, Park Hills, MO 63601, (573) 431-6226

11-12—REDWOOD FALLS, MINNESOTA: Show and sale; New Ulm Gem & Mineral Club, Minnesota Inventors Congress; Redwood Area Community Center, 901 Cook St.; Fri. 11-6, Sat. 11-6; club displays, grab bags, jewelry, rocks, amethyst, demonstrations, door prizes; contact Ruth Hacker, P.O. Box 37, Morgan, MN 56266, (507) 249-3811

11-13—ALBUQUERQUE, NEW MEXICO: Show, "Gem Faire"; Gem Faire Inc.; New Mexico State Fairgrounds, 300 San Pedro NE; Fri. 12-7, Sat. 10-6, Sun. 10-5; \$5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

11-13—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

12—KENT, CONNECTICUT: 8th annual show; Connecticut Antique Machinery Association, Danbury Mineralogical Society; museum grounds, 1 mile north of Kent on Rte. 7; Sat. 9-4; free admission; rocks, minerals, fossils, jewelry, buy and trade, new mining museum exhibits; contact Connecticut Antique Machinery Association, (860) 927-0050; Web site: www.ctamachinery.com

12—NORCROSS (ATLANTA), GEORGIA: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn Select - Peachtree Corners, 6050 Peachtree Industrial Blvd. NW; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

12—SKOKIE, ILLINOIS: 3rd annual show, "Goede Fest"; Chicago Rocks & Minerals Society; St. Peter's United Church of Christ - Gymnasium, 8013 Laramie Ave.; Sat. 1-5; free admission; geodes from Iowa, Missouri, Indiana, Mexico, Brazil, etc., geode cracking, dealers, educational exhibits, mineral inclusion identification; contact Craig Heinze, (847) 584-8637; e-mail: cheinze@flash.net; Web site: www.chicagorocks.org

12-13—CARTERSVILLE, GEORGIA: Show, "Rockfest"; Tellus Science Museum; 100 Tellus Dr.; Sat. 9-5, Sun. 10-4; adults \$12, seniors \$10, students and children \$8, museum members free; dealers, gems, minerals, fossils, jewelry, children's activities, mineral identification, demonstrations; contact Michelle Pate, 100 Tellus Dr., Cartersville, GA 30120, (770) 606-5711; e-mail: michellep@tellusmuseum.org; Web site: www.tellusmuseum.org

12-13—SAN FRANCISCO, CALIFORNIA: Show, "San Francisco Crystal Fair"; Pacific Crystal Guild; 99 Marina Blvd.; Sat. 10-6, Sun. 10-4; admission \$6; contact Jerry Tomlinson, (415) 383-7837; e-mail: sfxtl@earthlink.net; Web site: www.crystalfair.com

13—CHARLOTTE, NORTH CAROLINA: Show, "Rings & Things BeadTour"; Rings & Things; Renaissance Suites Hotel (Terrace Ballroom), 2800 Coliseum Centre Dr.; Sun. 2-6; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

14—DURHAM, NORTH CAROLINA: Show, "Rings & Things BeadTour"; Rings & Things; Hilton Durham, 3800 Hillsborough Rd., near Duke University; Mon. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

15—SPOKANE, WASHINGTON: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn - Richmond Central, 3207 North Blvd.; Tue. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: d Robertson@rings-things.com; Web site: www.rings-things.com

continued on page 42

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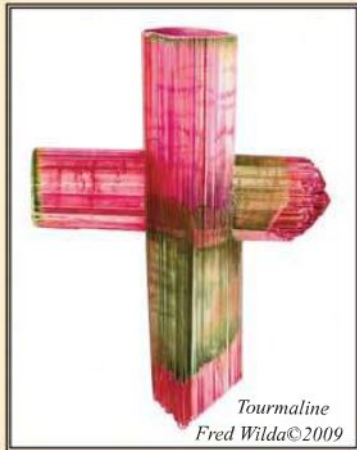
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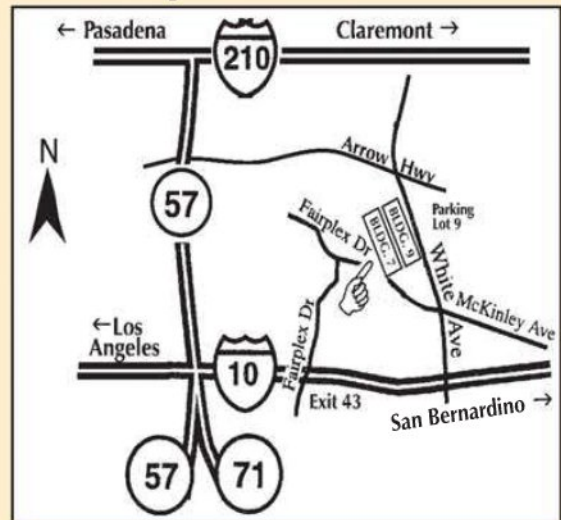
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GENE MUELLER PHOTO

He Brought Many New Jaspers and Agates to the Market

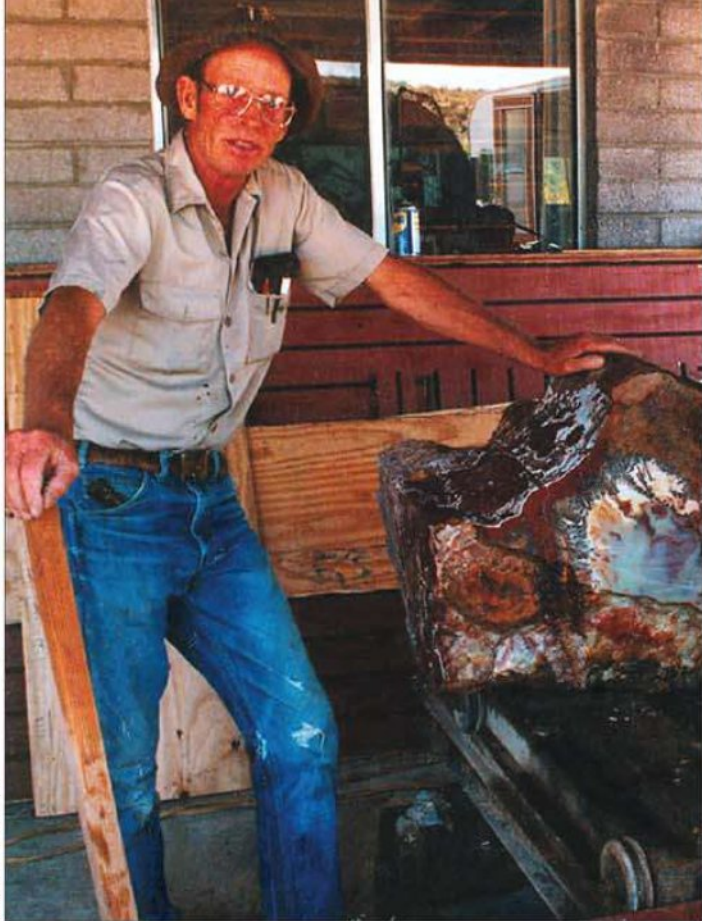
Story by Barbara L. Miller

It has been a pleasure to become acquainted with "pioneers" in the rock hunting and lapidary world. Many lapidaries will recognize Darrell Jacobitz, better known as "Jake" by his rock friends, by the stones he sells at rock shows. He is one of the foremost rockhounding pioneers and the discoverer and miner of many new varieties of jasper and agate.

BARBARA MILLER PHOTO/JACOBITZ SPECIMEN



When a specimen of "egg"- or "orb"-type Morrisonite was found at the Jake's Place claim, discovered by Jacobitz and owned by Gene Mueller, it was considered a very good day.



JACOBI TZ PHOTO

Jake proudly displays a beautiful Arizona 7 Springs onyx boulder that he mined from the Maricopa County, Arizona, source.



BARBARA MILLER PHOTO/JACOBI TZ SPECIMEN

This polished slice of Flower jasper shows dark rust-colored flowers and "multi-volcano appearing eruptions" across the lower edge.



BARBARA MILLER PHOTO/MILLER SPECIMENS

The Oregon picture jaspers Jake has mined include (left to right) Rocky Butte, Morisonite and Deschutes.



MILLER PHOTO AND SPECIMEN

Near the Graveyard Point Plume beds, Jake found a small deposit of unusual red, green and white agate, which he named Christmas Tree Plume.

Jake was born and raised in Wisconsin. After high school, he joined the Army, then spent three years in Iowa, where he worked as a machine operator on road construction. Deciding the winters were too cold, he drove to the Pacific Northwest. In The Dalles, Oregon, he found work building electric power lines. While working at the junction of the Deschutes and Columbia rivers, he met a man named Hoot Elkins. Hoot told Jake he was selling Deschutes Picture jasper he had dug out of the canyon wall on the east side of the Deschutes River.

Jake had always been interested in rocks and listened intently when Hoot told him a large deposit of Biggs Picture jasper had been found during highway widening between Biggs and Wasco, Oregon, and was free to anyone who would load and haul it away. He quickly located the deposit, loaded 1,200 pounds of jasper, and hauled it to a nearby rock dealer, who bought the entire amount. He said that experience in 1967 turned his hobby of gathering interesting rocks into a business.

For three and a half years, Jake mined a major petrified wood deposit, a combination of hickory and oak, located almost four miles south along the Deschutes River. He said that was his initiation into the hard work of mining for saleable specimens. Jake taught himself how to recognize the various agates and jaspers, onyx, and petrified wood, as well as the geographical locations in which they might be located. He says the successes of "old-time rockhounds" like Hoot Elkins, Charlie Moore, Dudley Stewart, Ed Brandt, and Chris Christopherson inspired him to make rocks a lifetime interest and business.

Not many rockhounds have covered the miles that Jake has trekked during prospecting trips. In 1968, while investigating the Owyhee River canyon in southeast Oregon, he came upon an area that looked promising. He found a beautiful jasper that he named Rocky Butte and mined it for many years. Dudley Stewart, owner of the Stewart Rock Shop in Boise, Idaho, bought Jake's first load of the jasper.

Beginning in 1974, Jake had a one-quarter share in five Bruneau jasper claims and mined them for seven winters. They were located one mile downstream from the Jarbridge and Bruneau river junction in Idaho. The winters in the Bruneau River canyon were pleasant; Jake maintained a garden near a natural hot springs while working the Bruneau claims. The upper rim areas were generally snowed in, so he had to have enough supplies to last the winter months.

Jake had hunted, mined and sold rock by himself for years. He met Bev Hardin while searching for rock in Oregon and other states. Their union has provided knowledge and exceptional rough rock to the lapidary world. Jake began selling his jasper finds at the Quartzsite Improvement Association's Pow Wow in Quartzsite, Arizona, in January 1974, and the couple have continued the activity. For the past 14 years, they have provided polished specimens for an exhibit case in the QIA main building. Each year's display highlighted one of the many stones they had mined.

For many summers, Jake and Bev traveled to Wyoming. One of their stops was at the Blue Forest Petrified Wood beds near Fontenelle Reservoir, west of Farson, where the beautiful blue chalcedony encased wood is found. During the few days they spent at the flat, treeless beds, all was very productive, quiet and peaceful. All was not serene, however, when they were camped in the mountains at Horse Creek, near the Wiggins Fork River, north of DuBois,

Wyoming. Jake walked up the creek a mile or two and saw a pile of rocks someone had stacked. He picked up a piece of limb cast and had a strange feeling he was being watched. He carefully turned to see a huge bull moose very close by, watching his every move. Jake said he was relieved when the big fellow decided he was no threat and walked away. During the night, they were awakened by a bear sniffing and scratching on the sides of the tent. They learned later the bear had tried to kill a nearby rancher's dogs. In the quieter moments of their trips, he found many pieces of Wiggins Fork limb cast replacement composed of white to clear agate with spectacular green moss inclusions.

Jake told me about his experiences mining Morrisonite, also known as Morrison Ranch jasper. I love this beautiful southeast Oregon jasper and wanted to know the history of its discovery. He said it was discovered in the 1940s by rancher Jim Morison, who was horseback riding near where Birch Creek enters the Owyhee River. Morison mentioned the jasper find to Idaho rock collecting friends, Dudley Stewart, Chris Christopherson and Howard Duncan. The three men named the jasper Morrisonite in honor of their friend Jim, but erred a bit in spelling his last name. They mined the jasper until the 1960s. According to Gene Mueller's 1984 BLM report, during the 1960s, brothers Emmett, Web and Walter Norris worked the Morrisonite mine. They were the first to file a claim, in 1964, on the rim above the Owyhee Canyon and River. This was all handwork—no equipment was used—and the jasper was not of good quality.

The report also says Ed Brandt, from Nampa, Idaho, made the first commercial filing on two claims, the Big Hole #1 on Apr. 11, 1971 and Big Hole #2, on July 28, 1973. They were located 600 feet below the Sheepshead Mountain rim and 1,400 feet above the Owyhee River. Brandt arranged for brothers-in-law Charlie Carress and Jim Longwell to build a road from the rim down to the claims. Equipment could then be taken down to remove waste rock. Brandt filed three more Morrisonite jasper claims: The Christine Marie on July 14, 1971, the Amy Ellen on Oct. 10, 1971 and the Lacey on June 1, 1975.



GENE MUELLER PHOTO

LEFT: According to Jake, this specimen of Bloody Basin Plume agate is a rarity because moss agate is the usual find in that location.

ABOVE: Gene Mueller and Jake Jacobitz worked together to mine the "Rolls Royce of Jaspers" from the Morrisonite claims for six years.



GENE MUELLER PHOTO



BARBARA MILLER PHOTO/JACOBITZ SPECIMEN

This beautiful sphere, made from Mushroom jasper from Jake's claim in Arizona, has a crystal-lined vug.



BARBARA MILLER PHOTO/JACOBITZ SPECIMEN

Many beautiful specimens came out of the Mueller-Jacobitz Regency Rose Plume agate claim.

Later in 1975, Brandt sold the claims to Tom Caldwell and his father. Tom wanted to develop the two Big Hole mines and went to see Jake at his Rocky Butte claim, approximately 12 miles to the northeast, to ask for his assistance. For two years, Jake helped on Tom's two mines, as well as working his own claim. After that, he mined Rocky Butte full time until 1982. Several others have been mining Rocky Butte since and are continuing to do so as of this writing.

Caldwell passed away around 1978. In June 1985, Tom's widow leased the property to Jake. He shivered when telling me about the first night he spent in the old cabin on Sheepshead Rim overlooking the canyon and river. Even though it was June, it was the coldest night he had ever spent. His sleeping bag was of very little help. He had no electricity, water or plumbing in the cabin, but used kerosene lanterns to light the long, chilly winter nights. Pack rats and mice were regular visitors and an occasional

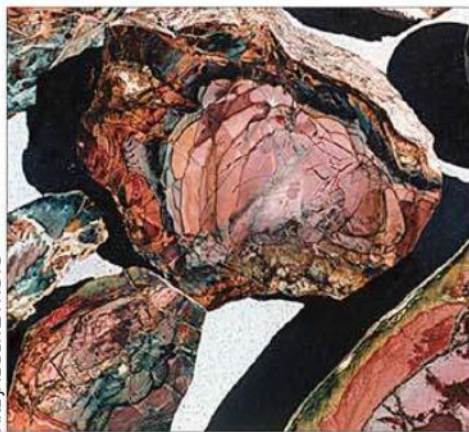
rattlesnake showed itself. Water and groceries had to be hauled in regularly.

Rock lovers are an amazing group of people. Jake said there were those who drove many miles to the Morrisonite cabin during the winter and battled snowy trails to buy some of the stone. He said Charlie Moore drove his snowmobile 15 miles to buy 100 pounds of the jasper. Charlie stayed all night in the cabin and headed back to his truck parked on the main road the next morning.

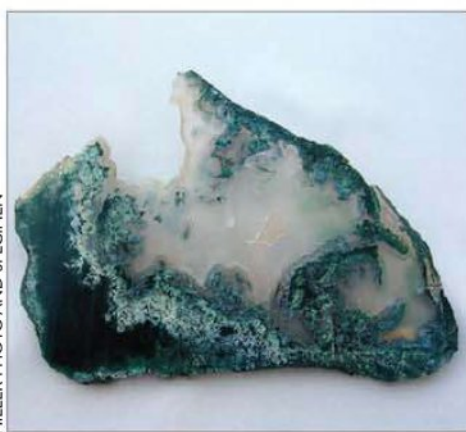
In the summer of 1989, Jake found Flower jasper in a cone-shaped deposit about one mile south of the Morrisonite area. Even though it was a short distance away, the new find was of a totally different picture pattern. Many pieces had rust-colored, flowerlike inclusions on a light tan background. In one of the polished slices, the tan background shows dark rust-colored flowers and "multi-volcano eruptions" across the lower edge. Unfortunately, the deposit of this unusual jasper was not large.



From his years of prospecting and mining, Jake has several piles of accumulated rock stored in his backyard. He slabs the material and sells it at rock shows.



The Morrisonite jasper specimens from the Jake's Place claim show beautiful colors and patterns.



The Wiggins Fork limb casts Jake found near DuBois, Wyoming, showed green moss in white to clear agate.

Until 1996, Jake mined Morrisonite continuously and sliced it at home to sell at rock shows. We have bought specimens from him for many years and realize what a master he is at cutting rock. He leaves no saw marks, making it obvious he knows how to do the cutting, which includes keeping his equipment in excellent operating condition.

The Morrisonite claims were sold to a new owner, Gene Mueller, owner of The Gem Shop in Cedarburg, Wisconsin, in 1989. In 1990, he filed a new claim on a spot in which Jake had found some very good Morrisonite and named it "Jake's Place."

Jake and Gene worked together on several of the Morrisonite jasper claims. They began a long day's work by driving the jeep down from the Sheepshead Rim to the jasper claims overlooking the Owyhee River. Jake drilled several blasting holes, inserted dynamite sticks and a blasting agent, then lit them to fire in sequence. Gene operated

the trac-hoe and moved the newly exposed boulders, separating the "possibles from the duds." The boulders with visible jasper veins were then broken with sledgehammers into smaller pieces and examined for signs of the beautiful jasper. The matrix would be hammered away from any obvious jasper, then taken back to the cabin for further cleaning that evening; 50 percent or less of the material would be saleable specimens.

Jake and Bev worked with Gene mining the "Rolls Royce of Jaspers" for six years. In 1996, the sad day arrived when they had to close the Morrisonite jasper area. The veins were getting very thin and good material was found only occasionally, making it too costly to continue. Since that time, Jake has continued prospecting out in the "boonies", looking for new stones.

In 1994, Nolanvision, of Cedarburg, Wisconsin, produced an informative and interesting video, "Morrisonite Jasper", about mining the "Rolls Royce of Jaspers". It lets

viewers witness the extremely hard work involved in hardrock mining and listen to Gene and Jake sharing some of the history of the jasper. Gene said the video is sold out, but will be repackaged into a 20-minute DVD that will be available through his Web site, www.thegemshop.com, in The Gem Shop, and at shows for \$20.

While spending the winter in Arizona in 1992, my husband, Keith, and I met Jake and Bev. They were camping north of Carefree, while prospecting and mining rock in that area. We were novices in the rock world at that time, and the couple taught us how to recognize jasper and agate. When Jake showed us several slices of beautiful Oregon picture jasper he had mined, cut and polished, we realized what was hidden inside those outwardly nondescript rocks: pictures of unequal beauty. We purchased some rough chunks of jasper and began an interesting and rewarding lapidary hobby.

We spent several days rock hunting north of Carefree, following Jake's instructions. Traveling about four miles north of 7 Springs Campground on Forest Road 24, we turned left at the fork, arriving at the abandoned 7 Springs Onyx mine. In the mine's heyday, the beautiful cream-colored slabs, with their brown and rust banding, were made into ice cream-parlor table- and countertops and turning knobs for automobile steering wheels. When we visited the onyx site, the wall of the old quarry had been covered with sand. We walked the quarry area and the road, hoping to locate some specimens. We found several small chunks that had fallen from trucks and been partially buried by sand and included them in our landscaping at home. In the early period of the mine's abandonment, Jake knew where to dig to find larger pieces. He also purchased several large onyx boulders from friends who had dug them before the mine's existence.

Jake located the beautiful red Bloody Basin Moss agate and mined it for six years, selling it to specimen and lapidaries at shows. The site is 30 miles northwest of Carefree, Arizona, on the east side of Forest Road 24. Occasionally, he found a plume agate, but moss was far more prevalent at the site. He said the agate was originally found by two cougar hunters in the early 1950s. One of the two, Charlie Hill, began mining Bloody Basin agate. The basin was the site of deadly skirmishes between the Army and Apache Indians in the late 1800s.

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ROCK PIONEER Darrell "Jake" Jacobitz from page 33



JAKE JACOBITZ PHOTO

Jacobitz used a Caterpillar to mine Regency Rose Plume agate at his claim west of Homedale, Idaho.

On one of his prospecting treks, while hunting Bloody Basin agate along a tributary of the Verde River, Jake found black jasper with red geometric patterns throughout it. Since he had to climb a 2,000-foot canyon wall and walk almost two miles back to his truck, he packed out only what he could carry of this Indian Creek jasper. He hasn't returned to the site, even though the material cut and polished well.

Near the Graveyard Point Plume agate beds in Oregon, west of Homedale, Idaho, Jake found a small deposit of unusual agate. He named it Christmas Tree Plume, due to its red, green and white coloration. We have a specimen slice and value it highly.

The Jacobitz and Mueller partnership reformed in 1996, when Gene filed a claim on a deposit of the beautiful Regency Rose Graveyard Point Plume agate in Oregon, about 20 miles west of Homedale, Idaho. What gorgeous specimens they have found! The chunks are very large and have to be cut into slices or specimens to sell at shows.

Jake spends his summers hunting new rock in southeast Oregon. In 2003, on a trek into an area southwest of Homedale, Idaho, after a huge prairie fire, he found a newly uncovered reddish-black stone with red web-like inclusions and named it Spiderman jasper. On a 107-degree day in August 2006, near Three Fingers Butte, Oregon, he found the Tuff Mountain jasper he has sold at the Quartzsite Pow Wow. In the same area, he located, then mined Walk About Creek and Ridgecrest jaspers. A friend once gave Jake a list of jaspers that have been found in the Three Fingers Butte area of Malheur County, Oregon. Jake had discovered 25 of them.

When the winter winds begin to blow, Jake travels to Arizona. One of his favorite areas is the Red Top agate beds north of Brenda. He told me about a memorable trip he made to the area with a friend, who asked, "Where should I begin digging?" Jake nonchalantly pointed to the side saying, "That might be a good spot." After digging a short time, the friend found a good sized chunk. When they broke it open, the specimen proved to be one of

a kind. Between the white agate center and the red outer portion was a beautiful lavender fortification! Occasionally, a blue fortification is found in the agate, but only one example of the lavender has surfaced, to their knowledge.

Jake's Mushroom jasper claim, south of Aguila, Arizona, produces specimens grey to white mushroom picture inclusions and red borders and splotches scattered throughout a green background. Two of Jake's polished specimens and a unique 3-inch sphere with a quartz crystal-lined vug were on display at the 2008 QIA Pow Wow.

While prospecting north of Wenden, Arizona, Jake found gem-grade psilomelane (black hematite), which he named Black Gold. This stone has plume patterns, as well as the usual botryoidal growths. After digging them, he had to carry his finds over a mile to his truck, so he doesn't go back for another sackful very often.

We in the lapidary field are grateful to the various dealers who mine beautiful stones, display them at shows, and give us the opportunity to purchase them. Since 1967, Jake has walked a record number of miles to prospect for the new stones he brings to the lapidary world. For this, we thank him. ♥



JAKE JACOBITZ PHOTO

Regency Rose Plume agate was mined in large chunks and hauled away by truck to be cut into specimens.

Opals: The Queen of Gems

Recently we've added a new section to our website listing large 500 gram to 1000 gram parcels of Welo opal from Ethiopia. And selling opals in wholesale quantity has been met with great success. But we're not sure that the message is getting out to rockhounds without computers. So we're listing a parcel, from our website, that is for sale now in March (ads have to be submitted 2 months in advance of magazine mailings). If you have any questions about what large parcels may be available at any time, you can give us a call at the phone numbers listed below.



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PICKS & PANS

News and Reviews

MEET THE ARTISTS:

Local Lapidary Hobbyists at the Lizzadro Museum

by Liz Stanislav

For many lapidary artists what began as a hobby evolved into an artistic career or a healthy creative obsession. For some, the art of lapidary is a talent passed down from generation to generation. For others, an interest in lapidary art forms new friendships based upon shared visions and creative collaboration. Whatever the case may be lapidaries find creative inspiration through working with stone.

Tom Josefek of North Riverside, Illinois, learned his lapidary skills from his parents, the late Paul and Sylvia Josefek. The Josefeks were avid rock and fossil enthusiasts, collectors, lapidary hobbyists, and co-creators of the "Rock Café", a whimsical lapidary work of art created from collected stones (that resemble food) and cut and polished stones made to look like edible culinary delights. Paul Josefek enjoyed working with silver, turquoise and faceting. Having experience working at Illinois Tool Works he constructed his own faceting machines. Sylvia Josefek had an affinity for collecting a variety of rocks and fossils and came up with the concept of creating the "Rock Café". A typical Josefek family vacation would include places like Quartzsite, Arizona, for "rockhounding" expeditions.

It comes as no surprise that the Josefeks' son Tom is interested in the lapidary arts, as well. Experimenting with different stones and collecting materials for future projects is second nature for the hobbyist. Influenced by his parents, he plans on expanding on their work by creating a "Rock Café" of his own inspired by "The Iron Chef" television show that will include a formal five-course dinner made entirely of stone.

Through his parents' involvement in The Earth Science Club of Northern Illinois (ESCONI), an artistic collaboration bloomed with miniaturist and lapidary artist Edie Rodriguez of Carol Stream, Illinois. Josefek now creates small-scale objects such as soapstone vases constructed to contain tiny seashell flower arrangements designed by Rodriguez. Rodriguez has been creating miniatures for 25 years with the simple goal of making small-scale objects as realistic as possible. Seven years ago she began working with various gemstones after meeting Sylvia Josefek at the Chicagoland Gem & Mineral Show held each May at the DuPage County Fairgrounds in Wheaton, Illinois. Sylvia Josefek inspired Rodriguez to create hand-carved miniatures from stone. Some of her first experiments involved creating a

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Miniature stone vases cut by Tom Josefek for Edie Rodriguez's flower arrangements

cornucopia made of soapstone and small-scale vine twisted ivies made of aventurine.

For Rodriguez the most challenging aspect of her work includes finding things that are small enough to create realistic interpretations of larger objects, such as her detail oriented tiny seashells used in the creation of individual flower petals. When working in stone, she seeks out materials that are not fractured making them ideal for carving. Incorporating the use of stone added a new dimension to her work making her creations unique within the world of miniatures. Her work has grown more daring as she is willing to take on more challenging projects such as miniature flowers including tulips and roses, and even bonsai trees. Rodriguez continues to collaborate with Tom Josefek in creating lapidary miniatures and shares her knowledge of creating lifelike miniatures through educational workshops held at the Museum in December.

Lapidary hobbyist Lorel Abrell of Downers Grove, Illinois, began her journey of working with stone through jewelry classes held at the College of DuPage and reading the *Lapidary Journal* in the 1980s. During this time she experimented with a variety of techniques including silversmithing, scrimshaw, faceting, cabochon cutting, wire wrapping, beading, and casting jewelry. Upon viewing renowned lapidary artist Olive Colhour's work on a vacation to Portland, Oregon, Abrell became inspired enough to study with the artist at a workshop held in Seattle. She began with a

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Miniatures by Edie Rodriguez

piece of agate that she worked to "get the colors out of." Rather than beginning with softer stones such as soapstone, Abrell started working with harder stones like jade and obsidian making her work more challenging.

Today Abrell prefers to create smaller items and jewelry although she has enjoyed experimenting in the creation of larger sculptures as well. She continues to work with hard stones and is a member of the West Suburban Lapidary Club and ESCONI. Abrell says rock and mineral clubs serve as a resource for information, ideas, and inspiration for artists and hobbyists. For anyone considering lapidary as a hobby, she recommends keeping [an] open mind, maintaining a positive attitude and the willingness to experiment! Lorel Abrell will teach soapstone carving to children and adults at the Museum on Aug. 7.

Bill & Lois Zima of Des Plaines, Illinois, were inspired to take up lapidary as a hobby through a mutual childhood interest in stones and various craft projects that included the art of jewelry making. In furthering their lapidary skills, they became members of the Des Plaines Valley Geological Society, attended gems shows and read books on how to make gem trees and wirewrap jewelry.

Challenges to their work involve finding supplies through locating dealers who specialize in lapidary findings. What began as an interest in jewelry making has grown into an evolution of work spanning 30 years including creating, exhibiting, and selling their work at Gem and Mineral Shows and sharing their knowledge with others. Lois feels that creating lapidary art as a hobby is a good pastime and a good way to become knowledgeable about the environment and what is going on in the world. Bill and Lois Zima will teach "Create A Gem Tree" June 26 at the Lizzadro Museum.

Many thanks to the hobbyists mentioned in this article for sharing their time, talent, and knowledge of lapidary art through educational programs held at the Lizzadro Museum. The "Rock Café" will be exhibited at the Museum from May 4 to Sept. 5, 2010. ♥

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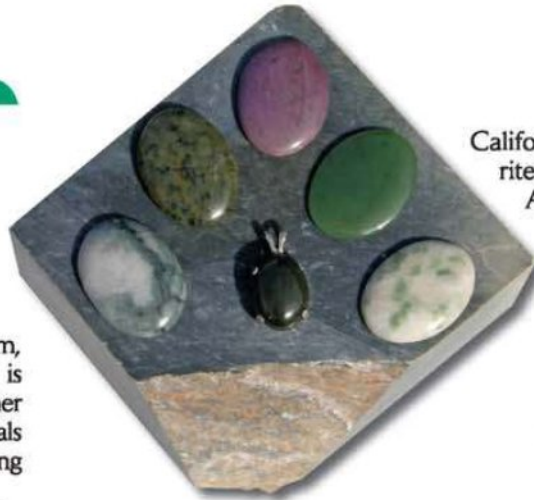
Nephrite, $\text{Ca}_2(\text{Mg,Fe})_5(\text{Si}_8\text{O}_{22})(\text{OH})_2$
 Jadeite, $\text{Na}(\text{Al,Fe})\text{Si}_2\text{O}_6$

Surprisingly, there is no mineral named "jade." It's a general term applied to jadeite and nephrite. What are the differences between these two rocks? Jadeite is a pyroxene: a silicate mineral containing sodium, iron or aluminum. Technically, nephrite is not a mineral, but a compact form of either tremolite or actinolite. Both of these minerals are amphiboles: silicate minerals containing calcium, magnesium and iron.

Jadeite is made of interlocking, granular crystals, resulting in a sugary texture with vitreous to greasy luster. Nephrite, on the other hand, has interlocked fibers, resulting in silky texture with dull to waxy luster.

Pure jadeite is white, but included minerals color it green, lilac, pink, orange, yellow, red, blue, brown or black. Nephrite is more limited in color, including magnesium-rich cream-colored varieties to iron-rich black varieties, with shades of green between.

Jadeite is perhaps most commonly called jade, even though it's rarer than nephrite. Jadeite sources include Myanmar, Japan,



Although we commonly think of jade as being green, both jadeite and nephrite jade actually come in a range of colors. Sometimes, rough jade has a "rind" that hides the color inside.

California, and Central America, whereas nephrite comes from China, New Zealand, Siberia, Alaska, British Columbia, California, Wyoming, Europe and elsewhere.

So why are both called "jade"? Well, they're nearly identical in polished form. Both occur in metamorphic environments, often within rocks formed at subduction zones. Each has a Mohs hardness around 6.5, is tougher than steel, and has been used in tools according to evidence found in archeological sites going back 3,000 years. Both take a mirrorlike polish with pleasing translucency, and therefore have been popular lapidary stones. They have been revered as holy stones for nobility by Asian and Mesoamerican cultures.

If you are buying jade, beware: fakes abound! The carved stone that is most often sold as jade is serpentine. An easy test can be performed with a nail: it will scratch serpentine (and most other fakes), but not jade. The Web site <http://molly.kalafut.org/jade/fake.html> uncovers jade lookalikes.

—Jim Brace-Thompson

Lizzadro Museum Events

Catch these fun exhibits and family events coming up at the Lizzadro Museum of Lapidary Arts:

May 4 - Sept. 5: Special Exhibit: "The Rock Café"

Chicago-area lapidary hobbyist, Sylvia Josefcek collected rocks and minerals that resembled food and created the Rock Café, featuring three balanced meals made of stone. Warning: Eating rocks will lead to broken teeth!
 Regular Museum hours and admission.

June 5: Stone Hunt

This 45-minute hands-on activity allows children and adults to search for gemstones and mineral specimens among more common rocks and minerals. Learn the difference between rocks and minerals and how to distinguish between them. Each rock or mineral found is identified



At the "Rock Café," breakfast is served!



Bill Zima will teach Gem Tree techniques.

and can be taken home. This activity is intended for participants 5 years of age through adult. 2 p.m.

\$4 per person, Museum Members Free • Reservations recommended; call (630) 833-1616.

June 26: Create a Gem Tree

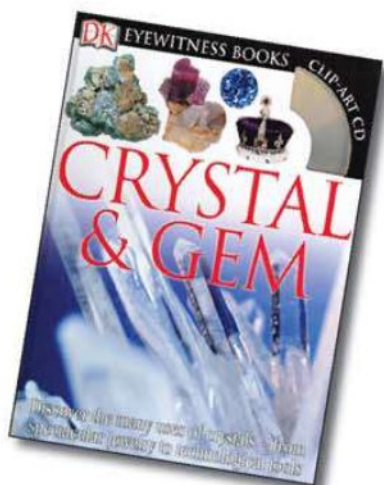
Lapidaries Bill and Lois Zima, of the Des Plaines Valley Geological Society, will teach a class on creating a small trees using gemstones and wire. These beautiful trees never need water and make great gifts. This activity is intended for anyone aged 9 years to adult. All materials are included in the \$20-per-person fee. 1 p.m. to 3 p.m.

Fee: \$20.00 per person, Museum Members \$15.00 • Reservations recommended; call (630) 833-1616.

Lizzadro Museum of Lapidary Art, 220 Cottage Hill Ave., Elmhurst, IL 60126; www.lizzadromuseum.org

Take the Quiz, Win a Prize!

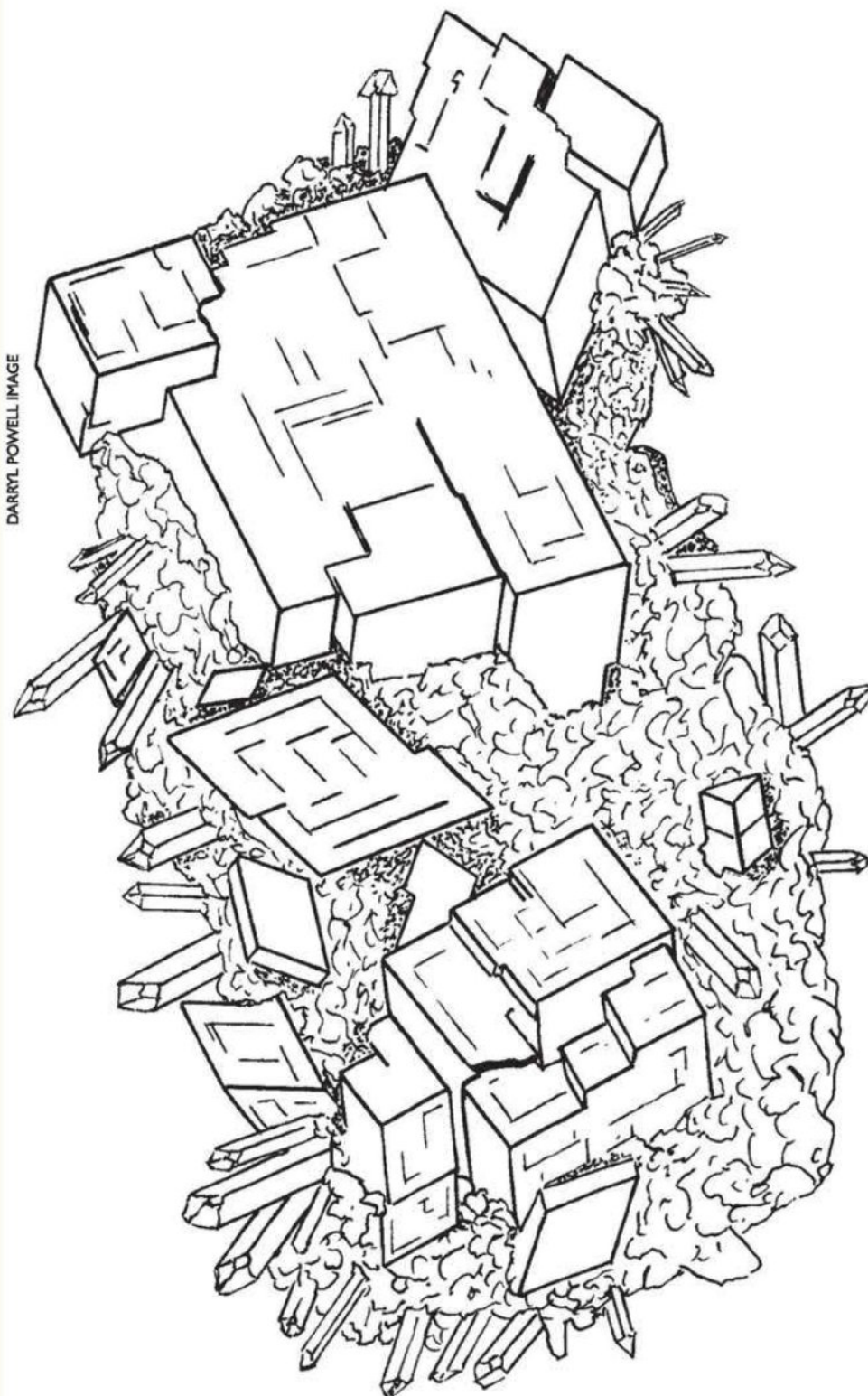
The Quiz is open to U.S. residents 17 and younger. All the questions can be answered by carefully reading *Rock & Gem Kids*. Mail your answers to **May Quiz, Rock & Gem magazine, P.O. Box 6925, Ventura, CA 93006-9899**. Five winners will be drawn from the valid entries received by **May 31, 2010**. Valid entries must include the correct answers, the entrant's name, age and address, and the signature of a parent or guardian. This month's prize is the DK Eyewitness Book *Crystal & Gem*, which includes a CD of mineral clip art.



1. "Jade" is a general term for _____ and _____.
2. _____ is a silicate mineral containing sodium, iron or aluminum.
3. Amphiboles are silicate minerals containing _____, _____ and _____.
4. The carved stone most often sold as jade is _____.
5. Rhodochrosite is a _____ mineral.

Color a Rhodochrosite

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ROCK SCIENCE

by Steve Voynick

From Azurite to Malachite

Vivid midnight-blue and rich forest-green colors make azurite and malachite, respectively, among the most familiar, readily identifiable, and collectible of all minerals. Especially interesting and attractive are composite specimens in which these two minerals occur together.

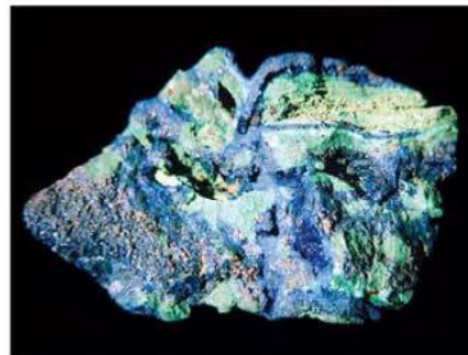
Azurite, $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$, and malachite, $\text{Cu}_2(\text{CO}_3)(\text{OH})_2$, are both basic copper carbonates. Both minerals crystallize in the monoclinic system, have similar origins, and occur in the same mineralogical environments. Specimens of azurite usually contain some malachite, and vice versa. Yet, azurite and malachite are quite different in color and crystal habit.

Both are secondary minerals that form from the oxidation of copper sulfides in shallow sections of virtually all copper deposits. Known since antiquity, they have been used for blue and green pigments and as the earliest ores of copper.

Because azurite yields almost the same amount of metallic copper as malachite, azurite was long thought to be just a color phase of malachite. But in 1824, French mineralogist François Beudant succeeded in chemically differentiating the two basic copper carbonates, assigning the name "azurite" (from the French *azure*) to the blue mineral.

The intricate and complex patterns of blue and green seen in composite specimens of azurite-malachite are due to a difference in oxidation levels between the two minerals. Both crystallize directly from aqueous solutions, but because azurite is the less oxidized mineral, it requires less oxidation energy to form in aqueous mineralogical environments. Thus, it usually precipitates out of solution before malachite. However, when greater amounts of oxidation energy are available, malachite can crystallize before azurite. Changes in the levels of available oxidation energy during the precipitation process create the well-defined, alternating layers of blue azurite and green malachite in many attractive composite specimens.

Because azurite is less oxidized than malachite, it also has less chemical stability. When exposed to water, azurite will oxidize into malachite very slowly, which can create blue-green color gradations. Many composite specimens show these intermediate colors. Azurite's chemical instability and tendency to oxidize into malachite explain why malachite is much more abundant.



Structural differences within their monoclinic crystal lattices give azurite and malachite very different crystal habits. Azurite tends to form bladed and tabular crystals. Malachite, however, occurs mainly in massive and botryoidal forms. As azurite oxidizes to malachite, the original azurite crystals are replaced on a molecule-by-molecule basis by malachite, a process that often forms pseudomorphs. Pseudomorphs possess the chemical composition and lattice structure of the new mineral, but retain the shape of the original mineral. Malachite-after-azurite pseudomorphs therefore have malachite's chemistry and diagnostic green color, but the outward shape of the original, bladed azurite crystals.

Color is the most obvious physical difference between azurite and malachite. Both contain copper (cupric, Cu^{2+}) ions, which are powerful blue-green chromophores. The respective colors of azurite and malachite are due to differences in their crystal lattices. In azurite, copper ions within the lattice absorb all wavelengths of white light except for a narrow band of blue, which is reflected. In malachite, different positions and energy levels of the copper ions cause the lattice to reflect the blue, green and yellow wavelengths of white light, which are viewed as green.

When admiring a composite azurite-malachite specimen, remember that those pseudomorphic crystals and intricate patterns of blue and green are all due to a difference in oxidation levels between azurite and malachite. 💎

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





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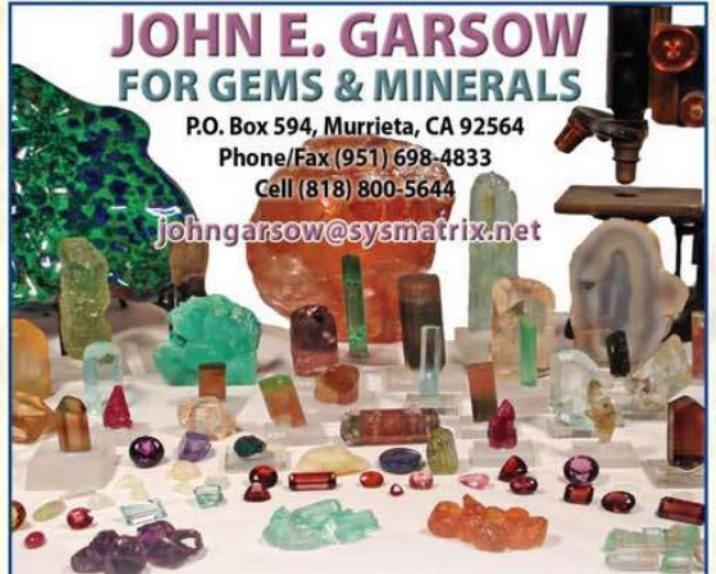
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June 18 - 20 Whittier, CA;

AFMS/CFMS North Orange County Gem & Mineral Society Hosting, So. Calif. University of Health Sciences; 16200 E. Amber Valley Rd.

July 16 - 17 Minocqua, WI;

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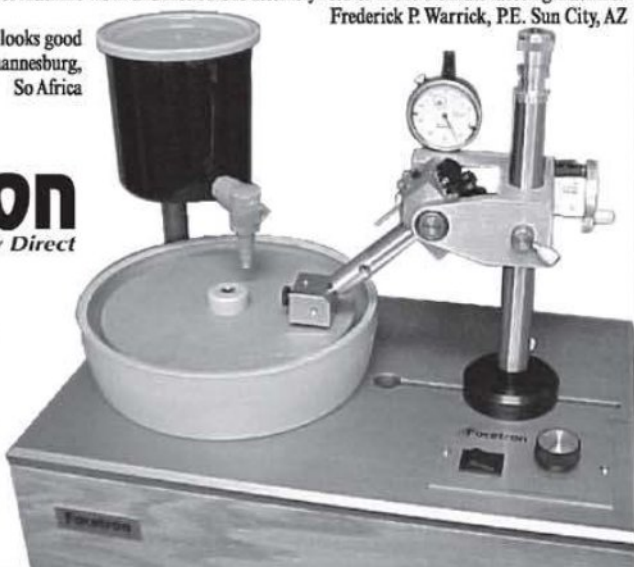
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Show Dates from page 28

SEPTEMBER 2010

16—MCLEAN, VIRGINIA: Show, "Rings & Things BeadTour"; Rings & Things; Best Western Tysons Westpark Hotel (Tyson's 1 and 2), 8401 Westpark Dr.; Wed. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

17—TIMONIUM, MARYLAND: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn Timonium, 9615 Deereco Rd.; Thu. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, P.O. Box 450, Spokane, WA 99210, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

18-20—ASHEVILLE, NORTH CAROLINA: Show, "Asheville Gem Fest"; Colburn Earth Science Museum; Pack Place Education, Arts & Science Center, 2 S. Pack Square; Fri. 10-6; Sat. 10-6, Sun. 11-5; free admission; kids' activities, silent auction; contact Felicity Green, Colburn Earth Science Museum, P.O. Box 1617, Asheville, NC 28802, (828) 254-7162; e-mail: museum.colburn@gmail.com; Web site: www.colburnmuseum.org

18-20—NEWPORT, OREGON: 47th annual show, "Rock'n the Coast"; Oregon Coast Agate Club; Yaquina View Elementary School, Multipurpose Room, 351 S.E. Harney St.; Fri. 10-6, Sat. 10-6, Sun. 10-4:30; dealers, demonstrations, displays, agate, jasper, gems, fossils; contact K. Myers, (541)265-2514

18-20—SANDY (SALT LAKE CITY), UTAH: Show, "Gem Faire"; Gem Faire Inc.; South Towne Exposition Center/Exhibit Hall 5, 9575 S. State St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; \$5 weekend pass; contact Yoo Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

18-20—WHITTIER, CALIFORNIA: AFMS/CFMS show, "Hidden Treasures"; North Orange County Gem & Mineral Society, American Federation of Mineralogical Societies, California Federation of Mineralogical Societies; So. California University of Health Sciences, 16200 E. Amber Valley Rd. (www.scuhs.edu); adults \$6, children under 14 free; Fri. 10-5, Sat. 10-5, Sun. 10-5; speakers, field trips, display cases, raffle, kids' room, demonstrations, vendors, supplies, jewelry, beads, fossils, gems; contact Don Warthen, (626) 330-8974; e-mail: odwarthen@verizon.net; Web site: www.nocgms.com

19—ESSINGTON, PENNSYLVANIA: Show, "Rings & Things BeadTour"; Rings & Things; Wyndham, 46 Industrial Hwy.; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

19-20—BUTTE, MONTANA: Annual show; Butte Mineral & Gem Club; Civic Center Annex, 1340 Harrison Ave. (exit 127 North); Sat. 10-5, Sun. 10-5; 15 dealers, minerals, gems, jewelry, fossils, displays, demonstrators; contact Pete Knudsen, P.O. Box 4492, Butte, MT 59702, (406) 496-4395

19-20—CAYUCOS, CALIFORNIA: 46th annual show; Cayucos Gem & Mineral Show; San Luis Obispo Gem & Mineral Club; Cayucos Vets Hall, 10 Cayucos Dr.; Sat. 9-5, Sun. 9-5; free admission; rocks, slabs, minerals, fossils, gems, carvings, lapidary equipment, drawing; contact Mike Lyons, (805) 610-0757; e-mail: jadestar@charter.net

19-20—POWELL, WYOMING: Show, "Wyoming Wonders"; Shoshone Rock Club, Cody '59ers; Park County Fairgrounds, 655 5th St.; Sat. 9-7, Sun. 9-4; adults \$2, ages 12-18 \$1, children 5th grade and under free with adult; contact Jane R. Neale, (307) 754-3285, Mary Ann Northrup, (307) 754-4472, or Art Schatz, (307) 548-7258

20—HANOVER, NEW JERSEY: Show, "Rings & Things BeadTour"; Rings & Things; Ramada Inn and Conference Center (Ballroom), 130 Rte. 10 W; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

21—NORTH HAVEN, CONNECTICUT: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn North Haven, Emerald Ballroom 1, 201 Washington Ave.; Mon. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson,

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24—ROCHESTER, NEW YORK: Show, "Rings & Things BeadTour"; Rings & Things; Monroe Community College, Brighton Campus, Bldg. #3, Monroe A & B, R. Thomas Flynn Campus Center, 1000 E. Henrietta Rd.; Thu. 12-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

24-27—PRINEVILLE, OREGON: Show, "Prineville Rockhound Show and Pow Wow"; Prineville Rockhound Pow Wow Association; Crook County Fair Grounds, 1280 S. Main; Thu. 9-5, Fri. 9-5, Sat. 9-5, Sun. 9-4; free admission; auction, field trips; contact Rich Knight, 1709 SW Hunter Rd., Prineville, OR 97754, (541) 447-5298; e-mail: richknight@yahoo.com

25-27—BLOOMINGTON, INDIANA: 45th annual show and swap; Lawrence County Rock Club; Monroe County 4-H Fairgrounds, from IN 37, go south on IN 45S for 1.2 miles, then right (west) on Airport Rd. for 0.7 mile; gems, jewelry, minerals, fossils, rocks, lapidary equipment, supplies, rockhound and prospecting supplies, 4-H project material, science project material; Fri. 10-6:30, Sat. 9-6:30, Sun. 10-4; contact Dave Treffinger, 13101 E. 250 N., Loogootee, IN 47553, (812) 295-3463; Web site: www.lawrencecountyrockclub.org

25-27—SAN DIEGO, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Scottish Rite Event Center, 1895 Camino del Rio S; Fri. 12-7, Sat. 10-6, Sun. 10-5; \$5 weekend pass; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

26-27—COLORADO SPRINGS, COLORADO: Show, "Rock Fair at WMMI"; Colorado Springs Mineralogical Society; Western Museum of Mining and Industry, 225 N. Gate Blvd.; Sat. 9-4, Sun. 9-3; adults \$5, children \$2; vendors, rocks, minerals, jewelry, children's area, rock, mineral and fossil identification, speakers, demonstrations, gold panning, metal detecting; contact Ronald "Yam" Yamiolkoski, (719) 488-5526; e-mail: info@csms.us; Web site: www.csms.us

26-27—GILSUM, NEW HAMPSHIRE: Show, "Gilsun Rock Swap and Mineral Show"; Town of Gilsun; Gilsun Elementary School, Rte. 10; Sat. 8-6, Sun. 8-4; free admission; more than 60 dealers, buy, sell or swap, beryl, quartz crystals, semiprecious stones, rocks, minerals, displays (specimens, fossils, hand-crafted jewelry); contact Rob Mitchell, Gilsun Recreation Committee, P.O. Box 76, Gilsun, NH 03448, (603) 357-9636; e-mail: gilsunrocks@gmail.com

26-27—OSAGE BEACH, MISSOURI: Osage Rock & Mineral Club; 9th annual show; The Inn At Grand Glaize, 5142 Hwy. 54; Sat. 11-5, Sun. 11-5; gemstones, jewelry, meteorites, geodes, fossils, minerals, quartz crystals, custom jewelry, cabochons, gift items, demonstrations, displays, kids' games, prizes; adults \$2, seniors (60+) and kids 10 and younger \$1; Scouts in uniform free, families \$5 maximum; contact ORM, (417) 532-4367, or Roger Varvel; e-mail: rvarvel@fidnet.com

26-27—RAPID CITY, SOUTH DAKOTA: 30th anniversary show; Western Dakota Gem & Mineral Society; Rushmore Plaza Civic Center, 444 N. Mt. Rushmore Rd.; Sat. 9-6, Sun. 10-4; adults \$3, children under 12 free; dealers, gems, minerals, fossils, jewelry, silent auction, informational programs; contact Jamie Brezina, (605) 721-8840, or Don Rathert, (605) 348-8948; Web site www.wdgm.org

26-27—STATE COLLEGE, PENNSYLVANIA: Nittany Gem & Mineral Show; Nittany Mineralogical Society; Mt. Nittany Middle School, 656 Brandywine Dr.; Sat. 10-6, Sun. 11-4; adults \$5, seniors and students \$2, children 12 and under free with adult; expert speakers, hands-on activities, demonstrations, displays, Pennsylvania mineral specimen contest, club silent auctions with kids' sections, field trips; contact David Glick, 209 Spring Lea Dr., State College, PA 16801, e-mail: xidg@verizon.net; Web site: www.ems.psu.edu/nms/

JUNE-JULY 2010

30-4—MADRAS, OREGON: 61st show; All Rockhounds Pow Wow Club of America; Jefferson County Fairgrounds; free admission; swap tables, door prizes, rock toss, auction, members-only field trips daily, more than 70 vendors, jewelry, faceted gemstones, minerals, fossils, crystals, findings, equipment; contact Pauline Miller, (360) 658-8091; e-mail: paulinem280@aol.com

continued on page 48

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Slightly rounded, dark red willemite crystals were once common in the mines of Franklin and Sterling Hill, New Jersey.

PART II:

The Quality and Variety Have Never Been Greater

Story and Photos by Bob Jones

Of all the minerals being mined and collected these days, there are some that will always be in demand and be more highly regarded than most. The nice thing about this that is we are in what I consider the halcyon days of mineral collecting, an ideal time to collect minerals that seem destined to be future classics.

Granted prices are high—too high—but the quality and variety of available specimens has never been greater. I suspect this is directly related to the high price of the finest specimens. Money begets minerals by encouraging more diligent collecting, the re-opening of old haunts, and a much greater search in more remote places for marketable minerals.

Even the mining companies have caught onto the value of good minerals. The gold mining company operating at Round Mountain, Utah, is saving crystallized gold specimens and auctioning them off instead of sending them to the crusher! Several companies, including the operators of the Morenci, Arizona, copper mine, have entered into collecting contracts with private groups, taking a piece of the resulting “action”! The overall effect of these arrangements is more and better quality minerals coming into the marketplace.

Among these wonderful minerals are some that will always be high on a collector’s list of desirable specimens to own. Just as every philatelist wants the old Zeppelin airmail stamps, every mineral collector strives to own certain species that, by general consensus, are “must haves” for any significant collection. It is the specimens from classic sources that often make a collection significant, so why not add potential classics now?

Response to my article “Modern Classic Minerals” (April *Rock & Gem*, p. 12) has prompted me to continue the discussion on minerals that I consider are slated for classic status. My list includes rhodochrosite, gold, wulfenite, beryl varieties emerald, aquamarine, and red beryl, apophyllite, pyromorphite, epidote, cinnabar, cassiterite, kermesite, and bournonite, which I covered last month. Benitoite, vanadinite, cerussite, diopside, danburite, franklinite, and willemite will be the focus of this article. To that list, you can probably add a few of your own choices. For this series, we’ll stick to those cited and maybe others you request!

Cerussite is one of those minerals that have been around for centuries in a couple different forms. As a secondary lead mineral, usually derived from galena via an anglesite route, it has been found all over the world. Yet, from only one mine has cerussite been found in fantastic specimens in quantities that are nothing short of breathtaking!

The premier cerussites from Tsumeb, Namibia, in South West Africa, are the snowflake twins, radiating, open structures of cerussite wherein six crystals join at 60-degree angles to form a completely enclosed sixling. Others form “V” twins from two conjoined crystals. Still others develop as what we call reticulated twins, crystals branching from a common central axis like the bones of a fish, also known as herringbone twinning.

Just as every philatelist wants the old Zeppelin airmail stamps, *every mineral collector strives to own certain species* that, by general consensus, are **“must haves”** for any significant collection.



EVAN JONES COLLECTION

These brilliant red crystals of the lead vanadate mineral vanadinite are from the once-lost Renaldo Pacheco mine in Arizona.

Cerussite ranges from transparent to translucent and is usually white, but can be influenced by impurities, which can impart a reddish, greenish or bluish tint. The larger cerussites from Tsumeb are about 6 inches long, with the majority found in any size under that. The quantity of cerussite from Tsumeb is remarkable. It was encountered at every mine level on which secondary minerals formed.

The more perfect snowflake cerussites were never common, but incomplete, distorted, or slightly damaged examples were more common. As for the other twinned examples from Tsumeb, count them in the hundreds of thousands. Cerussite is certainly highly regarded and will always be sought by astute collectors.

There are a few notable cerussites from another locality, the Stevenson-Bennett mine in the Organ Mountains of New Mexico, that should be highly sought. Unfortunately, the number is so limited that few have even seen them, except in a display. The better examples are simple twins up to 10 inches long that are slightly smoky in color. Other localities have also yielded a few exceptional cerussites, but for sheer quantity of excellent specimens, nothing matches Tsumeb.

Vanadinite is another mineral that has been found all over the world, though not in the same quantities as cerussite. Vanadinite is a lead vanadate that is usually quite colorful. Like cerussite, it is a mineral derived from primary galena. Generally, vanadinite has been found in small, simple, hexagonal crystals under 1/4 inch. Crystals an inch or larger have also been found.

Vanadinite crystals often completely cover the matrix rock. Huge quantities of these nice but not great vanadinites have been produced over the past several decades. One locality in Morocco, however, has produced remarkably lustrous rich red to red-orange hexagonal crystals of 1/2 inch or more in showy specimens with crystals stacked in piles.

The Acif mine, in Morocco, is the source of the better examples of very showy vanadinite in quantity. Their quality exceeds anything from other sources, including the noted Apache mine and Old Yuma mines, in Arizona. The color of Moroccan vanadinite runs the gamut, from pale tan to brown to yellow-orange to orange-red to red. The better specimens are completely covered with brilliant hexagonal red crystals in sizes that are exceptional for the mineral.

The matrix of some specimens is covered with black or nearly black manganese oxide upon which are individual 1/4- to 1/2-inch bright-red crystals that stand in stark contrast on the dark matrix.

Certainly, the finer Moroccan vanadinites qualify as some of the best ever found, and the quantities of available specimens



JONES COLLECTION

Huge numbers of diopside specimens from Tsumeb, Namibia, were found as tightly clustered crystal groups with a nice green color.



GROBEN COLLECTION

California's state gem is lovely blue benitoite, a rare barium titanium silicate mineral that occurs on a matrix of white natrolite.

enrich the mineral collecting hobby. They should be considered among the more desirable modern classics.

While Tsumeb is well known for superb cerussites, it may be even better known for its marvelous green diopside specimens. This copper silicate may well be what we think of as the signature species of a deposit.

Wonderful diopside specimens have come from several localities in Africa: Mindouli, Reneville, Katanga, Guchab and Omaue have all produced significant specimens. Yet, it is Tsumeb that has dominated the entire diopside market with its sheer volume of superb specimens.

Tsumeb produced thousands of specimens over a period of many years, which happened to coincide with the rapid growth of the mineral collecting hobby. Maybe it's because, overall, they are simply the finest diopside specimens to be unearthed.

The earliest diopside came from Russia. Crystals were generally well under ¼ inch and fairly sparse on most specimens. Still, Siberian diopside was instantly popular among collectors.

The various African diopside sources mentioned above quickly produced specimens that eclipsed anything from Russia. Some are geodelike, with rich green crystals lining the curving interior. More typical specimens were hand-size specimens of nice, intergrown crystals with fine green color. Crystals tended to be intergrown and under a half-inch in length. Most diopsides came forth without any other minerals associated with them.

Diopside from Tsumeb, on the other hand, is frequently found associated with other species. It may be the only mineral on a specimen, but is frequently found included in calcite or formed on calcite or dolomite. It is even found associated closely with cerussite. The better crystal diopsides, however, are sharp prisms, most of which are interlocked and completely covering matrix. Others are stacked one on another, with the topmost crystals barely attached. The largest crystals approached 2 inches and many of them were doubly terminated. They are a vibrant green and have high luster!

Miners reported that, sometimes, an entire hanging wall in the mine would be coated with crystallized diopside. It's no wonder hundreds of flats of crystals sometimes showed up at the Munich or Tucson shows!

The sheer quantity of superb diopside, the exceptional size of some crystals, the rich green color seen in most specimens, and the variations of form, color and association all suggest that Tsumeb diopside fits nicely into the category of classic minerals.

Blue is not a very common color in minerals. So, when a fine blue mineral is found, especially as gem crystals, it becomes very popular. Such a mineral is benitoite, the California state gem. The first person who found benitoite crystals thought they were blue diamonds. Studies showed it was not only an unusual mineral, but had a crystal form different from any other known mineral species.

The world's only important source of benitoite is the Gem mine in San Benito County, California, a mine that has been very productive for decades—at least until the federal government put the brakes on mining.

Benitoite occurs in a white natrolite matrix on a gray-blue crossite rock. Associated with the benitoites are shiny black, doubly terminated neptunites and microscopic joaquinite, a very complex metallic silicate. On most specimens, the white natrolite has to be etched away to reveal the enclosed benitoites.

The benitoites from the Gem mine range in color from dull gray, when full of included crossite, to sparkling, clear, sapphire blue, when suitable for faceting. Specimens of benitoite and neptunite on the white natrolite background are exceptionally attractive and very popular. As an added attraction, this benitoite also responds a very lovely rich blue under short-wave ultraviolet light.

The benitoite mine has been worked off and on since its discovery in the early 1900s. Production has never been huge, but the steady trickle of specimens from both mining and rockhounding has made small quantities of specimens available. The better specimens are highly prized and, unless another important discovery is made, the better specimens from the Gem mine, originally called the Dallas Gem mine, will always be considered classics by advanced collectors.

In the 1830s, a work crew was digging a ditch in downtown Danbury, Connecticut, when it cut into a rock formation. Small vugs in that formation yielded tiny, yellowish, nondescript crystals that were later shown to be a new mineral. It was later named



FENN MINERALS

Danburite was considered an uncommon mineral until superb groups of fine crystals like this one were found in the Charcas mine at San Luis Potosi, Mexico.



This New Jersey franklinite from Editor Bob Jones' collection is associated with red willemite and white calcite.



The thick, smoky cerussite crystal in this specimen from Mibladen, Morocco, has formed on a matrix of barite.



Tsumeb, Namibia, is world renowned for the large, twinned crystals of the secondary lead mineral cerussite it produced.

“danburite”. This inauspicious beginning certainly didn’t suggest that today we’d be enjoying superb danburite crystals to 4 and 5 inches long that are transparent and colorless. Others are a lovely shade of pink and occur in groups a foot or more across!

These latest danburites have been coming in huge quantities from the Charcas mine at San Luis Potosi, Mexico, a mine well known for its poker-chip calcites and other attractive species. These chisel-shaped danburites are sometimes cloudy white at the crystal base, but gradually turn water clear at the terminations. Some clusters consist of myriad opaque crystals, each several inches long, sometimes decorated with minor calcite crystals. The mine’s premier danburites are transparent or a delicate pink, 6 or 7 inches long, and in clusters several inches across.

Perhaps one of the more appealing aspects of Charcas danburites is the huge quantity of specimens, especially single crystals, that the mine produced. The singles are most useful in educational kits for beginning collectors. And with a Mohs hardness of 7 to 7.5 and high luster, danburite is an excellent choice for amateur faceters to practice on.

I doubt many collectors think of danburite as a modern classic. In my mind, it fits the criteria: a rare mineral that has suddenly become abundant from one locality. Its crystals are superb, and very showy specimens are found in quantities that will satisfy the market. Granted, it is generally a white mineral, but Charcas has also produced very lovely pinkish specimens.

I doubt that anyone would argue against franklinite from Franklin and Sterling Hill, New Jersey, being listed as a modern classic mineral. Specimens were found over 100 years ago when Dutch settlers first explored the northern New Jersey highlands. The twin deposits of Sterling Hill and Franklin are world famous for their zinc species and the several hundred other species, some unique to the deposit, that are found there. As if that were not enough, many of these Franklin-Sterling Hill minerals, more than 70 of them, respond to ultraviolet light. Franklinite, however, does not!

Franklinite occurs in black octahedral crystals composed of a complex mix of manganese, iron, zinc and oxide. The normal crystal habit for franklinite is octahedral. In fact, I’ve never seen a cubic franklinite, but many of the franklinite octahedrons show nice dodecahedral modifications.

The chemistry of franklinite is complex enough to have given miners fits when they first tried to smelt the franklinite ore. Once the riddle of its chemistry was solved, franklinite became a major ore of zinc and mining the deposits proceeded up to 1954.

Franklinite octahedrons can be under ¼ inch on an edge or so rounded as to look like small black peas. The showy crystals, how-



The Western Union mine in Arizona, which is now closed, produced just a small number of choice vanadinite specimens.

ever, can be as much as 4 or 5 inches on an edge. Most occur on a white calcite matrix, very often associated with willemite, which is often a brick-red color, and zincite, another red mineral.

One of the small problems with franklinite is that its crystals tend to fracture easily, so it is not unusual to see a fine, large crystal with damage. Of course, miners had a solution for that little problem. They would carefully fill in the damaged area with plaster of Paris and paint it black!

I would be remiss if I did not include Franklin-Sterling Hill willemites in this discussion of modern classic species. As noted above, willemite is an almost constant companion of franklinite, so the more highly sought New Jersey specimens are those showing fine crystals of both minerals.

Willemite has been found in the New Jersey deposits in a full range of colors, from colorless to yellow, apple green, gray, and even black. A lot of crystals are flesh red and were given the name troostite, which is now discredited.

Willemite crystals can be gemmy, though these tend to be small, slender and either yellowish or greenish. The bulk of massive willemite is reddish due to an iron impurity. Franklinite and willemite very often occur with massive red zincite, and the three constitute the major ores of Sterling Hill and Franklin, which was earlier known as Mine Hill or Franklin Furnace.

Willemite crystals are often blocky, as much as 7 inches long and 1 inch wide. They are hexagonal and sometimes doubly terminated, though this is difficult to see, as most willemites of this type are embedded in calcite. Most specimens, in fact, require the removal of calcite, usually by mechanical means, to expose enough of the franklinite and willemite to create a very showy specimen. Also, keep in mind that willemite is one of the more brilliantly fluorescing minerals from here. Embedded in the white calcite, which fluoresces a brilliant red, the green-fluorescing willemite makes a Christmassy color combination that is well known from these deposits!

The quantity of franklinite and willemite that has come from Franklin and Sterling Hill is difficult to assess; since these minerals were mined as ore, the bulk of it went into the crusher and was smelted. However, miners did manage to use the traditional lunch-bucket “conveyor” to bring forth large quantities of specimens, which ended up in museums and private collections.

These are just a few of the species we consider modern classics. The listing of exceptional, potentially classic species is almost endless to advanced collectors. Other recently mined species that are obvious nominees to the modern classic list include adamite, cavansite, legrandite, twinned smoky quartz and amazonite, and many others. We’ll touch on some of these in Part III. 💎

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27-29—SOUTH BEND, INDIANA: 47th annual show and sale; Michiana Gem & Mineral Society; St. Joseph County 4-H Fairgrounds, Esther Singer Bldg., 5177 S. Ironwood Rd. (at Jackson Rd.); Fri. 2-7, Sat. 10-6, Sun. 10-4, adults \$2.50, children 6-12 \$1, under 6 free; dealers, gems, fossils, minerals, jewelry, demonstrations, exhibits, Kids' Korner, silent auction; contact Marie Crull, (574) 272-7209; e-mail: crullb2@sbcglobal.net; or Kathy Miller, (574) 291-0332

28-29—COLUMBUS, OHIO: Show; BeadStreet USA; The Veterans Memorial Bldg., North Hall, 300 W. Broad St.; Sat. 10-6, Sun. 11-5; vintage beads, Swarovski crystals, lampwork, precious metal findings, gemstones, supplies; contact Jane Strieter Smith, (216) 521-4367; Web site: www.beadstreetusa.com

28-29—FREEPORT, NEW YORK: Show; Freeport Recreation Center; 130 E. Merrick Rd., Meadowbrook Pkwy. exit M9 west; Sat. 10-5, Sun. 10-5; adults \$5.50, children under 12 free with adult; dealers, minerals, gems, jewelry, fossils, beads, save 50 cents with this ad; contact Ralph Gose, P.O. Box 1418, Melville, NY 11747, (631) 271-8411; e-mail: kaleidoscopegemshows@yahoo.com

28-29—JASPER, TEXAS: 16th annual show; Pine Country Gem & Mineral Society; The Event Center, 6258 Hwy. 190 W, 5 miles west of Jasper; Sat. 9-5, Sun. 10-5; adults \$2, students and children free; silent auction, Spinning Wheel, door prizes, grand prize raffle, rock food table, lapidary demonstrations, educational exhibits; contact Jonetta Nash, Rte. 2 Box 248, Jasper, TX 75951, (409) 384-3974; e-mail: jonetta.nash@yahoo.com

28-29—MOUNTAIN HOME, ARKANSAS: Show; Ozark Earth Science Gem, Mineral & Fossil Club; Senior Center in Cooper Park, 1101 Spring St.; Sat. 10-6, Sun. 10-5; free admission; door prizes, mineral and gem displays, interactive children's events, minerals, fossils, handmade jewelry, demonstrations, silent auction, touch and feel area; contact Edward Hakesley, 821-1 Alexis Cir., Mountain Home, AR 72653, (870) 424-0956; e-mail: edscamp3@yahoo.com; Web site: www.ozarkearthscience.org

28-29—PEORIA, ILLINOIS: 47th annual show and Midwest Federation Convention; Geology Section of the Peoria Academy of Science; The Grand Hotel, 4400 N. Brandywine Dr.; Sat. 9-5, Sun. 10-5; free admission; "Homer" the Triceratops display, speaker Dr. Michael Henderson, silent auctions, kids' area, fluorescent display, panning flume; contact Jim Travis, (309) 645-3609; e-mail: boatnick@aol.com; Web site: http://pasgeology.com

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3-6—CRAWFORD, NEBRASKA: 24th annual show, "Crawford Rock Swap"; Northwest Nebraska Rock Club; Crawford City Park, 1st St. and Main St.; Fri. 8-6, Sat. 8-6, Sun. 8-6, Mon. 8-12; free admission; buy, sell, trade, swap, rocks, minerals, fossils, agates, free agate bed field trips; contact Wade Belins, 120 Gordon Ave., Box 569, Chadron, NE 69337, (308) 432-8950; e-mail: agates@bbc.net

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4-6—CANBY, OREGON: Show, "Willamette Valley Gem, Mineral & Jewelry Show"; Oregon Gem, Mineral & Jewelry Shows; Clackamas County Fairgrounds, 694 N.E. 4th Ave.; Sat. 9-6, Sun. 9-6, Mon. 9-4; free admission; contact Jean Miller, P.O. Box 136, Molalla, OR 97038, (503) 829-2680; e-mail: shadow92337@molalla.net; Web site: www.ogmshows.com

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Repair or Replace?

Depending on the extent of the damage, faceted stones may be difficult to repair. The shape and size of the stone and the damage to it will determine whether it can be repaired without changing its size and shape significantly. Since diagrams aren't available for most damaged stones, we have to examine them carefully and find or create a diagram that will allow us to cut a replacement stone, if necessary. If we are going to try to repair the stone, a lot of planning must take place before we start cutting. Then we have to grind below the damaged part of the stone, hoping we don't encounter internal flaws or damage that could cause the stone to crack or shatter. We may also have to re-cut other parts of the stone so that the repaired area blends in with the other facets. Highly skilled lapidaries can, however, repair gemstones so they look as good as new—or maybe even better.

First, it is important to inspect the damage. Also inspect the stone to identify what type it is and whether it is natural or synthetic. You will find, when dealing with estate jewelry, that many of Grandma's precious gems were actually glass. The tools you'll need to help identify what a stone is include a corrected jeweler's loop, a refractometer, and a dichroscope. Next, you need to discuss with the owner what you can do to re-cut or re-polish the stone and what the cost will be. Many stones are not worth repairing and are better off being replaced. If the owner has a sentimental attachment to the piece, cost may not be a factor.

Recently, I had an antique dealer bring me a brooch that was made around 1850. He wanted to retain the oxidation and patina of the silver and only wanted a missing stone replaced. Of course, he wanted it cut to match the other stones in the piece. After measuring the length, width and depth of one of the stones, I used GemCad to create a design for a similar stone. Using the gem's proportions for crown and pavilion depth and table size, I was able to estimate the angles. Gemologists also use this technique if they want to estimate the weight of a stone without removing it from a jewelry setting.



Once I had created a diagram that matched the other stones as closely as possible, I used GemRay to view the virtual reflection pattern of my design and compared it to the other stones. Even though my design was slightly different, the reflection pattern matched nearly exactly, including a small culet facet I noticed on the other stones. I cut the stone and returned it to the antique dealer, who was very happy with what I had done.

This was a fairly time-consuming project, but I think cutting replacement stones is easier than repairing stones in general. If re-cutting will change the size and/or shape of the stone, make sure the owner understands they'll have to have the jewelry setting either modified or replaced. I usually try to cut the stone to look as near to the original as possible, unless the owner wants it changed. For repair, I use the finest lap possible, preferably a 1200 diamond lap, to remove the least amount of material necessary, followed by oxide or diamond to polish it, depending on the material.

It is often difficult for a small gem-cutting business owner to obtain stones like emerald, sapphire, ruby or alexandrite due to availability and cost. If cutting a new stone is required to repair a piece of jewelry, all you can offer are synthetic alternatives. The better synthetics are more like natural gems than low-end flame fusion stones; however, most people don't realize the difference, so educating people is a big part of offering gem repair or replacement.

A gem-repair professional must have the ability to create a design and cut a stone that matches other stones in a set as nearly as possible; therefore, good design and cutting skills are mandatory. For those without design abilities, I recommend Seattle Faceting Books' Facet Design series, by Robert Long and Norman Steele, published by P/M Marketing. This seven-volume set has a multitude of designs for almost every classic shape one could imagine. The designs are categorized by shapes and there are charts that offer various angles for a variety of materials. The books are available from faceting suppliers such as Kingsley North (800-338-9280; www.kingsleynorth.com) and Graves Co. (800-327-9103; www.gravescompany.com).

Gem repair isn't practical for every damaged stone; sometimes they simply aren't worth repairing and are better off being replaced. Mountings made of sterling silver or gold, however, are worth recycling.

It probably isn't possible to learn faceting this week and set up a gem repair business the next week; it takes a number of years to hone the skills needed. If you are willing to learn faceting and other lapidary techniques, however, it's possible to develop a set of skills that clients could find valuable. 💎

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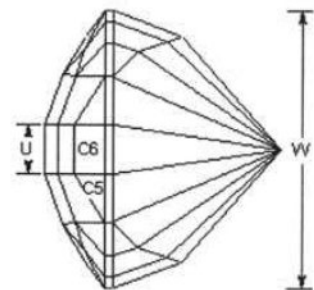
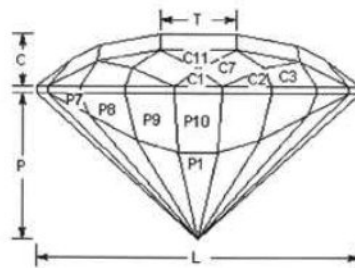
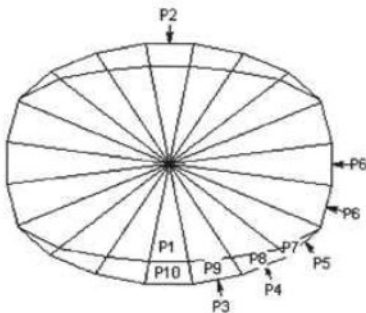
Faceters are welcome to submit their original designs for publication. Mail materials to Many Facets Submissions, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003.

This design is another in my "OMNI" series and could very well be my favorite. Despite the higher facet count, it is quite simple to cut. The OMNI tier makes it easy to establish the proper girdle outline, and I took great care in using angles that are nicely rounded.

While I developed this design for a piece of electric-blue topaz, it should work nicely for a lower RI material such as quartz. Remember, that the checkerboard top and deeper cut will darken gem materials, so this will likely work best with rough that has light to medium color saturation.

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

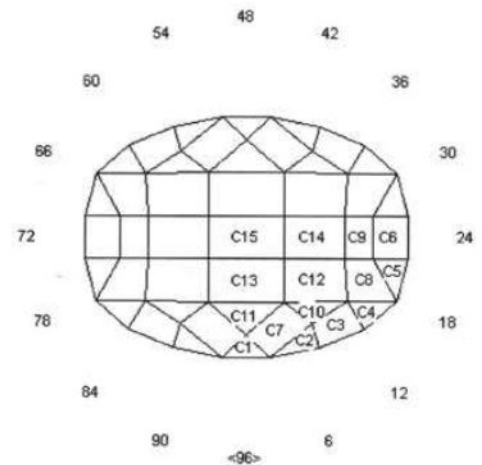


PAVILION

P1	42.00°	96-06-12-16-20-24-28-32-36-42-48-54-60-64-68-72-76-80-84-90	OMNI - cut to CP
P2	90.00°	96-48	Establish width
P3	90.00°	03-45-51-93	MP @ P1, P2
P4	90.00°	06-42-54-90	MP @ P1, P3
P5	90.00°	11-37-59-85	MP @ P1, P4
P6	90.00°	20-24-28-68-72-76	MP @ P1, P5 and corners
P7	64.20°	11-37-59-85	Level girdle
P8	66.90°	06-42-54-90	Level girdle
P9	68.10°	03-45-51-93	Level girdle
P10	68.50°	96-48	Level girdle

CROWN

C1	38.00°	96-48	Establish girdle width
C2	38.00°	03-45-51-93	Level girdle
C3	38.00°	06-42-54-90	Level girdle
C4	38.00°	11-37-59-85	Level girdle
C5	38.00°	20-28-68-76	Level girdle
C6	37.00°	24-72	Level girdle
C7	34.75°	02-46-50-94	GMP
C8	31.80°	15-33-63-81	GMP
C9	27.25°	24-72	MP @ C5
C10	30.50°	05-43-53-91	MP @ C2
C11	30.10°	96-48	MP @ C1
C12	22.55°	07-41-55-89	MP @ C4
C13	20.45°	96-48	MP @ C7
C14	10.40°	24-72	MP @ C8
C15	0.00°	Table	MP @ C12



DJG "OMNI" oval checkerboard

© David Groncki 2009
Angles for R.I. = 1.610
79 + 20 girdles = 99 facets
2-fold, mirror-image symmetry
96 index
L/W = 1.353 T/W = 0.316
U/W = 0.179
P/W = 0.609 C/W = 0.220
Vol./W³ = 0.423

2010

Lapidary Article of the YEAR CONTEST

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HOW TO ENTER

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

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

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

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

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

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

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

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

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

JUDGING

Articles will be judged by a combination of reader response and editorial merit. Readers should send a brief explanation of why a project deserves the big prize to 2008 Lapidary Article of the Year Contest, *Rock & Gem* magazine, 290 Maple Ct., Ste. 232, Ventura, CA 93003 or to editor@rockngem.com.

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

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

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

THE PRIZE

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



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Wisconsin's RED TOURMALINE

These Rubellite Crystals Can Only Be Collected with Your Camera



The rubellite tourmaline crystals at the Animikie Red Ace pegmatite are often well formed and striated.

Story and Photos by Robert Beard

While most field trips focus on collecting, there are many mineral localities to which the public have access, but where specimen collecting is not allowed. Unfortunately, this is becoming more common, as land use nearly always becomes more restrictive with time. The Animikie Red Ace pegmatite in Florence County, Wisconsin, is a good example of a site that is well worth visiting, even though collecting is not allowed there. This site has red tourmaline, known as rubellite, and it is relatively easy to access. It is located west of the Pine River and south of state Route 101 near the Wisconsin-Michigan border.

Tourmaline is a complex cyclosilicate that is found in granitic pegmatites, and it sometimes also occurs as an accessory mineral in igneous and metamorphic rocks. Black tourmaline, known as schorl, is relatively common in granitic and gneissic rocks that crystallized at relatively high temperatures. Although common, black tourmaline is still an interesting mineral to collect, as it often forms radiating and distinct elongated crystals.

Colored tourmalines, on the other hand, are among the most prized gemstones. The color of tourmaline can vary greatly and is dependent upon the composition of the surrounding rock. For instance, black tourmaline is iron-bearing, and due to the abundance of iron in most rocks, it is not surprising that it is the most common variety of tourmaline. Brown tourmaline, known as dravite, is magnesium-bearing and is also relatively common.

Lithium-bearing tourmalines are generally light-colored and can come in a variety of shades. Elbaite is a gem variety of tourmaline and often forms long, multicolor, semitransparent prisms in shades of green (verdelite), blue (indicolite), and pink to red (rubellite). Elbaite tourmalines are among the most prized tourmalines. Elbaite was originally discovered on the island of Elba, off the west coast of Italy.

Rubellite tourmaline gets its name from the Latin word *rubellus*, which means "red". While rubellite tourmalines are found in lithium-rich rocks, manganese is the cause of its color. However, the presence of manganese often results in more inclusions in the mineral, and this reduces the quality of the gemstone. Clear, deep red rubellite is very rare and is among the most valuable of the colored tourmalines.

The rubellite deposit in Florence County is relatively well-documented in the geologic literature. I first learned of the site when researching potential mineral localities to visit during my annual family vacations in northeastern Wisconsin. Dr. William Cordua, a geology professor at University of Wisconsin at River Falls, prepared an excellent summary of Wisconsin mineral localities (www.uwex.edu/wgnhs/MinIndexIntro).

htm). Since the information was arranged by county, it was very easy to determine which minerals I might be able to see when in Wisconsin.

A Florence County deposit known as the Animikie Red Ace pegmatite immediately got my attention, as it was relatively close to where we would be staying on an upcoming trip and appeared to be accessible. The Animikie Red Ace pegmatite is the largest and most complex member of the Hoskins Lake pegmatite field, which contains more than 200 pegmatites, in Florence County. You'll find a brief description of this mineral occurrence at Mindat.org (www.mindat.org/loc-12662.html).

Northeast Wisconsin can be a challenging place for a field trip, as the extensive glaciation, forests, and ground cover obscure the rocks and their relationship to each other. The bedrock geology of northeastern Wisconsin is best described as a complex assemblage of Precambrian metamorphic and granitic rocks.

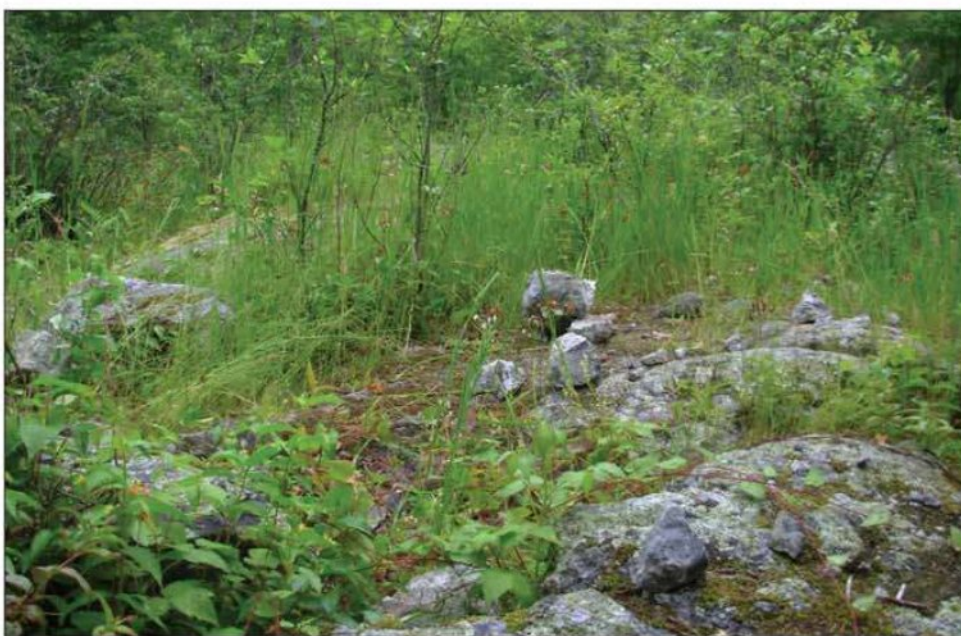
Precambrian rocks are often difficult to understand in the best of conditions, but northeast Wisconsin has very limited exposures, and geologists have to make the most of mountainside outcrops, road cuts, construction sites, and mines. The challenge to understand the geology is further compounded by the lack of economic drivers to further evaluate the area. For instance, similar geologic terrains in nearby Michigan, which have extensive iron and copper deposits, have been evaluated much more thoroughly. While some geologic work has been done to evaluate the northeast Wisconsin region for copper, iron, gold, and uranium, there is much more work that could be done to understand the geology.

The most recent geologic investigations of this area have focused on the mineralogy and petrology of the rocks, as well as groundwater and environmental issues in the region. Unfortunately for the mining geologist of the late 20th and early 21st centuries, even if a large mineral deposit is found in Wisconsin, the environmental permitting issues would almost certainly preclude any development. This was the case at the large copper deposit that was discovered near Crandon, located in Forest County in northern Wisconsin. Millions of dollars were spent to investigate the deposit and apply for mining permits, but the Nicolet Minerals Co., which was owned by Rio Algom, sold out to the Mole Lake Sokaogon Chippewa and the Forest County Potawatomi tribes in October 2003, and the project was immediately stopped.

The Precambrian rocks of Florence County and the surrounding area consist of diabase dikes and sills, metagabbros, meta-



The bridge over the Pine River is an excellent spot in which to get your bearings for finding the Animikie Red Ace pegmatite, which lies in the woods to the west.



During the summer months, the vegetation grows quite high, obscuring many of the rocks.



Some of the outcrops show protruding crystals of red tourmaline that often show hexagonal patterns and striations.

diabase, metasediments, and granitic intrusive rocks. Rubidium-strontium (Rb-Sr) dating indicated that many of these rocks had an apparent age of 1,650 million years, but further dating using uranium-lead (U-Pb) indicated that the rocks are really about 1,800 million to 1,900 million years old. The "apparent age" may have resulted from a widespread, low-temperature and low-pressure metamorphic event that effectively reset the radiometric clocks. The U-Pb dates indicate that extensive crustal development likely occurred along the southern edge of the Superior province during the period of 1,800 million to 1,900 million years ago, and while the development of new mines is likely out of the question, it is important to keep these time frames in mind when evaluating the geology of Precambrian rocks in the region.

A major downside to the Anamikie Red Ace pegmatite was located along the Pine River in land managed by the Wisconsin Department of Natural Resources (DNR), and Dr. Cordua's notes indicated that collecting might be restricted. This was confirmed by reviewing information on the DNR Web site (www.dnr.state.wi.us/org/land/facilities/pinepopple/documents/PinePoppleBrochure.pdf), which clearly states that the removal of vegetation, rocks, minerals and wildflowers is not permitted. At least I could visit the without having to obtain landowner permission.

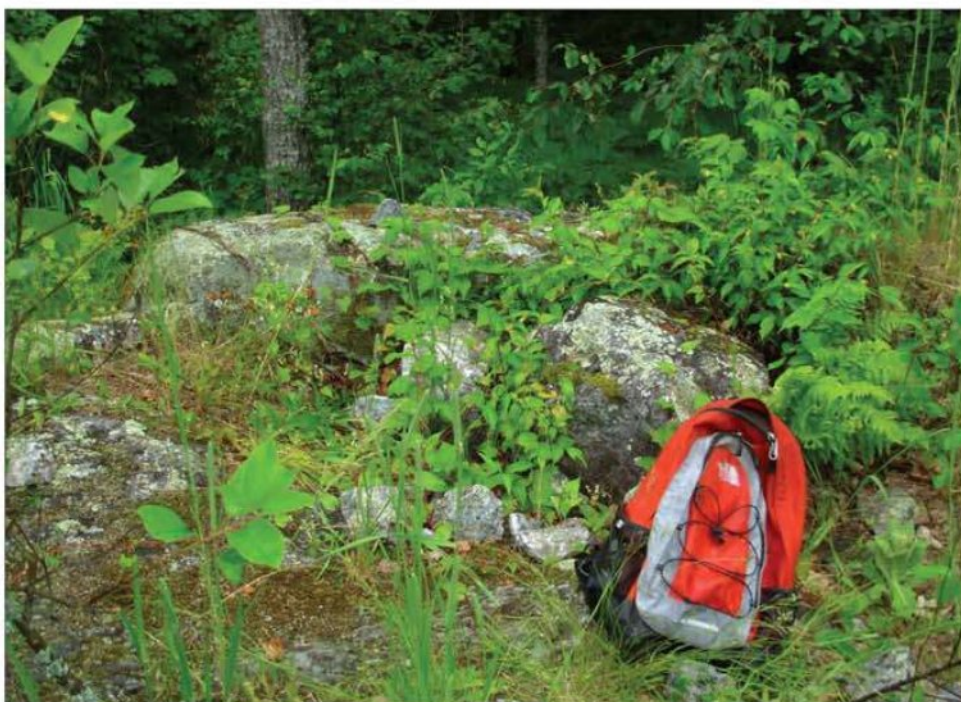
My first trip to the site was unsuccessful. It was in early May 2005, and although the snow was gone, it was still extremely cold. There was not much vegetative cover that early in the year, which was an advantage, but I still could not find the site. Unfortunately, all I had to go on was that the deposit was located in outcrops along the Pine River; I had no idea whether that meant on the east or west side. I climbed over many large outcrops and very rugged terrain, but did not find a hint of tourmaline. I was quite disappointed in not finding the site.

I later contacted Dr. Cordua by e-mail for better directions, and he said to just park on the road west of the Pine River, hike south, and look for the outcrops. I returned to the site in June 2007, determined to find the site. This time, I parked at a river access parking area east of the Pine River and walked west of the river looking for a hint of any trails.

I soon found what appeared to be an old road, but it was overgrown with ground cover. I wore my steel-toed boots and gloves, and I was equipped for the mosquitoes and deer flies with insect repellent wipes and the hot sun with 45 SPF sunscreen and a good hat. You always have to take personal protection and safety into account, as a severe sunburn or multiple insect bites can greatly impair your trip.



The best place to start walking into the woods is marked by some large boulders south of state Route 101.



Many loose rocks containing red tourmaline lie on the ground around this pegmatite outcrop.

As I walked south on the road, it soon seemed to veer to the right (southwest). Toward the Pine River on the left (east), the elevation of the landscape increased. I reasoned that outcrops would be present to the east, so I left the road and climbed. I soon reached the crest of a ridge and could see outcrops of dark gray schist and gneiss below me. I began to look for signs of pegmatite in the bedrock, which would be indicated by zones of white quartz or other light-colored minerals.

I soon came to the flat, and while there were several outcrops, I still did not see any tourmaline. The outcrops were moderately interesting schist, but I really wanted to see some mineralization. I soon turned back north and watched the ground and outcrops, looking for any anomalous rocks.

I soon came across some loose, light-gray rocks. They were coarsely crystalline, and

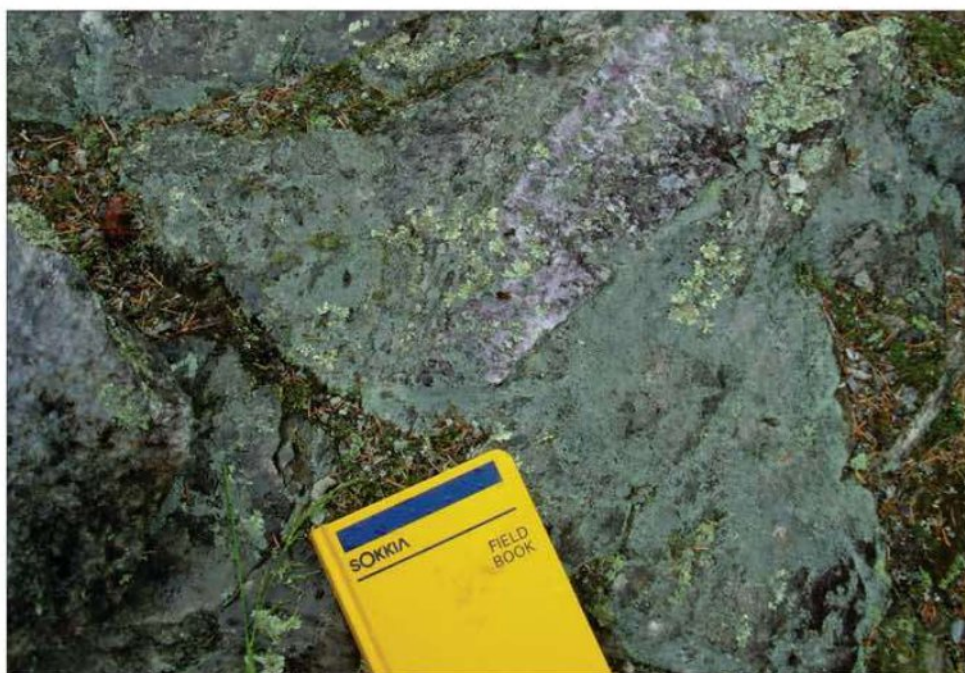
upon careful inspection I was able to see a hint of pink, which suggested that tourmaline or other lithium-bearing minerals were present in the rock. This was the sign I was looking for. I continued looking, but did not find anything else. I knew the source had to be nearby, and it had to be higher than the rock I had found, as rocks do not roll uphill. While obvious, this is a very useful fact to remember when you are trying to find the source of a mineral.

I came to the base of a large mass that protruded from the hillside and found more of the light-gray rocks at its base. I began to climb and, with some effort, emerged on top of a flat area with light-gray outcrops. I could see red and purple minerals in the exposed rocks, and I knew I had arrived at the correct site.

This was the Anamikie Red Ace pegmatite deposit. The area was unlike other



This outcrop of the Animikie Red Ace pegmatite contains quartz masses with red tourmaline.



The red tourmaline, known as rubellite, occurs as pink-purple masses that contrast with the moss-covered rocks of the pegmatite outcrop.

mineralized pegmatites I have visited, as I did not see any large prospect pits or other indications of heavy equipment or blasting. However, I did see some small drill holes, which were evidence that someone was either getting ready to blast or perhaps simply removing cores for academic research. There were several broken rocks around the deposit, which was evidence that others had been to the site to look for tourmaline. Many of these rocks had pink and purplish zones, which I have found are common in pegmatites that are enriched in lithium. I was certain that some of this was from disseminated lepidolite, which is lithium-bearing mica, and according to Mindat.org, lepidolite occurs at the site. Lepidolite is generally a lilac-gray or rose color, and this color is often an indication that you are close to mineralized zones.

The exposed rocks also had several bands of tourmaline mineralization in place that obviously could not be easily broken out. Nature has a way of protecting outcrops from collectors, and nothing protects an outcrop like a smooth, flush face of solid granite. These bands are one of the prime attractions for mineralogists at the site. I collected GPS coordinates so I could find the deposit again if I ever returned to the area.

I later found out how lucky I was to find the pegmatite when I made a return visit in June 2009. I came back to explore the area surrounding the pegmatite mass to see whether there were any large outcrops of tourmaline-bearing minerals. Since I had been to the site in 2007, I thought it would be a cinch to find. I parked at the river access parking area and crossed state Route 101 to enter the woods west of the Pine

River. As I recalled, I only had to walk a short distance to the pegmatite.

This trip was my best example to date of how either my memory is failing dramatically with age or time changes the way we remember things. I walked south, then west, and then north again, and could not find the site. I soon realized that I was making a big loop and returning to where I had started. The undergrowth was extremely thick, and it was dangerous hiking. I could easily twist or break an ankle on the ground, which was covered with old logs and large branches, or disturb a large animal that might be hiding in the undergrowth. I had seen bears with cubs in the region, and they were the last things I needed to encounter.

Fortunately, I had my GPS unit with my old waypoints. I had not labeled them, but they were dated, and from the order I was able to tell which one was the mine site. It should have been relatively simple to point and walk to the site, but I had to climb over trees and rugged terrain, so even with a GPS unit, it was difficult. I had all but given up when I saw a glint of light-colored rocks on a small ridgeline that I could see through the forest. I knew that this had to be the site.


Sure enough, I soon arrived back at the pegmatite, just as my GPS had directed me. The site was much farther south than I had remembered, and it was also much farther into the woods. I do not think I could have found it again without my GPS.

The site was much the same as I remembered, but there were a few more broken rocks, and I was certain that others had been to the site since my last visit. I could still see the prominent bands of purple and red tourmaline crystals in the outcrops. These were not going anywhere unless someone was going to either blast or bring in heavy equipment, and given the land status, this was not going to happen.

I checked around the edges of the ridgeline for more indications of tourmaline mineralization, but did not find anything in an outcrop. The best place to see the red tourmaline in place is on the smooth granitic rocks that are exposed on the relatively flat surface of the small ridge. The edges of the ridge are weathered, dark gray to dark brown, coarse gneiss and schist, and these rocks did not have any distinct zones of mineralization.

Some of the light-colored rocks from the pegmatite are on the forest floor below the ridge, and many of these contain red tourmaline. Since the light rocks stand out on the forest floor they are generally easy to spot. However, on my June visit, the vegetation was extremely thick. It would be best

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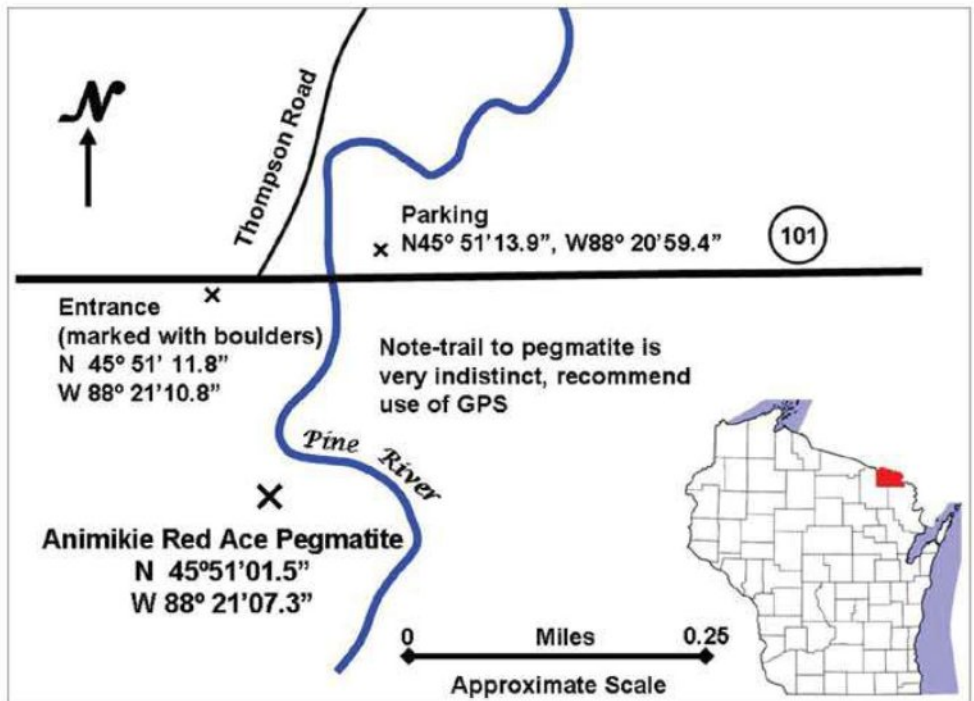
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Wisconsin's RED TOURMALINE from page 61



to visit this site in the very early spring or late fall when the vegetation is thinnest, but this is certainly not the best time to come to Wisconsin for vacation.

The Animikie Red Ace pegmatite has been studied in detail and much information about the mineralogy of the deposit is available online. During my latest research on the site, I found an abstract from the November 2004 Geological Society of America meeting in Denver. It was called "Crystallization conditions and fluid chemistry of the Animikie Red Ace Pegmatite, Florence County, Wisconsin", by Emily Hartwick, Mona-Liza Sirbescu, and James Student, who were with Central Michigan University at the time (http://gsa.confex.com/gsa/2004AM/finalprogram/abstract_81040.htm). They compared the chemistry of fluid inclusions at the Animikie Red Ace pegmatite to other lithium-rich pocket gem pegmatites and nonpocket pegmatites. While they determined that fluid inclusion chemistry could be a useful exploration tool for pocket gem pegmatites, they unfortunately also concluded that the results suggest that the Animikie Red Ace pegmatite likely does not contain pocket gems.

This report might explain the lack of development of this pegmatite. If it did contain pocket gems, it likely would have been blasted to pieces many decades ago, long before the Wisconsin DNR implemented restrictions on the area.

For reference, I collected the following coordinates in the field, and later checked them using aerial photographs from Google Earth. (Google Earth can be downloaded through www.google.com.) All coordinates are referenced using the North American Datum 83 and World Geodetic System 84 (NAD83/WGS84), and are in the degree-minutes-seconds format:

Parking area at River Access: 45° 51' 13.9"N, 88° 20' 59.4"W

Trail Entrance: 45° 51' 11.8"N, 88° 21' 10.8"W

Animikie Red Ace Pegmatite Outcrop: 45° 51' 01.5"N, 88° 21' 07.3"W

To get to the site, take state Route 101 to where it crosses the Pine River. East of the river is a canoe access point and parking. Park here, walk across the bridge (west), and look for the best place to start walking south into the woods on the south side of state Route 101. There is no trail that leads to the site. At the time of this writing, the entrance to the best way to walk into the woods was marked with some boulders along the road, but these boulders are only meant to keep vehicles out and do not mark a trailhead. You can expect to bushwhack nearly all the way to the site, and you will cross fallen timbers and push through briars and high forest undergrowth. You may also have to cross swampy areas if you get too close to the Pine River. It is best to have a GPS unit that you can program to lead you to the site, as it is very easy to miss.

It is relatively easy to make the trip in the early morning and finish by lunchtime, so you will still have lots more of your day for other vacation activities. Due to the undeveloped nature of the trail to the site, however, it is not recommended for children or those who have trouble walking through the underbrush, and you must have good, strong boots and gloves to protect yourself from the briars and fallen timbers, along with insect repellent and sunscreen. While collecting is not allowed, this site is so unique that it still makes a worthwhile trip for anyone who is interested in pegmatites and the opportunity to see red tourmaline. ♥

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Show Dates from page 51

SEPTEMBER 2010

10-12—MARIETTA (ATLANTA), GEORGIA: Show; Frank Cox Productions; Cobb County Civic Center, 548 S. Marietta Pkwy.; Fri. 1-5, 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

10-12—WINSTON-SALEM, NORTH CAROLINA: 39th annual show; Forsyth Gem & Mineral Club; Educational Bldg., Dixie Classic Fairgrounds, Gate #9; Fri. 10-7, Sat. 10-7, Sun. 12-5; contact W.A. Marion, 1163 Bear Creek Church Rd., Mocksville, NC 27028; e-mail: MarionA1@yadtel.net

11-12—FAIRFIELD, IOWA: Show; The Sac & Fox Lapidary Club; The Fairfield Arts & Convention Center, Main & Briggs; Sat. 9-6, Sun. 10-5; adults \$3, students \$1, children under 6 free; children's activities, demonstrations; contact Betty Morris, 618 N. Lincoln St., Mt. Pleasant, IA 52641; e-mail: emorris@lisco.com; Web site: sacandfoxlapidaryclub.com

11-12—ROSEBURG, OREGON: Show, "Rough to Gems"; Umpqua Gem & Mineral Club; Douglas County Fairgrounds, I-5 Exit 123; Sat. 10-6, Sun. 10-4:30; free admission; dealers, rough, gems, minerals, fossils, beads, jewelry, tools, equipment, books, display cases, demonstrators, knapping, UV mineral exhibit, silent auction, wheel of fortune, geode cutting, raffle, door prizes, gold panning, kids' rock hunt; contact Bob Sampson, 752 Cooper Creek Rd., Sutherlin, OR 97479, (541) 459-1755; e-mail: davenmow@q.com

11-12—SILOAM SPRINGS, ARKANSAS: Annual fall swap; Northwest Arkansas Gem & Mineral Society; clubhouse, Hwy. 43N; Sat. 9-5, Sun. 10-5; free admission; auction, kids' gem wash, silent auctions, grab bags; contact Dave Leininger, (479) 787-5619; e-mail: hulagrub@aol.com; Web site: www.nwarockhounds.org

12—BLOOMINGTON, MINNEAPOLIS: Show, "Rings & Things BeadTour"; Rings & Things; Hilton Minneapolis/St. Paul Airport, Ballroom A, B, C & D, 3800 American Blvd. E; Sun. 12-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

14—GREEN BAY, WISCONSIN: Show, "Rings & Things BeadTour"; Rings & Things; Suamico Ale House, 2310 Linville Rd.; Tue. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

15—MILWAUKEE, WISCONSIN: Show, "Rings & Things BeadTour"; Rings & Things; Clarion Hotel Airport, 5311 S. Howell Ave.; Wed. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

15-19—DENVER, COLORADO: Fall show, "Colorado Mineral & Fossil Show"; Martin Zinn Expositions LLC; Holiday Inn - Denver Central, 4849 Bannock St.; free admission; 200 wholesale and retail dealers from all over the world, free shuttle to shows at the Merchandise Mart; Wed. 10-6, Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-5; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax (303) 223-3478; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

15-19—DENVER, COLORADO: Show and sale, "Denver Coliseum Mineral Show"; Eons Expositions; Denver Coliseum, 1900 44th St.; Wed. 10-6, Thu. 10-6, Fri. 10-6, Sat. 10-6, Sun. 10-4; free admission; 130 dealers, minerals, fossils, crystals, meteorites, gems, artisan jewelry, gold, services, equipment, displays; contact Lowell Carhart, 7514 Antelope Meadows Circle, Peyton, CO 80831, (719) 886-7046; e-mail: lowellcarhart@yahoo.com; Web site: www.ColiseumShow.com

16—SCHILLER PARK, ILLINOIS: Show, "Rings & Things BeadTour"; Rings & Things; Comfort Suites O'Hare Airport, 4200 N. River Rd.; Thu. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

17-19—BEREA, OHIO: Show and sale; GemStreet USA; The Cuyahoga County Fairgrounds, The Arts & Craft Bldg., 164 Eastland Rd.; Fri. 10-6, Sat. 10-6, Sun. 11-5; fine gems, jewelry, beads, fossils, minerals; contact Jane Strieter Smith, (216) 521-4367; Web site: www.gemstreetusa.com

17-19—COOS BAY, OREGON: Show, "South Coast Rock & Gem Fest 2010"; Far West Lapidary and Gem Society; 4th

St. parking lot, across from Outdoor-In, downtown; Fri. 10-5, Sat. 10-5, Sun. 10-5; dealers, rockhound sales, jewelry, gems, minerals, fossils, rough and finished rocks, tumbled rock, geodes, faceted stones, cabochons, thunder eggs; contact Rocky Pribble, P.O. Box 251, Coos Bay, OR 97420, (541) 572-8301

17-19—DENVER, COLORADO: Show, "Colorado Fossil Expo"; Martin Zinn Expositions LLC; Denver Merchandise Mart Plaza Annex, 451 E. 58th Ave.; Fri. 9-6, Sat. 10-6, Sun. 10-5; adults \$6, seniors and teens \$4; 50 dealers, fossils, meteorites, petrified wood, amber, paleontological exhibits, part of the Denver Gem & Mineral Show; contact Martin Zinn Expositions, P.O. Box 665, Bernalillo, NM 87004-0665, fax (303) 223-3478; e-mail: mzexpos@aol.com; Web site: www.mzexpos.com

17-19—ENID, OKLAHOMA: Show; Enid Gem & Mineral Society; Oak Wood Mall, 4125 Owen K. Garriot (Hwy. 412); Fri. 10-6, Sat. 10-6, Sun. 12-5; contact Billy E. Wood, (580) 234-5344

17-19—LINCOLN, MISSOURI: Show and swap; Mozarkite Society of Lincoln, Missouri; Lincoln City Park; Fri. 10-5, Sat. 9-5, Sun. 10-5; free admission; beading, public digs for Mozarkite; contact Ted Bollick, 1201 S. St., Clinton, MO 64735, (660) 890-4983, or Kay Shaver; e-mail: kaysha ver405@wmconnect.com; Web site: www.mozarkite.com

18—GRAND RAPIDS, MICHIGAN: Show, "Rings & Things BeadTour"; Rings & Things; Stars Room, 3221 Plainfield Ave. NE; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

18-19—CASTLE ROCK, WASHINGTON: Show; Southern Washington Mineralogical Society; Castle Rock Fairgrounds; Sat. 10-6, Sun. 10-4; spin table, gem dig, country store, magnetic sand, gold panning, rock cutting, silent auction, live auction Sat., demonstrations, door prizes, scholarship raffle, black light display, dealers; contact Fran Wolff, P.O. Box 1492, Kalama, WA 98625, (360) 560-2987; e-mail: fwolff@comcast.net

18-19—CLARKSVILLE, INDIANA: Show, "Falls Fossil Festival"; Indiana Society for Paleontology; Falls of the Ohio State Park, 201 W. Riverside Dr.; Sat. 9-6, Sun. 10-5; free admission; vendors, fossils, minerals, books, jewelry, polished stones, guided Devonian fossil bed hikes, Silurian and Devonian fossil collecting piles, Cave-in-Rock mineral collecting pile, children's craft activities, guest speakers, fossil and rock ID, fossil park and museum brochures; contact Alan Goldstein, 201 W. Riverside Dr., Clarksville, IN 47129, (812) 280-9970; e-mail: agoldstein@dnr.in.gov; Web site: www.fallsfotheoia.org

19—NOVI, MICHIGAN: Show, "Rings & Things BeadTour"; Rings & Things; Sheraton Detroit Novi, 21111 Haggerty Rd.; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

21—INDEPENDENCE (CLEVELAND), OHIO: Show, "Rings & Things BeadTour"; Rings & Things; Skyline Hotel and Conference Center, 5300 Rockside Rd.; Tue. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

23—WEST HENRIETTA (ROCHESTER), NEW YORK: Show, "Rings & Things BeadTour"; Rings & Things; RIT Inn & Conference Center, 5257 W. Henrietta Rd.; Thu. 12-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

25—BURLINGTON, (BOSTON), MASSACHUSETTS: Show, "Rings & Things BeadTour"; Rings & Things; Hilton Garden Inn Boston-Burlington, 5 Wheeler Rd.; Sat. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

25-26—MISSOULA, MONTANA: Show, "Big Sky Rocks"; Hellgate Mineral Society; Ruby's Reserve Street Inn, 4825 N. Reserve St.; Sat. 10-6, Sun. 10-5; contact Bob Riggs, 14 Holiday Ln., Missoula, MT 59801, (406) 543-3667

25-26—SHAROVILLE, OHIO: Show; BeadStreet USA; The Sharonville Convention Center, 11355 Chester Rd.; Fri & Sat 11am; Sun 11am-5pm; vintage beads, Swarovski crystals, lampwork, precious metal findings, gemstones, supplies; contact Jane Strieter Smith, (216) 521-4367; Web site: www.beadstreetusa.com

26—NORTH HAVEN, CONNECTICUT: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn North Haven (Emerald Ballroom 1), 201 Washington Ave.; Sun. 1-5; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

26-27—BLOOMINGTON (MINNEAPOLIS), MINNESOTA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Ramada Inn Mall of America Hotel and Convention Center, 2201 E. 78th St. (I-494 at 24th Ave. S. Exit); Sun. 11-6, Mon. 10-3; contact G&LW, P.O. Box 98, Flora, MS 39071-0098, (601) 879-8832; e-mail: info@glwshows.com; Web site: glwshows.com

27—EAST HANOVER, NEW JERSEY: Show, "Rings & Things BeadTour"; Rings & Things; Ramada Inn and Conference Center (Ballroom), 130 Rte. 10W; Sun. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

28—ESSINGTON (PHILADELPHIA), PENNSYLVANIA: Show, "Rings & Things BeadTour"; Rings & Things; Ramada Inn Airport (Ballroom B, C & D), 76 Industrial Hwy.; Tue. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

30—PITTSBURGH, PENNSYLVANIA: Show, "Rings & Things BeadTour"; Rings & Things; Holiday Inn - RIDC, 180 Gamma Dr.; Thu. 12-4; free admission; gemstones, bead strands, wholesale prices, findings, stringing supplies; contact Dave Robertson, (800) 366-2156; e-mail: drobertson@rings-things.com; Web site: www.rings-things.com

OCTOBER 2010

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

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

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

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

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

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

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Show Dates from page 65

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

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

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

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

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

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

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

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

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

9-10—ORLANDO, FLORIDA: Show, "Fossil Fair"; Florida Fossil Hunters; Central Florida Fairgrounds, 4603 W. Colonial Dr.; Sat. 9-5, Sun. 10-4; adults \$4, students \$1; fossils, rocks, gems, minerals, educational exhibits, children's dig pit, raffles, silent auctions, vendors, books, supplies; contact Valerie First, 223 Ringwood Dr., Winter Springs, FL 32708, (407) 699-9274; e-mail: vjfirst@aol.com; Web site: www.floridafossilhunters.com

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

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

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Mineral Miscellany

The variety of miscellaneous facts and information that comes across my desk as an editor is amazing. Most of it, I suspect, our readers will find interesting, yet each item is not sufficiently broad in scope to constitute a decent article or a full column. Therefore, I am devoting this month's column to those odds and ends related to our hobby in the hope that you'll enjoy them and find them of interest.

Most collectors are familiar with the lovely bladed mineral vivianite. This prismatic hydrous iron phosphate is very common; nicely crystallized, collectible specimens have been found in dozens of deposits. It is commonly found inside old seashells at Mullica Hill, New Jersey, and in Virginia. It is common in iron deposits in bogs and marshes. The largest specimens ever found are 3 feet long and came from in a marsh near Anola, Camerouns. Today, they are displayed at the School of Mines, Paris.

Spectacular green to blue vivianite crystals up to 10 inches long have come from Huanuni and near Poopó, Bolivia. The Blackbird District (Lemhi County) of Utah has produced gorgeous blades as long as several inches. In fact, the sources for this mineral are too numerous to count. It is so common you should be able to buy it at almost any show—but I doubt you can.

The problem is that vivianite has an Achilles' heel; many dealers avoid it because it self destructs. Some crystals tend to split. The huge Cameroon crystals displayed in Paris, for instance, are wired together!

When exposed to light—any light—vivianite tends to darken, losing its lovely green color and phasing into blue, then finally blue-black. In effect, it becomes a different mineral, metavivianite. So if you have a nice green vivianite specimen, keep it tightly boxed! If your crystal has already altered, there's no way to reverse it.

When you go to mineral shows, you undoubtedly see large slabs of gray rock with lovely, dark trilobite fossils protruding from their surfaces. It is obvious that the fossils have been exposed by chipping away the enclosing rock. These spectacular fossil slabs are from Morocco.



This blocky specimen of vivianite from a source in Bolivia, South America, is already starting to alter and darken from exposure to light.

Right next to the trilobites, and in even more abundant supply, are slabs of dark gray to black rock shot through with long, tapering fossil nautiloid shells, which also come from Morocco. These are often so tightly packed and jumbled they form a spectacular scene of ancient life.

You can buy wall hangings, stone pictures, end tables, and even bathtubs constructed out of these ancient fossiliferous rocks. Can you envision a kitchen countertop made of dark limestone full of fossil sea life? Where did all these fossils come from and when did we start seeing them on the market?

The discovery of the deposits goes back almost 100 years when a geologist found trilobites in the rocks exposed at an airport near Casablanca, Morocco. It wasn't until the 1980s that extensive mining and marketing brought these amazing fossils to the current market. Now, you see these gorgeous fossils everywhere. They result from the labors of as many as 50,000 workers! Imagine a rock source in this country that would employ that many people. That would surely help the unemployment situation here!

Diamonds are the stuff of legend and lore. One true story I've come across has to do with the 1,000-plus carat Cullinan diamond, which has been faceted into several large stones that are part of the British royal regalia. In order to turn a rough diamond into a brilliant gem, the stone has to be cleaved, then ground and lapped, and finally polished.

King Edward VII of England, who acquired the Cullinan in 1907, hired noted diamond expert Joseph Asscher to cleave the

stone. If a diamond is not struck properly along cleavage planes, it could shatter into small bits. Asscher spent months studying the stone to determine its cleavage planes so that he could achieve the maximum number of large stones from the huge diamond.

When he was ready to cleave the giant stone, a group of observers, including doctors and royal representatives, gathered to observe the critical moment. Asscher put his knife on the cleavage marks he had made on the Cullinan and was ready to strike the blow, fatal or successful. With

a wooden mallet, he struck the knife, but the diamond had failed to cleave. Whether from fright or relief, Asscher fainted! After being revived, Asscher tried again, successfully. The rest is history!

The Hope diamond is certainly a gem that has been blessed—or cursed—with legend and lore. I know of one true event connected with this precious stone because the fellow to whom it happened told me about it. Some years ago, after the Hope diamond was given to the Smithsonian Institution and thus the American people, it was decided to check the weight of this famous gem, which had been reported at 44 carats.

To weigh the Hope, it had to be removed from its mount. Remember that all diamonds have a greasy feel. During its removal, the Hope slipped and fell to the floor! It could have cleaved, but it did not. The poor fellow who had fumbled the gem said his life passed before his eyes during the time it took the stone to fall and bounce! Incidentally, the gem is heavier than was thought: it weighs 45.52 carats!

Salt, while it currently has little value compared to diamonds, has been one of the most significant and influential minerals ever found. The human body cannot survive without it! Roman soldiers were paid with a *salarium argentum* (literally "salt silver"), a credit for obtaining salt (or silver!). This term gave us the word "salary".

The Biblical city of Jericho developed around salt mining, and Salzburg, Austria, is on the edge of a salt mining area. Even today, you can take underground salt mine

tours near Salzburg. The best part of the tour is donning a leather apron on your backside and sliding down a huge oak log from one mining level to another, just as the salt miners did a couple hundred years ago!

Salt is so important to progress and so necessary that it has often been taxed. The Chinese probably were the first to devise a salt tax. The French crown was the greediest, imposing a salt tax so high that it triggered the French Revolution in 1789!

In the early 1900s, an excessive salt tax charged by the British in India triggered Mahatma Ghandi's nonviolent rebellion, which led to that country's independence. Today, we use salt compounds to keep our frozen highways ice free. So salute lowly salt, the life-saving substance composed of two poisonous elements, sodium and chlorine.

Did you know that John Sutter, of Sutter's Mill fame, was actually a criminal from Switzerland? As a debtor, he abandoned his wife and children in Switzerland in 1834 and scrambled to New York. Over the next five years, his travels took him along the Oregon Trail, to Hawaii, and back to the California Territory, which was then under Mexican control. You know the rest. Far from making his fortune, the gold rush left Sutter with nothing until the State of California gave him a small pension—out of pity, I imagine. I suspect his Swiss wife figured he got what he deserved!

Did you know that the emerald mines of Colombia were found by a horse? Spanish conquistadors invaded that part of South America, but though battle after battle was waged, the Spaniards could not defeat the local tribes. They finally succeeded by bringing in huge attack dogs, which the natives had never seen before.

Though the Spaniards saw and took emeralds from the regalia of the tribal leaders, they could not find their source, nor could they get the locals to reveal the location of their emerald mines.

One day, a Spanish soldier was riding his horse in a rather remote area when the animal came up lame. When the soldier checked the horse's hoof, there was a green emerald crystal stuck in it! The horse had been walking over the dumps of the emerald deposit. In more recent years, this editor has had the opportunity to go underground in those old mines.

Stories of the role animals have played in mineral discoveries are legion. Any number of prospectors credit their desert canaries with such insights. Arizona's Vulture gold mine was supposedly found when Henry Wickenburg's donkey wandered away from camp and was found standing on a rich gold outcrop.

My favorite story, simply because of the resulting amazing specimens, is that of the discovery of the silver deposits at Kongsberg, Norway. Two youngsters herding sheep on a hillside were surprised to find a rock containing a shiny metal. One of their



Deposits of fossilized sea life in limestone were first noticed in Morocco about 100 years ago.



The Colombian emerald mines were found by the Spanish when a soldier's horse stepped on a crystal.

sheep had scraped away the moss on the rock with its hoof, exposing the vein.

The kids showed the metal to their father, who realized it was silver. When he tried to sell the silver, he was immediately arrested. It seems the King of Norway claimed ownership of all deposits, known and unknown, of silver and gold. When the deposit was mined, it produced some of the most spectacular native silver specimens ever found!

Rumor has it that the earlier German silver mines were also found by an animal. It seems a soldier had stopped to answer a call of nature. While his horse waited impatiently, it pawed the ground, revealing a streak of silvery metal. This resulted in the beginning of silver mining in Germany at the end of the first millennium. Mines in the Harz Mountains and the Erzgebirge region were sources of massive wealth.

The mining techniques developed in this region spread across the world, thanks to Georg Bauer's book *De Re Metallica*, which was published in the 1550s. The techniques

described in the book were applied in mines throughout the New World. Mining engineers kept a copy of Bauer's book on their desks right into the 1920s.

On the subject of animals, while reading Allan Eckert's really wonderful book *The World of Opals* (John Wiley and Sons, 1997), I came across a fascinating story about a cat that lived in an underground opal mine in Australia. In 1896, the cat died. Its master put the cat in his hat and buried it in the floor of his opal mine. The mine was later abandoned, not to be opened again for 50 years! When the new owner began working the mine, he unearthed the cat in the hat (no jokes, please). Much to his amazement the skeleton of the cat had been completely replaced by pink opal!

On another matter, we've gotten a bit hysterical over small matters like a drop of mercury. Granted, contact with this harmful substance in quantity or over regular, prolonged periods is dangerous. Lewis Carroll's *Alice in Wonderland* character the Mad Hatter was based on real people who worked with mercury in the process of making hats. But knee-jerk reactions to this substance these days concern me.

For example, two girls brought a small glass thermometer to school in Phoenix, Arizona. It broke in a classroom and a couple of drops of mercury—all the thermometer held—spilled. In a swift and massive reaction, not only the classroom but the entire school was evacuated and cleaned by hazardous materials teams in full protective gear. It seemed a bit excessive to me!

I say that because back in 1936, when I was in the sixth grade, one of the kids brought a small jar of mercury to class. Several of us enjoyed rubbing the liquid metal on copper pennies, turning them a bright shiny silver color. I'm still here, though the incident may explain why some people at times say that I'm "nuts"!

What really bothers me is another recent classroom incident. A teacher brought a small jar of mercury into class for a density demonstration in which she compared it to a like-size jar of water. After the demonstration, she put the jar of mercury on a shelf, where a couple of boys found it and ended up spilling it. Again, there was total evacuation, the haz mat team was called in, and the kids in the school were tested, all for good reason. The disturbing part was that the teacher admitted later she did not even know what the silvery liquid in the jar was! So much for modern teacher training!

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.

Back to Field Trips

I just had to write and tell you that I am thrilled with your March 2010 issue. You got back to basics! You have three [articles about] field trips that are possible for me to do this summer. Utah, Washington, and New Mexico are do-able. Yippee!

I have cut out the Field Trip section from every issue of *Rock & Gem* magazine going back to the late '90s, as we have had a subscription for many, many years. I staple the pages together and file them by state. I have quite the collection, and when we travel I just pull out the field trips and choose the ones that are close to where we will be. Our four kids have always loved looking for rocks with us, and still do now that they are grown up.

Recently, you have kind of gotten away from the "in the field"-type articles, focusing on gem and minerals from around the world. These are countries that I do not have the means to visit. So to find three USA/Out West field trips in one issue is wonderful!

I thank you very much for getting back to your "roots" and expanding the field trips. It has always been one of my favorite parts of the magazine.

—Cindy Schultz
Franklin, WI

Please note that the Washington field trip site described in "Lucas Creek, Carnelian," by Stuart "Tate" Wilson (March 2010, p. 46) has been closed to rockhounding. For more information, see *All She Wrote* (p. 6).

—Editor

Collecting Limits

I very much enjoyed the article on the Washington State Field Trip. But the paragraph about Doug that started "Over the past 20 years" on page 48 of the March 2010 issue of *Rock & Gem* was appalling. If this is factual, Doug is not a rockhound and he does not have a collection. He has a hoard and he is a hoarder. We all know these people exist on the fringe of our great hobby, but they should never be portrayed in anything but a very negative way.

This person is helping to destroy our hobby in at least two ways: 1. Hoarding practices like this cause collecting sites to be shut down and locked for all the honest collectors; 2. Think of the thousands of rockhounds that will be denied the chance to collect a few good pieces of material at

this site because much of the material is locked in a storage unit.

Lastly, maybe it's time to print the American Federation of Mineral Societies Code of Ethics in the magazine. Especially the part that states, "I will cause no willful damage to collecting material and will take home only what I can reasonably use."

—Clarence Burns
via e-mail

Hoarding, to some degree or another, forms the basis of all collecting activities, but Clarence poses a fair question: How much collecting is too much? Field collectors can compare their own collecting practices to the principles of the AFMS Code of Ethics, which can be found online at <http://amfed.org/ethics.htm>. For more information on the now-closed Lucas Creek carnelian site, see *All She Wrote* (p. 6).

—Editor



SCENIC AGATE CABOCHONS

Bill Osborne, of Bill's Agate Farm in Cochran, Georgia, cut the 12 cabochons pictured above from a small piece of Parral agate weighing less than 1 pound. Parral comes from the agate beds in southwest Chihuahua, Mexico. Bill says that no other scenic agate with these colors was found in the several hundred pounds of material he went through.

Book Review Boost

Several months ago, Bob Jones wrote a rave review in *Picks & Pans* for my book *Tales Mark Twain Would Have Loved To Steal*. It was recently awarded the Gold Medal Winner by Readers Favorite for nonfiction humor. I have had to order a second printing of the current edition, and am presently working on an enlarged hard cover second edition. Thanks for the boost; I used some of Bob's comments to help promote my book in the contest.

—Glenn Wasson
via e-mail

Beryllium Treatment

In the article you state that indicolite is "often heat treated or infused with beryllium to change less desirable shades into fine blue." Can you cite any credible sources that demonstrate that beryllium has actually been diffused into tourmaline and that this diffusion improves the blue coloration?

—Paul Merkel
via e-mail

My statement about indicolite being infused with beryllium was a mistake. According to the Gemological Institute of America, heat treating is the most common treatment for tourmalines. While other studies are being conducted, no conclusive studies have been released that indicate beryllium is a factor at this time.

—Jim Perkins
Off the Dop columnist

Geology for Beginners

I have read your magazine here at the local Vancouver, BC, library, and was wondering if you may have some links or useful books I should look into about geology for the beginner. I know quite a bit about fossils, but nothing much about rocks or gems or stones.

—Davie M.
via e-mail

Check out Bob Jones' excellent article "Build a Mineral Reference Library" in the January 2010 issue (p. 56). It gives the titles of several good basic references. One book the article does not mention is *The Rockhound's Handbook*, by James R. Mitchell (Gem Guides Book Co.). Be sure you get the second edition, which was published in 2008.

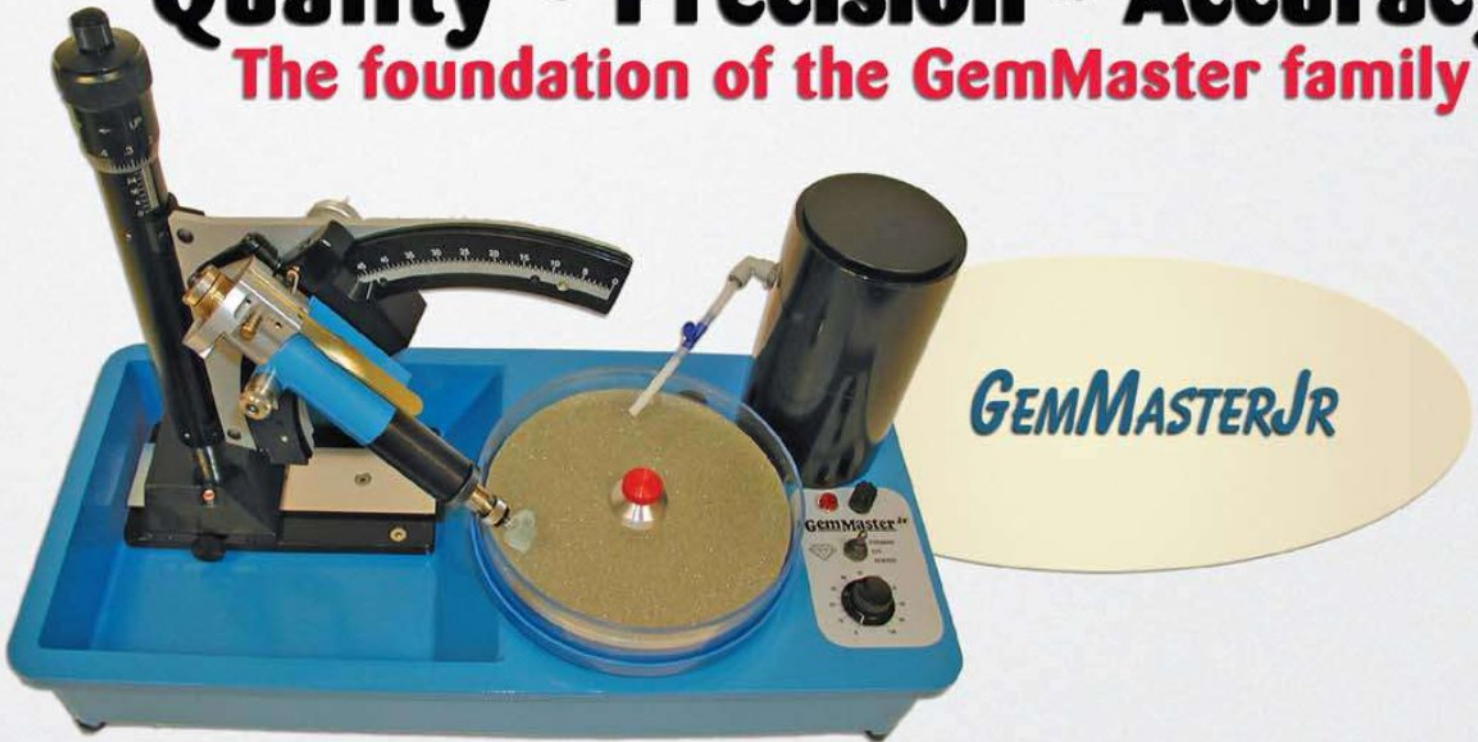
—Editor



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