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Volume 40, Number 08

August 2010

ON THE COVER

This 10-inch by 5-inch specimen of petrified wood was collected from private land adjacent to Petrified Forest National Park in Arizona and resides in the collection of Keith and Theresa Bartell. (Tom Shearer photo)

FEATURES

"Chalcedony Park" 12

You can look, but don't collect in Arizona's Petrified Forest

by **Bob Jones**

Petrified Wood: A Natural Enigma..... 20

It's a favorite with rockhounds and lapidaries

by **Bruce I. Wingate**

Dangerous Dust..... 26

The lapidary hobby's forgotten hazard

by **Douglas Hamilton**

Rock & Gem Kids..... 38

Silver, agates, and Mineral Fun patches

India's Zeolites (and Non-Zeolites)..... 44

Minerals in abundance from the Deccan Plateau traprock quarries

by **Bob Jones**

44



32



60



SUBSCRIPTION QUESTIONS? Call (760) 291-1549

In Pursuit of Nebraska Mammal Fossils... 52

Good collecting on private land in the Platte River Valley

by **Jim Landon**

Evolution of a Museum..... 60

The Weinman Mineral Museum becomes Tellus Science Museum

by **Lori Carter**

FIELD TRIP

DoBell Ranch Collecting

A quest for Arizona's wonderful, colorful petrified wood..... 32

by **Mary Crosswhite**

REGULAR COLUMNS

All She Wrote..... 6	Picks & Pans..... 42
Craftsman of the Month..... 8	Off the Dop..... 56
Show Dates..... 10	Contest Rules..... 57
Shop Talk..... 18	Many Facets..... 66
Rock Science..... 24	On the Rocks..... 72
	Field Notes..... 74

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Face to Face



In the middle of putting together this month's issue, I enjoyed the opportunity to mingle with some of the people who are going to read it. On June 18-20, Whittier, California, was the site of this year's American Federation-California Federation show, hosted by the North Orange County Gem & Mineral Society. Senior consulting editor Bob Jones, who was scheduled to give a talk on Sunday, and I manned the *Rock & Gem* booth on Saturday. It was a very enjoyable day; the only flying I had to do was on the freeway and I didn't have to pack any luggage. It was also nice to be back in Orange County, my old stomping grounds.

Bob and I spent a pleasant day chatting to passers-by, discussing Bob's new project (see *On the Rocks* for the scoop!), passing out magazines, and helping readers start or extend their subscriptions for an insanely low rate. I was able to put faces to the names of some current and past contributors, talked to some new acquaintances about becoming future contributors, saw a selection of interesting competitive exhibits, and bought a nice piece of Chinese agate from one of the vendors.

We enjoy meeting our readers, answering their questions, and hearing their feedback on the magazine. If you aren't able to travel to any of the major shows we attend, however, I'm also accessible via mail, e-mail and phone. I'd love to hear from you at any time.

Next on the *Rock & Gem* show calendar is the East Coast Gem, Mineral & Fossil Show, put on by Martin Zinn exhibitions LLC in West Springfield, Massachusetts, Sept. 17-19 (see Show Dates for details). Stop by and say "hi".



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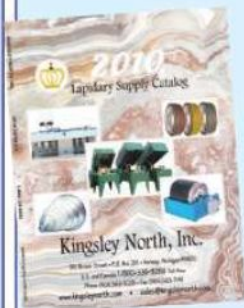
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CRAFTSMAN OF THE MONTH

My passion for rocks began while searching for fossils in riverbeds," says August Craftsman of the Month Adrian Prodescu, of Bucharest, Romania, "including that of the Danube River, which runs through my native Romania. The need for a cabbing machine came soon and was a good occasion to expand my hobby in relation to my engineering profession, building mechanical devices, so I built my own cabbing machine. Generally, I use those cabs in wire-wrapped jewelry, but I occasionally feel the call to combine my two hobbies and to do something more challenging with the cabochons I craft. So far, I have challenged myself with knife making, so a sword seemed like the next natural step.

"After drawing the outline of a classic medieval sword onto a 5-millimeter-thick stainless steel plate, I cut out the shape with an angular grinder. I used a bench grinder for the coarse shaping and a file for the fine tuning of the piece. To manage the precise sharpening of the edges, I built a jig that kept the filing angle constant. A mirror polish was achieved through hand sanding. I used sandpaper up to 2500 grit and finished with T-CUT metal polish. The total time spent on smooth sanding and polishing the blade was some 10 to 12 hours.

"Brass plates for the hand guard and for the square end were cut and shaped next. The holes for the cabs were then drilled into



these plates from the inside outward; the sides were tapered to better hold the cabochons in place. The cabochon stones are tiger's-eye, amethyst sage, local Romanian agate, and petrified wood from all over the world. The central cab on the face of the hand-guard is cacoxenite in amethyst.

"I used steel bolts to sandwich the stainless steel of the sword with the overlying brass plates during the crafting process. The bolts' appearance did not match the medieval character of the sword, so once the brass pieces were brought to the final shape and finish and the cabs were set in place, these bolts were carefully removed and replaced with brass rivets.

"The last step for the sword itself was the crafting of the handle scales. Both of them are stone and brass intarsia. The front scale has a small square charoite central piece surrounded by four matching stones. The back scale has a large piece of Arizona petrified wood as a central stone and four small corners of various other petrified woods. These pieces were glued together with two-part epoxy. After allowing the epoxy to cure, the inset pieces were given their final shaping and polishing. The scales were then glued onto the stainless steel handle using the same epoxy.

"In keeping with the medieval theme, the wall mounting used to display the sword is shaped as an elongated shield, its underlying wood frame covered with hand-worked leather. The two decorative cabs on the shield are Zebra jasper. The shield is bordered with brass plate and the same material was used for the belt that holds the sword in place." ♦



Would you like to be named Craftsman of the Month?

To enter the contest:

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

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

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



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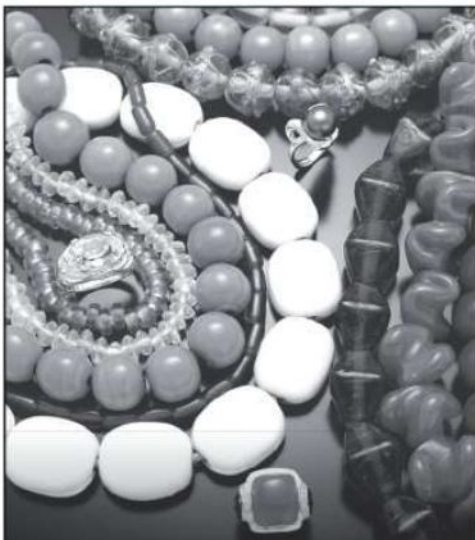
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 AUG. 13, 14, 15 TACOMA, WA
 AUG. 20, 21, 22 COSTA MESA, CA
 AUG. 27, 28, 29 SAN DIEGO, CA
 SEP. 3, 4, 5 SANTA BARBARA, CA
 SEP. 10, 11, 12 SAN RAFAEL, CA
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AUGUST 2010

6-8—DALTON, GEORGIA: 19th annual show; Treasures Of The Earth Gem & Jewelry Shows; Northwest Georgia Trade & Convention Center, 2211 Dug Gap Battle Rd., I-75 exit 333; Fri. 2-7, Sat. 10-6, Sun. 11-5; adults \$3 (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

6-8—HILLSBORO, OREGON: Show, "Gem Faire"; Gem Faire Inc.; Washington County Fairgrounds, 873 NE 34th Ave.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

6-8—MELBOURNE, FLORIDA: Show; Frank Cox Productions; Melbourne Auditorium, 625 Hibiscus Blvd.; 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) 954-2010; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

6-8—NORTH BEND, OREGON: Show, "Nature's Wonders"; Far West Lapidary & Gem Society; North Bend Community Center, 2222 Broadway; Fri. 10-6, Sat. 10-6, Sun. 10-5; displays, jewelry, demonstrations, kids' activities, exhibits, silent auction, raffle, door prizes, dealers, faceted and rough gems, minerals, gold, silver, crystals, beads, mountings, tools; contact Rocky Pribble, P.O. Box 251, Coos Bay, OR 97420, (541) 572-8301

7—ISHPEMING, MICHIGAN: 35th annual show; Ishpeming Elks Club; 597 Lake Shore Dr.; Sat. 9:30-4:30; free admission; mineral displays, dealers, kids' area, silent auction, hourly prizes, raffle, mineral demonstrations, field trips Fri. and Sun.; contact Ernest Johnson, 1962 W. Fair, Marquette, MI 49855, (906) 228-9422; e-mail: ejohnson@nmu.edu

7-8—AUSTIN, TEXAS: Show; Austin Bead Society; Palmer Events Center, 900 Barton Springs Rd.; Sat. 10-6, Sun. 11-5; admission \$5, \$1 off with food donation; handcrafted jewelry, supplies, raffles; contact Austin Bead Society, P.O. Box 656, Austin, TX 78767-0656, or Michele Chesak; e-mail: mchesak@gmail.com; Web site: www.austinbeadsociety.org

7-8—BETHESDA, MARYLAND: 60th annual show; Gem, Lapidary and Mineral Society of Washington, DC; Stone Ridge School, 9101 Rockville Pike; Sat. 10-6, Sun. 10-5; adults \$6, seniors \$5, children under 16 free with paying adult; gemstones, minerals, fossils, jewelry, beads, collectibles, dealers, exhibits, Crystal Cave, kids' activities, door prizes; contact Mary Bateman, 2700 S. 9th St., #203, Arlington, VA 22204-2328, (703) 521-4614; e-mail: mbateman1@verizon.net; Web site: www.gimscd.com

7-8—SAN FRANCISCO, CALIFORNIA: Show, "Golden Gateway to Gems 'In the Pink'"; San Francisco Gem & Mineral Society; County Fair Bldg. (Hall Of Flowers), Golden Gate Park, 9th Ave. and Lincoln Way; Sat. 10-6, Sun. 10-5; adults \$7, seniors \$6, child under 12 free with adult; demonstrations, jade carving, chain maille weaving, wire wrapping, bead stringing, silver metal clay modeling, cabochon cutting, California Academy of Sciences displays; contact Carleen Mont-Eton, 4134 Judah St., San Francisco, CA 94122, (415) 564-4230; e-mail: publicity@show.sfgms.org; Web site: www.sfgms.org

7-8—WATERVILLE, MAINE: 40th annual show, "Mid-State Gem & Mineral Show"; Water-Oak Gem & Mineral Society; Mount Meric School, 152 Western Ave.; Sat. 10-5, Sun. 10-4; free admission; dealers, gems, minerals, fossils, beads, jewelry, specimens, demonstrations, lapidary arts, books, magazines, educational displays, fluorescent minerals; contact Ellery Borow, P.O. Box 47, Waterville, ME 04903-0047, (207) 547-3154

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13-15—NOVI, MICHIGAN: Show; International Gem & Jewelry Show Inc.; Rock Financial Showplace, 46100 Grand River Rd.; Fri. 12-6, Sat. 10-6, Sun. 11-5; adults \$8; open to the public, professional jewelers, artists; contact International Gem & Jewelry Show Inc., 120 Derwood Circle, Rockville, MD 20850, (301) 294-1640; e-mail: info@intergem.net; Web site: www.InterGem.com

13-15—PASS CHRISTIAN, MISSISSIPPI: Show; Harrison County Gem & Mineral Society; West Harrison County Community Center (Espy Center), 4470 Espy Ave.; Fri. 12-7, Sat. 9-6, Sun. 10-5; adults \$3, children 12 and under free; door prizes, grand prize raffle, bring your rock and stump the expert Sun.; contact Tomsey Westermeyer, 9270 Serenity Dr., Pass Christian, MS 39571, (228) 586-5279 or (229) 326-2390; Web site: tomsey@cableone.net

13-15—PORT TOWNSEND, WASHINGTON: Show; Port Townsend Rock Club; Jefferson County Fairgrounds, 4907 Landes St.; Fri. 10-9, Sat. 10-9, Sun. 10-6; contact Tom Madsen, 2915 state Rte. 20, Port Townsend, WA 98368; e-mail: tomadsen@olympen.com

13-15—TACOMA, WASHINGTON: Show, "Gem Faire"; Gem Faire Inc.; Tacoma Dome/Exhibition Hall, 2727 E. "D" St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

13-15—WEST SPRINGFIELD, MASSACHUSETTS: Show, "East Coast Gem, Mineral & Fossil Show"; Martin Zinn Expositions LLC; Better Living Center, Eastern States Exposition, 1305 Memorial Dr.; Fri. 10-7, Sat. 10-7, Sun. 10-5; adults \$6, ages 12 and under free with adult; more than 200 dealers from the U.S. and abroad, door prizes, guest speakers, museum-quality exhibits, gem panning, large wholesale section, collection of Bill Larson, Pala Int'l; 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

14-15—EDMONDS, WASHINGTON: 4th annual sale; Maplewood Rock & Gem Club; Maplewood Clubhouse, 8802 196th St. SW; Sat. 9-5, Sun. 9-4; free admission; more than 20 dealers, rocks, rough, jewelry; contact Bev Ryder, 4625 Strumme Rd., Bothell, WA 98012, (425) 338-4184; e-mail: famryd@aol.com; Web site: www.maplewoodrockclub.com

14-15—LAKEVIEW, OREGON: Show, "Tallman Rock Roundup"; Tallman Rockchippers; Lake Co. Fairgrounds, 1900 N. 4th; Sat. 10-4, Sun. 10-3:30; free admission; kids' activities, silent auction, dealers, demonstrators, field trips; contact Johanne Deidrich, 244 N. M St., Lakeview, OR 97630, (541) 947-3237; or LeRoy Johnson; e-mail: lostmy marblesor@yahoo.com

14-15—RICE LAKE, WISCONSIN: 14th annual show; Northwest Wisconsin Gem & Mineral Society; University of Wisconsin, Barron County; Sat. 10-5, Sun. 10-4; free admission; contact Roy Wickman, (715) 357-3223, or Dave Skrupky, (715) 966-2547

14-15—WALNUT CREEK, CALIFORNIA: Show, "Contra Costa Crystal Fair"; Pacific Crystal Guild; Civic Park Community Center, 1375 Civic Dr. at Broadway; Sat. 10-6, Sun. 10-4; admission \$6; contact Jerry Tomlinson, (415) 383-7837; e-mail: sfxlt@earthlink.net; Web site: www.crys talfair.com

continued on page 16

Rock & Gem



Rhodochrosite - Fred Wilda ©

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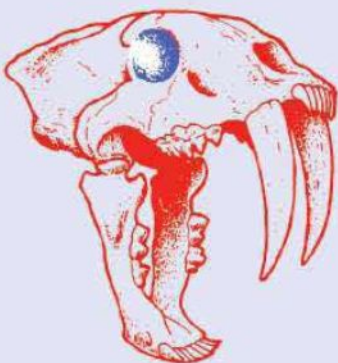
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"Chalcedony PARK"



DOUGLAS MOORE PHOTO

In the late 1800s, destructive gem hunters used black powder or dynamite to blow apart petrified logs in Arizona's Petrified Forest to get at the amethyst crystals some of them held. This accounts for most of the millions of colorful petrified wood shards that are spread across the park.

Look, but Don't Collect in Arizona's Petrified Forest

Story and Photos by Bob Jones

Does the title of this article seem unfamiliar to you? Never heard of Chalcedony Park, you say? Sure you have. Chalcedony Park holds America's finest accumulation of colorful petrified wood. Now that can't be, you say, because the finest and most colorful petrified wood is in the Petrified Forest National Park of eastern Arizona—and you're right!

Arizona's Petrified Forest is rich in agatized petrified wood in a wonderful palette of colors. Noted mineralogist and mineral collector George Frederick Kunz named the area Chalcedony Park in 1893. The rich red colors of the wood, largely due to iron-rich jasper, contrast wonderfully with the gray of chalcedony, the yellow of uranium salts, and the stark black, spidery lines of manganese oxides. These metal salts in silica quartz make this ancient wood the finest and most colorful such fossil in the world. And the wood really is a fossil, dating back some 150 million years or more.

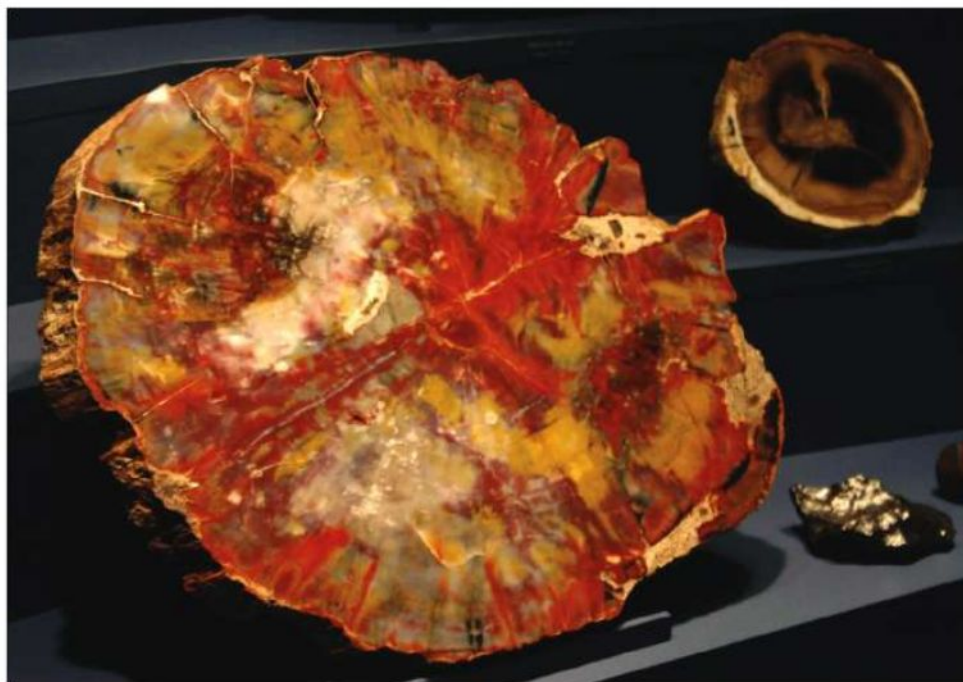
When the general public first got word of this amazing site rich in colorful petrified logs in the late 1800s, tourists and destructive gem hunters descended on the place, tearing into the remains of these ancient trees. Wagons and even the nearby railroad were used to haul off tons and tons of logs. The huge log on display at the Smithsonian Institution's National Museum of American History was hauled to Washington, D.C. by train in those early days.

While the petrified wood was the main target of tourists and specimen seekers, gem hunters weren't all that interested in it. They wanted the gem crystals of amethyst that had developed inside some of the logs. Those huge petrified logs look pretty solid—you wouldn't suspect some held a gem secret. Some of the logs have huge cracks in them, but they hardly show off the logs' interiors. Some have worm holes bored by ancient creatures, but even those don't reveal much. The gem hunters didn't have the patience to try to figure out what was inside a log. They simply applied a bit of black powder or dynamite and blew the logs apart to get the amethyst. This hit-or-miss gem mining activity is what accounts for most of the millions upon millions of petrified wood shards that are scattered all over the park.

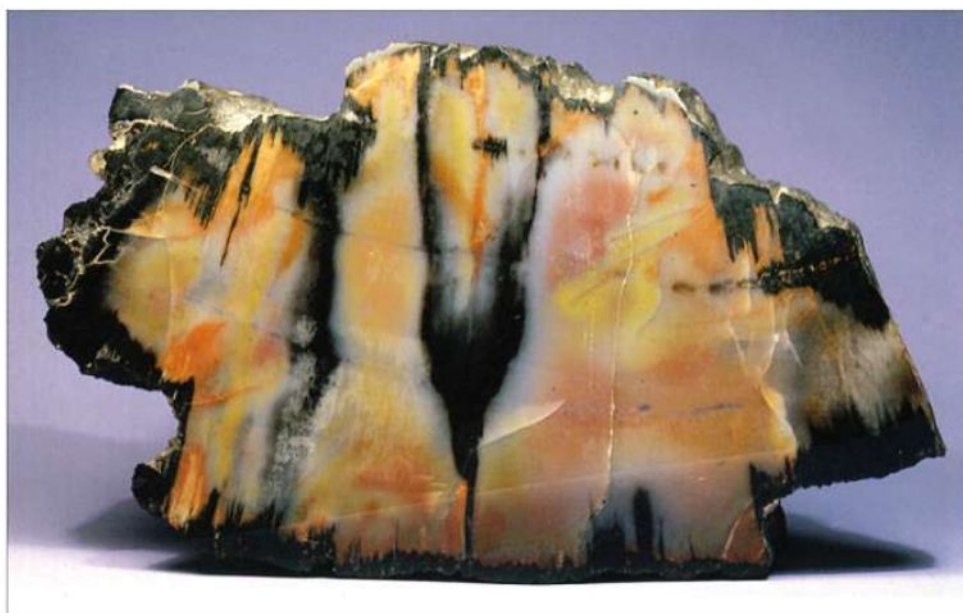
Today, collectors still like to use Arizona's petrified wood as gem material for jewelry, lapidary objects, and decorative stone. Fortunately, the material is not horribly expensive. The only reason we still have this marvel of erosion and petrification is that someone recognized the value of the region and worked to preserve it.



The silica-filled cells of the original wood are easy to see in this close up of an Arizona petrified wood slice.



This superb example of colorful petrified wood comes from Arizona's Petrified Forest, which was given the name "Chalcedony Park" by George Fredrick Kunz in 1893.



The mineral salts iron oxide, manganese oxide, and uranium oxide produce the shades of red, black, violet and yellow seen in Arizona's petrified wood.

The logs were first mentioned in an Army report in 1851. This brought people into the area in search of the material, the worst of which were the gem hunters. In 1891, Lester Ward, a paleobotanist with the U.S. Geological Survey, proposed that the government close the area to homesteading and turn it into a national monument to protect the logs. In 1906, President Theodore Roosevelt officially closed the area to the destructive gem hunters and anyone else anxious to own a hunk of these red and yellow beauties, but the vast area was hard to police. I know of one family member who passed through the national monument in 1915 and brought out a 4-inch-thick section of half log that was very colorful, but very illegal!

In 1962, the monument was officially made a national park. Roosevelt was conservative in the scope of his declaration. He left plenty of log-bearing land, known to geologists as the Chinle Formation, in private hands, and collecting has continued ever since. Private land that borders the park is accessible to collectors for a fee. They can dig in the shaly Chinle Formation and, if they're lucky, extract entire logs. The government has added to the original park by buying up private land, first in 1962 and again just a few years ago.

This region in eastern Arizona is arid, with no regularly flowing rivers. Only when the snows melt or when the occasional rainstorm passes through do the few creeks and one river flow. The Puerco River runs right along the southern part of the park. It used to be an ancient travel route used by Native Americans, and later by early settlers. Waters from the north feed into the Puerco via a couple of mostly dry creeks with interesting names, the Lithodendron and Little Lithodendron. "Lithodendron" means "stone tree" and honors the precious petrified logs of the Chinle Formation.

The Chinle Formation is a shaly bedrock that erodes fairly easily and is not difficult to dig in. It developed near the beginning of the Age of Dinosaurs when the region was really swampy. At that time, the North American continent was still part of the supercontinent of Pangaea.

The Chinle Formation is made up of several layers of rock, including the Moenkopi sandstones and shales, Shinarump conglomerate,

and gypsiferous clays (collectively known as "members"), which were laid down during the Middle Triassic. It is in the Chinle that we find the greatest quantity of petrified wood, not only in Arizona, but in the other states in which it outcrops.

The earliest section of the Chinle Formation is known as the Shinarump Member, a conglomerate of stream-rounded pebbles and sand that have been cemented together. What makes the Shinarump interesting to me, aside from the fact that it bears deposits of radioactive uranium and vanadium minerals, is that at some point water flowed with enough force to carry and deposit the gravel and sand that became conglomerate, as well as logs, which later became locked in



Lapidaries enjoy working with Arizona's petrified wood, which is consistently hard and offers a variety of colors and patterns.

the conglomerate and were partially or completely petrified.

It was in a Utah outcrop of the Shinarump Member, in the North Mesa No. 5 mine, that Pat Haynes found the first and only known specimens of hydrous vanadium sulfate, which he named bobjonosite. Needless to say, collecting a mineral that bears my name was a real kick, especially since my sons were with me. And guess where that rare blue mineral was found in the mine? It was dug out of the core of a buried and nearly completely petrified log! I say "nearly completely" because some of the core material in that log was more carbon than silica.

The mechanism that creates petrified wood is a common function of nature



This colorful slice of silica-replaced Woodworthia from Arizona's Petrified Forest shows the original tree ring structure very clearly.

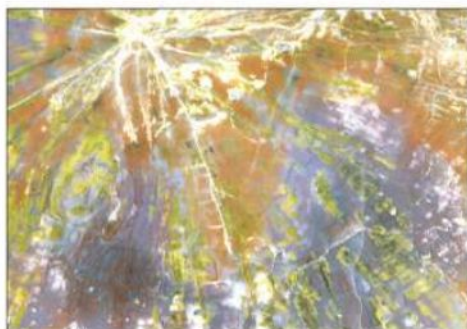
under certain conditions. These stone logs show up in many Western states. States in the Northwest and the Great Basin states of Nevada and Utah are good wood sources, as are Colorado and Texas. But none of these common sources can match the colorful gem wood found in Arizona.

The trees that lie in Arizona's Petrified Forest National Park actually grew somewhere else, probably in what we now call northern New Mexico and southern Colorado. Eons ago, during the Triassic Period, there were no coastal mountains in California. Moisture-laden westerly winds blew in off the Pacific Ocean unimpeded, bringing plenty of moisture with them. The earth position of the region at that time was equatorial, so the weather was hot and humid. There is evidence that heavy rain and strong winds tore through the region, bringing down huge Araucarioxylon arizonicum conifers, some of which stood over 200 feet high. The resulting floods carried the trees, tens of thousands of them, into the area that was to become Arizona. The raging water tumbled at the logs, tearing off limbs, roots, and even the tree bark in many cases. The logs finally came to rest on a water-soaked flood plain. Apparently, the rains and mud flows continued long enough to quickly bury the arriving logs, protecting them from rot and insects. This was ideal for petrification.

The land is restless, and soon tectonic action began to lift the area. It also caused a series of volcanoes to erupt repeatedly to the west, where California and Nevada are today. The volcanoes spewed huge quantities of high-silica ash into the westerly winds, which carried it into Arizona, covering the mud flats beneath which the logs were buried. That volcanic ash became the



Araucarioxylon, an ancient conifer, is the most common type of petrified wood found in Arizona.



The bright yellow in this Arizona petrified wood is caused by included uranium salts, probably carnotite.

source of the silica that replaced the wood. Invading water also dissolved metallic salts, including iron oxide, manganese oxide, and some uranium salts, out of the ash.

When the solutions entered the cells of the buried wood, the wood was carried away and the silica, with its variety of coloring agents, was left behind to exactly replicate the wood's structure. The iron oxide imparted a red to yellow color in the agatized wood. The manganese oxides created delicate violet hues and contrasting black streaks and crack fillings. The uranium salts, though rare, gave the agate wood a bright yellow color. It is these coloring agents that make Arizona's petrified wood the most colorful and most beautiful in the world!

The process that exchanges minerals for wood is slow, proceeding molecule by molecule. The wood was carried away and the colorful silica was left behind. We know this happened because a close look at a slice of petrified wood reveals all the features we would see in natural wood—from cracks, defects like worm borings, and the ring structure of the tree right down to the cell structure—now preserved in stone.

You may wonder how discrete gem crystals like amethyst could develop inside a solid log. Actually, some of the logs were not solid; they were probably dead internally long before they were carried to their final resting place. Dead trees begin to rot, creating internal hollows, perhaps aided by the action of insects, mold, and creatures that live in such conditions. As it rots, wood gives off some heat, so creatures actually migrate into rotting logs and take up residence. It was in these hollow logs that high-silica solutions could settle and quietly create crystals in an environment conducive to crystal development.

An interesting feature of Petrified Forest National Park is its environment relative to its elevation. Situated at about 5,500 feet

above sea level, below the Colorado Plateau in an area shielded from moisture-laden westerly winds, the region is now quite arid. The ancient swamps are long gone, and the area enjoys an annual rainfall of less than a foot each year. The temperature range is fairly extreme. In winter, it snows, and even blizzards can invade these high plains. The snow is often delivered by bitterly cold winds. In summer, the temperature can climb to a nasty 125 degrees F.

When the area was fairly mild and rainfall was plentiful, locals farmed along the Puerco River, which flowed year 'round. But as the elevation rose and the barrier mountains in California developed, eastern Arizona dried up. This gradual drying of the climate caused the native population to leave. The increasing elevation and arid conditions also explain why the petrification process finally ceased. It simply ran out of rain!

Araucarioxylon conifer trees are not the only petrified plant variety in the park. All sorts of swamp-dwelling plant remains—cycads, ferns, and the like—are found there. These support the theory that the logs were buried in a soggy mud conducive to the petrifying process. Another petrified tree occasionally found in the park is Woodworthia. This wood's tan, brown, gray, violet, and even pale pink colors are an interesting contrast to the bright red, violet and gold of Araucarioxylon. Remains of animals and other types of plants have also been found here, but the main attraction is the richly colored and patterned petrified wood—an amazing sight to behold.

As you pass along I-40 near Holbrook, Arizona, be sure to take time to visit the old Chalcedony Park, now called Petrified Forest National Park. Leave what you see for the next visitors. You can buy as much petrified wood as you wish in the shops, museums and towns around the park. Let's preserve our mineral heritage!💎



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Show Dates from page 10

AUGUST 2010

20-21—TAHLEQUAH, OKLAHOMA: Show; Tahlequah Rock & Mineral Society; Tahlequah Community Bldg., 1st St. and College Ave.; Fri. 9-6, Sat. 9-6; free admission; vendors, rocks, minerals, children's activities, fluorescent display, snack bar, museum participation; contact Don Alberty, P.O. Box 932, Tahlequah, OK 74465, (918) 207-9733; e-mail: moody_tuner@yahoo.com

20-22—BRIDGETON (ST. LOUIS COUNTY), MISSOURI: Show; Greater St. Louis Association of Earth Science Clubs; 12365 St. Charles Rock Rd.; Fri. 4-9, Sat. 10-6, Sun. 11-5; adults \$5, seniors \$4, juniors (6-17) \$2; national dealers, gems, fossils, minerals, jewelry, equipment, hourly prizes; contact Robert Morse, (636) 462-4423; e-mail: morse@centurytel.net

20-22—CARTERSVILLE, GEORGIA: Show, "Southeast Gem, Mineral & Fossil Show"; Martin Zinn Expositions LLC; Holiday Inn, I-75 and 411 NE; Fri. 10-6, Sat. 10-6, Sun. 10-5; free admission; 80 wholesale and retail dealers, open to the public; 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

20-22—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; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

20-22—LAKE GEORGE, COLORADO: Outdoor show; Lake George Gem & Mineral Club; U.S. Hwy. 24, next to post office; Fri. 8-5, Sat. 8-5, Sun. 8-5; free admission; 40 dealers, minerals, fossils, jewelry, lapidary, local amazonite, smoky quartz, topaz; contact Becky Blair, (719) 748-3030; e-mail: blairra@hotmail.com; or John Rakowski, (719) 748-3861; e-mail: rakgeologist@yahoo.com

20-22—LEBANON, PENNSYLVANIA: 13th annual show and sale, "Gem Miner's Jubilee"; Mid-Atlantic Gem & Mineral Association; Lebanon Expo Center, Rte. 72 and Rocherty Rd.; Fri. 10-6, Sat. 10-6, Sun. 10-4; adults \$6, children under 12 free; gems, jewelry, minerals, fossils, beads; contact MAGMA, (301) 565-0487; Web site: www.gem-show.com

20-22—LEXINGTON, KENTUCKY: Show, "Gemboree 2010"; Blue Grass Gem & Mineral Club; Lexington Convention Center "Heritage Hall", 430 W. Vine St.; Fri. 12-6, Sat. 9-7, Sun. 10-6; adults \$1, students and children free; rocks, gems, minerals, jewelry, fossils, Kentucky agate, displays; contact Phillip Daly, 10330 Forkland Rd., Parksville, KY 40464, (859) 854-0418; e-mail: phillipdaly@bellsouth.net; Web site: <http://sites.google.com/site/gemboree2010/>

20-22—LONG BEACH, CALIFORNIA: Show; MalicJewels Jewelry & Gift Show; Long Beach Convention Center Hall B, 300 E. Ocean Blvd.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

20-22—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

20-22—SEASIDE, OREGON: Show; Oregon Gem, Mineral & Jewelry Shows; Seaside Convention Center, 415 1st. Ave.; Fri. 10-6, Sat. 10-6, Sun. 10-4; free admission; free pearls to 100 ladies daily; contact Jean Miller, P.O. Box 136, Molalla, OR 97038, (503) 829-2680; e-mail: shadow92337@molalla.net; Web site: www.ogmshows.com

21-22—BOSSIER CITY, LOUISIANA: Show; Ark-La-Tex Gem & Mineral Society; Bossier Civic Center, 620 Benton Rd.; Sat. 10-6, Sun. 10-5; adults \$4, students \$1, children 5 and under and Scouts in uniform free; door prizes, youth activities, exhibits, live demonstrations; contact Charlie Johns, 9314 Overlook Dr., Shreveport, LA 71118, (318) 687-4929; e-mail: cwsejohns@bellsouth.net; Web site: www.larockclub.com

21-22—MADRID (CANTON), NEW YORK: 44th annual show; St. Lawrence County Rock & Mineral Club; free admission; outdoor/indoor show, kids' fluorescent mineral hunt Fri., mineral-collecting field trips, free wire wrapping

continued on page 30

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SHOP TALK

by William A. Kappale

Lapidary Tools

I don't know about you folks, but the tools in my shop fall into three categories: "must have", "might need", and "just want". Oh yes, there is a fourth category, "really want, but probably will never be able to afford". Now, most of us who have been at this hobby for a number of years have accumulated a lot of tools. Most of them, however, are used very little. Those of you who are just starting out can take heart in the knowledge that, of the many hobbies that could infect us, lapidary may actually require the fewest tools.

There are a few ways to get started in lapidary, but perhaps the most common one is tumbling, which is also probably the most tool-friendly way. With the possible exception of a screwdriver and a pair of pliers, the only tool needed is the tumbler itself. Making cabochons, by contrast, requires a couple of machines. Cutting the rock into usable slabs requires a diamond saw. The most common type uses a circular steel blade with diamond bonded to the rim. The sizes of these blades run from 4 inches to over 36 inches, but most hobbyists will be able to do 90 percent of their sawing with a 10-inch slab/trim saw. This saw will cut the average-size rock into slabs and will work well for trimming the preforms. To grind and polish the cabs, you can choose either a wheel-type or disk-type machine. There are pros and cons for each type, but it is really a Ford vs. Chevy choice. Adding a few dop sticks, maybe a dop wax pot, and a wrench or two pretty much completes the inventory for cabbing tools.

There is quite an array of small power tools and specialty hand tools that can be used in lapidary. The Foredom tool consists of a motor connected to a handpiece with a flexible shaft. The handpiece holds various steel, carbide, silicon carbide, and diamond cutting tools for use on wood, metal and stone. The Dremel tool does essentially what the Foredom does, but the motor and handpiece are one and are usually used without the available flex shaft accessory. The Dremel tool is also less expensive than the Foredom.

Hand tools play an important part in the lapidary arts, and one of the most common hand tools in the world is the simple pair of pliers. When pliers are mentioned, though, most folks think only of the slip-joint style that resides in every junk drawer and tool box on the planet. In fact, there are probably more styles, types, sizes and flavors of pliers than of any other hand tool around.



Jewelers' pliers are the ones most often associated with lapidary. They are small and light and are used primarily in making cabochon mounts or in wire wrapping. One of my favorites, which is often overlooked by the lapidary, is the vise grip style. These workhorses are usually associated with big stuff like construction, auto mechanics, welding, etc., and because of this, most folks think of vise grips as big tools, 6 or 8 inches long, and not suitable for things like jewelry. I have a pair, though, that measures 4½ inches from nose to tail, smaller than many jewelers' pliers, and they come in very handy all the time.

I recently found a set of specialty pliers on sale at a store that deals in lots of miniature tools for hobbyists. They were originally made for orthodontists to use to shape and adjust braces, so they will make all kinds of curves bends and zigzags and should work great for wire wrappers.

Finally, we can't overlook diamond. Diamonds are not only a girl's best friend, they can also be a lapidary's best friend. Small diamond files, diamond burrs for the Foredom and Dremel tools, diamond drills, and diamond hole saws have come down considerably in price and are certainly worth a try. The inexpensive ones probably won't last as long as the expensive ones, but for occasional use, they will do fine. 💎

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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PETRIFIED WOOD:

A Natural Enigma

It's a Favorite with Rockhounds and Lapidaries

Story and Photos by Bruce I. Wingate

Petrified wood is a favorite with rockhounds and lapidaries. Much of its fascination derives from the fact that this semiprecious mineral material was once a living plant. It is common enough to be collectible and its silica composition puts it among the most popular lapidary materials, as does its wide range of patterns and colors.

Petrified wood has been used by man for thousands of years. Arrowheads, charms, game balls, and decorative objects made from the material have been found in burial mounds. The Pueblo Indians used petrified wood as a building material. Some Indian tribes attributed petrified wood to their gods. The Paiutes believed that petrified logs were the arrow and spear shafts of Shinauav, the Thunder God, and his foe.

A Navajo legend tells of a fierce, mighty, alien giant named *Yei tso* whose father is said to be made of stone. About 40 miles northwest of Mount San Mateo (New Mexico) is a high volcanic hill named El Cabezón ("the Great Head"). According to



This piece of petrified wood has been cut lengthwise to reveal an internal pattern that aids in identification.

Navajo legend, this hill is the head of *Yei tso*. The Navajo call petrified wood *yei bits' in*, meaning "giant's bones". Lava flows in the same area are referred to as *yei bidil* ("giant's blood").

Petrified wood became popular in 1900 when Tiffany & Co. displayed slabs from Arizona's Petrified Forest National Park at the New York World's Fair. So how did this natural enigma come to be?

PETRIFICATION PROCESS

The petrification of wood begins with burial: by volcanic ash, by mud flows, as an indirect effect of volcanoes, or by sediment from seasonal flooding. When the wood is covered, oxygen is cut off, halting the decaying process. Groundwater that contains various dissolved minerals from the sediments or ash seeps into the individual cells, replacing the organic material with silica minerals, which crystallize into forms of agate, jasper, chalcedony and opal.

These semiprecious minerals are varieties of quartz, but their crystalline structures are denser than that of common quartz. Most of the petrified wood that is found is fractured, usually due to exposure to air and water.

Over time, the wood's cell structure is replaced by minerals. Trees are one of the few plants whose cell structure has been preserved well enough to be studied in detail. It is not totally understood how the cell structure is preserved. One theory suggests the wood is replaced by the minerals on an atom-by-atom basis.

Theories differ as to how long the petrification process takes. Some make it as short as several hundred years, others up to millions of years. One theory indicates that the better preserved the cell structure is, the more quickly petrification took place.

Petrified wood has formed in several parts of the world and in different time periods (<http://science.howstuffworks.com/>



TOP LEFT: This piece of scarce jet-black wood from northern Arizona shows pronounced white rings.

BOTTOM LEFT: This piece of petrified wood has at least 14 bird holes, each a little less than ¼ inch in diameter, and a partial layer of chalcedony.

ABOVE: Petrified bark is scarce because the softer wood rarely survives weathering to become petrified.



brown to almost black. I have polished the ends of several of these pieces. The interior has a black metallic shine that indicates high manganese content.

Another rare find is an imprint of a log in mud or sandstone. This may also indicate that the tree fell and was covered quickly. Much of the surrounding sand and dirt would be washed away by flowing water. One specimen that

I have and one other that I have seen have small pieces of bark embedded in the impression. The outer shape and contours of the bark are well preserved.

Occasionally, petrified wood from the stump and root system is found. These pieces often show exterior grain or pattern curvature. Look for pieces with "knots", the points at which branches grew out of the trunk. Samples with bird and worm holes, and in some areas petrified leaves, needles, and pine cones, have been found.

Some pieces of petrified wood have hollow centers filled with crystals, much like a geode. Crystals also form on the outside or inside of hollow pockets on the exterior. I have found several pieces of wood that have perfectly clear selenite on the inside.

Limb casts are formed when wood buried in hot ash is burned away, leaving an opening that is later completely filled by agate (chalcedony). Some limb casts are very well formed, showing the entire shape of the limb with other branches. Limb casts usually have a white exterior and are discerned from petrified wood by their general appearance. When cut, there are no growth rings or cell structure.

Petrified wood is found in an endless variety of colors and patterns. Color is de-

termined by the chemical content of the water or ash that seeps into the wood during petrification. Not all petrified wood will have good color or patterns. The amount of minerals and chemicals present at the time of petrification will determine the shade and intensity of the color. It is possible to predict the overall color quality of an area's petrified wood by observing the surrounding terrain. Of course, there will always be surprises. Any piece of wood with good, intense color is a highly collectible piece, but a well-rounded collection should contain a variety of examples, regardless of color or intensity.

Shades of red, caused by iron oxide, appear to be most common. Yellows, browns and orange are caused by other forms of iron oxide. Black is produced by manganese oxides and, in some cases, carbon.

Other common colors in petrified wood are white, gray and tan. White and gray come from silica. Silica (SiO_2) is one of the more common elements in the earth's crust. Tan results from silicon dioxide. Petrified wood that is found in areas with a high concentration of gypsum will usually be tan and gray, as gypsum contains calcium.

Tan is more commonly seen in permineralized wood, in which minerals are deposited within the cell structure of the organism. Wood permineralized with silica is called "silicified wood"; when it is preserved with calcite, it is termed "calcified wood". When calcified wood is exposed to light, it turns dark from the ultraviolet radiation.

The less common colors found in petrified wood are green, blue and purple. According to ScienceViews.com (www.scienceviews.com/parks/woodcolors.html), green is caused by pure, native iron, which is rare on earth, but common in meteor-

petrified-wood-info.htm). In the United States, for example, Arizona's Petrified Forest National Park dates from the late Triassic Period (about 225 million years ago), there is a Devonian (385 million years ago) petrified forest near Gilboa, New York, and the Mississippi Petrified Forest, near Flora, is a relatively recent 36 million years old.

You can learn a lot about the type of tree that was petrified by studying the specimen. If a large portion of the trunk is found, it may be possible to tell whether the tree was alive or dead at the time of petrification. When a tree dies, the wood dries out and begins to get small splits along the length of the log. When preserved, these indicate that the tree died shortly before it was petrified. A layer of chalcedony on the outside of a piece usually indicates that the tree was alive when it was covered in hot ash.

It is rare to find petrified bark, since it is softer than wood and seldom survives long enough to become petrified. The presence of bark may indicate that the tree was covered quickly, usually by ashfall, and there was no time for the bark to decay. In a flood or mud flow, the bark will be dislodged as the tree tumbles downstream.

Pieces of petrified bark that I have examined vary in color from dark red and dark



An imprint of a log in mud or sandstone is a rare find and may indicate that the tree was covered quickly.

ites; blue and purple shades are caused by manganese dioxide; and pyrite or organic carbon produce black.

Common opal is white, gray or black, while precious opal shows a rainbow of colors. Opalized wood is formed when the cells of the organic wood are replaced by opal, in which the structure of the original wood can still be seen. Opalized wood is very colorful and is scarcer than regular petrified wood. A good location for finding opalized wood is Virgin Valley, Nevada. This opalized wood may have formed about 16 million years ago. One of the largest petrified logs in the world is found here. It is 14 feet wide and about 300 feet long.

IDENTIFICATION

In order to identify a piece of petrified wood, it must be prepared for study. Take a small slice from a specimen and fine polish it or fine polish one end of a small sample. The specimen must be fine polished to show the cell structure. A rough-cut piece will show very little detail. A large sample is not necessary—I have studied samples as small as 1 inch—though larger samples will show more of the cell patterns. If possible, obtain samples of both crosswise and lengthwise cuts, as each piece will show different aspects of the cell structure. Examining the cell structure from the top and side helps to further classify the tree. If both cuts cannot be obtained, use at least the cross-cut sample.

Select samples with less intense colors for study. Intense colors indicate a higher mineral content, which may make the cell

structure less pronounced. Black specimens may also be hard to examine and identify, and clear, translucent areas do not show cell structure well. Cells do stand out well in white, however. Some specimens that I have examined have only small patches of preserved cells. This also makes accurate classification difficult because there is less to compare to known samples.

To begin your study, it is recommended that you select samples of known wood types from identified areas that have been studied and dated to make positive identification easier. As you obtain, study and classify additional samples, they will come in handy for purposes of comparison.

You can examine the prepared sample using a 20x loupe or an inspection microscope, which has higher magnifications.



This unique specimen of petrified wood shows the base of a branch still attached to the main trunk.

When using a loupe, make sure that there is adequate lighting. Wetting the piece before examining it will make the cells stand out more.

There are two common types of fossil trees: gymnosperms and angiosperms. The gymnosperms are nonflowering, seed-bearing trees that include conifers like cedars, firs, pines, redwoods and spruces. Ancient conifers grew up to 220 feet tall and 10 feet wide in marshes and forests under humid conditions. The angiosperms are flowering trees that include maples, oaks, sycamores and walnuts. Each is easily distinguished by its cell patterns. There are a number of subclasses of each of these groups.

Ginkgoes were some of the first trees to appear on earth around 250 million years



This scarce piece of green petrified wood from Arizona, still in its matrix, was impregnated with copper.

ago. They evolved before either the conifers or the angiosperms. Only four areas in the world are known to have petrified ginkgo. At Ginkgo Petrified Forest State Park in Vantage, Washington, ginkgo is one of 50 types of petrified species, including redwood, Douglas fir, walnut, spruce, cottonwood and magnolia.

Palms are considered angiosperms, but they have a totally different cell structure than regular angiosperms. Their cell structure is less organized and the cells are grouped into round or irregularly shaped bundles.

Though they are not considered wood, petrified fern stems are collectible. Fern wood is often misidentified as palm wood. Several specimens that I found looked like regular wood on the surface, but when they were cut, a totally different cell structure was exposed.

Identification showed the specimens to be "fern trees". These "trees" lived about 65 million years ago and grew to between 18 and 20 feet tall.

The conifers and the angiosperms are easily distinguishable from each other. The conifer's pattern will show growth rings, with cells that transport nutrients, called tracheids, in between the rings. Larger holes may be noted that are farther apart; these are resin ducts. Resin ducts are found in a few species of the pine family. The angiosperms have larger holes, or vessels. Some are round, but most are an irregular shape. Each subclass of tree has a unique cell structure. Unknown samples have to be compared to known types for positive identification.

Resources

Common Fossil Plants of Western North America, 2nd edition

by William D. Tidwell
Smithsonian Books, 2010

Petrified Wood in the U.S.A: Where to Collect It, Where to See It

by Arthur Manning
2002

EvolvingEarth.org

How to Identify Fossil Wood
www.evolvingearth.org/learnearth/science/sciencearticles0809identifypetrifiedwood.htm

Cutting the specimen to reveal internal structures, colors and patterns gives the petrified wood collector additional opportunities for appreciation. Wood can be cut for display in at least three ways. Cut a cross section of a limb or log to show color and growth rings. In some samples, growth rings will be very pronounced and may be different colors from the rest of the wood. A piece cut lengthwise will show other patterns. Those cut diagonally show even more. Polishing the cut end will highlight the colors and patterns. Limb casts can have some pattern. They should be cut and polished on one end only.

COLLECTING

While petrified wood is more common in the Western states, it can be found in nearly every state, so collecting opportunities are almost limitless. The variety of colors and species of tree makes an excellent collection possible. Petrified wood can be found in pieces that vary in size from small shards to log sections. This resource is disappearing, so collect only what you need or will use for a specific project. Some sites have already been picked clean.

The Bureau of Land Management (BLM) limits the amount of wood that can be collected on its land to 25 pounds, plus one piece, per day or 250 pounds a year (Federal Regulation 43 CFR 3662). No single piece greater than 250 pounds may be taken without a special permit. Collected wood cannot be sold commercially unless a permit is obtained. 💎

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TANZANITE, blue, AAA, beautiful cut, 3 mm round brilliant	\$18.00 each
SPINEL, Burma, pink, fine cut, 2 mm round	\$ 2.99 each
BLACK SPINEL, (black diamond subst.), fine cut, 2 mm round brilliant	\$0.90 each
SILVER TOPAZ, fine cut, 3 mm round brilliant cut, \$0.75 each, 6 mm round	\$3.60 each
SKY BLUE TOPAZ, fine cut, 3 mm round	\$2.00 each
AMETHYST, dark purple, fine cut, 3 mm, round brilliant cut	\$1.25
CITRINE, gold color, fine cut, 6x3 mm marquise	\$1.99 each
GARNET, red, fine cut, 4 mm round	10 pcs for \$7.50
RHODOLITE GARNET, fine cut..... 4 mm round, trillion \$2.50 each	2.5 mm, round \$.80 each
HESSONITE, 3 mm, round brilliant, root beer color,	\$1.75 each
MEXICAN OPAL, fine cut..... orange, 4x6 mm oval \$3.00 each	yellow, 7x5 mm oval, \$2.99
ZIRCON, Cambodia, with a hint of blue beautiful 2 mm round	\$0.50 each
HELENITE, volcano stone, fine cut 5 mm rounds, red, blue, or green	\$3.00 each
TOURMALINE, cabochon , pink..... round, 4 mm \$3.50 each	round, 5 mm \$5.40 each

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ROCK SCIENCE

by Steve Voynick

Beryllium: From Beryl to Bertrandite

With its well-formed, hexagonal prisms and rainbow of eye-catching colors, beryl is an eminently collectible mineral. When pure and colorless, beryl is the gemstone goshenite. But the trace presence of such chromophoric elements as chromium, iron and manganese can turn it into green emerald, pink morganite, golden heliodor, blue aquamarine, and even red beryl.

Beryl is much more than just a gemstone. It was once the only ore of beryllium, a metal with many unusual properties. With an atomic weight of just 9.0, beryllium is the second lightest metal, only one-third the weight of aluminum. Yet, it has greater stiffness than carbon steel, so it has many structural applications. And its X-ray transparency and neutron-absorbing properties make beryllium vital to many nuclear applications.

Although widely distributed in the earth, beryllium rarely occurs in concentrations rich enough to mine. In fact, for long after its discovery in 1798, there was no reason to mine it at all. It remained a laboratory curiosity until the 1930s, when rapidly advancing X-ray and nuclear technologies finally created substantial demand for its unique properties.

At the time, beryl was the only ore of beryllium. As beryllium prices soared during World War II, mining beryl-rich, granite pegmatites became quite profitable, especially when miners encountered huge crystals of opaque, common beryl. Containing about 15 percent beryllium by weight, these massive crystals, as long as 12 feet and weighing 4 tons, were true bonanzas. Throughout the 1950s, numerous small pegmatite mines provided industry with an ample supply of beryllium and mineral collectors with plenty of beryl specimens and gemstones.

By the late 1950s, however, the relatively few beryl-rich pegmatites in the United States were nearly depleted and could no longer satisfy the growing demand for beryllium for use in newly developed, lightweight, heat-resistant aerospace alloys. The United States then began relying on imported beryl from the pegmatite fields of Brazil.

Meanwhile, prospectors in the United States began searching for new deposits, focusing their efforts on western Utah's Topaz-Spor Mountain region, an area previously mined for uranium and fluor spar and a well-known collecting locality for



topaz, fluorite, beryl and garnet. For the first time, exploration geologists employed beryllometers, forerunners of the portable X ray-fluorescence analyzers now used for field mineral identification. But these crude instruments could identify only beryllium and, apart from confirming the identity of obvious beryl samples, were of little help.

Then in 1959, a geologist accidentally subjected samples of tuff, an earthy volcanic rock, to the probing X rays of a beryllometer and was surprised to find a relatively high beryllium content. Laboratory analysis revealed that the beryllium-rich mineral within the tuff wasn't beryl at all, but bertrandite, a basic beryllium silicate that forms small, yellowish, orthorhombic crystals.

Geologists deduced that groundwater had leached beryllium from nearby formations of volcanic rhyolite and redeposited it as tiny, disseminated crystals of bertrandite within the porous tuff. Although the beryllium-rich tuff graded only 0.5 percent bertrandite, it occurred in a large, shallow formation suitable for inexpensive open-pit mining.

When mining began at Spor Mountain in 1969, the United States immediately became self-sufficient in beryllium. Today, Spor Mountain is still the world's largest known beryllium deposit and provides most of the 150 tons of elemental beryllium that are produced worldwide each year.

To collectors, the most familiar of the beryllium-bearing minerals will always be beryl. But when it comes to mining beryllium, bertrandite is the mineral to remember. ♥

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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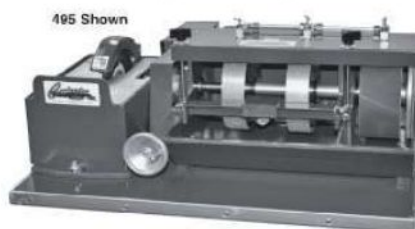


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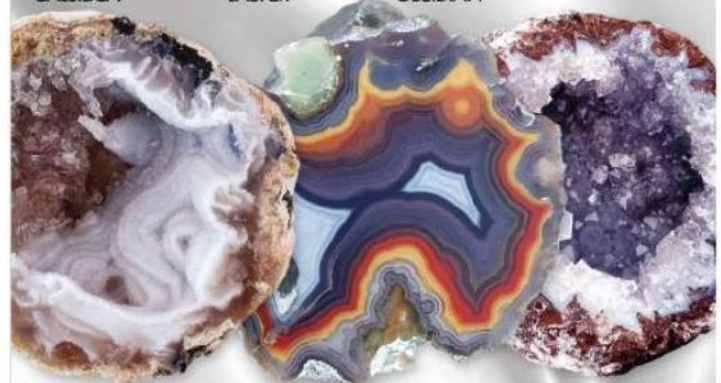
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DANGEROUS DUST

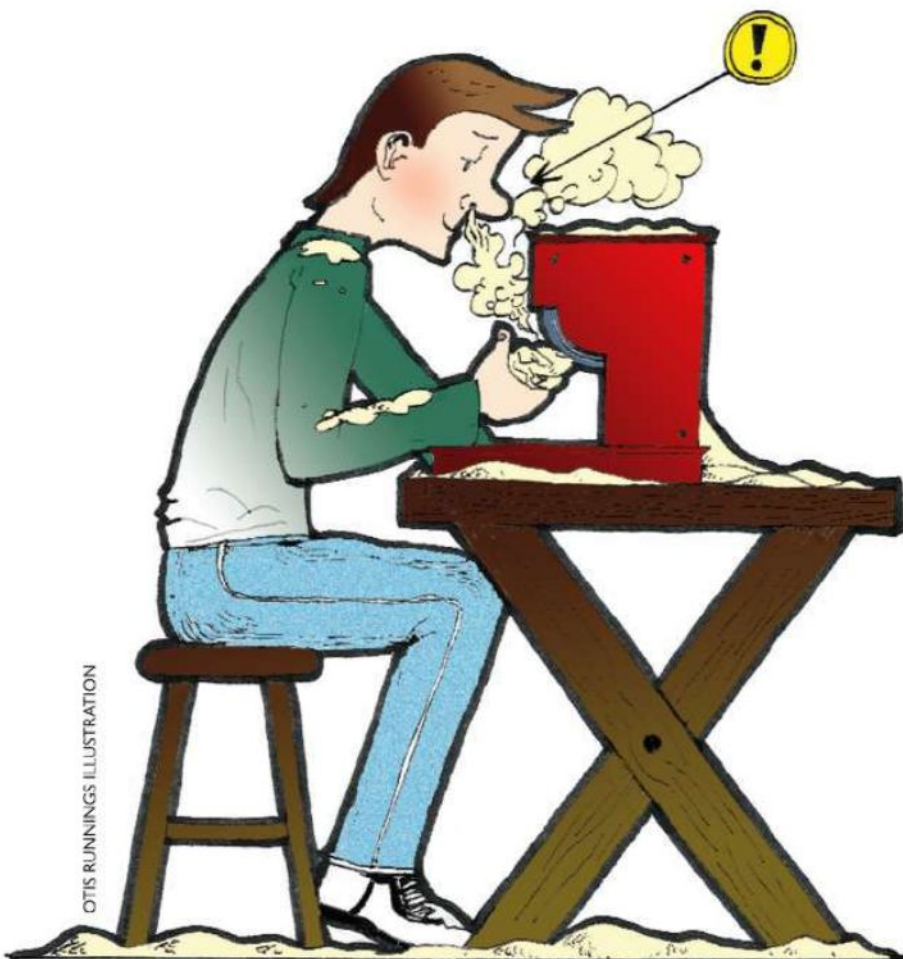
Story by Douglas Hamilton

The Lapidary Hobby's Forgotten Hazard

W

hen I first became interested in lapidary work, it seemed the perfect hobby. Today's equipment is simple, relatively cheap, and very high tech. Working material is easy to find, as rocks are about the most abundant material on the planet. The hobby itself is rewarding and exhilarating. And there is little danger of personal injury from runaway saws, faceting machines, or polishers, as the cutting edges are relatively dull and forgiving. So after 30 years of procrastination, I finally decided to go for it, and purchased a brand-new rock saw and grinder/polisher. Wow, did I have fun! For that first few months of cutting and grinding, I was in seventh heaven. All those lovely rocks I had lusted after for so long were finally put under my polishing wheel: lapis, agate, jasper, tiger's-eye, malachite, turquoise, chrysocolla and quartz.

But I soon began to experience a nasty and completely unexpected cavalcade of health problems: coughing, hoarseness, difficulty clearing my throat, breathlessness, and a dull ache in the pit of my lungs. Of course, I had always worn safety glasses with side protection, as recommended in every manual, but a mask seemed a cumbersome hindrance. As the situation worsened, I tried several dust masks, but there was little improvement. It was time to do a little research, so I hit the books and started talking to fellow rockhounds. It was a revelation. Rock dust from lapidary work turns out to be more than just a nuisance; it can be deadly.



OTIS RUNNINGS ILLUSTRATION

The joys of rock polishing without a respirator will frequently lead to serious lung problems later on.

A single heavy dose can cause crippling lifelong problems. It attacks the lungs in a variety of ways: First, by coating the inner lining and blocking the transmission of oxygen into the bloodstream. Second, tiny sharp fragments slice and cut into the alveoli, which coat the inner lining of the lungs, causing irritation and inflammation. Fresh dust seems to be more harmful because the sharp edges have not had a chance to be softened by moisture. Some forms of rock dust are quite poisonous in and of themselves. Whether it is inhaled, ingested, or contacted by exposed skin, the effect can be injurious to your health.

Among the worst offenders are minerals containing copper (II) oxide (CuO), the higher oxide of copper, which can cause damage to the endocrine and central nervous systems. These minerals include some of our most colorful and treasured semiprecious stones: turquoise (9.8 percent copper oxide), chrysocolla (45 percent), and malachite and azurite (70 percent). These percentages are only close approximations; each rock has its own signature of impurities. It is worth remembering that other closely related copper compounds are highly bioactive and have been used in pesticides, fungicides, and wood preservatives for decades. This is dangerous material. These high-copper rocks should not be licked to bring out the color, and oil mixed with the dust should be carefully cleaned off exposed skin. Several lapidaries who smoke have described their own novel test for over exposure: Apparently, copper-impregnated dust combines with nicotine and tobacco tar in saliva to form a sicken-

ingly sweet compound similar to saccharin. When their mouths start to taste like a candy factory, these rockhounds know it's time to quit. Another sign is influenza-type symptoms. Symptoms of CuO dust poisoning mimic the flu, causing headaches, coughing, sweating, sore throat, nausea and fever. Skin, eye, and respiratory tract irritation are also common, along with a distinct "metallic" taste. A common name for these health effects is "metal fume fever."

In fact, when you get right down to it, almost all the rocks most favored by cutters and polishers contain compounds that can be dangerous when inhaled. Silicates are the most common family of minerals on earth, and silicosis has long been one of the chief hazards facing stone masons. The ancient Greeks and Romans were the first to observe its ravages, and correctly associated the problem with mining and rockwork. Similar to the "black lung disease" of coal miners, it came to be known in later years as "grinder's consumption". The simple steps taken to prevent it were a major achievement in the modern field of occupational health. Ironically, although silicosis

is well understood today, thousands still die from its effects every year, mainly from mining and sandblasting in the third world. The symptoms of inhaling crystalline silica (SiO₂) dust include shortness of breath, cough, fever, emphysema, pulmonary fibrosis, lung scarring, and increased susceptibility to tuberculosis and cancer. Silicosis often takes many years to develop from repeated exposure to low doses of dust, but once established it is irreversible.

The silicates include a bewildering variety of precious and semiprecious stones. In fact, it's hard to imagine the world without them, as they can be found in every class of rock and occupy a niche in every conceivable geological environment on the planet. The family includes quartz, chalcedony, jasper, agate, aventurine, bloodstone, carnelian, chrysoprase, amethyst, opal, onyx, beryl, petrified wood, obsidian, flint, chert, soapstone, sandstone, glass and tiger's-eye. In almost all of these, the content of silicon dioxide approaches or exceeds 50 percent. It should be mentioned that African tiger's-eye also exposes the lapidary to another potent danger: asbestos. The vibrant optical effect of its chatoyancy is caused by parallel-oriented, finely fibrous amphibole asbestos. Serpentine has a high chrysotile asbestos content, but this is not considered quite as dangerous as the tiger's-eye. Some soapstone varieties also contain asbestos and should be cut or carved with caution.

While working on this story, I was surprised to discover a very different kind of hazard: radioactivity from fossils. In a recent study of 300 randomly selected fossils from



DOUGLAS HAMILTON PHOTO

Forget the cheapo dust masks—a quality NIOSH approved respirator is essential to the lapidary's respiratory health.



DOUGLAS HAMILTON PHOTO

Malachite and chrysocolla dust is quite toxic (45 to 70 percent CuO), and should not be breathed, ingested, or left on skin surfaces.



DOUGLAS HAMILTON PHOTO

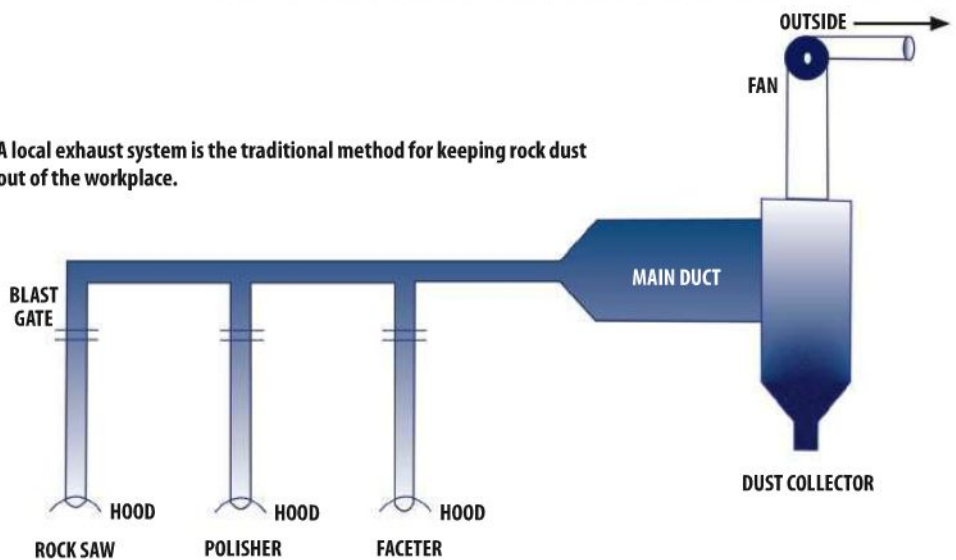
Amphibole asbestos is responsible for the beautiful chatoyancy of African tiger's-eye and can pose a danger to the lapidary who works with it.

the Hagerman Fossil Beds of Idaho conducted by C. Neal Farmer, Ronald L. Kathren, and Craig Christensen, a hand held Geiger-Müller survey instrument detected discernible levels of radiation one to two orders of magnitude above the ambient level of background radiation in three-quarters of the specimens ("Radioactivity in Fossils at the Hagerman Fossil Beds National Monument", *Journal of Environmental Radioactivity*, Vol. 99, Issue #8, August 2008, pp. 1355-1359). That is a huge difference.

In some areas like the Hagerman Beds, and the Morrison Formation at Dinosaur National Park (Colorado/Utah), fossils have even been hunted using Geiger counters. According to the study, radioactive fossils seem to occur most commonly between 900 and 1,000 meters above sea level in ancient sandy riverbeds, while clay-rich depos-

A local exhaust system is the traditional method for keeping rock dust out of the workplace.

DOUGLAS HAMILTON ILLUSTRATION



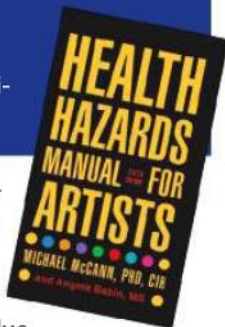
the contrary, a few simple precautions can almost completely eliminate the threat of injury from most rock dusts. Here is a list of suggestions that will make your workshop a lot safer and allow you to enjoy lapidary work in good health.

2. An open window or air conditioner does not provide adequate ventilation for the lapidary workplace. The simplest solution is to work outside. This keeps most contaminants out of your workshop and costs nothing, but it is not always possible. If inside is your preference, consider setting up a local exhaust ventilation system. This would include a dust hood to collect contaminants, ducts to carry them outside, and a suction fan to power the system. Adjustable blast gates would allow a dust hood to be placed next to each appliance. Ducts should be circular, with as few bends as possible, and should exit the shop. If you have close neighbors or are processing a lot of rock, provide a dust collector to remove contaminants from the vented air.

Setting up such an elaborate system can be expensive and time-consuming for the part-time hobbyist. Some wood-working tool suppliers have come up with an ingenious alternative. They have adapted a wet/dry-type vacuum cleaner with a High Efficiency Particulate Absorbing or Arresting (HEPA) filter to collect shop dust using a little extra pipe and some suction nozzles. There is no reason this system should not work for rock dust, as well. The vacuum should be placed outside the house because the dust-laden air sucked into the intake will be blown out the vacuum's exhaust port. Even HEPA filters fail or become clogged, and some dust will always slip through. It's far better for it to be blasted outside than into the shop or another enclosed area. Kits, diagrams, pipe, and suction nozzles available from www.leevalley.com or elsewhere on the Internet. Search for "dust collection" and "dust collection network".

Further Reading

Health Hazards Manual for Artists, 6th Ed.
by Michael McCann
Lyons & Burford Publishers, 1994



its and those at other altitudes do not seem to show these high levels. Apparently, naturally occurring uranium produces radium, which decays into radon, an inert gas. Ancient groundwater transported these radioactive elements into sandy fossil-bearing areas, where they precipitated out of solution during the fossilization process. Even small fossils like shark teeth and trilobites can have significant readings. The National Park Service is so concerned that it put out a "Conserve O Gram" with detailed instructions for handling and displaying specimens (www.nps.gov/history/museum/publications/conserveogram/02-05.pdf). While it is probably safe to collect most fossils, at the very least, you should wash up and change your clothes after leaving the field. And always wear a respirator when you cut or polish the pieces—radioactive dust is highly carcinogenic!

But enough of the doom and gloom. This litany of dangers is not intended to drive rock lovers from their favorite hobby. On

1. Always wear a National Institute for Occupational Safety and Health (NIOSH) approved respirator with replaceable cartridges and dust filters. Some cartridges today combine a pre-filter with the cartridge, which makes things simpler. Respirators provide a wide variety of protection against dusts, solvents, fumes and mists. They are designated N, R and P, depending on the cartridge's ability to filter out oil; N stands for "no protection", R for "resistant to oil", and P for "oil-proof". The number that follows the initial tells you what percentage of the particulates is filtered out by the cloth pre-filter. For example, an N-95 respirator will not keep out oil spray, but will screen out 95 percent of airborne dust particles.

Avoid cheap dust masks; they don't fit tightly enough and they filter poorly. If you can, try on several different respirators at the store to get the best fit. Shave your beard, if you have one, to get an airtight seal. Store the mask in a closed container or plastic bag when it's not in use, and occasionally wash it with warm soap and water, both inside and out.

Try this simple negative pressure test on your respirator: Block up the air inlets, breathe in, and hold for 20 seconds. If the mask is still held airtight against your face, it fits. Cartridges should be changed after about eight hours of use.



Turquoise dust contains almost 10 percent copper oxide (CuO), which can cause flu-like symptoms and breathing problems when inhaled.

3. Always use water or oil as a lubricant when cutting, drilling, polishing or faceting, but be aware there are problems with both fluids. When water evaporates, it stops holding the dust down, allowing it to become airborne. A fine oil mist laden with toxic dust can be kept out your lungs with a good respirator, but it will settle on skin surfaces and stick like glue. Also, most lapidary oils are highly irritating or downright poisonous to breathe. Some, like old-fashioned kerosene, are dangerously flammable, as well. Everyone has their favorite method, but I work outside using mineral oil and a P (oil-proof) respirator cartridge with a built-in 100 percent particulate filter.

4. Always wear a head covering and apron and/or coveralls when grinding, and change clothes after you have finished. Rock dust loves to stick to clothing and hair, and you will carry it around the house and breathe it all day long (as will your family) if you don't change. Take a

shower after your lapidary work, shampooing your hair and using lots of soap. Launder coveralls and work clothes frequently. Disposable clothing, coveralls and apron might also be an option.

5. Never dry sweep the workshop. Most of the dust will just become airborne and migrate elsewhere. Use a vacuum cleaner with a HEPA filter instead. If you really want to get down and dirty, use a wet mop on the floor and a wet rag with a water bucket on other surfaces.

Not all of these suggestions need be slavishly followed. If you grind infrequently, you can probably forget some of them, but if you are an addict like me, you might want to implement most. Individuals vary greatly in their tolerance to rock dust. Some will go through life with nary a problem, but others can be extremely sensitive. Low doses on a daily basis will slowly accumulate, and that dust isn't going anywhere once you breathe it in. Smoking and living with a woodstove or in an area with poor air quality will make you that much more vulnerable to problems. Listen to your body. If your lungs start to complain, take more precautions; you only have one set to last a lifetime. 💎



Dust from red jasper, Brazilian agate, and petrified wood all contain high amounts of silicon dioxide (SiO₂), which can cause silicosis when inhaled.

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Show Dates from page 16

lessons, geode cracking, swapping; contact William deLorraine, (315) 287-4652; e-mail: wdellie@verizon.net; Web site: www.StLawrencecountymineralclub.org

21-22—YELM, WASHINGTON: Show, "Biggest Little Gem Show in the N.W."; Nisqually Valley Rockhound Society; Yelm City Park, Hwy. 507 (I-5/Marvin Rd. Exit 111); Sat. 10-6, Sun. 9-4; free admission; silent auction, door prizes, kids' booths, tailgaters, inside displays; contacts Mike Smith, 18814 119th Ave. SE, Yelm, WA 98597, (360) 458-8747, or Tim Howard, 17240 110th Ave. SE, Yelm, WA 98597, (360) 458-7841; e-mail: Tim_WSSMI@comcast.net

27-29—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; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

27-29—SANTA CLARA, CALIFORNIA: Show; MalicJewels Jewelry & Gift Show; Santa Clara Convention Center, Hall D, 5001 Great America Pkwy.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7800; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

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 Strieler Smith, (216) 521-4367; Web site: www.beadstreetusa.com

28-29—CONCORD, NEW HAMPSHIRE: 47th annual show, "Gem & Mineral Festival"; Capital Mineral Club; Everett Arena, 15 Loudon Rd., I-94 exit 14; Sat. 9-5, Sun. 10-4; adults \$5, kids 12 and under free with parent; retail and wholesale dealers, displays, raffles, door prizes, minerals, crystals, faceted gems, books, magazines, fossils, jewelry, carvings, displays, free mineral for kids under 12; contact Scott P. Higgins, (207) 439-1107; Web site: www.capitalmineralclub.org

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 & Fossils 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: bcatnick@aol.com; Web site: http://pasgeology.com

SEPTEMBER 2010

3-5—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; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

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 Beins, 120 Gordon Ave., Box 569, Chadron, NE 69337, (308) 432-8950; e-mail: agates@bbc.net

3-6—FORT BRAGG, CALIFORNIA: 48th annual show; Mendocino Coast Gem & Mineral Society; Town Hall, Main and Laurel; Fri. 10-6, Sat. 10-6, Sun. 10-6, Mon. 10-4; free admission; contact Don McDonell, P.O. Box 868, Fort Bragg, CA 95437, (707) 964-3116; or Jane Webb, (707) 964-7182

3-6—HENDERSONVILLE, NORTH CAROLINA: 20th annual show, "Gem & Mineral Spectacular"; Henderson County Gem & Mineral Society; Whitmire Bldg., 301 Lily Pond Rd.; Fri. 10-6, Sat. 10-6, Sun. 10-6, Mon. 10-5; adults \$3 (free faceted gemstone), children under 12 free with adult (free grab bag); dealers, gems, minerals, jewelry, supplies, fossils, beads, bench jeweler, educational programs, displays, lapidary demonstrations, geode cracking, door prizes, free shuttle to Hendersonville Apple Festival; contact Ken Gillon, (828) 606-1353; Web site: www.hcgms.org

4-5—AUGUSTA, MAINE: 21st annual show; Kennebec Rocks & Minerals Club; National Guard Armory, Western Ave.; Sat. 10-5, Sun. 10-4; door prizes, lapidary demonstrations, fluorescent display, mineral displays, dealers, minerals, jewelry, gems, fossils, geode slicing, mineral mine, kids' games, free kids' stones, "Rocky" the rockhound dog; contact KRMC, (207) 873-6270

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. 9-5, 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

4-6—SILVER CITY, NEW MEXICO: 27th annual show; Rolling Stones Gem & Mineral Society; Grant County Business and Conference Center, 3031 Hwy. 180 E, next to ACE Hardware; Sat. 10-5, Sun. 10-5, Mon. 10-4; free admission; more than 55 dealers, daily free field trips, silent auction, wheel of fortune; contact Marcia Andre, 1311 Peterson Dr., Silver City, NM 88061, (575) 534-0006; e-mail: marciarandre@gmail.com; Web site: www.rollingstonesgms.blogspot.com

9-12—TUCSON, ARIZONA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; Holiday Inn Palo Verde/Holidome, 4550 S. Palo Verde Rd. (I-10 at Palo Verde Rd.); Thu. 10-6, 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

9-12—TUCSON, ARIZONA: Business-to-business gem trade show; Gem & Lapidary Wholesalers Inc.; The Grant Inn, 1365 W. Grant Rd. (I-10 and Grant Rd.); Thu. 10-6, 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

10-12—FERNDALE, CALIFORNIA: 6th annual show, "Wildcat Gem Fest"; Wildcat Gem & Mineral Society; Humboldt Co. Fairgrounds, 1250 5th St.; Fri. 12-7, Sat. 10-7, Sun. 10-5; free admission; door prizes, raffles, kids' games, demonstrations, classes, gems, minerals, fossils, jewelry, silent auction; contact Mike Martin/The Stonery, P.O. Box 189, Miranda, CA 95553, (707) 499-6194; e-mail: micknorma@directv.net

10-12—GREENFIELD, INDIANA: 34th annual show, "Greater Indianapolis Gem, Mineral & Fossil Show"; 500 Earth Sciences Club of Indianapolis; Hancock County 4-H Fairgrounds, 802 Apple St.; Fri. 10-8, Sat. 9-7, Sun. 10-4; free admission; dealers, swappers, fossils, minerals, gems, jewelry, lapidary equipment, silent auctions, door prizes, kids' activities, demonstrations, educational displays and programs, special fossil exhibit by the Children's Museum of Indianapolis; contact Don Mahoney, 17914 Juniper Rd., Argos, IN 46501, (574) 892-5264; e-mail: DLMCNACLU@aol.com; Web site: www.geology.iupui.edu/Outreach/500_earth_sciences/index.htm

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,

continued on page 36

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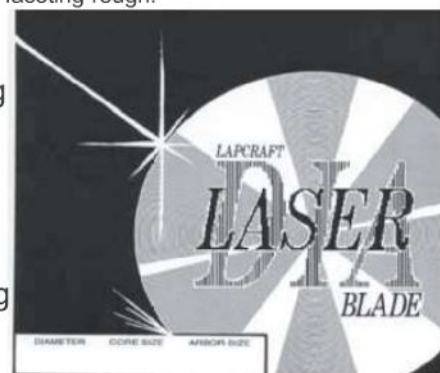
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DoBell Ranch Collecting

A Quest for Arizona's Wonderful,
Colorful Petrified Wood

Story and Photos by Mary Crosswhite



While some trees were lined up like fractured Lincoln Logs, other huge pieces of tree trunk were just scattered over the countryside.

Oh, my! A rockhound really needs to brush up on her Ten Commandments before visiting Petrified Forest National Park east of Holbrook, Arizona. I was confident I could handle the "Do Not Steal" thing, but now I really understand the challenge of that "Do Not Covet" rule. It was nearly impossible not to want all that incredible rainbow-colored petrified wood!

Petrified Forest National Park encompasses 93,533 acres of the Chinle Formation in eastern Arizona. The Chinle is a large sandstone formation in the Southwest that was laid down in the Late Triassic Period, over 200 million years ago. Now, the area is known for its badlands, semiarid grasslands, and painted desert, but at that time it was home to forests and a river system as large as the Mississippi or Amazon River system.

The tall conifers that grew along the river banks sometimes fell to the forces of seasonal flooding and were carried downstream, deposited on the rivers' floodplain, and buried under layers of silt, mud and volcanic ash deeply and densely enough to protect them from the oxygen that would have caused them to rot.

Over the span of millennia, groundwater carried silica down through the mud and silica crystals began lining and filling in the cell walls of the fallen trees. The mineral often retained the original tan or brown color of the wood. But one of the very beautiful things about some of the trees in Petrified Forest National Park is that the petrification process continued another step past this "pre-mineralization" stage. Eventually, the silica replaced all the organic material in the logs, producing agatized pseudomorphs of wood. The replacing mineral was often spectacularly colored by trace elements such as iron, copper, chromium, manganese, silicon dioxide, and uranium. This amazing geological process produced not only huge fossils, but works of art!

After—or perhaps while—this slow art work was being done, a lot of geology "happened": the Chinle sandstone drifted with the North American continent to its present position, the Colorado Plateau was uplifted, and wind and water gradually wore away layers of the sandstone to reveal the fossils underneath.

When my husband, Chris, and I visited the southern section of the Petrified Forest, off U.S. Highway 180, as part of a rock-hounding vacation in September 2009, we were blown away by the sight of huge, mostly intact, fallen trees colored brilliant reds, blues, yellows and even oranges and greens! We were back to the whole "coveting" dilemma.

We were very good. I can't say we didn't touch any of those incredible trees, but we



We collected petrified wood from one of Gordon's excavation sites, but this piece was a bit too big to handle.



The gravel under this chunk of rainbow wood is composed of smaller fragments of petrified wood!



The mineral replacing the wood was often spectacularly colored by trace elements like iron, copper and chromium.



Our 300-pound prized piece of rainbow petrified wood, which we had shipped from Arizona by truck, sits in a place of honor in our garden.



Inside Frank's museum, we found newspaper clippings about Frank's work, his vintage Coca-Cola bottle collection, and many samples of polished petrified wood.

didn't take even the tiniest piece—even though all the giant logs were sitting on a vast bed of colorful chips! Unfortunately, the Park Service estimates it loses tons of rock per year to folks who want to carry away a little sample. At one site in particular, The Crystal Forest and Trail, visitors who look closely can see where crystals of amethyst and quartz were pried out of pockets in the petrified wood. Those crystals must have been spectacular in place!

That's not to say that rockhounds have to leave Arizona without any of this incredible material. We'd been told by several helpful rockhounds in Arizona to contact a man named Gordon DoBell, who owns the ranch immediately next to Petrified Forest National Park. The DoBell Ranch sells petrified wood, and rockhounds are allowed to do their own collecting on the property. They are charged about \$28 for each 5-gallon bucket they collect.

The DoBell Ranch was more than just acres of land blessed with beautiful fossils and more than just a collecting site. We felt like we had entered a petrified wood historical theme park! Tonya, our greeter and guide, first showed us around this fascinating property and gave us a history lesson on "Grandpa Frank" DoBell, his petrified wood business in the area, and the saws and lapidary tools he built himself to cut and polish the material back when Arizona was still making its way from the Wild West to a more populous ranching, mining and tourism state.

It seems Grandpa Frank answered the call of opportunity out West when he came to Arizona in 1936. He met and fell in love with "Grandma Edna" Paulsell, whose fa-

ther, John, ran the Rainbow Forest Lodge up on state Route 66. Grandpa died a few years ago, but the house he shared with Edna and the museum he built are still there. His workshop and hand-built lapidary machines and his old roadside stand, still bearing the sign "Petrified Wood 5 Cents", also survive. Upon request, visitors are allowed to go through them.

The DoBell family thinks the site is worthy of official museum or historic site designation, and I tend to agree with them. The house is still furnished as it was for the 50-plus years Grandpa and Grandma lived in it, and it is a time capsule all on its own. We even saw a handkerchief Grandma had embroidered with an image that looked like Bambi, next to a bell; she used that insignia on many things to signify the DoBell Ranch.

The house, museum, and roadside stand sit on an old, abandoned road. According to Tonya, Grandpa Frank just about invented the business of cutting petrified wood into beautiful pieces, polishing it, and selling these works of natural art to the public. Hardy tourists of the 1930s and '40s stopped to buy samples on their way to the Petrified Forest. Then the federal government decided to expand the scenic park and wanted to buy Frank's land. Frank wouldn't sell, so the upgrade went on without him, and in the process U.S. Highway 180, which brought tourists past Frank's museum and store, was re-routed about a mile farther south. The spur to Frank's house, still referred to as "Old Highway 180", became a fossil itself, although a sign on the new highway still pointed to the DoBell Museum.

Tonya gave us a hand-drawn map of the ranch and buildings and cheerfully loaned

us buckets and tools to help us collect. We had been told we could look anywhere on the property within the fence line, so we drove our rented SUV over to where Gordon had recently excavated a buried log. Most fragments were lying on the surface or were partly covered in dirt from the excavation. Of course, there were very large pieces, like the newly unburied log, which we could drool over but couldn't have moved even if we could have broken off an end! As always, limiting our collection was probably the biggest problem: We were restricted to what we could mail or carry back on a plane to Maryland. Should we leave the pieces that didn't have at least three or four colors? Or the ones without samples of bark? Just how big was that largest flat rate box again? Oh! Was that piece opalized?

A picnic bench near the DoBells' house, which visitors were welcome to use for a lunch break, sat in the middle of a stunning selection of petrified wood pieces Gordon had excavated and brought back with a front-end loader. There were huge rounds, several inches thick, that were completely encircled by bark, large pieces, and small pieces, and bins of broken pieces. This was just a fraction of the DoBells' inventory. Behind Gordon's home and workshop were several more storage areas, including the ones where he kept his prize pieces, those showing striking displays of crystallization and especially beautiful colors.

Of course, we supplemented our self-collected wood by buying a few small pieces of Gordon's that we just couldn't bear to leave behind. Then I played the "trick" on Chris I traditionally play on our rockhound adventures: I pointed to an unreason-

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There were plenty of small samples of petrified wood to be gathered on the DoBell Ranch.

ably huge rock sample and said, "I want that one, honey". Well, the beautiful round of wood I pointed to this time—I was joking! Honest!—was bigger than even the heroic postal flat rate boxes could have handled, but the price Gordon quoted us on it was just too good to pass up! So Chris got out his computer and started checking account balances and searching out shipping companies, and the next thing you know, we were the owners of an approximately 300-pound piece of rainbow petrified wood that I don't think the Smithsonian would be ashamed of. We were home a week later, but it took about a month for a trucking company to deliver our giant sample to us. But we still feel like we got a great deal.

The DoBell Ranch is by no means the only place to collect petrified wood in this part of Arizona. There are many free collecting sites, although I have to admit we collected so much at the DoBells' I scratched them from our itinerary. Information on places to collect is available by searching online or in Arizona rockhounding books such as *Minerals of Arizona* (Geoscience Press, 1999) or *Minerals, Fossils and Fluorescents of Arizona* (Arizona Desert Ice Press, 2006), by Neil R. Bearce. There is also more interesting information about Frank DoBell's life in *Route 66: The Highway and Its People*, by Quinta Scott and Susan Croce Kelly (University of Oklahoma Press, 1990). Tourist stores and small stands all around Holbrook also sell samples of Arizona petrified wood.

Petrified Forest National Park can be accessed from Interstate 40 (Exit 311) or U.S. Highway 180 East. There are three Visitor Centers: the Painted Desert Visitor Center and Painted Desert Inn National

Landmark, near the North Entrance, and the Rainbow Forest Museum near the South Entrance. They are connected by a 28-mile scenic road through petrified wood outcrops, sculpted rocks, and painted desert and surrounded by more beautiful horizon than I knew existed before I went to Arizona!

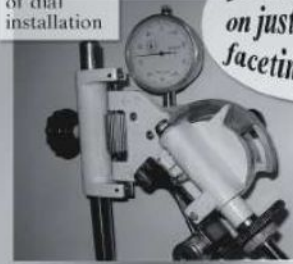
The DoBell Ranch can be reached off U.S. Highway 180, either by the dirt track, following the sign for the DoBell Museum if you can find it, or by a gate about a mile west of the national park entrance road. Before you go to collect, call Gordon DoBell at (928) 524-3349 or write to him at P.O. Box 691, Holbrook, AZ 86025 for permission to come and collect. 



The slabs in Frank DoBell's museum includes this black petrified wood slab that's almost 2 feet across.

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Show Dates from page 30

SEPTEMBER 2010

Sarasota, FL 34236, (941) 954-0202; e-mail: frankcox@comcast.net; Web site: www.frankcoxproductions.com

10-12—MONROEVILLE, PENNSYLVANIA: Show; MalicJewels Jewelry & Gift Show; Monroeville Convention Center, South Hall, 209 Mall Blvd.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

10-12—SAN RAFAEL, CALIFORNIA: Show, "Gem Faire"; Gem Faire Inc.; Marin Center/Exhibit Hall, 10 Avenue of the Flags; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

10-12—TOLEDO, OHIO: 39th annual show and sale; Toledo Gem & Rockhound Club; Stranahan Complex, 4645 Heatherdowns Blvd.; Fri. 2-8, Sat. 10-6, Sun. 11-5; adults \$4, seniors and students \$3, children under 12 free; free kids' mineral kits and games, exhibits, demonstrations, mini classes, Touch & Feel Area, scholarship raffle, silent auction, club sales, more than 20 dealers, beads, jewelry, gems, precious metals, fossils, minerals, carvings, gem trees, tools, equipment; contact Jerri Heer, 247 Decatur, Toledo, OH 43609, (419) 531-8124; e-mail: jheerx6@aol.com; Web site: www.rockyreader.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—RICHMOND, BRITISH COLUMBIA, CANADA: 50th annual show, "Gold 'N' Opportunities"; Richmond Gem & Mineral Club; Richmond Arts & Cultural Center; 7700 Minoru Gate; Sat. 10-5, Sun. 10-4; dealers, club boutique table, member show cases, kids' corner; contact Livia Waterson, 7700 Minoru Gate, Richmond, BC V6Y 1R9

11-12—ROSEBURG, OREGON: Show, "Rough to Gems"; Umpqua Gem & Mineral Club; Douglas County Fairgrounds, 2110 Frear St., I-5 Exit 123; Sat. 10-6, Sun. 10-4:30; displays, Wheel of Fortune, silent auction, dealers, raffle, demonstrations, door prizes, gold panning, children's rock hunt; contact Bob Sampson, (541) 459-1755, P.O. Box 1264, Roseburg, OR 97470

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

11-12—WALLA WALLA, WASHINGTON: Show, "Walla Walla Gem & Mineral Show"; Marcus Whitman Gem & Mineral Society; Walla Walla County Fair Ground, Community Center, 9th St. and Orchard; Sat. 10-5, Sun. 10-5; dealers, opal, petrified wood, jasper, agate, sunstone, wire wrapping, faceted gems, slabs, rough, jewelry, silent auction, demonstrations, kids' section; contact Warren Rood, (509) 522-2330; e-mail: warrenrood@yahoo.com

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 Lineville 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: Wholesale/retail show, "Denver Expo 2010"; T.E.P. Gem Show; National Western Complex, 4655 Humboldt Street Wed. 10-7, Thu. 10-7, Fri. 10-7, Sat. 10-7, Sun. 10-4; free admission; open to the public, free shuttles to other shows; contact Al Sargent, T.E.P. Gem Show, P.O. Box 2902, Tucson, AZ 85702, (520) 883-6447; e-mail: TEPGemShow@cs.com; Web site: www.tucsonelectricparkgemshow.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—TWO HARBORS, MINNESOTA: 11th annual show, "Agate City Rock Show"; Agate City Rock Shop; 721 7th Ave. (Hwy. 61); Sat. 9-5; free admission; dealers, collectors, buy, sell, trade, Lake Superior agate, agate, thomsonite, fossils, crystals, rough and polished rocks, flint knapping, marbles, spheres; contact Bob Lynch, 721 7th Ave., Two Harbors, MN 55616, (218) 834-2304; e-mail: bob@agatecity.com; Web site: www.agatecity.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-Inn, 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—DENVER, COLORADO: 43rd annual show, "Denver Gem and Mineral Show"; Greater Denver Area Gem & Mineral Council; Denver Merchandise Mart, 451 E. 58th Ave. (I-25, Exit 215); Fri. 9-6, Sat. 10-6, Sun. 10-5; adults \$6, seniors and students \$4, children free with adult; runs concurrent with the Colorado Fossil Expo, exhibits, dealer displays, minerals, fossils, meteorites, gems, jewelry, demonstrations, speakers, "Minerals of Creede/Mineral County"; contact Emily Epstein, (303) 233-2516; e-mail: emilye@sprynet.com; Web site: www.denvermineralshow.com

continued on page 40

Lightning Ridge Opal

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SHOW SCHEDULE 2009 - 2010

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Kerr Scott Building, State Fairgrounds

April 30 - May 2, 2010

Houston Texas -
Houston Fine Mineral Show, Embassy Suites Hotel, Room 201

August 13 - 15, 2010

Springfield, Massachusetts -
Eastern States Exposition Center

September 15 - 19, 2010

Denver, Colorado -
Holiday Inn North, Room 115

October 8-10, 2010

Detroit, Michigan -
South Macomb Community College Expo Center,
Warren, Michigan

November 12 - 14, 2010

Houston, Texas - Humble Civic Center



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Silver Ag

Silver and gold often are paired as precious metals, but while athletes are encouraged to “go for the gold,” silver goes to runners up. For such an interesting mineral, it hardly seems fair! Silver is a metallic element. It has brilliant white metallic luster and leaves a silvery-white streak. It’s soft and malleable like gold, with the same Mohs hardness of 2.5 to 3, but is lighter in weight (specific gravity 10.1 to 11.1). Unlike gold, silver oxidizes (tarnishes) when exposed to air, turning black.

While silver occurs in pure form as veins, fernlike “wires,” or small cubic crystals, it’s most commonly obtained as a byproduct when other metals like copper, lead, zinc, or gold are extracted from ores. The two major silver-producing countries, Peru and Mexico, have been mining this metal since 1546. In the late 1850s, the United



BOB JONES PHOTO

Pure silver can form in fernlike “wires” and has been used in money for thousands of years.

States’ largest silver find, the Comstock Lode, was made in Nevada, and ghost towns from the resulting rush dot the West.

Silver has been used throughout history as the basis for monetary systems. For instance, the British pound (£) originally denoted the value of 1 troy pound of sterling silver. Most economies have moved off such systems, but silver coins and bullion are

still used as investments. Its malleability, luster and affordability (compared to gold) make silver perfect for ornamental uses, but silver also has practical applications: With the highest electrical and thermal conductivity of all metals, it’s useful in electronics. It’s alloyed with mercury and tin for dental work. Quantities of silver were once used in film, but digital photography has hugely reduced that use.

—Jim Brace-Thompson

Earth Digger Patches

Earth Digger Clubs is a patch program I designed for mineral clubs and societies to use in their junior programs. Each one-hour program focuses on a specific aspect of mineral collecting or a specific mineral species. At the conclusion of the program, the juniors turn in their worksheets and receive a patch for completing the work. All the programs include hands-on activities, a chance to observe mineral specimens, and a focus on learning from books and Internet resources.

The programs topics include Building a Mineral Collection, Hardness, Making Crystals (from paper models), Making Crystals (from solution), Mineral Fun, Garnet, Quartz, Pyrite, Gypsum and Calcite. These programs are complete enough to be run according to the directions and flexible enough that experienced leaders can add their own materials to enhance them. Each program comes with junior worksheets and a Leader’s Guide. These colorful patches can also be purchased separately from the patch program.

Club leaders can get more information on this program and other mineral education resources and fun stuff by visiting www.diamonddanpublications.net, writing to Diamond Dan Publications, P.O. Box 143, Manchester, NY 14504, or calling (585) 278-3047.

—Darryl Powell



Minnesota's State Rockhound Symbol

Minnesota named Lake Superior agates, also called "Lakers", its state gemstone in 1969. These banded chalcedony gems are predominately colored red, orange-brown and white, but they also show blue-gray, yellow, and other colors. The red color is caused by iron, which is mined extensively in the state.

Red-and-white "candy-strippers" are considered classic Lakers. Specimens can also exhibit a range of effects, including eyes, shadows and plumes. Most are pebble- to palm-size and they are often fractured because of extreme age and exposure to freeze-thaw cycles.

Over a billion years ago, volcanic eruptions split the North American continent nearly in half. Lava spilled onto the surface and cooled into basalt rock. Inside the cooling lava, gas bubbles created openings called "vesicles" into which silica was deposited to form agates. The basalt has been dated at 1.2 billion years, making Lakers some of the world's oldest agates. Although some are found in the host rock, they're more commonly found in 1 million- to 1.8 million-year-old Lake Superior till, sand, gravel and boulders deposited by glaciers. Ice Age glaciers plucked agates from basalt and distributed them across Minnesota and other north-central states.

Collecting along Great Lakes beaches has been a popular pastime since the 1800s, and folks continue to hunt in lakes, streams, and gravel quarries. I still have the first candy-striper I collected as a boy. It's a beauty, even unpolished! Because Lakers have been ground by glaciers and tumbled by meltwater streams, they often don't need polishing to bring out their patterns. Lapidaries craft them into beads and cabochons. They were once used for marbles; "aggies" were a treasured target to shoot for when "playing for keeps."

The people of Minnesota celebrate Lakers in a number of ways. The Carlton County Gem & Mineral Club sponsors annual "Agate Days" in Moose Lake, Minnesota, the Minnesota Mineral Club holds an occasional "Night of the Agates", and in 2004, Moose Lake State Park dedicated the Moose Lake Agate and Geological Interpretive Center.

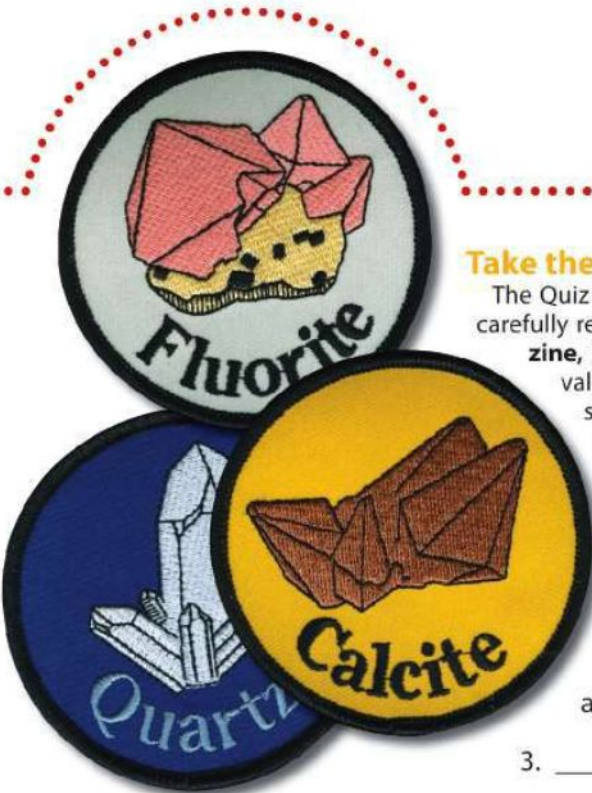
—Jim Brace-Thompson

Have a parent help you read more about Lake Superior agates on these Web sites:

- www.dnr.state.mn.us/education/geology/digging/agate.html
- www.superiortrails.com/rock-hound.html



Lake Superior agates include "eye" agates and classic red-and-white "candy strippers."



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 **August Quiz, Rock & Gem magazine, P.O. Box 6925, Ventura, CA 93006-9899**. Five winners will be drawn from the valid entries received by **Aug. 31, 2010**. Valid entries must include the correct answers, the entrant's name, age and address, and the signature of a parent or guardian. This month's prize is a set of eight Mineral Fun patches generously donated by Diamond Dan Publications.

1. Unlike gold, silver _____ when exposed to air.
2. Silver is most commonly obtained as a _____ when other metals are extracted from ores.
3. _____ has hugely reduced the use of silver in film.
4. The red bands in Lake Superior agates are colored by _____.
5. _____ distributed Lake Superior agates across Minnesota.



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Show Dates from page 36

SEPTEMBER 2010

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—HILLSBORO, OREGON: 30th annual show; Portland Regional Gem & Mineral Show Association; Washington County Fairgrounds, 873 NE 34th Ave., Hwy. 26 Shute Rd. exit; Fri. 10-6, Sat. 10-6, Sun. 10-5; contact Josh Heater, (971) 570-5456; e-mail: jfrankray@hotmail.com

17-19—HOLLAND, MICHIGAN: Show, "Rockhounding: A Green Hobby"; Tulip City Gem & Mineral Club; Holland Civic Center, 150 W. 8th St.; Fri. 9-8, Sat. 9-7, Sun. 11-5; adults \$2, students 50 cents; more than 50 club member, museum and college displays, "green" demonstrations, Petoskey stone polishing, kids' games, touch display, fluorescent mineral display, lapidary demonstrations, silent auction, club sales, children's silent auction, 8 dealers, fossils, minerals, jewelry, lapidary equipment, contact Rebecca Cistaro, 1162 Wintergreen Dr., Holland, MI 49424, (616) 393-9307; e-mail: r4squares@charter.net; Web site: www.tulipcity.org

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: kayshaver405@wmconnect.com; Web site: www.mozarkite.com

17-19—TIMONIUM, MARYLAND: Show; MalicJewels Jewelry & Gift Show; Timonium Fairgrounds Exhibition Halls, 2200 York Rd.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

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: drobotson@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.fallsoftheohio.org

18-19—HARTLAND, MICHIGAN: Annual show; Livingston Gem & Mineral Society; Old Hartland High School, 9525 Highland Rd.; Sat. 10-7, Sun. 10-4; adults \$2, students 50 cents, children free; dealers, demonstrators, flint knapping, children's games, wire wrapping, show cases; contact Chuck Amberger, 20815 Dixboro, South Lyon, MI 48178, (248) 446-0818; e-mail: camber2@sbcglobal.net

18-19—PASO ROBLES, CALIFORNIA: 19th annual show, "Rockhound Roundup"; Santa Lucia Rockhounds, Pioneer Park, 2010 Riverside Dr.; Sat. 10-5, Sun. 10-5; free admission; exhibits, raffle prizes, silent auction, demonstrations, youth activities, rocks, gems, minerals, fossils, meteorites, crystals, beads, carvings, lapidary equipment; contact Kim Patrick Noyes, 7343 El Camino Real #301, Atascadero, CA 93422, (805) 610-0603; e-mail: kimnoyes@gmail.com

18-19—REDWOOD CITY, CALIFORNIA: 44th annual show, "Harvest of Gems"; Sequoia Gem & Mineral Society; Community Activity Bldg., 1400 Roosevelt Ave.; Sat. 10-5,

continued on page 48

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News and Reviews

BOOK REVIEW:

Arizona Rocks & Minerals: A Field Guide to the Grand Canyon State

by Bob Lynch and Dan Lynch

The purpose of *Arizona Rocks & Minerals* (Adventure Publications Inc., 2010), is to help the rockhound identify the various minerals that occur and can be collected in Arizona. This is a field identification guide, not a field trip guide; it does not identify specific deposits or collecting sites. It is up to the reader to locate occurrences and get permission to collect.

Minerals are listed alphabetically, and each page of text has a facing page of color specimen photos. The text give descriptions of some physical properties, a section of interesting notes about the mineral, and a short description of where you might expect to find the mineral that is so general as to be of little use. A map outline highlights the parts of the state in which each mineral occurs, but the vastness of the areas marked makes these maps of little practical use.

The pocket size of this 252-page guide makes it suitable for field use. End materials include a glossary and a list of mineral shops and museums. This text might be of some use to a beginner collector, but is rather simplistic for those who have any experience in collecting in Arizona.

—Bob Jones

Adventure Publications Inc., 820 Cleveland St. S., Cambridge, MN 55008, (800) 678-7006

Van Pelt Gem Carvings

The premiere exhibit of Harold Van Pelt's life work in gemstone carving opened July 17, 2010 at the Bowers Museum of Cultural Art in Santa Ana, California. Van Pelt and his wife, Erica, are perhaps best known as one of the finest gem and mineral photography teams in the world. Their photos have appeared in numerous magazines and books.

"Few people realize that Van has been pursuing another art—the art of stone carving—for almost 40 years," says Bowers Museum President Peter Keller. "If it weren't for annual guest exhibits of individual pieces at the world renowned Tucson Gem & Mineral Show, Van's work would be all but unknown. Each year, the Tucson Gem &



Mineral Society [has] asked Van to display one of his creations at their annual show and each year he has."

The exhibition at the Bowers will be the first time anyone has had the opportunity to see the full body of Van Pelt's work in one place. All his carvings are done in either quartz (rock crystal) or agate (a banded variety of quartz). These are the same materials that have been worked by gem carvers since ancient times due to their beauty, durability and availability.

Many will find it very difficult to understand that these exquisite containers have not been molded or blown, but ground by hand. One of the most fascinating pieces is a faceted egg; when you take a close look, you realize it is hollow and the walls are paper thin.

"That is what makes Van's work so very special and rare and why the Bowers Museum is so proud and elated to present this wonderful exhibition," Dr. Keller says.

The Bowers Museum of Cultural Art is located at 2002 N. Main St. in Santa Ana, California. For ticket and tour information, call (714) 567-3695 or visit www.bowers.org.

Graves Mountain Hosts Swap and Dig

Graves Mountain, near Lincolnton, is the premiere location in Georgia to collect a wide variety of minerals. It is the world's best known site for collecting museum-quality specimens of rutile, lazulite, iridescent hematite, and much more. On the first weekend in October and the last weekend



in April every year, caretaker Junior Norman holds two "Rock Swap and Dig" events that are open to all clubs and rockhounds.

The mountain is open to collecting from 8 a.m. to 6 p.m. each day of the event. All attendees must stop at the welcome table to sign a liability release (www.wncrocks.com/resources/Collecting%20site%20graves.htm) and make a small contribution to help with expenses. The dig will end and everyone must be off the mountain by 6 p.m. each day.

From Washington, Georgia, take U.S. Highway 378 11 miles east, or from the Hardee's in Lincolnton, Georgia, drive about 5.5 miles west on U.S. Highway 378. Look for a sign at the entrance to Graves Mountain on the south side of the road.

There is an area in the parking lot for vendors to sell and trade minerals. If you would like to set up a booth, contact Junior at (706) 359-3862 or (706) 359-2381.

Arizona Museum Threatened

On Feb. 12, Governor Brewer entered the Arizona Mining and Mineral Museum with members of the Arizona Centennial Commission and presented a "repurposing" of the mineral museum building. Using large sketches prepared by Gallagher & Associates, she explained her plan for a 5C Centennial Museum to be constructed in the same building. The 5Cs represent cattle, citrus, climate, copper, and cotton. The sketches showed exterior and interior views of the building. There was no visible trace of any of the existing displays, mining equipment, or artifacts presently in or around the museum. During a following question period, the mineral museum staff was told that the large outdoor displays (head frame, locomotive, stamp mill, etc.) would be "relocated". However, no alternate location was identified. A mineral museum contractor subsequently estimated it would cost \$250,000 to move these displays.

The Governor's office purported that the change would be a budget reduction as well as a part of the centennial celebration. The mineral museum reportedly could not support the rent for the building. She claimed that increased revenue from the Centennial Museum would make it self supporting, and that "no public funds" would be used to build the new museum. However, within days, a subsequent statement from the Governor's office contradicted that. That statement said the state would continue to pay the rent on the building, and the money would simply be transferred to the Arizona Historical Society budget. Furthermore, the rent budget would be increased "as necessary" because



the plans included a substantial increase of the floor space in the building.

... In truth, the mineral museum is largely self supporting. Except for the curator, all labor is provided by volunteers or is paid for by proceeds from the gift shop and lapidary shop. Even the curators' salary is largely offset by admissions. Therefore, the only real costs to the state are a portion of the curators' salary and the actual cost of providing the facility. The total true annual cost to the taxpayers is probably less than \$250,000 per year for utilities, limited maintenance, insurance, and janitorial service.

For that, the taxpayers get a top rated and internationally recognized mining and mineral museum. The museum is on at least 10 lists of top 10 museums in Phoenix and Arizona. This museum draws visitors to Phoenix, and undoubtedly brings more money into the Arizona economy that the state spends on subsidizing it. Many international visitors come to the mineral museum after attending the annual world-class Tucson Gem & Mineral Show. Fifty-six thousand people visited the mineral museum in 2009. About 25,000 were students on school tours and they have free admission. However, if just one third of the remaining 30,000 paying visitors spend just \$25 in Arizona, then the museum brings as much money into the Arizona economy as the state spends subsidizing it.

—Dick Zimmermann

Read the full text of "What's Happening to the Arizona Mining and Mineral Museum?" at www.minmumad.blogspot.com/.

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INDIA'S Zeolites (and *Non-Zeolites*)



Cavansite occurs as vibrant, transparent, blue crystals of modest size that contrast starkly with the mineral's normal background of white stilbite.

Minerals from the Deccan Plateau Traprock Quarries

Story and Photos by Bob Jones

The Deccan Plateau of India is one of the largest areas of volcanic rock in the world. There, basaltic flows, commonly referred to as traprock, cover tens of thousands of square miles and have yielded countless thousands of superb zeolites and associated minerals. The plateau is located in the west-central part of the subcontinent and is made up of volcanic flows that preceded and followed the largest period of volcanic activity (about 65 million years ago). It is from these major flows that the bulk of India's zeolites and associated minerals have come.

Historically, India has been better known for its amazing diamonds, which were long since mined out. We're not exactly sure when diamonds were first discovered in India, but it was long before the start of the first millennium.

India was not bereft of minerals before the deluge of fine zeolites struck. The perfect hexagonal but opaque rubies from Mysore have long been nice collector specimens. They are not gemmy, but occur in a schist matrix. India has yielded millions of garnet crystals that are now offered for sale. These very common gems are usually drilled and strung for use in necklaces. The lapidary enjoys lovely objets d'art cut and carved from moss agate found abundantly in India.

Still, India was never considered a prolific specimen producer until a vast quantity of zeolites and associated minerals began surfacing. These are the minerals that have put India on the specimen collector's map!

It wasn't until the last quarter of the 20th century that India's zeolites began to gain great attention among collectors. Local Indian dealers quickly realized there was an opportunity to develop a mineral market. The result was a concerted effort in India to gather and prepare fine mineral specimens. As a result, spectacular Indian zeolites and their companion minerals are seen in abundance today. Collectors around the world have come to enjoy and appreciate the superb specimens coming from the Deccan Plateau traprock quarries.

The more common zeolites found in the Deccan Plateau include stilbite, okenite, heulandite and the needle minerals mesolite, scolecite, natrolite and mordenite. Another zeolite, laumontite, would be a nice mineral to collect, if only it were stable.

Laumontite, which is extremely common in the Deccan Plateau, tends to lose moisture as soon as it is collected. It slowly disintegrates into a soft, white powder. This is unfortunate, since some of these prismatic crystals can be 6 or 8 inches long. Fortunately, pale green prehnite coated long, randomly clustered laumontites, forming superb casts that are very attractive. They sparkle brightly, though are a bit brittle.

Prehnite pseudomorphs after laumontite are well worth collecting. The prehnite is often completely hollow, as the original hydrous calcium aluminum silicate simply dissolved away. To add to the beauty of these prehnite casts, a second solution deposited small, bright apophyllites and even white okenite on the prehnite, enhancing the already interesting pseudomorphs. The only problem with these very attractive specimens is that, if the original laumontite has not completely disintegrated, it can cause later damage to the specimen.

It seems a bit odd that prehnite, which is such a common mineral in Eastern American traprock quarries, is uncommon in India. The better sources for this usually green mineral are the quarries around Bombay, where it occurs mainly as botryoidal or spherical crystal clusters. The color of this non-zeolite is usually a pale green, but it can be colorless or grayish.

Stilbite is a common white mineral that can be easily recognized much of the time. It can be stained pinkish to orange by iron oxide or colored by greenish celadonite. Celadonite is the green, massive mineral often seen lining agates from a number of localities.

The classic crystal form for stilbite is subparallel bow-tie crystals that are pinched in the middle and fan out at opposite ends. The mineral has a good pearly luster, which is another identifiable trait. Snow-white stilbite clusters can even look like cauliflower, showing a curving, reniform surface. Less commonly, stilbite occurs as single tabular, curving crystals attached to other minerals like mesolite, calcite and apophyllite.



These pseudocubic crystals of the non-zeolite mineral apophyllite were discovered during the digging of a well in India.



Mesolite is just one of the white zeolite minerals that form in long, slender needles.



This large geode, actually a complete amygdule opening, is lined with green apophyllite topped by the zeolite mineral stilbite.



India is noted for its abundance of choice green apophyllite, like this crystal cluster.



Stilbite is usually white, but iron atoms can give it a lovely orange color. The large crystal is calcite.

The thing that keeps stilbite identification from being completely straightforward is that the companion mineral stellerite looks exactly like stilbite and occurs with it! Just to complicate things a bit more, there are two types of stilbite: calcium rich and sodium rich. You can't tell them apart unless you use complicated tests that are beyond the average rockhound's means.

Stellerite, a hydrous calcium aluminum silicate, is not as chemically complex as stilbite, a hydrous calcium, potassium, sodium, aluminum silicate. Stellerite is orthorhombic. Stilbite is monoclinic, but very often forms in pseudo-orthorhombic crystals. So you can't eyeball them apart. Wisdom suggests that, unless you obtain a stilbite from India that has been properly identified, you might better label your specimen with both names, stilbite/stellerite.

One of the particularly appealing zeolites from India is heulandite. It forms white needles several inches long that spray out like

the hairs on a scared human and are aesthetically very pleasing. Though the crystals are brittle and easily damaged, with care these sparkling, high-luster needle crystals can retain their beauty. When associated with other fine minerals, sprays of mesolite are even more appealing.

The most spectacular mesolite crystal sprays are those jutting from a white matrix base with one or more bright-green fluorapophyllites, upon which a delicate, radiating spray of mesolite has formed. Occurring together, these two minerals are considered by most as the finest, most eye-appealing specimens found in the traprock quarries of India. More than any others, this combination is really what put India's Deccan Plateau on the map as a specimen source. The finest examples of this combination of mesolite-apophyllite come from the Bombay area. Other localities produce the same combination, but the apophyllite tends to be a paler green.

One of the zeolites you can easily confuse with mesolite is scolecite, another white needle mineral from India. In fact, there is a trio of similar needle crystals found in traprock deposits: mesolite, scolecite and natrolite. Add okenite and mordenite to the mix, and you really have a problem. The average collector would be hard pressed to tell these needle minerals apart.

You can identify okenite because of its elasticity; the crystals bend at a gentle touch. Okenite caused quite a stir when some smart entrepreneur marketed it as a "pet rock".

Mordenite usually forms extremely thin, almost hairlike crystals that are just slightly elastic, so you might be able to spot it. Otherwise, you have to depend on the label that comes with the specimen you buy.

Mesolite, scolecite and natrolite can be distinguished only through testing. Scolecite can be heated in a test tube until it melts, forming a wormlike mass, but such tests are not usually within the scope of a collector's testing arsenal. The solution to this dilemma is to believe the label that comes with your specimen and enjoy the beauty of these lovely needle crystal minerals.

Another very common zeolite species from India is heulandite. It's really abundant here, both as a cavity lining and in fine white crystals. Impurities like iron

oxide can give it a pink to yellow-orange color. Celedonite, mentioned earlier as a coloring agent, will give heulandite a soft gray-green color.

This calcium, sodium, potassium, aluminum silicate is usually found in crystals shaped like a coffin that sags in the middle or like an inverted fingernail. It has a strong pearly luster along its bright sides. In this form, heulandite is actually layer upon layer of individual tabular crystals, piled up in a more or less parallel arrangement.

A lovely fan shape is another fairly common form for India's heulandite. This form is often encountered in the quarries at Jalgaon. Some of the crystals from this vast quarry are the pinkish color mentioned earlier. Other quarry sources are around Poona, and at Wegholi and Mahodari. As for associations, heulandite has been found with just about every other mineral species encountered in the Deccan Plateau.

One reason for the current abundance of Indian minerals is the almost explosive growth of quarry operations because of India's burgeoning population and increasing need for construction materials. This uptick in quarrying even resulted in the discovery of new species for the Deccan Plateau.

A case in point is cavansite, one of the most colorful minerals to emerge from all this quarrying. This mineral was first found in Oregon as a small colorless species of little import. Then in the early 1970s, quantities of a bright-blue mineral were mined at the then new Wagholi quarry near Poona. Quantities of this attractive and uncommon species began hit the market and really caused a stir.

Cavansite occurs as vibrant, transparent, blue crystals of modest size, with individual crystals seldom reaching an inch in length. The crystals almost always form in radiating or spherical clusters with a high luster forming shiny blue balls that contrast starkly with its normal background of white stilbite. It is often artfully scattered in clusters over the white matrix and is one of the most attractive minerals to come from amygdaloidal cavities in the Deccan Plateau.

Cavansite, $\text{Ca}(\text{VO})\text{Si}_4\text{O}_{10} \cdot 4(\text{H}_2\text{O})$, is a bit of an oddity because it is named after its chemistry—it is a calcium vanadium silicate—not its place of origin or discov-



Natrolite usually forms thicker crystals than mesolite, like these 2-inch diverging beauties.



GROBEN COLLECTION

Choice cavanite crystals show small, white single crystals of stilbite.

erer, which is a nice change. When the first quantities of cavanite were saved, few realized it had a dimorphous partner, pentagonite. All the material was labeled cavanite. Later studies revealed the material's dual nature. Cavanite and pentagonite have exactly the same chemical formula, color, and crystal form. You absolutely cannot look at one of these blue beauties and tell what it is.

Dimorphism of the two minerals results from their differing crystal habits. Both are orthorhombic, but cavanite very seldom twins and most forms on stilbite or sometimes heulandite. Pentagonite, on the other hand, almost always twins and prefers to form on mordenite, a white needle zeolite. But don't depend on that as a guide. You're a lot better off taking the word of the dealer who labels your specimen. Or if you prefer, put both mineral names on your label.

Cavanite is not a zeolite, nor is it one of the more common and colorful minerals found in the plateau. Apophyllite is one non-zeolite that occurs in quantity at just about every quarry in India and is always associated with a variety of zeolites and non-zeolites like calcite and, less often, quartz.

The variety of crystal forms and huge quantity of apophyllite found provides the serious collector with a great chance to study crystal forms; this mineral crystallizes in a host of shapes within both the tetrahedral and orthorhombic systems. As a result of its prolific occurrence, apophyllite is one of the most important species from the Indian trap quarries. The finest specimens are found with zeolites in most occurrences around the world, and the best come from India!

The most exciting apophyllites are the intense green crystals found with and on sprays of long mesolite needles. The contrast of delicate white needles and large intense-green crystals is remarkable. This superb combination comes from Poona in quantity, with other sources helping flesh out the supply.

Apophyllite also occurs as pseudocubic crystals that lack color but are of good size, over an inch on an edge. Other apophyllites are more typically thick and tabular or short and prismatic, again lacking any color.

This attractive mineral is usually labeled fluorapophyllite, and rightly so, but there are two other types of apophyllite, one of which is found sparingly in India. To distinguish among the three, scientists have added chemical element symbols to each mineral's name: apophyllite-KF (fluorapophyllite), apophyllite-KOH (hydroxyapophyllite), which is also found in India; and apophyllite-NaF (natroapophyllite).

Hydroxyapophyllite is more often found in the quarries around Bombay, while quarries around Poona, Nasik and Jajgaon are better known for fluorapophyllite.

Certainly, the oddest form of fluorapophyllite was found at Rahuri (Maharashtra), India. It is zoned with crystals sporting a nice green interior enclosed in water-clear material. These apophyllites are really odd, as the crystals are pseudocubic and have formed huge, spherical crystal groups, often perched atop a stem of stilbite or another mineral. Many of these crystal groups are hand-size, with the larger ball-like clusters reaching a stunning 20 inches in diameter.

While on the subject of non-zeolite minerals from the Deccan Plateau, powellite

comes to mind. This calcium molybdate surfaced there almost as a surprise. After all, basaltic lavas are not well known as a source of metal elements like vanadium, which is found in cavanite, and molybdenum, the metallic component of powellite.

To collectors' extreme pleasure, choice pale to strong yellow powellite crystals were found in the quarries around Nasik. Nested among crystals of stilbite, apophyllite and mesolite, these sharp tetragonal dipyrnidal crystals were first found in the 1970s.

One of the more common forms of Indian powellite is pseudocubic. These beauties are as much as 2 inches on an edge. Perched atop a white crystallized zeolite base, these beautiful crystals are highly prized by collectors. They also fluoresce!

The quarries of India have produced far more species than are described in this article. Recent finds of a very limited number of babingtonite crystals, tapered aragonite crystals, rounded gyrolite, small rosettes of hematite, some fluorite, and even rare species like goosecreekite are encountered here, so the dedicated collector of zeolites and associated minerals will find a treasure trove of species in the huge quarries of the Deccan Plateau.

Given the size of the plateau and the burgeoning growth of India's population, there is every reason to believe these basalt deposits will continue to be worked and Indian zeolites will be with us for decades to come. Their abundance and considerable beauty certainly add to any collection. Every collector should consider learning more about zeolites and the other minerals coming from India's lava formations.💎

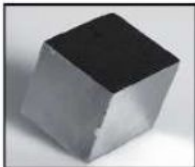
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Show Dates from page 40

SEPTEMBER 2010

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18-19—RHINEBECK, NEW YORK: 41st annual show and sale, "The Hidden Beauty of Stone"; Mid-Hudson Valley Gem & Mineral Society; Dutchess County Fairgrounds; Sat. 10-5, Sun. 10-4; adults \$5, seniors \$4, students \$2, children 12 and under and Scouts in uniform free with adult; 30-plus dealers, minerals, gemstones, fossils, meteorites, jewelry, 6 free rocks for kids, exhibits, fluorescent booth, lapidary demonstrations, wholesaler; contact Carolyn Reynard, (845) 471-1224; Web site: www.mhvgms.org

18-19—SCARBOROUGH, TORONTO, CANADA: 42nd annual show, "Wonders of the Earth"; Gem & Mineral Club of Scarborough; Don Montgomery Community Centre, 2467 Eglinton Ave. E.; Sat. 10-6, Sun. 11-5; adults \$5, children \$1; dealers, jewelry, minerals, fossils, displays, lapidary demonstrations, live auction, silent auction, kids' auction, door prizes, kids' quarry; contact GMCS, (416) 282-5319; Web site: www.scarbgemclub.ca

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

24-26—JOPLIN, MISSOURI: 12th annual show, "Rock-a-thon"; TriState Gem & Mineral Society; Joplin Museum Complex, 504 Schifferdecker Ave.; Fri. 9-6, Sat. 9-6, Sun. 9-6; free admission; demonstrations, door prizes, dealers; contact Chris Wiseman, P.O. Box 555, Joplin, MO 64802; e-mail: jmc-cwiseman@sbcglobal.net

24-26—OAKS, PENNSYLVANIA: Show; MalicJewels Jewelry & Gift Show; Greater Philadelphia Expo Center, 100 Station Ave.; Fri. 12-6, Sat. 11-6, Sun. 11-5; free admission; loose diamonds, colored gemstones, contemporary, antique, estate, costume, custom designed, gold, silver, titanium and beaded jewelry, beading supplies, mineral specimens, gift items; contact Debbie Williams, 270 E. Hunt Hwy., Suite 16, #323, San Tan Valley, AZ 85143, (480) 458-7600; e-mail: debbie@malicjewels.com; Web site: www.malicjewels.com

24-26—SALT LAKE CITY, UTAH: Show, "Gem Faire"; Gem Faire Inc.; South Towne Exposition Center/Exhibit Hall 3, 9575 S. State St.; Fri. 12-7, Sat. 10-6, Sun. 10-5; weekend pass \$5; contact Yooy Nelson, (503) 252-8300; e-mail: info@gemfaire.com; Web site: www.gemfaire.com

24-26—SAN BERNARDINO, CALIFORNIA: Show, "OBMS Tail Gate Gem & Mineral Show"; Orange Belt Mineralogical Society; Western Regional Little League Ball Park, 6707 Little League Dr.; Fri. 9-dusk, Sat. 9-dusk, Sun. 9-dusk; free admission; rocks, jewelry, tools, lapidary display, education, kids' event, kids' club, silent auction, raffle, workshop; contact Shane Ripley, 205 W. Benedict #8, San Bernardino, CA 92408, (909) 557-3605; e-mail: OBMS_PR@yahoo.com; Web site: <http://obmsrocks.yolasite.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—FRANKLIN, NEW JERSEY: 54th annual show; Franklin Mineral Museum; Franklin School, Washington Ave.; contact Lee Lowell, (973) 827-6671

continued on page 50

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Show Dates from page 48

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—MONTEREY, CALIFORNIA: 51st show; Carmel Valley Gem & Mineral Club; Monterey Fairgrounds, 2004 Fairgrounds Rd.; Sat. 10-6, Sun. 10-5; adults \$3.50, senior \$2.50, children free with adult; exhibits, kids' stuff, grab bags, door prizes, wheel of fortune, demonstrations (fossil impressions, sphere making, silver jewelry making, grinding and polishing gemstones); contact Janis Rovetti, 1047 Roosevelt St., Monterey, CA 93940, (831) 657-1933; e-mail: janis12@sbcglobal.net; Web site: www.cvgms.org

25-26—OSHKOSH, WISCONSIN: 39th annual show; Oshkosh Earth Science Club; Sunnyview Expo Center, 500 E. County Rd. Y; Winnebago County Fair Grounds; Sat. 9-5, Sun. 10-4; adults \$2, students with ID \$1, children under 12 free; rocks, minerals, fossils, lapidary arts, jewelry, more than 80 vendors, private collections, Weis Earth Science Museum exhibits, kids' rock polishing and painting, take-home specimen kits, grab bags; contact Bob Fox, (920) 235-4669; e-mail: oesc-webmaster@hotmail.com; Web site: www.oesclub.com

25-26—SHARONVILLE, 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

25-26—SOUTH SIOUX CITY, NEBRASKA: 45th annual show; Siouxland Gem & Mineral Society; South Sioux City Senior Center, 1501 W. 29th St.; Sat. 9-6, Sun. 10-4; adults \$1.50, students (12 and older) 50 cents, children under 12 free; exhibits, four dealers, agates, rough and polished specimens, gems, beads, geodes, minerals, superb faceted jewelry, fossils, door prizes, spin the wheel, silent auction, displays, Siouxland dinosaur hunters' exhibits; contact Bob Powell, (712) 378-2775

25-26—TRAVERSE CITY, MICHIGAN: Annual show; Grand Traverse Area Rock & Mineral Club; Grand Traverse Heritage Center, 322 Sixth St.; Sat. 10-5, Sun. 11-4; adults \$2, children free with adult; dealers, rocks, gems, minerals, jewelry, demonstrations, jewelry making, rock cutting and polishing, kids' area; contact Cynthia Vaughn, (231) 276-6150; e-mail: Maple2b@aol.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

SEPTEMBER-OCTOBER 2010

28-3—IDABEL, OKLAHOMA: Show and sale; McCurtain Gem & Mineral Club; Museum of the Red River, 812 SE Lincoln Rd., Hwy. 70 S. bypass; Tue. 9-5, Wed. 9-5, Thu. 9-

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5, Fri. 9-5, Sat. 9-5, Sun. 11-4; free admission; contact Doris Perkins, 405 SE Ave. G, Idabel, OK 74745, (580) 286-3133; e-mail: rperkins9236@sbcglobal.net

OCTOBER 2010

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

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

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

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

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

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

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

2-3—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.centralarkrockhound.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

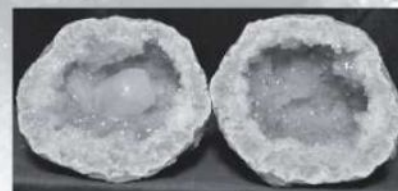
2-3—LEXINGTON, KENTUCKY: 20th annual show and sale; Rockhounds of Central Kentucky; Kentucky National Guard Armory, 4301 Airport Rd.; Sat. 10-6, Sun. 12-5; adults \$1, children 6-12 50 cents, or \$3 per family, Scouts in uniform free; dealers, minerals, jewelry, equipment, club sales and exhibits, Kentucky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

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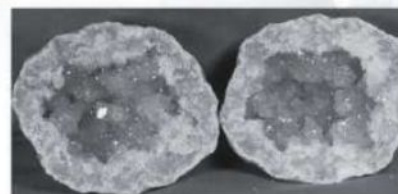
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Story by Jim Landon

Collecting on Private Land in the Platte River Valley

When I was growing up among the cornfields of southeast Nebraska, my family was interested in fishing. This avocation led to frequent excursions to places that occasionally yielded fossils. One such place was a sand pit in the Platte River Valley near the town of Central City, Nebraska. For millions of years, the Platte River has transported sediment from the east slopes of the Rocky Mountains in Wyoming and Colorado eastward, across Nebraska and into the Missouri River drainage. Because of this, the Platte River Valley has long been a source of aggregate for the concrete and construction industries. Its sand pits are operated in a manner similar, in some ways, to a giant suction gold dredge and are known for producing great fossils on occasion.

The water table in the Platte River Valley is generally close to the surface. To start a pit, a company first leases land from one of the local farmers. Next, it brings in heavy equipment to remove the topsoil and dig a trench to a depth at which it encounters the water table. Next, it assembles a pump platform using empty 55-gallon oil drums as floats and mounts the pump and a large diesel



The lower jaw of *Gompothere* contained two flat, forward-projecting teeth, plus the paired tusks in the skull; thus they are commonly called "four tuskers".

engine on the finished platform. An extendable dredge pipe is then connected to the pump assembly and a delivery pipe connects this to a headframe assembly, which is constructed on dry land. This headframe assembly has at least two screens installed. When material is dredged from the trench bottom, the first screen sorts out all the rocks and mud balls that are larger than gravel size. The second allows sand and silt to pass through and return to a previously mined section of the pit. All the rocks, clay balls, and fossils drop off the first screen into a waste pile. When my family visited these pits to go fishing, I would quickly head to these waste piles to look for goodies.

In years past, these waste piles were just pushed aside and eventually used to backfill sections of the pits. Operators never paid much attention to what was dropping off the screen, so it wasn't difficult to find fossil bones of many types of prehistoric mammals on every fishing trip we made. An average haul would consist of vertebrae and teeth from extinct bison, camels and horses, and occasionally, a mammoth tooth fragment would show up. The size and quality of bones recov-



I found this nearly intact mammoth mandible in a gully in Seward County, Nebraska, after a heavy spring rain.



This *Gompotherium* skull, found on Long Pine Creek, was the best preserved member of this species recovered in the past 50 years. Note the socket for a missing tusk.

ered was proportional to the size of the dredge intake pipe; most were in the 10- to 12-inch range. Any bones on the bottom of the dredge pond that were larger than the intake pipe generally stayed on the bottom or were recovered in pieces.

After my parental grandfather died in 1957, my grandmother eventually remarried. As luck would have it, her new husband, Art Oberg, operated a gravel pit outside Hordville, Nebraska. With my interest in fossils, I thought it was a marriage made in heaven. Art had been dredging gravel for nearly 40 years and, unlike most pit operators, had a keen interest for anything falling out on the waste piles of his operation. His pride and joy was his collection of mammoth teeth, and when I first set eyes on it I nearly had a heart attack. Over the years, he had amassed a group of more than 40 specimens, some complete and perfect, others damaged by the dredging process.

Art was full of stories about how where each one was found. He had recovered many of the intact teeth from the dredge intake, where they had become lodged. Most operators were not keen on this happening, as the operation would be shut down until the plug could be cleared. Art was an exception. With Art's eventual passing, I inherited his collection, which I proudly display at my club's annual rock show in Yakima, Washington.

The Platte River Valley is still dotted with numerous sand and gravel operations and respectable fossils can still be found. Along with the fossils, one can also find occasional agates and petrified wood that have traveled from distant sources in Wyoming and Colorado.

If you are interested in trying your luck at hunting gravel pits, bear these things in mind:

- Always obtain permission from either the landowner (if the pit has been abandoned) or the operator (if the pit is still active).

- Many operations that were previously open to the public for fishing and recreation are now strictly off limits due to vandalism and fear of liability.

- Active sand pit operations are potentially very dangerous and you need to stay clear of the working face of the pits, as frequent cave-ins make the banks unstable. The same is true of the sand spoil piles at the pit edges. They can collapse at any moment and suck you into the pit. Art used to stabilize these piles by setting off dynamite charges to shock the sand into collapsing into the pit. With the world being what it is today, the casual use of explosives is no longer possible. I always thought watching this procedure was better than the fourth of July.

- You can find potential contacts for active gravel operations at www.nebrconccagg.com.

Fossils of Pleistocene Era mammals are fairly numerous in parts of eastern Nebraska if you know where to look. During the Pleistocene, continental glaciers originating in Canada made their way south and west, diverting the Missouri River and other streams and forcing them to flow south instead of east. The environment at the margins of these large ice sheets was favorable to large, grazing herbivores like mammoths, mastodons, bison and camels. Outwash from these diverted rivers carried enormous volumes of sand, gravel and silt, which are now buried under sheets of wind-deposited silt called loess. When modern streams cut through these loess beds, they expose the glacial outwash sands and gravels, which can potentially yield mammal fossils. In southeast Nebraska, the West Blue River and Beaver Creek drainage areas have yielded mammoth and other Ice Age herbivore fossils in the past.

Beaver Creek, which is a tributary of the Platte River, has been one of my favorite fishing streams in this state for years. The lower reaches of the creek cut through an exposure of Cretaceous Age Pierre Shale and has piled chunks of this soft marine sediment into numerous bars, which are great places to look for shark teeth and fossil fish remains. In the past, after every spring flood season, I would make the trek to the part of the creek near the town of Genoa, Nebraska, to see if anything new had turned up. Over the years, I have found numerous remains from extinct bison and horses, along with lots of marine fossils. The bars also yielded a mammoth femur, ribs, vertebrae, and isolated teeth.

One fall, while on one of my outings, I walked the creek in hip boots, checking out the gravel bars for anything collectible. I rounded a familiar bend where the creek had been eroding away the side of a large hill. At the base of this cut, the Pierre Shale was exposed about 3 feet below the waterline. Perched on this shale layer was a 6-foot-thick exposure of Pleistocene sand and gravel. I had suspected for some time that exposures like this one were the source of the mammal fossils I had been finding.

As I looked across the creek at the cut, I spotted two knob-shaped objects breaking the surface of the water. At first I thought they might be parts of some piece of long abandoned farm equipment, but upon closer inspection I realized that they were bone and the upper condyles of a really big jaw. I waded across the creek, trying not to take a header in the cold water in my haste, and began to appraise what I had discovered.

Most of the streams in Nebraska like Beaver Creek have a clarity somewhere between that of mud and tea, so I had no clue what lay beneath the surface. I ran my

hands down the sides of the jaw and swished away the enclosing sand and mud. Soon I could feel the rough, parallel grooves that are characteristic of mammoth teeth and realized I had found an intact jaw. At this point I was beyond excited. After removing the rest of the clinging sediment, I was able to step between the condyles and pick up the whole jaw in one piece.

By doing this, I was breaking every cardinal rule of any reputable paleontologist. Ideally, the specimen would first be encased in a plaster field jacket to protect it. As most of the jaw was under water, however, that pretty much ruled out that option. I staggered back across the creek with the hefty fossil in tow and loaded it into the back of my truck for the trip home. The next day, I hauled it into Lincoln, Nebraska, and turned it over to the staff of the state museum. After restoration and stabilization, it is now on permanent display in the museum's Elephant Hall.

Another place I enjoyed visiting on a yearly basis was one of the few trout streams in Nebraska, Long Pine Creek. As a kid, I looked forward every year to my father getting vacation time so we could head to the Sand Hills in north central Nebraska to spend a week at the Hidden Paradise resort, which is near Long Pine, Nebraska. The headwaters of the creek are spring fed, so the water is clear and cold and a perfect haven for rainbow and brown trout.

The lower reaches of Long Pine Creek cut through the Miocene Age Crookston Bridge member of the Niobrara Formation. This formation is well known to paleontologists for its diverse vertebrate assemblages, as well as beautifully preserved petrified wood. A state fish hatchery in Valentine, Nebraska, has several large, complete agatized logs of several different tree species on display that came from this formation.

One summer, while returning from a trip to the agate beds north of Crawford, Nebraska, I made a stop at one of my collecting areas on Long Pine Creek. It had been a few years since I had last visited and found several fragments of agatized bone and tortoise shell. In several places along this stretch, the creek is eroding away the Miocene sediments in exposures as high



JIM LANDON PHOTO

These Columbian mammoth teeth are two of the best from Art Oberg's collection. The parallel enamel ridges are one of the characteristics that distinguish them from mastodon teeth.

as 100 feet. The canyon that once held an open burr oak, elm and cottonwood forest is now heavily overgrown with Eastern red cedar. This invasive species now makes passage very difficult, if not impossible, in many areas. I headed downstream to check out my previously productive spots and found the creek had been doing a good job of eroding the banks. I found a few bone fragments and a rather respectable fossil horse tooth, but was for the most part rather disappointed with my haul.

After about a mile I came to the least accessible, but largest, cut. This exposure is on a 60-degree slope, which makes traversing it rather dicey. A misstep would put you in the creek or, even worse, the poison ivy that grows in a continuous band on the lower part of the slope. Neither option was appealing. The sediment layers in this cut consist of yellow to buff semicemented sands and silts with occasional thin lenses of fine gravel. The uppermost part of the cut is pure unconsolidated sand from the sand hills that blanket hundreds of square miles in this area.

As I began to work my way across the slope, I had to cut steps in the bank with my trench shovel to keep my footing. About a third of the way across, I started finding bone fragments. All of them had an interior texture like Swiss cheese, so I knew they were coming from a skull of some kind. I followed the bone scatter upslope to find the source, and at the point at which it converged, I started to carefully dig away the sediment with a trowel. I immediately ran into solid bone, and by the time I stopped, I had exposed about a square foot of something really big. Instead of continuing, I reburied the exposed bone and bagged the fragments for the trip home.

A couple weeks later, I made a trip into Lincoln to visit my buddies who work in the vertebrate paleontology research de-

partment of the state museum and took my finds with me. One of them, George Corner, is one of the most amazing field researchers I have ever encountered. Give him almost any scrap of fossil bone, and he can tell not only what it is, but what species it came from. I told them of my discovery, opened my bag of scraps, and laid them out on

a table. I have found that, at times like this, all work stops and everyone in the lab gathers around to check out the new stuff.

George immediately identified the fragments as having come from a skull, and when I told him where they had come from, he identified it as being from a *Comptotheres*, which is an extinct four-tusked mastodon. I told them there was more of the skull still embedded in the cliff, so we started to develop a recovery plan. One of my former high school students, Ken Imig, had obtained a degree in geology from the University of Nebraska and was also working as a preparatory for the vertebrate paleontology department. It was decided that Ken would represent the museum on this field dig.

At the time of this discovery, I was teaching biology and advanced biology in Seward, Nebraska. Getting my students out of the classroom and into nature was a high priority. I organized a crew of students and invited one of my teaching buddies, Ed Brogie, who taught science in Laurel, Nebraska, to bring a crew from his school. We left town after school in early October and drove to the Long Pine Wayside area near the town of Long Pine, Nebraska, where we were to meet up with Ed and his students. After making camp and eating, we all turned in for a restless sleep, anticipating what might be hiding in that cliff.

The next day, we rose at 6:30 a.m., caught a quick breakfast, and headed off to the creek in our vans. We toted all our excavation tools and supplies to the cliff. Just below the cliff, several trees had fallen across the creek, so we decided to access the site by crossing on the logs. Bad idea! One of Ed's students lost his footing and took a header into the creek while carrying Ed's camera—not a good start to the day. We made our way across the bluff face to where I had reburied the skull and, under Ken's guidance, started our excavation.



GREG BROWN PHOTO

This close-up view of the Beaver Creek mammoth mandible shows the wear on the teeth, indicating that this animal was quite old when it died.

The kids took turns digging in the pit, and over time, the skull started to emerge. It was much larger than I expected and seemed to have no end. The part I had exposed turned out to be the back of the skull. As we continued to expose the rest, we found out that it had been buried upside down. After two days of digging, we encountered the teeth, which were all still in place. We also found that the skull was intact, except for the tusks, and not at all distorted. This, I was told later, was rare for fossil elephants, as their skulls are rather fragile and tend to break up before burial.

When we finished the excavation, we had exposed a skull that was nearly 4 feet long and about 2½ feet thick. What a find! After encasing it in a plaster and burlap field jacket, we next had to figure out how to lift it out of the pit and get it back across the creek to our rigs. We decided to make a cradle out of cedar poles, strap the skull to it, and make use of substantial teenage enthusiasm and strength to make the move. As we crossed the creek and struggled up the far bank with the heavy, awkward load, we nearly dropped it when one of the students lost his footing in a slimy, green cow pie.

Once the specimen was loaded, we packed up the rest of our gear and headed home with the prize, which I delivered to the museum the following week. After several months of preparation, it was put out on temporary display in Elephant Hall as part of special exhibit on elephant evolution in Nebraska. I was told that this speci-

men was the most complete for this species that had been found in nearly 50 years. We were all very proud of our accomplishment and it created memories that will remain with our students for a lifetime.

Much of the land along Long Pine Creek is under private ownership. There are recreational access points on the lower reaches of the creek, which are managed by the Nebraska Game and Parks Commission (www.outdoornebraska.ne.gov). One of these is near Long Pine Creek's confluence with the Niobrara River. At this point, the creek is cutting into the Pierre Shale and, like the exposures on Beaver Creek, produces scattered marine fossils. A number of people have found petrified wood on the gravel and rock bars in the creek, and the water is usually clear enough for you to see what you are looking for. For information on and directions to the Long Pine Creek recreation areas, contact the NGPC's main offices at 2200 N. 33rd St. Lincoln, NE 68503-0370 or call (402) 471-0641.

The best time of year to visit the Long Pine area is spring or fall. Summers in Nebraska are generally hot and humid. If you are there in the spring, be prepared for ticks; the whole area is alive with them. Fortunately, they are not the species known to transmit Lyme disease or Rocky Mountain spotted fever. These guys just want to remove every drop of blood from your body. A good bug repellent, especially on your socks and pant legs, usually keeps them at bay. If you want to obtain access to the private land that makes up most of the Long Pine Creek drainage, make sure you get permission from the landowners in advance.

The relationship that the professional paleontologists from the Nebraska museum have with the people of the state is very special and mutually beneficial. Many of the fossil discoveries in the state have been made by amateurs. Instead of keeping the finds to themselves, they contact the museum and have the professionals come out to assess what they have discovered. Family and local volunteers are readily invited to participate in excavations, and significant quarry sites are usually named after the family on whose land the finds were made. This mutual respect and trust has taken many years to develop and, in my opinion, is a true example of educational outreach at its best. 🍷

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OFF THE DOP

by Jim Perkins

New Splash Guard for Facetrans

Throughout the many years I've been a faceter, I've seen a lot of different people's inventions to solve what they perceive to be issues with their faceting machines. One of the most common kinds of inventions I've observed deal with splash guards for the Facetron™ faceting machines by Jarvi Tool Co.

Owner Jeff Jarvi feels everyone has a different idea of what works best for them and therefore provides the machine with a standard splash bowl, which allows the owner to decide whether they want to modify the splash bowl in order to cut and polish the girdle or just hold it down out of the way while doing so. I've always cut a window approximately 2½ inches wide and 1½ inches deep into the splash bowl so that I could set the dop arm at 90 degrees and let the dop and stone reach the laps without having to squash the splash bowl down and hold it.

Over the years, I've used sponges, and all sorts of homemade plastic dams to block the water spray while working on the pavilion and crown. One of my students came up with a novel idea: He cut a section out of an appropriately sized GladWare® reusable bowl purchased at the grocery store. The lip on the rim of the bowl section fit securely over the top edge of the Facetron splash bowl and made a secure dam, preventing water from splashing out through the opening I had cut.

I used that method for several years until I heard of the latest invention, from Terry Gump of West Virginia. Dan Dutton, one of my students from Wisconsin, told me he had purchased one and said how much he liked it and recommended I try them. I wrote to Terry and asked him to send me two on Dan's recommendation. When I received them, I was very pleased with their appearance, fit and finish. In order to install them you must cut a window into the splash bowl. Since I had already done this, it wasn't a problem. Since the standard length of the splash guard is 5 inches, it works perfectly with the size of my windows.

I made sure my splash bowls were clean and found it easier to install Terry's splash guards by removing the bowls from the machines. Then I fed the bowl into the plastic splash guard a little at a time. You want to be careful, as it is possible to break them if you force them. I slipped them on



without a problem. They are made so that they slide open and closed very smoothly. They work like a sliding glass door, opening to allow access to the laps when you are grinding and polishing the girdle of your stones and closing when you're working on the pavilion and crown to prevent water from splashing out onto your clothes. It's such a simple idea that it's amazing to me that nobody thought of it until now.

In my opinion, these are a must-have addition to any Facetron machine, as they not only work well, but are in keeping with the excellent fit and finish of the Facetron and the cost is not excessive. My order was delivered promptly and was well packed to prevent damage in transit. I'm not sure whether Terry is a tool and die maker or a plastic injection molder, but I do know that he takes pride in his workmanship. He's a faceter, too, so I'm sure that he owns a Facetron, saw a need, and decided to do something about it. Now he is willing to share his innovation with the rest of us.

You can write to Terry at 814 Capital St., Spencer, WV 25276, or e-mail him at terry.fgump@gmail.com. The splash guard costs \$24.95, and shipping inside the continental United States is \$4.95. Custom lengths can be made for an additional cost and custom imprinting is available.

Products like this often go overlooked because they are specialty items with a limited market potential and are usually only produced on a low-volume basis.♥

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



2010

Lapidary Article of the YEAR CONTEST

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WHO IS ELIGIBLE

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

HOW TO ENTER

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

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

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

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

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

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

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

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

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

JUDGING

Articles will be judged by a combination of reader response and editorial merit. Readers should send a brief explanation of why a project deserves the big prize to 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*.

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EVOLUTION of a Museum

The Weinman Mineral Museum Becomes Tellus Science Museum

Story and Photos by Lori Carter

The Weinman Mineral Museum in Cartersville, Georgia, officially closed its doors on July 31, 2007. Far from being a sad day, it was a very exciting stage in the museum's evolution from a small, local mineral museum into a state-of-the-art regional science museum. The bittersweet farewell to the Weinman Mineral Museum was just a step toward welcoming the Tellus Science Museum, which opened its doors on Jan. 12, 2009.

The museum was originally named for William J. Weinman. Born in 1872 in Lynchburg, Virginia, Weinman was raised in an atmosphere of mining and chemical production. He started his own mining company in his early 20s and he became a successful industrial entrepreneur and a generous philanthropist. Through local mining and charitable contributions, he brought great economic prosperity and compassion to Bartow County and to the city of Cartersville in northwest Georgia. Among his business

ventures in the region were several barite mines, which helped provide barium during World War I.

Just a few years after his death in 1966, Weinman's family contributed the majority of the funds used to establish the Weinman Mineral Museum. It was founded in 1983 as a museum that would focus on the local mineralogy and mining history of Georgia.

When the facility opened, much of its collection came from a museum that was housed in the lobby of the Fulton Federal Sav-



Colorful mineral spheres are a popular exhibit in the Tellus' new Weinman Mineral Gallery.



A stampede of dinosaurs indigenous to Georgia is featured in the expanded Fossil Gallery.



An innovative periodic table with a window for each element spans a whole wall in the new Weinman Mineral Gallery.



Many of the specimens on display were collected from well-known locations in Georgia, like this amethyst cluster from Jackson's Crossroads.



A new fluorescent display allows visitors to view specimens under regular and ultraviolet light.

ings and Loan in Atlanta. The Fulton Federal collection, later renamed the John Dent Collection to honor one of Cartersville's former mayors, had been assembled by Gil Withers, one of the south's pioneer rockhounds.

In 1986, Frank Mayo, an Atlanta chemist, businessman, and avid mineral collector, along with his daughters, donated funds for expansion of the museum as a tribute to his wife and her love of mineralogy. In 1987, the Frank and Winifred Mayo Wing was dedicated and became the home of the museum's national and international collections. Also added at that time were the Frank Mayo Mineral Library and storage and office space.

The largest exhibit hall in the museum contained gems, minerals and fossils mined or collected in Georgia. In 2002, this exhibit hall was named The McNitt Family Room in memory of

the Neil McNitt family, who perished in the tragic 1996 crash of ValuJet flight 592 in the Florida Everglades. Neil McNitt was a geologist and operated a successful business buying and selling used mining equipment throughout Georgia.

From its history to its contents, the Weinman Mineral Museum was an integral part of the community. The museum has always been supported by local mineral clubs and was filled with specimens on loan or donated from people like you and me.

Tellus incorporates and expands upon everything the Weinman Mineral Museum was, plus it has some exciting new features, including the only fully digital planetarium in North Georgia that is regularly open to the public. In addition to mineral, fossil, and mining exhibits, Tellus includes earth science, astronomy, transportation, and physical science exhibits. Specialized classrooms that spill outside are used for enhanced educational programs and provide facilities for hands-on experiences and experiments.

From the old museum's 9,000 square feet, Tellus has grown to encompass 120,000 square feet and includes science trails that are integrated throughout the 48-acre site. Mining equipment on display outside the museum includes a "dinky", a small train engine that was used to pull mining cars; a Euclid truck that was used to mine ochre; and a 100-ton Komatsu dump truck.

The first thing that greets you as you step through the museum's doors is an enticing view of a full-scale cast of an Apatosaurus skeleton that inhabits the Great Hall. The Apatosaurus is 82 feet long, 18 feet high at its shoulders, and 23 feet high at its head. Beyond our new dino friend are four large galleries: the Weinman Mineral Gallery, the Fossil Gallery, the Science in Motion (Transportation) Gallery, and My Big Back Yard, the museum's hands-on science gallery.

You cannot miss the entrance to the Weinman Mineral Gallery because it is marked by a gargantuan amethyst geode from Rio Grande do Sol, Brazil, that is an astounding 7 feet tall, 5 feet wide, and 2 feet deep! As you turn into the gallery, you will encounter a 7-foot-tall, 5-foot-wide, 5,000-pound copper boulder from Michigan's Upper Peninsula.



In the new Weinman Mineral Gallery, each element in the periodic table is represented by a window containing various items related to and listing interesting facts about the element.

When combined, the museum's old mineral galleries totaled about 3,200 square feet. The new Weinman Mineral Gallery occupies nearly 10,000 square feet, more than three times the old space. The museum's permanent collection, which includes specimens from Georgia and all over the world, has been expanded so that pieces previously stored away, as well as new acquisitions, are displayed, along with some exciting new features.

An earth science exhibit lets visitors see our planet from the outside all the way to its core and learn more about geology. Earthquakes and volcanoes are explained in an entertaining and educational format. One of the most unusual displays in the earth science exhibit is an animated sphere that shows 600 million years of plate tectonic movement from Pangaea to earth's present-day arrangement.

The McNitt Family Mining Exhibition in the Weinman Mineral Gallery focuses on local and Georgia mining history and explains how minerals are used in places you would never suspect. Some of the mining equipment on display outside of the original museum is now featured inside the new gallery. A "jaw crusher", designed to crush ore samples for testing, was donated by the McNitt Mining Equipment Co. in memory of Neil, Judy, Laura, Lindsey and Clark McNitt, for whom the exhibition was named.

The two tiny fluorescent cases from the old museum have been enhanced and transformed into a narrated walk-through display with choreographed lighting so visitors can see fluorescent minerals in their natural state and under shortwave and longwave ultraviolet light.

An expanded meteorite exhibit that includes a lunar meteorite and a Martian meteorite, a spectacular gold collection, and a walk-through cave exhibit evoke memories of the old museum. But some new exhibits are sure to delight visitors, including a gem exhibit that showcases the lapidary arts of faceting and cabbing. A colorful exhibit of mineral spheres never fails to draw oohs and aahs from visitors.

Several mineral exhibits highlight specimens based on their origins including specimens from Georgia, all over the United States, and all over the world. Other exhibits group specimens based on their chemical class.

The Fossil Gallery was expanded from 800 square feet to 7,500 square feet—almost 10 times its original size! Fossils and casts of fossils from around the world are on display, with emphasis on animals indigenous to Georgia and the Southeast United States. A skeleton cast of Glyptodon, a relative of the armadillo, and a 40-foot replica *Tyrannosaurus rex* quietly observe visitors as they examine a mastodon and a saber-tooth cat from Georgia's Ice



The expanded Fossil Gallery displays fossils that have been arranged to demonstrate movement, as well as show the animal's structure.



A Glyptodon, an animal related to modern armadillos, is placed where visitors can see the intricate details of the bony plates of its armor.

Age. A Mesozoic "confrontation on land" display features a Hadrosaur and an Appalachiosaurus, while a "confrontation at sea" display features a Plesiosaur and a Mosasaur. All four of these animals were indigenous to Georgia.

Children and adults are given an opportunity to pan for gemstones and dig for fossils, a fun, interactive way to learn about rocks, minerals and fossils, while introducing people to the joys of rockhounding! These activities are provided in a comfortable indoor environment and are included with admission to the museum.

Several new galleries, facilities, activities, and educational programs have been added to increase the educational potential of the museum and to enhance the overall museum experience. One of the new facilities is a 200-seat theater used for films, lectures, presentations, special events, and community functions.

Jose Santamaria, the executive director of the museum, expressed how exciting it is to have the opportunity to expand the visibility of mineralogy in Georgia and the Southeast. With the transition to Tellus, the museum is not only bigger, but better. I asked him what prompted the expansion. Jose explained that it was not a recent decision, but has been many years in the making. From the interest generated by temporary exhibits and programs about space, as well as other areas of science, it was obvious that there was a need that the museum could help fulfill. With the support

of individuals, small companies, and large corporations, like Vulcan Materials and Anheuser-Busch, the unreachable dreams of Tellus became attainable reality.

Julian Gray, the curator of the museum, is particularly excited about the acquisition of mineral specimens from the Philadelphia Academy of Natural Sciences collection. He explained that the academy was founded in 1812 and is often considered the birthplace of American mineralogy. For many years, the academy's historic collection languished in storage, until a few years ago, when a group of mineral dealers purchased part of the collection. Tellus acquired 803 southeastern minerals from the collection, and in doing so is helping preserve a portion of mineralogical history. Recently, the Georgia Capital Museum collection was donated to Tellus as a part of Georgia's mineralogical record. Julian is passionate about the museum's role in the collection and preservation of the mineralogical heritage of the region.

Cantey Smith, the director of education, explained that there are programs that complement the new galleries. In addition to a guided tour of the gallery and a fossil dig where participants get to keep a small sample, several programs have been designed to enhance the Fossil Gallery. For example, the Fossiliferous program teaches students the definition of a fossil, an overview of the different types of fossils, and how fossils are formed. The Geologic Time Scale program explains the stages the earth

has been through, the amount of time each stage represents, and the relatively short time life has been present. In the Fossil Dichotomous Key program, upper-grade students learn what a dichotomous key is and how to use one, and they manipulate actual fossils through a series of steps to identify the fossilized organism.

Cantey points out that the education department doesn't stop with public school systems and teacher professional development. They reach beyond into enrichment activities for Scouts, home-schooled children, adult learners, summer programs, school break programs, and the general public.

Beyond the ability to offer more options for earth science education, Tellus continues developing the Weinman's popular lecture series, offering earth science topics, as well as geology field trips. More speakers from all over the country and the world are being invited to Tellus so visitors can have an unprecedented opportunity to hear and meet the people who are shaping the future of geology, mineralogy, paleontology, astronomy, and other sciences.

The old museum space is now being used for offices and to expand the Mayo Library. The library was already an impressive assortment of books and periodicals, but a significant donation of books has made the library truly outstanding. Though not a part of the museum's exhibits, the library is accessible to the public for research and study.

In addition to the library, some of the minerals and fossils from the museum's

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Mining equipment on display outside the museum includes this "dinky", a small train engine that was used to pull mining cars.

permanent collection are available for research, study, and authentication purposes. Plus, Julian is making the museum's specimen preparation lab accessible to mineral and fossil enthusiasts.

Jose, Julian and Cantey all stressed the importance of making everything Tellus represents accessible to all who visit there. The exhibits and educational programs have been designed so that adults will learn and enjoy as much as children will. Jose and all the people involved in the transition from the Weinman to Tellus have worked diligently to make Tellus a place where, as Jose enthusiastically says, "visitors will be able to enjoy a full day of engaging exhibits and leave with newly attained knowledge and an eagerness for learning more".

The mission of the Weinman Mineral Museum continues with its transformation into Tellus. As more people have the opportunity to experience Tellus, Julian envisions it becoming a serious center for mineralogy in the Southeast. He believes that, in the near future, when people think of mineralogy in the Southeast, they will think of Tellus.

Where does the name "Tellus" come from? Well, Tellus was the Roman goddess of the earth. So even though the new museum has expanded its focus to include more than just earth science, its name still reflects its humble roots as a mineral museum.

Tellus Science Museum is located at 100 Tellus Museum Dr., Cartersville, Georgia, and is easily accessible from Interstate 75 Exit 293 (U.S. Highway 411). To learn more, visit www.tellusmuseum.org, call (770) 386-0576, or e-mail info@tellusmuseum.org.

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MANY FACETS

by David Groncki

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.

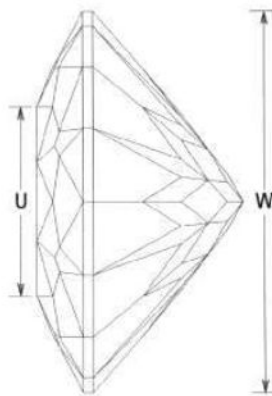
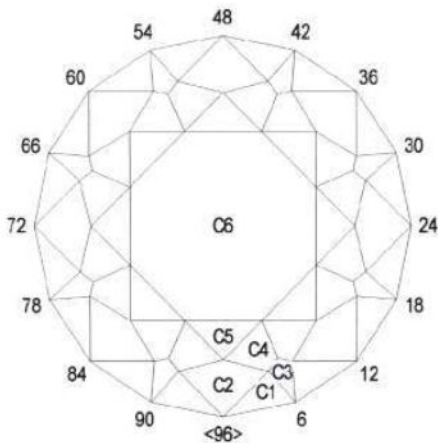
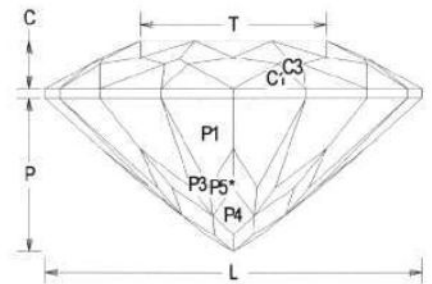
Find frosted designs a nice change of pace, and folks who view my box of cut stones seem to pick them out right away. I especially like to frost topaz, be it silver or one of the shades of blue. This design has a high number of facets, but a relatively low number of tiers, so it cuts pretty quickly. The frosting is done to two pavilion tiers, which produces a very interesting pattern.

When cutting the pavilion, first cut and polish all of the non-frosted tiers (P1-P4). Be aware that when you cut tier P4, the point of the facet will point toward the girdle (but come far short of reaching it!) and you will cut so the top of the facet cuts just slightly past center point.

For cutting the frosted facets, I use a well-worn 260 grit bonded lap, but do *not* turn on the motor. I keep it stationary and scratch the stone back and forth across the surface of the lap using light, quick strokes. These can cut quickly! So I only do a couple swipes before checking to see how it is cutting. I find a meter pretty useless, except perhaps to get the starting mast height in the ballpark. Just take it slowly and you should be fine.

The crown is pretty standard meet point and I designed it to complement the pattern in the pavilion. I hope you enjoy this design and I would love to hear from you if you try it. Happy faceting!

-David Groncki
digroncki@comcast.net



DJG Frosted Round

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Angles for R.I. = 1.610
113 + 16 girdles = 129 facets
8-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.497 U/W = 0.497
P/W = 0.403 C/W = 0.124 Vol./W³ = 0.191

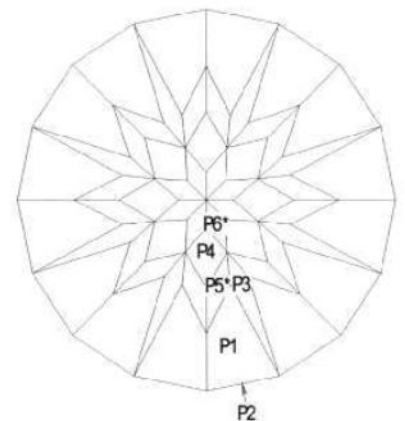
PAVILION

P1	42.40°	03-09-15-21-27-33-39-45-51-57-63-69-75-81-87-93	TCP
P2	90.00°	03-09-15-21-27-33-39-45-51-57-63-69-75-81-87-93	Establish width
P3	41.27°	06-18-30-42-54-66-78-90	GMP
P4	38.71°	96-12-24-36-48-60-72-84	Cut just a little bit past CP
P5*	39.88°	01-11-13-23-25-35-37-47-49-59-61-71-73-83-85-95	MP @ P3, P4
P6*	32.36°	06-18-30-42-54-66-78-90	MP @ P3

CROWN

C1	35.20°	03-09-15-21-27-33-39-45-51-57-63-69-75-81-87-93	Establish girdle height
C2	29.00°	96-12-24-36-48-60-72-84	GMP
C3	32.82°	06-18-30-42-54-66-78-90	GMP
C4	23.58°	01-11-13-23-25-35-37-47-49-59-61-71-73-83-85-95	MP @ C1
C5	22.15°	96-12-24-36-48-60-72-84	MP @ C2
C6	0.00°	Table	MP @ C4

*These facets are frosted. Cut them in after the rest of the pavilion has been completely polished.



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Index to Advertisers

Ackley's Rocks.....	55	Lapcraft, Inc.....	31, 59
Amateur Geologist.....	41	Lasco Diamond Products.....	19
Arrowhead Lapidary & Supply.....	30	Lehigh Mineral Auction.....	65
Au-Rus Wax Patterns.....	59	Daniel Lopacki Co.....	51
AZ Timeless Treasures.....	65	Lortone, Inc.....	49
B&J Enterprise/Joyce Emerson.....	59	Majestic Press, Inc.....	24
Barranca Diamond.....	17	MarZee Lapidary Tutorial DVDs.....	58
Beautiful Agates.....	65	McDermitt Rock & Gem Show.....	31
John Betts — Fine Minerals.....	49	Metalliferous.....	37
Bezel Form.....	55	The Mineral Gallery.....	58, 65
Bonanza Opal Mines, Inc.....	65	Mineralab.....	48
Capistrano Mining.....	65	Mineralman.....	65
CarTopCampers.com.....	58	Minerals Unlimited.....	41
Collectorscabz.com.....	24	Miner's Keepers.....	50
J S Copti.....	59	Minertown.....	65
Covington Engineering.....	25	Minnesota Lapidary Supply Corp.....	29
Crystal Cave.....	58	Nature's Outback.....	65
Crystal Grove.....	65	New Era Gems.....	35
Crystal Moon Gallery.....	59	North Coast Faceting.....	59
Deepak Gems.....	65	Northwest Distributors.....	50
Denver Gem & Mineral Show.....	25	Oakrocks.net.....	65
Diamond Pacific Tool Corp.....	C3	On the Rocks Gems, Jewelry & More, Inc.....	59
Dragonsaye Auctions.....	59, 65	Optima Gem.....	35
Earthworks.....	24	Oxy Rocks.....	58
Easy Steps Video.....	55	Pickens Minerals.....	59
Bill Egleston.....	41	Pioneer Gem Corp.....	36
Eloxite Corp.....	67	Polaris Tool & Machine.....	30
Eon's Expositions Denver Coliseum Show.....	17, 49	Polymetric Instruments, Inc.....	59
Facet Shoppe.....	55	Pretty Rock.....	59
Fac-Ette Manufacturing, Inc.....	C4	Raytech Industries.....	40
Faceting Dials.....	36	Blaine Reed.....	58
Fall Creek Rock Shop.....	59	Research Unlimited.....	58
Fine Mineral Show.....	59	Rockaway Opals.....	65
Fire Mountain Gems.....	9, 58	The Rock Peddler.....	58
The Foothills, Inc.....	18	Rocks & Minerals.....	65
John E. Garsow Gems & Minerals.....	41	Ross Metals.....	3, 5
Gem & Lapidary Wholesalers, Inc.....	15	Sapphire Mining.....	65
Gem Center USA Inc.....	25	Search4Gems.....	58
Gem Faire, Inc.....	10	Shipwreck Beads.....	17
Gem-Fare.....	29	South Pacific Wholesale Co.....	64
The Gem Shop.....	65	Joseph P. Stachura Co., Inc.....	24
Gem Miner's Jubilee.....	56, 64	Steve's Rocks & Gifts.....	36
Gemological Institute of America.....	65	Super Agates.....	65
Gems by John, LLC.....	58	Sylmar Displays.....	43
The Geode Gallery.....	51	TFG Collector.....	24
Geological Wonders.....	65	Tagit.....	50
Georgia Rock Shop.....	34	Tru-Square Metal Products.....	40
Gilman's.....	35	U.S. Geological Supply.....	67
Great South Gem & Minerals, Inc.....	67	Ultra Tec.....	C2
William Holland School of Lapidary Arts.....	16	Unique Tool.....	43
Hughes Associates.....	42	The Universe Collection.....	43
Inland Lapidary.....	23, 64	VR Gem Cutters.....	23
Imperial Manufacturing.....	58	The Village Smithy Opals, Inc.....	37, 59
JS Gems Lapidary.....	48, 59	Whittmore Durgin Glass Co.....	59
Jarvi Tool Co.....	48	Wright's Rock Shop.....	37, 65
Jeanne's Rock & Jewelry.....	59	Martin Zinn Expositions, LLC.....	11
Jesco Products, Inc.....	26		
Katy Rock Shop.....	65		
Kingsley North, Inc.....	7, 16, 30		
Kino Rocks & Minerals.....	58		
Knight's.....	58		
Kristalle.....	31, 65		
Lamberton Rake.....	29		

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O N THE ROCKS

Two Amazing Events

Two amazing events have occurred that mineral collectors need to know about. Maybe that's too strong a statement for the second item, but the event that is taking place in China as you read this is certainly amazing. It will raise awareness of collectible minerals and the supply of good specimens in that vast country!

In the February 2010 issue of *Rock & Gem* magazine, I described the important specimen mining activities of The Collector's Edge, of Golden, Colorado. On a visit to Golden in mid-April, I learned of another event initiated by the company that just about knocked me over!

The directors of the Geological Museum of China, that country's official museum, had invited Collector's Edge to work with them to assemble "Mineral Treasures of the World", an ambitious two-month exhibition of superb worldwide minerals to be held in the museum's great hall. After a lot of sometimes difficult negotiations with Chinese officials, "Mineral Treasures" started on May 18 and will run through July 18.

This exciting event has been heavily advertised throughout China and is the first major effort to promote the educational value, investment value, and beauty of fine minerals. This is not a mineral sale, but an exhibition designed to encourage and promote mineral collecting and preservation in China! It is a remarkable effort by an American mineral dealer to actually partner with a foreign government institution to promote the science and hobby of mineral collecting.

You may recall that, several years ago, I was invited to lecture at China's first International Gem, Mineral & Fossil Symposium. Whether that effort has culminated in the current exhibition I do not know, but at that initial symposium, I met a number of Chinese officials who were supportive of the mineral collecting hobby and of efforts to promote it. What really opened my eyes at that time were the possibilities of expanding the hobby of mineral collecting in China. For example, I found out that there are many clubs for stone collectors in China. Their members do not collect crystals, but stones. And not any old stones, but stones that have a pattern, a design, a



Zambian emeralds, mined by The Collector's Edge, are part of the company's display in the Beijing exhibition.

cluster of phenocrysts, and the like. These stones tell a story to the beholder! The collectors see the beauty of these natural patterns and designs in rocks and give them special treatment and understanding.

Membership in these stone-collecting clubs exceeds 4 million! That is one reason the Geological Museum and Collector's Edge are holding this exposition. They want to open the eyes and minds of the Chinese people to the beauty, aesthetics, value, and investment potential of crystallized minerals.

The overall intent of this joint exhibition is to share the knowledge of minerals and mineral collecting in order to foster business, avocation, and academic study of crystallized minerals in hopes this will lead to more active specimen mining and preservation related to the hobby and science of minerals. A thriving hobby market should encourage greater appreciation and preservation of nature's minerals in China. This is particularly important these days, as China has exploded onto the mineral scene with dozens of localities producing specimens by the tens of thousands. When many of these species were found in China, the specimens rivaled the best known for the same species from other countries.

For example, the bournonites of Cornwall, England, have been held in high esteem for two centuries. Now, China has produced bournonites the equal of those from England's ancient mines. Some Chinese calcites rival the best from many older localities, including the revered calcites from the old Cumberland, England, mines. Not only is the 2010 China exhibition promoting the preservation of such minerals in China, it will educate the general public in that vast country about the importance and aesthetic beauty of minerals.

To that end, the Geological Museum of China asked Collector's Edge, which has had a significant presence in China for over a decade, to participate in the exhibition and develop a series of educational and mineral collecting exhibits. The Chinese are extremely artistic and love nature and things from the earth. This exhibition takes advantage of this talent and interest to bring the mineral collecting hobby and science to the Chinese people.

The Collector's Edge has shipped more than 100 of the world's finest specimens—extremely valuable and very showy—to join with a greater number of the museum's specimens for viewing. More importantly, these specimens are arranged in several educational categories, each emphasizing some aspect of the collecting hobby and science. To further their educational goals, Collector's Edge has developed a very informative dual-language book, which will be available to the people who attend the exhibition.

There are five categories of exhibits. One explains how minerals are mined through specimens, pictures, and a video. This helps collectors understand the complexities of finding and preserving nature's "flowers of the mineral kingdom".

A second category demonstrates the laboratory preparation and preservation of mineral specimens. This section is of particular interest to museum staff and collectors who recognize the need for and value of the proper preparation of natural specimens so they can be presented in their best light and form. Such preparation also makes possible the marvelous photographic renditions of minerals we see in textbooks.

A third section highlights the techniques and knowledge collectors need to recognize and identify superb specimens for collection, display and investment. In other words, it is a practical guide to recognizing fine minerals! This kind of information is actually very useful to all of us, no matter how experienced we are in mineral buying. We all think we know what to look for in a specimen. No matter what criteria we use, each of us will collect according to interest and taste. But there are general guidelines that are worth knowing.

Every specimen selected for display should be aesthetically appealing. Maybe that's why so many dark to black minerals get little consideration. External perfection is most important. Is there any damage? Is it visible or negligible? Color and luster are also critical in the selection and display of minerals. Is the specimen a rarity? When cavansite first appeared in Munich some years ago, collectors went nuts over it, as it was a rarity at the time. Hundreds of specimens have now come forth, so prices and enthusiasm have waned a bit since the initial offerings.

How about provenance? This is the history of a particular piece. Was it ever in a museum? Was it ever in an advanced collector's hands? How rare is it compared to where it came from? Is it a type locality piece, one of the first ever found for that particular species? These are the criteria that determine a specimen's provenance.

For example, I have two specimens at home that are from Franklin, New Jersey. One is a superb willemite, the other an equally fine franklinite and rhodonite specimen. The fact that they hail from a mine that closed in 1954 gives them a nice provenance in itself, but what makes them precious to me is that they were once in the collection of Dr. John Sinkankas, my mentor. That is their provenance to me, and heaven and earth won't remove them from my office!

A fourth exhibit category deals with the investment potential in minerals. This is very useful information given today's volatile specimen market. An exhibit featuring worldwide marketing trends is the highlight of this section.

Finally, a section of the exhibition is devoted to helping the novice get started in the hobby. The guidelines given above are certainly helpful, but other factors like pricing, availability, crystal form, and size are important considerations for anyone collecting minerals as a hobby. When I ask someone why they collected a certain specimen, however, I most enjoy hearing



Superb calcites from China are among the most exciting minerals coming from that country today.

the answer, "Darn it! I just like it!" That's the best criterion for collecting!

At the exhibition, specimens are interspersed with charts, graphs and text to provide a comprehensive picture of the hobby and science of minerals and the specimen market today.

Given the tremendous quantity and high quality of the mineral specimens surging from China these days, this exhibition takes a giant leap toward opening the Chinese specimen market and encouraging mineral-collecting neophytes in China



Classic azurites from Bisbee will add color to the 2010 "Mineral Treasures of the World" exhibition in Beijing.

to jump in and get started in a hobby we all love so much. At the same time, with the Chinese government now directly involved in mineral collecting and production in China, more and more opportunities will emerge for progressive outfits like Collector's Edge to bring a greater number and variety of fine minerals to American collectors. With an office in Beijing and staff on site all the time, this company is in a perfect position to continue to enlarge upon its acquisition and exporting efforts to bring the very best in Chinese minerals to the world's market.

By the time you read this, I will have attended that exhibition, and I'll be sharing more information about it with you in future issues. The reason for telling you about this event now is to alert you to what is happening in the world of minerals. Imagine the impact of this exhibition on those 4 million stone collectors in China when they decide to collect crystal specimens! Minerals will become more collectible and more valuable. If this exhibition is success-

ful—and reports are that it has been, as far as mineral collecting goes—you ain't seen nothing yet!

For years, many readers and friends who follow what I write in *Rock & Gem* have been asking me, "When are you going to write a book?" Well, watch out. This is the second amazing event I referred to at the beginning of this column! I've written a book that is now in the editing stage prior to going to press.

We are still selecting photos, organizing chapters, and otherwise putting the thing together. *Rock & Gem* managing editor Lynn Varon, the editing genius who makes my articles readable, is editing the text, so you know it is going to be readable. Many of the photos will come from Jeff Scovil, whose work has been featured on our magazine covers frequently. I have known Jeff since he was a youngster and have watched him rise to the top of his profession as a mineral photographer. If you get bored with what I have written, you'll still enjoy absorbing the genius of his camera work!

The book's working title is *The Frugal Collector*. Sound familiar? It is a revised and enlarged upon compilation of my "Frugal Collector" series of articles that appeared in *Rock & Gem* magazine off and on over several years.

The book is different from regular gem and mineral books. It is factual, but features the minerals I like—ones I have chosen, in fact! It also includes lots of my experiences from my over 50 years of collecting, traveling, and enjoying the hobby. I love history and the elements, so the book contains information about the relationship between natural elements and minerals.

It will be a while before the volume appears; the book is scheduled to come off the presses in time for Christmas and will be available for purchase at the Quartzsite and Tucson, Arizona, shows in January and February 2011. Watch for preorder opportunities in *Rock & Gem* magazine and on the magazine's Web site, www.rockngem.com. Put a copy of *The Frugal Collector* next to your favorite *Bathroom Reader*, a series of paperbacks I thoroughly enjoy! Now let's see, what can I write about next?💎

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.



AUDREY SESSOMS PHOTO

Agate Identification

I recently began organizing my father's rock shop that he has had as a hobby for 40 years. I am going through the process of trying to identify the different rocks and gems he has rockhounded with my mother over the years.

In the process, I came across this slab and its adjacent slab of Mexican Lace. I thought it was pretty amazing and I wondered if others ever came across anything like this. It looks like a Picasso to me.

—Audrey Sessoms
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Motor Matters

Shop Talk is one of my favorite *Rock & Gem* segments. The column "Motors Matter" in the April issue referenced a Web site that sold sphere machine motors. I have been searching for GE 152 rpm motors for years. Surpluscenter.com had 35 of these motors; now only 32.

—Rob
via e-mail

Respirator Reference

In his April 2010 column about lapidary work, Bill Kappel mentioned wearing a respirator. I have several abalone shells I want to cut and polish. Another article I read about working with these shells suggests using a "N95" respirator. A store near me has a "P95" maintenance-free, dual cartridge respirator.

What is the difference between these two respirators? Can I use the "P95" to carve the abalone shell and do some soapstone carving? I have always used water when making cabs and plan to use some water source when working with other materials.

Any information you can give me will be greatly appreciated. Even a reference to some Web site with detailed information about these or other respirators used in lapidary work will be appreciated.

—Patricia M. Joseph
Suncoast Gem & Mineral Society

The N95 and P95 respirators have the same particle filtering efficiency (about 95 percent), but the P95 also filters certain oil-containing particulates. The N95 is a little more expensive than the P95, but personally, I would rather have more protection than less.

There are all kinds of stories around about the danger of abalone dust. I really don't know whether the dust is toxic or not, but I do know the particles are tiny and have needle-sharp edges, and I don't have to have a medical degree to know that such things can't possibly be good for the lungs.

By all means, use water when working with any lapidary material. Remember, though, that water alone does not mean you should not use a respirator, too.

You can find some more information on respirators on the Web site for the National Institute for Occupational Safety and Health (www.cdc.gov/niosh/npptl/topics/respirators/disp_part/).

—William A. Kappel
Shop Talk columnist

The photo of reader Bill Osborne's agate cabochons in the May 2010 Field Notes column (p. 74) was printed upside down.

—Editor

Fossil Memories

Wow, talk about *deja vu*. Your field trip article about Pete Patterson Park on the North Sulphur River ("North Sulphur River Fossils", by Robert Beard, June 2010) really brought back memories! My father, Walter L. Lawless Jr., took the family on a whirlwind tour of the West back in 1963-64. I was 12 years old and my brother was 8 years old.

I was always interested in rocks and fossils, being brought up in Midwestern Illinois in the heart of coal country. I had accumulated quite a collection by the time I turned 12.

—Gary L. Lawless
Greenbank, WA

Why I Collect

I have been wondering for a long time about why do I collect rocks and things. I'm going to look for the book Bob Jones mentioned (*On the Rocks*, June 2010 *Rock & Gem*, p. 76). I think I enjoy most hunting for the "treasure", be it heart-shaped rocks or trying to expand my knowledge about what the earth holds. Learning the difference between a rock and a mineral has been one of the benefits of my collection.

I have just finished putting together an exhibit of some of my rock collection for a local library (photo below).

—Fran Peters
Grasonville, MD



FRAN PETERS PHOTO

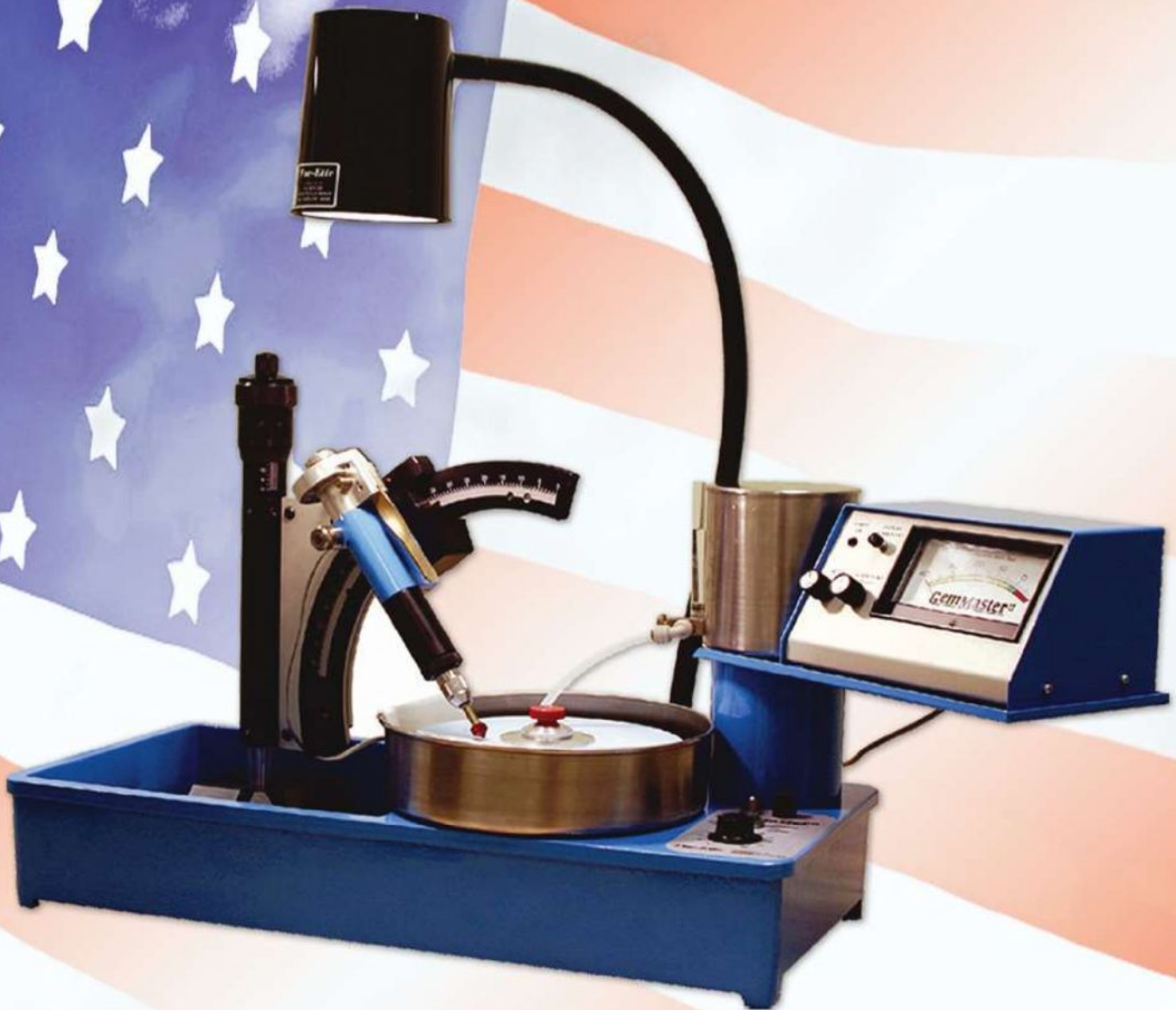


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