

Anne Black/Impactika

Hot rocks ignite collectors' passion

At the Tucson Gem and Mineral Show, leading meteorite dealers display spectacular new finds and old, treasured favorites.

by **David J. Eicher**

Once a year, an event takes place that brings together everyone who cares about space rocks. It's the Tucson Gem and Mineral Show, and for more than 50 years the event has attracted collectors, dealers, writers, and enthusiasts. Areas of interest include minerals, gems, beads, jewelry, and — yes — meteorites.

This year I went to the show mainly to interview several meteorite dealers about the current happenings in meteorite collecting. What I came away with were some amazing finds, great images, video interviews, and indications of a thriving hobby-within-a-hobby.

Why collect rocks from space? Well, so much in astronomy happens on such large distance scales that we hold most of our treasured moments as ethereal: a great view of the Orion Nebula or memories of a spectacular auroral display. With meteorites, however, you can actually hold tangible stuff in your hands.

You can handle a piece of the asteroid 4 Vesta. You can hold a piece of the Murchison stone meteorite, a revolutionary discovery rich with amino acids. You can touch a carbonaceous chondrite that originated in the outer solar system. Such objects predate the existence of the planet you are standing on.

This thin section is from the Nakhla martian meteorite. Researchers view thin sections through a polarizing petrographic microscope. The colors show the minerals in the specimen. Impactika sells many meteorite thin sections.

Meteorites let you feel astronomy as a subject. And with a quest for the most exciting stuff currently out there, I set off for Tucson and its great show — actually a network of many overlapping shows — with John Eicher, my dad, who is a chemist and mineral enthusiast. We traversed hundreds of dealers looking for interesting rocks in early February. Little did we know what was in store for us.

Here come the Meteorite Men

Perhaps the most outspoken characters in the meteorite field right now are Geoff Notkin of Aerolite Meteorites (www.aerolite.org) and his partner Steve Arnold



The Sikhote-Alin meteorite fall occurred around 10:30 A.M. February 12, 1947, in a remote region of the Primorye Province in Russia. The main characteristic of pristine specimens is a ragged, almost torn, appearance. Geoffrey Notkin and Steve Arnold exhibited numerous fine pieces at the Tucson Gem and Mineral Show. *Geoffrey Notkin*

(www.stevearnoldmeteorites.com). You may know them as TV's *Meteorite Men* from the series of the same name on the Science Channel. This year, the popular series has focused on such interesting localities as Odessa, Texas; Gold Basin, Arizona; Ash Creek, Texas; and Buzzard Coulee, Canada. For more on the series, see www.meteoritemen.com.

"Finding meteorites is only part of the challenge," says Arnold. "The other challenge is finding a home for them after we've found them." Some specimens go to researchers and some to private collectors, Arnold explains, and it's these meteorites that rock hounds go crazy for. I caught up with Arnold and Notkin at the Hotel Tucson City Center, where they displayed many dozens of their treasures and held court with fellow collectors.

Notkin displayed a beautiful, huge slice of the Brenham, Kansas, pallasite — a million-dollar rock — that Arnold famously found the main mass of in 2005. This find served as the pilot episode of *Meteorite Men* as well. The slice

they displayed was from one of Arnold's larger finds. The specimen is beautiful because of the included olivine crystals in the nickel-iron matrix that makes up most of the meteorite's weight.

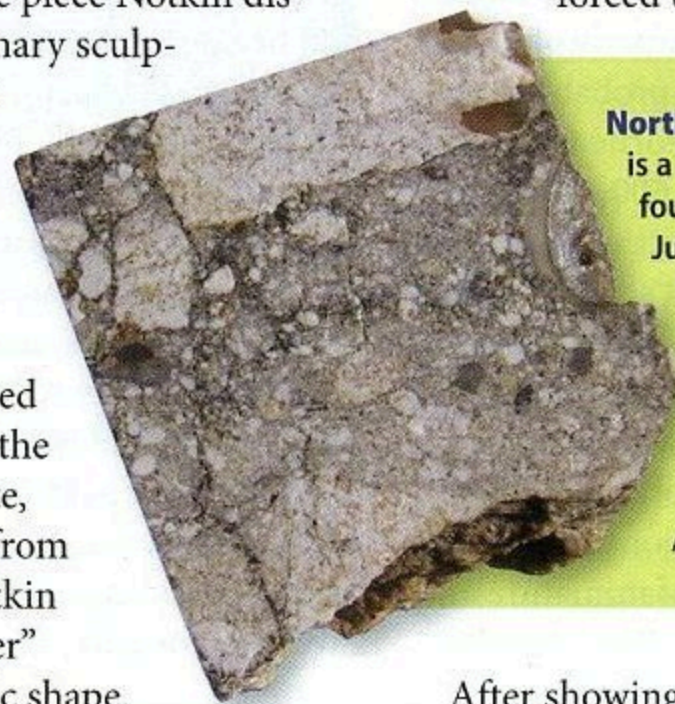
Another spectacular piece Notkin showed was a hand-sized Sikhote-Alin iron meteorite from the famous Russian fall in 1947. Although Sikhote-Alin meteorites are common because searchers recovered a huge quantity (the largest of any recorded fall), the piece Notkin displayed had extraordinary sculptural details from the melting of the metal as it heated in Earth's atmosphere and tumbled to the ground.

Arnold then showed an incredible slice of the Gibeon iron meteorite, another massive fall from Namibia. He and Notkin call it the "chili pepper" because of its fantastic shape. The piece also displays a terrific Widmanstätten pattern made visible by cutting, polishing, and etching the piece with a mild acid. The pattern is unique to iron meteorites, revealing the crystallization of the metal over long time periods of gradual cooling — something that didn't occur on Earth.

The men next displayed a piece of the Canyon Diablo meteorite collected at Meteor Crater near Winslow, Arizona. Aside from being a quite large, sculptural specimen, this sample stands out because the legendary meteorite collector Harvey H. Nininger collected it, probably in the 1940s or '50s. Such a provenance, linked to one of the great figures of meteoritics,

makes this iron a real gem in the world of meteorite collecting.

One of the most famous historical meteorite falls occurred in Ensisheim, Alsace (now part of France) in 1492. "It is one of the oldest known meteorite falls," Notkin says. "It fell on November 7, 1492, when even Arnold was a young lad." He adds, regarding the piece they had on display: "You can see amazing brecciation there, where different elements were forced together."



Northwest Africa (NWA) 5000 is a lunar meteorite searchers found in southern Morocco in July 2007. Anne Black of Impactika Meteorites sells specimens of this achondrite for as little as \$200. The total collected weight of this meteorite was 25.4 pounds (11.5 kg).

Anne Black/Impactika

After showing one of the oldest known falls, the men brought out specimens from one of the newest falls, Buzzard Coulee, from Saskatchewan, a chondrite that fell November 20, 2008. Their specimens showed a glistening black fusion crust that looked like it formed yesterday. As they held those stones and talked about roaming the Canadian fields just last year, the enthusiasm Notkin and Arnold bring to their work filled the room — these are two happy campers who contribute a great deal to the hobby of meteorite collecting.

David J. Eicher is the editor of *Astronomy*. He has collected meteorites since astronomy writer Walter Scott Houston gave him one in 1978.



What makes these Canyon Diablo meteorites special is that famed American meteorite collector and dealer Harvey H. Nininger (1887–1986) collected them. Canyon Diablo meteorites originated in the blast that created Meteor Crater near Winslow, Arizona. *Geoffrey Notkin*



The Brenham fall, a site near Haviland, Kansas, first yielded pallasites in 1949. While searching the region in October 2005, Steve Arnold discovered the main mass — a 1,433-pound (650 kilograms) monster valued at \$1 million. This picture shows a slice of the Brenham pallasite. *Geoffrey Notkin*

France is heard from ...

Sharing the same room at the Tucson show with Arnold and Notkin was another energetic soul in the meteorite world, Anne Black of Impactika Meteorites (www.impactika.com). A native of France and now calling the Denver area home, Black harbors one of the great collections any dealer can currently show.

Aside from her beautiful display specimens, Black has what is probably the largest collection of meteorite thin sections in the world, some 600 altogether, in a neat cabinet. Thin sections are slices of meteorite samples that scientists study microscopically. With transmitted light, thin sections can reveal textures and crystallization patterns, whereas polarized light shows a wash of colors that allow mineral identifications.

In her normal stock of miniature and cabinet-sized specimens, Black special-

izes in historical meteorite falls — “meteorites with a pedigree,” as she puts it. One of the meteorites Black pulled off the shelf to show us was a slice of Clark County, Kentucky, a 63.7-gram iron octahedrite valued at \$2,100 from the find in 1937. As she walked about the room, numerous other historically important meteorites, many of which you can find on her web site, surrounded Black.

Mineral collectors are familiar with a colleague of Black, the French dealer Alain Carion, one of the world’s experts on meteorites. He’s also the proprietor of a superb shop handling meteorites and minerals in Paris, not far from the Cathédrale Notre Dame. Carion has just produced a second edition of his famous introductory guide, *Meteorites*, which Black translated into English. This terrific book is available on the Impactika web site for \$20 plus postage and ought

to be a cornerstone text in any meteorite collector’s library.

In one corner of Black’s room was a display of several slices of NWA 5000, a fantastic lunar meteorite found in Morocco in 2007. She offers pieces of this Moon rock for as little as \$200 and as much as several thousand each, for those of you who really want to hang a piece of the Moon on your wall.

Another happy Frenchman ...

A few doors and one floor down from the Meteorite Men, I encountered another famous French meteorite hunter, Luc Labenne of Labenne Meteorites (www.meteorites.tv). Labenne has been hunting and dealing meteorites for many years and is known for his high-end specimens that often end up in museum collections. The inventory on his web site shows a wide range of diverse stones, irons, and stony-irons of all sizes and values.

Labenne proudly displayed two new lunar meteorites, the first of which — Dhofar 1528 — is an achondrite he found in the desert in Oman in June 2009. Labenne displayed the main mass of this stone, a 72.3g piece that showed rich brecciation with five or six different kinds of rock. The reverse side showed a rough, wind-blasted appearance. In a different display case, Labenne showed another new lunar, Dhofar 1527, this one found by his brother Jim in March 2009, also in the desert in Oman. This stone may well be from the lunar farside.

Another rare lunar meteorite, Shisr 166, also fell in the desert in Oman, and searchers found it in the spring of 2008.



The Clark County meteorite is an iron octahedrite found in Kentucky’s Clark County in 1937. Most of the 26-pound (11.8 kg) mass became part of the American Meteorite Laboratory collection administered by Harvey H. Nininger. This specimen offered by Impactika weighs 63.7 grams. *Anne Black/Impactika*



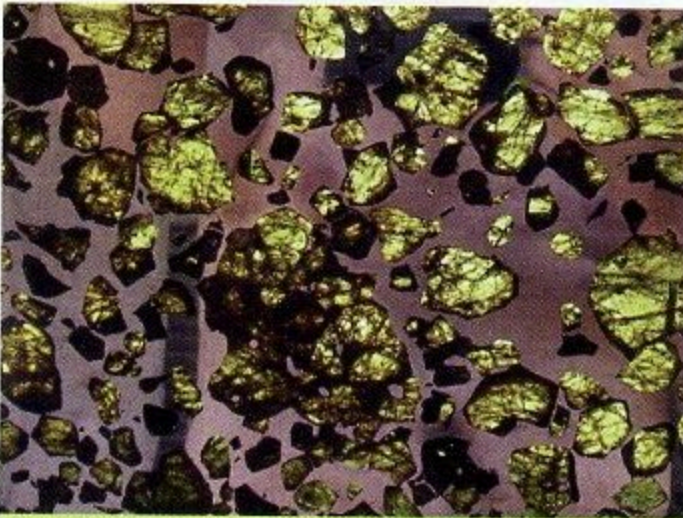
ITQIY (yes, that’s really its name) is a primitive, enstatite achondrite that fell in Western Sahara around 1990. At that time, a nomad found a 410-gram piece. Luc Labenne, while on an expedition to hunt meteorites in 2000, found a 9.5-pound (4.3 kilograms) specimen of this stone meteorite. *Luc Labenne*



This meteorite doesn’t even have a name yet. Perhaps meteoriticists will dub it *Minera Escandida*, a large copper mine near the discovery site. Luc Labenne found it during a meteorite-hunting trip to Chile in 2004. Scientists classify it as a carbonaceous chondrite bencubbinite, an iron meteorite with many inclusions. *Luc Labenne*



The Buzzard Coulee fall occurred November 20, 2008, in Saskatchewan. In 2009, Geoffrey Notkin found several pieces of the meteorite while searching the strewn field with a strong magnet affixed to a walking stick. *Geoffrey Notkin*



The Fukang meteorite is an example of a pallasite, a meteorite that has olivine crystals (peridot) surrounded by a nickel-iron matrix. In 2000, a Chinese merchant purchased the 2,200-pound (1,000kg) main mass. Tucson meteorite dealer Michael Farmer offers slices of this and other pallasites for sale. *Michael Farmer*

Farmer is known for his wide selection of stones and reasonable prices.

At the show, Farmer showed me many beautiful specimens. He began by pulling out some spectacular pallasites, the most beautiful of all meteorites due to their olivine inclusions. He had large slices of Fukang, Esquel, Brahin, and Springwater. Farmer's case of pallasites was truly one of the most beautiful collections I saw this year at Tucson — and I probably looked at 100,000 rocks!

Farmer also featured some nice iron meteorites including a huge slice of Nantan from China, etched to show the Widmanstätten pattern. He displayed a gorgeous chunk of Libyan Desert Glass, a tektite that formed from terrestrial sand when an ancient impact fused the sand into glassy masses. He trotted out a huge

Dhofar 1528 is a recently discovered lunar meteorite, the main mass of which weighs 72.3 grams. This anorthosite originated in the lunar highlands. Meteorite dealer Luc Labenne found this specimen silhouetted against the Oman desert in June 2009. *Luc Labenne*

Murchison meteorite specimen that fell in Australia in 1969 and is scientifically important because it contains amino acids, the building blocks of proteins.

See you in Tucson next year?

My father and I stumbled away from the full tour of meteorites at the Tucson Show tired but enriched with a vast knowledge of the meteorites dealers have out there for sale. Meteorite collecting is such a cool way to get your hands onto tangible pieces of astronomical history.

It's also an area that can be quite affordable: Yes, lunar and martian specimens are out there for anywhere from \$500 to \$100,000. Yet you can buy common iron meteorites and many stony ones for \$25 or \$50 each. In a hobby where people usually buy a telescope, some eyepieces, and charts, and then don't have lots of inexpensive toys to buy, why not pick up a space rock or two?

I caution you, though. You may find yourself easily addicted to meteorites and see a growing collection around your house or apartment. It's one of those really nice problems to have. Over and out from Tucson. ☺



See the video interviews the author shot at the Tucson show online at www.Astronomy.com/toc.

Labenne displayed a beautiful 4g piece that, amazingly, he found at night! In contrast to the two Dhofar specimens, Shisr 166 is a melted impact breccia, a piece from the main mass of about 100g that resides in a European museum.

Another strange meteorite Labenne showed me was *Minera Escondida* (name pending), a metal-rich carbonaceous chondrite found during Labenne's trip to Chile in 2004. Because of the heft and "skin" of the meteorite, "It was on my desk as a paperweight for 5 years," says Labenne. "Then one day I decided to cut it and have it analyzed, and it turned out to be a new kind of bencubbinite," a weird kind of iron meteorite with many inclusions. The proposed name comes from a copper mine near the find.

Perhaps the oddest specimen I saw is one that Labenne calls his favorite meteorite. ITQIY, a primitive, enstatite achondrite, fell in Western Sahara around 1990, and Luc found a large stone in 2000. The meteorite's fusion crust is dark black and shows flow lines from atmospheric heating during the meteorite's fall. This meteorite is unusual, and it's easy to see why Labenne admires it.

Michael Farmer, meteorite hunter

As I rounded the end of the building at the Hotel Tucson City Center, I found another old meteorite friend. Michael Farmer is an inveterate meteorite hunter and dealer who lives in Tucson. His web site, www.meteoriteguy.com (also www.meteoritehunter.com), has an extensive catalog of space rocks you can explore.