Collecting Minerals: Could You Find a Mineral New to Science?

by Art Smith
Member of the Houston Gem & Mineral Society

Probably most mineral collectors experience that special feeling of discovery when opening a geode, cavity, or vug—to be the first person ever to see its interior of beautiful and well-crystallized minerals. While collecting minerals at a well-known mineral locality, you find that unusual mineral that you have never seen before—from there or anywhere else. You wonder if it is a new mineral for the locality or even a new mineral to science, maybe even the first mineral species of this composition or crystallization to be found in nature and never before described. Maybe you have found a new mineral, but if you never follow up on it, you will never know. So it waits for someone else to recognize and appreciate its uniqueness.

Finding a new mineral for a locality, country, state, or even a new species takes some luck, good observations, much perseverance, and most of all, getting it into the right hands for analysis and description. The requirements for describing a new mineral species are well beyond the means of most collectors. You will note that the published descriptions of new minerals usually have several authors, each contributing their specific expertise on the data required to get approval for a new mineral species. Minerals new to a locality or state are much easier to confirm and report, but if you do report it, make sure your information is accurate.

I will relate two of my own experiences that illustrate some of the pitfalls and the necessary criteria for success when you think you might have found something new. Hopefully, you can learn from my past mistakes and benefit from what I did right.

Magnet Cove, Arkansas collecting in the 1970s

In 1970 I had been collecting minerals for 14 years and realized that most of the localities were producing the same old thing—nothing new or exciting. So it was time to look more closely at the microminerals. I had an old student binocular microscope that was abandoned by the paleontologist I shared an office with at Texaco. I identified and had confirmed some unusual minerals in some cores and well cuttings from Texas salt domes but realized I needed to upgrade the microscope if I was to get serious. I forked out about $500 for a new American Optical zoom microscope with a power up to 50x. The oculars were fixed so there was no way to increase the magnification, and there was poor resolution above 40x.

But now I felt ready, and after two trips to Magnet Cove collecting under and around the Cove Creek bridge at U.S. Route 270 (now State Route 51), I had quite a bit of material to go through. It was slow work having some of the specimens analyzed to confirm their identity, but a short article was eventually published (Smith 1994). However, even after publication I have reexamined the same and additional material. With more analyses, additional minerals are identified from this location. Some are complete surprises, but these will wait for a future article when all investigations are complete.

In 1972 it was time to branch out and try the Diamond Jo quarry on the south rim of Magnet Cove. The quarry, in syenite, was worked in the 1880s to supply rock for the Diamond Jo Railroad that ran from Malvern to Hot Springs in the flats south of the quarry. Small, about 1 cm across, white-rimmed miarolitic cavities in the syenite contained feldspar, aegirine, zeolites, and associated minerals that were described by Erickson & Blade (1959). I found these cavities to be quite common in the quarry and collected some.

In the western third of the quarry about halfway up the face, I found some smaller nonrimmed cavities averaging about 4 mm across (about the diameter of the end of a pencil eraser). One glance through a loupe and I noticed flashes of bright orange, and I knew I had something not described before from the quarry. At home with the microscope, there were all sorts of crystallized minerals in the cavities. Except for some suspected barite and molybdenite, most of the rare minerals I either misidentified or did not have a clue about what they were. I sent specimens to trading partners in Italy, Germany, and in this country. I even sent a packet to the micromount guru Neal Yedlin. That packet has its own story for another time. The result was that there was no one to help.

In February 1973 I met Henry de Linde, owner of the quarry, while collecting iron phosphates in the western Ouachita Mountains and told him where and what I had found. He eventually interested Mike Howard of the Arkansas Geological Commission who collected and sent some samples to Charles Milton, a retired but very active mineralogist of the U.S. Geological Survey. He was thrilled because he identified the orange crystals as labuntsovite, the second occurrence in the United States. Charles had previously identified the first occurrence of this mineral from his work on the Green River Shale in Wyoming (Milton 1958).

By the time I was made aware that there was work being done on the specimens, Charles Milton and his associates at the U.S. Geological Survey had identified two new mineral species from the cavities (Appleman et al 1987). However, in 1978 when I first met Charles Milton at the fall Coon Creek trip, we had much to talk about. I promised to send him some additional unknowns.

More importantly, I found out that the lack of power and the poor lighting of my microscope caused me to see some pale pink crystals as brown, and I had only a fuzzy view of some of the minute crystals. However, Charles and his associates at the U. S. Geological Survey identified other minerals, and some new species were added to the Arkansas and Magnet Cove list of minerals (Smith 1989), but there are still some unidentified minerals from the cavities. Most were not identified because there are too few samples, and larger samples are required for complete definition of the mineral.

I learned that I needed better equipment and so sprung for a new, more powerful microscope and for a fiber optic light plus a camera attachment. I made some valuable contacts who had the desire and means to help correctly identify new finds.

Pike County, Arkansas mercury mines, fall 1995

By 1995 I was even better equipped for mineral examination and description, but by then had lost most of my professional contacts—those who could confirm my identifications and identify my unknowns. The demise of mineralogy in the U.S. Geological Survey, deaths, and retirements had taken a big toll. So I was back to square one for help.

In October 1995 there were only four of us, Meredith York, Bob Gamble, Carl Stasza, and me on the Arkansas Coon Creek trip that year. Most of the others who were more flexible and wanted variety in collecting made a trip to Georgia and Alabama in September. We remaining hard core met at DeQueen, Arkansas, revisited some of the mines in the Antimony district, and had some collecting success (Smith and Staszak 1996). Then with no set schedule we headed south, and after visiting the Highland gypsum quarry, we got a motel in Murfreesboro and visited the Pike County mercury mines. We went northeast to the Bemis Hill mine on the opening day of deer season. The dirt road to the mine was completely blocked by an encampment of hunters, so we retreated back west and found the 41 prospect. We examined the dumps and found little cinnabar but a lot of reddish hematite and lots of coatings of white dickite.

Meredith suggested we go back further west and try the Funderburk prospect in the Cowhide Cove recreation area on Lake Greeson. None of us had done any serious collecting there. The prospect area consisted of mostly overgrown shallow trenches and dumps. All adits and shafts were obliterated, probably because it was now in a recreation area. Bob and Meredith worked a shallow overgrown prospect trench, and Carl and I attacked the only dump and former trash pile not completely overgrown on the side of a hill. We found a lot of dickite in sparkling white veins and coatings in a pale gray quartzite though it is generally referred to be sandstone. There was a small smattering of small clear and bright quartz crystals, but red cinnabar was rare and not conspicuous. Then Bob and Meredith called us down to their diggings because they stared finding some small red cinnabar crystals on and in matrix. I went, but Carl stayed working the dump.

I was no sooner digging in a promising area of the trench when Carl called, “I think I got something here.” “What”? “Some native mercury and probably some other stuff.” I zipped back over to Carl and noted that he was working on what was now about a basketball-sized boulder. There was some native mercury, cinnabar, and other things in cavities and smears. I bucketed all of Carl’s trimmings I could find and his discards as he worked on the boulder. Then I worked the dump some more to see what I could find, which was not much. Darkness comes fairly early in the Arkansas woods in late October, so we soon headed back to Murfreesboro and ate. Afterwards, Bob and Meredith headed back to Stephens, Arkansas, and Carl and I got a good night’s sleep before the longer trip back to Houston.

That fall I began using the services of Excalibur Minerals for EDS-SEM analysis on some of the unknowns I had accumulated for the last couple of years. Although it was costing me to have the work done, I was pleased with the results and kept sending

specimens for analysis. When I finally got to examine the Funderburk specimens, I thought that I could identify most of the minerals: red cinnabar crystals and probably black metacinnabar, native mercury, dickite, and quartz crystals. White glassy, translucent to opaque masses of calomel fluoresced a deep red under shortwave ultraviolet light. That made identification easy. However, there were a couple of tiny masses of compact, parallel to randomly oriented silky white fibers that I could not even give a good guess about their identity. The closest thing I thought of was gypsum variety satin spar, but I soon ruled that possibility out. They were on and with quartz crystals and not in veins, and the fibers were too fine plus the luster was too bright. So after examining it and musing over it several times, it went on the list to be identified by Tony Nickischer at Excalibur Minerals by EDS-SEM. However, finances and other mineral priorities kept it down the list until December 1997. Tony gave me a phone call and said that he could not identify it. It was mostly mercury with some aluminum and phosphorous. It did not fit any of the known mercury minerals. He asked if he could send it for X-ray diffraction. I said fine.

Tony's letter came in January 1998. X-ray diffraction showed it to be a new mineral, and he was transferring the specimen to Andy Roberts, a mercury mineral expert at the Canadian Geological Survey. If the unit cell could be identified and other requirements met, it could be written up as a new mineral. I had never met Tony, but that year we got together in his room in the Executive Inn at Tucson in February and discussed the situation, I told him I would try and find some more material at the Funderburk prospect. I was not successful in four tries, but I told Meredith York about it and he did succeed in finding some additional small specimens from the same place in the dump where the boulder was found. Were they just trimmings I had failed to pick up from the same boulder? I still do not know the answer to that question, but they may be.

Time went on, work on the mineral continued. The next year at Tucson Tony told me that the new mineral would be artsmithite. I was a little shocked, speechless, and honored. Finally in 2003 the description of artsmithite was published (Roberts, et al. 2003). The project now is to collect and document the complete mineral assemblage of the vein and to determine their associations and paragenesis. Naturally the key to this will be finding more material.

Was I looking for a new mineral species? Not really. I figured my best chance was finding and having identified some minerals new to Magnet Cove (Smith 1998a) and Arkansas (Smith 1998b). Although I enjoy mineral collecting, I get no satisfaction from a garage full of unidentified collected material (unlike some collectors I know). Yes, I still have a garage full of minerals, but most of it is labeled and identified. The real challenge for me is to figure out just what is in that material you collected. In many situations you need some help doing that through analysis and expertise beyond your own. Some times you may even get lucky, as I did. Will I stop collecting now? No way, the challenge is still there.

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Show Committee Field Trip Report

by Scott Singleton

As announced in the October BBG and via the HGMS e-mail distribution list, the Show Committee held a fall field trip for the entire Club to show our appreciation for the fine job everyone did during our annual Show. The field trip was held Saturday, November 15 and was at College Station. Fifteen Club members and guests attended along with seven Show Committee members. The weather was very pleasant for this November trip.

We met at an Exxon station on 2818 (the loop around the south side of town). From there we journeyed to our first stop, White Creek. We spent the entire morning wandering down the creek gathering all shapes, sizes, and types of petrified wood. Several people on the field trip had not been to this locality before and were quite happy to see relatively large quantities of wood just waiting for someone to pick it up, and they were more than happy to oblige (see photos). I remember seeing at least two individuals (one being Rick Rexroad) walking back from somewhere downstream totally soaked. I guess some people like swimming anywhere and at any time of the year!