Bay Area Mineralogists
May 2017

Meeting: Wednesday, May 10, 2017; 7 pm
USGS, 345 Middlefield Road, Menlo Park
Building 3, 2nd Floor, Rm 3-237

President: Don Windeler, don.windeler at rms.com
Editor: Barb Matz, matz.barb at gmail.com
BAM web site: www.baymin.org

In this Issue:

The Bay Area Mineralogists meet monthly during the school year, on the 2nd Wednesday, at the U.S. Geological Survey in Menlo Park, on the second floor of Building 3, where the campus map says "Rambo Auditorium." (http://online.wr.usgs.gov/calendar/map.html) The front doors will be locked so you'll have to come up the exterior stairs on the Middlefield Road side of the building. Parking is free.

May Program: Darwin Field Collecting

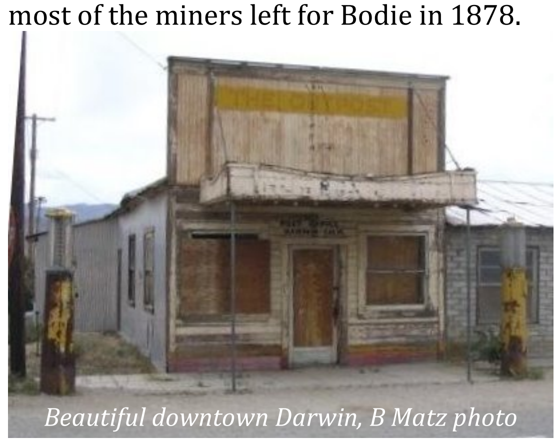
By Stan Bogosian

BAM members have made a number of collecting trips to the Darwin CA area over the past 10 years or more. Stan will show us pictures of the various mines and minerals, and the characters on the field trips.

For Show & Tell, we'd love to see your favorite Darwin specimens.

BAM members on the Rio Tinto dumps in the town of Darwin, 2009. Photo by Barb Matz.

The mining camp of Darwin, located in Inyo County between Owens and Panamint Valleys, was named for Dr. E. Darwin French, a local prospector. The silver-lead ore bodies at Darwin were discovered in November 1874. By 1875 the town boasted 3 smelters, 20 working mines, 200 houses, 78 business establishments, and 700 residents; however, the decline of the district began soon thereafter and was complete when most of the miners left for Bodie in 1878.



Beautiful downtown Darwin, B Matz photo

The district came to life again in 1906 when copper, previously worthless and left on the dumps, became a valuable commodity. By 1927 the Darwin district was producing silver, lead, gold, tungsten, and copper, and it reached an annual production high of around $7 million by 1945. At that time, Anaconda Copper Mining Company took over the principal mines in the district, which became the chief source of lead in California through the mid-1950s. There are no longer any operating mines in the district other than personal claims in the surrounding hills. The "inhabited ghost town" of Darwin is currently populated by 40 to 50 people, mostly reclusive artists.

A Cute Fluorite from Dal'negorsk

By Herwig Pelckmans

At the Crystal Gazers meeting last February, Jon Sigerman had brought a cute fluorite crystal for show and tell. The specimen was about toenail size, and looked like a perfect colorless fluorite cube (Figure 1) from where I was sitting. Such colorless fluorite crystals from Dal'negorsk are well known and have been published in several books and magazines before. What I could also see from about 10 feet away, is that the crystal was modified; it was not a simple cube, so to speak. So I was kind of curious to see it in person at the end of the meeting.

Figure 1. The fluorite crystal that sparked this article. About 2.7 x 2.1 x 1.8 cm. From Dal'negorsk, Russia. In the collection of Jon Sigerman; photo by and © Robert Weldon.

In order to identify all the crystal faces of modified fluorite specimens, it is good to keep in mind the properties of a cube (Figure 2). Of course we all know a cube has six faces, so if you want to sound exotic you call it a hexa-hedron (Greek for … six-faces). But there is more to a cube: it also has 8 corners, and 12 edges. It is important to keep those numbers in mind, for they will help us identifying the supplementary crystal faces that might be present.

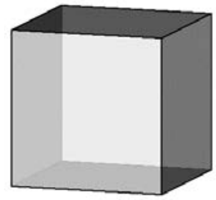


Figure 2. The cube, the most simple and most common fluorite crystal form.

So when Jon handled his treasure while talking about it, I had already noticed "the edges of the cubic fluorite crystal had been cut off," so to speak (Figure 3). Since we know a cube has 12 edges, these faces must belong to an isometric crystal shape that has 12 faces, and such a thing is called a dodecahedron (dodeca meaning 12 in Greek). Typical for this combination of cube and dodecahedron, are the elongated 6-sided faces that surround every side of the square cube faces (see again Figure 3). Such combinations are not an uncommon sight for fluorite, actually, even though some people might think otherwise, this combo is more common for fluorite than the classic cuboctahedron.

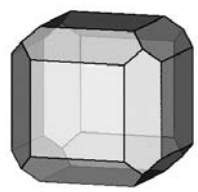


Figure 3. The cubododecahedron, combination of the cube and the dodecahedron.

It was only when I handled the specimen myself, that I noticed the story was not finished yet. Surprisingly, small, triangular faces were visible at each corner of the square faces. Since each face of the cube had 4 modifications, this crystal form had to have 6*4 = 24 faces. In the isometric crystal system, 3 shapes have 24 faces: the tetrahexahedron, the trisoctahedron and the trapezohedron (Figure 4).

Figure 4. The tetrahexahedron (left), the trisocta-hedron (middle) and the trapezohedron (right).

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From the shape and position of the small faces we noted on the fluorite crystal, it was clear they were part of a trapezohedron. Adding that form to our crystal drawing, it really started to look like what we saw that evening (Figure 5). It kind of surprised me, because the general rule says: the larger the crystal, the less likely to find lots of modifications. This is due to the fact some faces grow faster than others, and by doing so those fast growing faces will actually disappear.

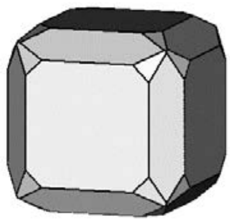

Figure 5. Combination of cube, dodecahedron and trapezohedron ({311} was used for this drawing). In this case the trapezohedral faces have the shape of small triangles.

Just when I thought I had seen it all, I discovered VERY small, supplementary faces, right in the corners of "what started out as a cube". Since a cube has 8 corners … indeed, these very small faces belonged to the octa-hedron (eight-faces). Adding that form to our crystal drawing, we get an idealized view of the crystal Jon obtained in Tucson in 2017 (Figure 6).

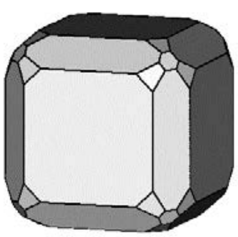

Figure 6. Idealized drawing of Jon's fluorite crystal from Dal'negorsk, Russia. Combination of cube, dodecahedron, trapezohedron and octahedron.

Doing the math, we see this crystal drawing has no less than 6+8+12+24 = 50 faces. In the real world, some of the faces are missing on Jon's specimen, and others are somewhat smaller or larger, but that is quite normal: natural crystals are in general not as perfect as theoretical crystallography would like them to be. :-)

Figure 7a is a close up photo of John's fluorite crystal, showing one corner of the cube with all its supplementary crystal faces. Due to small differences in growth, the upper trapezohedral face has the shape of a small triangle. See the corresponding drawing (Figure 7b) for more details.

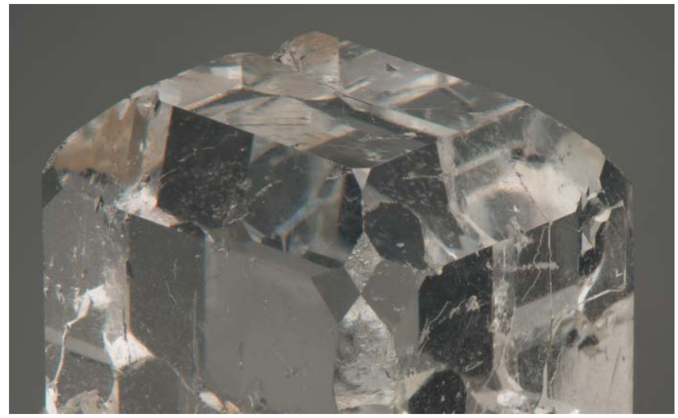

Figure 7a. Close up of the fluorite crystal shown in Figure 1. Photo and © Robert Weldon.

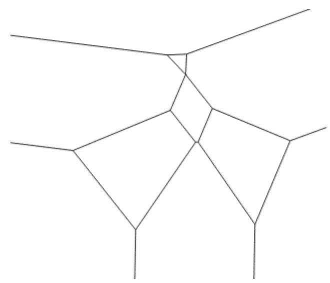

Figure 7b. Corresponding drawing of the close-up. The idealized view of Figure 6 has been adapted to the real world: the upper trapezohedral face has been reduced to a small triangle.

Although not common, fluorites with many more faces are known. That is actually quite logical, for one of the seven basic crystal shapes of fluorite is the hexoctahedron (Figure 8), and that form alone has no less than 48 faces! And it is actually quite unusual for fluorite to only have that shape, most of the time it is in combination with other shapes. Obviously, a combo of a cube and a hexoctahedron will have 48 + 6 = 54 faces.

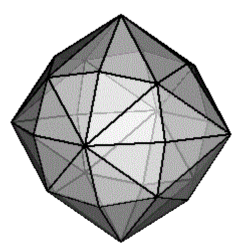

Figure 8. The hexoctahedron, the most complex fluorite form, with its 48 faces.

Fluorite crystals that show the seven basic crystal shapes of fluorite, all mentioned above, do exist and have been described from a few places in the world. The total number of their crystal faces can easily be calculated....
Yes, you are right, no less than 146 faces (6+8+12+24+24+24+48)! But when it comes to having the most faces of all fluorite crystals ever described, even these specimens really fall short.

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The record for fluorite so far (and actually for all minerals) is a crystal from Devonshire, UK, that was described in 1918 by Victor Goldschmidt (one of the most famous crystallographers of all times). The idealized crystal drawing of this fluorite specimen shows 1 cube, 1 octahedron, 1 dodecahedron, 3 tetrahexahedrons, 4 trapezohedrons and 3 hexoctahedrons. In other words, it has no less than 6+8+12+(24x3)+(24x4)+(48x3) = 338 faces! Below is a drawing of that crystal (Figure 9), as it appeared in Goldschmidt's *Atlas der Krystallformen*.

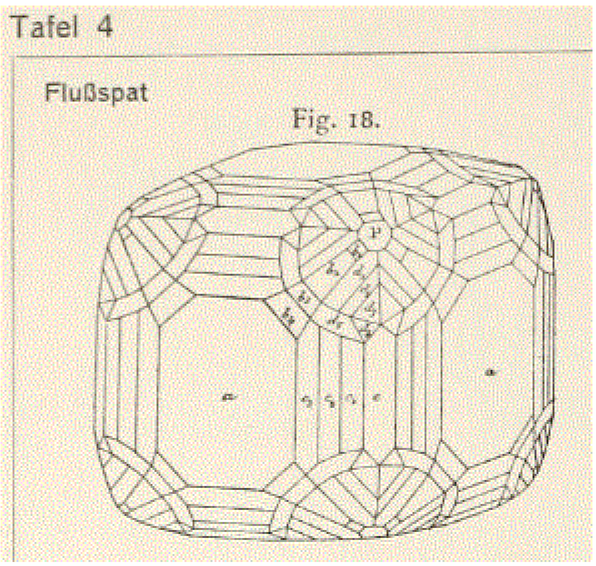

Figure 9. Idealized crystal drawing of the most complex (fluorite) crystal ever described (see text for more info).

NCMA Micromount Symposium

June 2-4, El Dorado CA

Northern California Mineralogical Association Annual Micromount Symposium, El Dorado Community Hall, 6139 Pleasant Valley Road.
Cost: $20 advance / $25 at the door.
Hours: Fri 3-9 pm, Sat 8am-9pm, Sun 8am-noon; Sun/Mon field trip to Zaca and Old Soldier Mines
<u>Talks</u>:
Don Howard, *What's Old in Minerals* [minerals found on last year's give-away table]
Mike Cox & Ted Hadley, *Geology and Mineralogy of the McDermitt Mine, Humboldt County NV*
Doug Merson, *Mineralogy of Mont Saint Hilaire, Quebec, Canada*
Other contributed talks – TBA.

BAM at California Academy of Science

Photos by Jean Lee

On April 6th, three members of BAM (and SFGMS) – Jean Lee, Roni Michaels, and Barb Matz – participated in the "Collections" Night Life event at the California Academy of Science:

Jean Lee brought colorful, touchable minerals.

Roni Michaels with her hands-on mineral specimens.

"Ooh" and "Cool!" was heard at Barb's micro table.