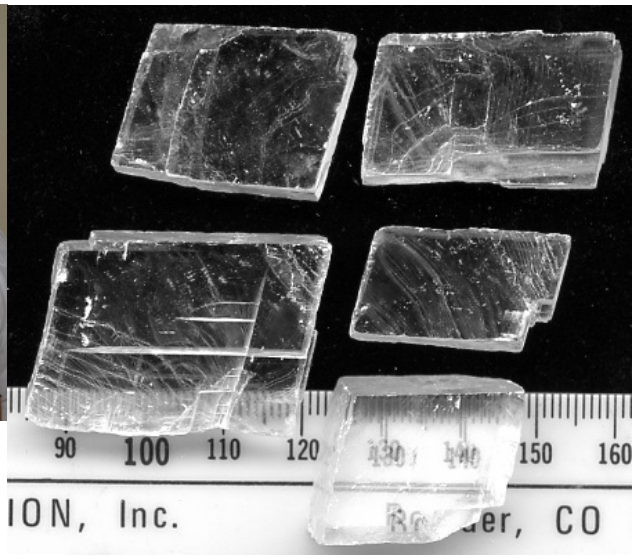
Rock Fun

This past Friday, Saturday, and Sunday I was again a volunteer exhibitor at the annual Denver Gem and Mineral Show. This year's theme was about agates, but many other minerals and rocks were shown. I help man the educational booth of Andrew Sicree, from State College, Pennsylvania. His theme is rocks that do things. This year he brought his older daughter, Theresa.



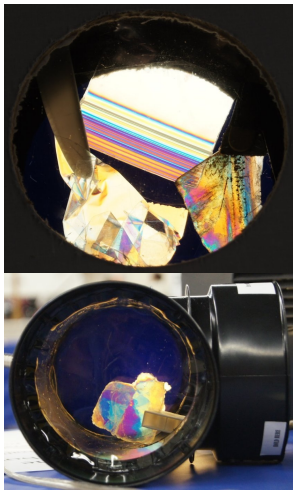
The left photo shows Andrew demonstrating cleavage. The calcite crystals usually fracture at the same angles or planes, as in these (right) examples. The kids enjoy breaking the crystals with a hammer and chisel. Notice in the lower right crystal that the metric ruler has a duplicate image. One image comes straight through as if the crystal was made of glass. The other image refracts to a different position. Both images are polarized but in directions perpendicular to each other.

Andrew also demonstrated cleavage with muscovite mica, which comes in thin transparent sheets that can be peeled apart. In the next photo the dark crystal is of biotite mica. The gray crystal is of muscovite mica. A thin sheet of it is peeled off and shown below the main crystal. Biotite can also be peeled. Both are flexible if in thin sheets, as we also demonstrate. We let the visitors bend large sheets of these rocks.

We demonstrate rock density by contrasts. We have a large boulder (about 40 cm) of pumice, a volcanic rock filled with tiny air bubbles, that will float on water. We surprise both adults and children by having them lift this rock. We also have dense galena, which is lead sulfide, which though small feels very heavy.

Sometimes Andrew heats a special collection of muscovite crystals that have internal water within the crystal structure. The heat makes the water expand to gas, turning the sheets of mica into fluffy worm-shaped lumps like popcorn. The result is called vermiculite.

Polaroid sunglasses pass light rays with a vibration in only one direction, blocking the rays with the perpendicular orientation. The polarized lenses can be arranged perpendicular to each other to block nearly all light, giving a very dark appearance. Some substances placed between two sheets of polarizing lenses will rotate the plane of polarization so that light will pass through the second polarizing lens. A varying thickness of those substances will produce colors. Muscovite mica is a good example. So are many types of clear plastics and cellophane. I spent most of my time with this demonstration. It is fun making such colors with colorless transparent materials.



The next demonstration, shown in the lower right on the blue table, used a lump of dark graphite, a variety of pure carbon. Visitors can write on paper with it. Graphite is mixed with clay to make the "lead" in pencils.

At the black table Theresa is demonstrating the double imaging of calcite crystals. She also shows rocks and materials with iridescent colors. Her hands are on fibrous gypsum crystal rocks that work like fiber optics to transmit an image from the bottom to the top of a rock.

At the far table we had some rocks that gave a bad smell of "rotten eggs" from hydrogen sulfide gas released when the rocks are struck against each other. Next we had a rock of talc, which is turned into soft Baby Powder. We struck a rock of pink halite and had people taste the tiny fragments - sodium chloride salt, to show that the salt we use for cooking can come from a rock.

The children at the far table are looking at magnetite - rocks that are strongly magnetized. The man is demonstrating that some rocks can conduct electricity, often by metallic deposits in them.

A huge demonstration to our right let people practice panning for gold particles mixed in sand. An elderly man often walked by with life size models of dinosaurs, of at least three different varieties. This one is "Mr. Bones". I like volunteering at the educational corner of this show.

Ed Holroyd
16 September 2014