Feeling Minerals

Most of us are sight oriented when we study rocks and minerals. Once, though, I was asked to give a program on minerals for the Minnesota Society for the Blind. As I was preparing this, I was impressed by the number of properties minerals have that can be sensed with the hands. It's worthwhile reviewing some of these as they are good identification tools for any one.

Density (or specific gravity) is one of the more familiar ones. This is the mass per volume. As an example, think of suitcases. They have a certain volume. When they are empty, they have little mass, thus a low density. Put clothes in them and they get heavier for their volume. If you're a typical rock collector, you have probably put rocks in your suitcases and increased their density immensely, much to the annoyance of airport luggage handlers. Mineral densities can be evaluated the same way - but "hefting" them. If they have a medium density, they will feel about normal in mass for their size. If they are low density, like pumice or muscovite, they will feel light. If they are higher density, like garnet, galena, copper, barite or magnetite, they will feel heavy for their size. There are, of course, many ways to measure this density precisely, but "the heft test" still is a useful field test requiring no expensive instruments. You can fine-tune your approach by practicing hefting known minerals.

Another property that can be appreciated with the hand is tenacity - the resistance of a mineral to mechanical crushing or bending. Brittle materials will break when stressed. Most minerals are brittle. Malleable minerals, such as copper or gold can be flattened into sheets. Those who collect on the old copper mines in Michigan's Keweenaw Peninsula are aware of the resistance of copper-bearing rocks, and the spiny feel of the broken copper edges. These minerals are also ductile, meaning that they can be drawn out in the form of a wire. Some minerals like chalcocite or gypsum are sectile, meaning they can be cut with a knife. Gypsum is soft enough to be cut by a fingernail. Some minerals, like the micas, are elastic and can return to their original shape after being bent. Some mineral like talc are flexible. Once bent, these minerals stay bent after the pressure is released.

The smoothness or slipperiness of a mineral's surface can also be used as a tool. Talc feels slippery. Serpentine feels greasy. The fibrous character of splintery or asbestiform minerals can also be sensed.

Other minerals have distinct surface properties related to their wettability. This has to do with the way particular atoms on the surface of a mineral interact with water or other materials. Chrysocolla becomes sticky when moist, as do many clay minerals. Some clay minerals, such as those in the smectite group, actually swell when they absorb water and loose their strength. This is one reason why so many Western roads (where smectites are common in the soils) are good when dry, but become slippery mud holes after a rain. Diamonds do not wet with water. If a pile of crushed minerals is saturated with water to become a slurry, then run over a grease (such as Vaseline) the uncoated diamonds will stick to the grease while the well-wetted gangue minerals will slide right by. Beryl, corundum, rutile, spinel, topaz and zircon are other minerals that wet with difficulty. The capacity of dirt to slide off of mineral surfaces also affects their cleaning. People who remark to me that datolites can be recognized on the mines dumps of the Keweenaw by the way the dirt seems to slide off of them are using this property.

Minerals are great to look at, but the enjoyment of their properties span all the senses.

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