Chapter 9
Picturing Minerals and Rocks

ABSTRACT

In this chapter, we draw inspiration from the study of Earth structures and materials, as well as processes and forces that change these structures, which is the core of the domain of physical geology. We examine minerals, main types of rocks, gems, and other more mundane earth baubles, the rock cycle, and processes that change the structure of the minerals. Projects are aimed at linking these physical and chemical processes and events with our ambient surroundings and personal perceptions of our own experiences.

MINERALS

The study of minerals is called mineralogy. Generally speaking, a mineral is a naturally occurring solid substance that has characteristic chemical composition and physical properties, and a crystalline, ordered atomic structure. There are more than 4,000 known minerals; they may comprise pure elements and simple salts or they may be very complex. Three layers: the crust, mantle, and core contain the dense materials (heavy metals: nickel and iron) close to the center and the lighter materials (rocks: basalts and granites) in the crust.

Classification of minerals takes different forms; it may take into consideration optical, chemical, x-ray diffraction, or other properties of minerals. Physical properties often used to classify minerals are the crystal structure of a mineral, its physical hardness (from talc to diamond), luster (from dull to vitreous), diaphaneity (from transparent, through translucent, to opaque), color, streak (the color of the powdered mineral), cleavage (a way it splits), fracture (a way it breaks), specific gravity, fluorescence, magnetism, radioactivity, and piezoelectricity, among other properties. Chemical properties of minerals are used to discern the silicate class (such as quartz), carbonate minerals (mostly in marine and evaporation setting), the sulfate, halide, oxide, sulfide, and phosphate classes, as well as element class containing metals and an organic mineral class (Dana Classification, 2012).

Now you may want to visit a page: Vedauwoo – Images, to find sharp boundaries between rocks, every conceivable gradation in texture and the rocks' composition. Vedauwoo is an area of granite rock formations located in southeastern Wyoming, United States. To further visualize images such as this, see Table 1.

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Table 1. An exercise in perspective

Visual Solution: Changing the Scale – An Ant Eye's Perspective
Imagine being very small, so the grain of sand or a small rock becomes a mountain for you. Looking on a grain of sand, a pebble, or a piece of rock, draw a mountain landscape with a horn-like rocky promontory, a sharp mountain ridge in the shape of an arête, and a rounded open space as a circus. What kind of a habitat would fit this picture with the rocks you have selected? And then, create drawings that show close-ups of grains to create an ant eye's perspective, a landscape that expresses in dark or light colors the characteristics of grains, such as size, rounding, size of components, and surfaces: rough, polished, or frosted. Maybe, each small-scale segment could be as big as a postcard; so then, all pieces could be put together as a mural showing the landscape drawn with a pen, placed at the top of these close-ups.

Biominerals

Seemingly simple definitions of familiar concepts, such as a mineral, may become controversial when the scientists take a closer look at the matter. Definition of a mineral began one of such objects of discussion when methods like the high-resolution genetic mapping and x-ray absorption spectroscopy could be used for examining minerals with a changed scale. A mineral can be an element or a compound; it may be amorphous or crystalline. More recent mineral classifications include an organic class that also takes in a very rare group of minerals with hydrocarbons.

Previously, only compounds formed by geological processes were regarded as minerals, while biogenic substances produced by life processes were excluded. However, many scientists agree that organisms are capable of forming minerals that could not be formed inorganically in the biosphere (Dana Classification, 2012). According to Skinner (2005), biominerals created by living