Mineral Showcase

Colemanite

$Ca_2B_6O_{11} \cdot 5H_2O$

Colemanite is a borate mineral found in alkaline lacustrine environments. Like most other borate salts, it occurs in interstratified lakebed deposits laid down in continental evaporate basins. In the Mojave Desert region, such borate deposits originated as precipitation from boron-rich solutions, ultimately found in the Furnace Creek Formation of Pliocene age (2-5 myo). Here, the boron itself, a rare element in the universe, was originally derived from underlying hot springs and fumaroles associated with Tertiary volcanics.

Colemanite is a secondary hydrous calcium borate derived from the alteration of such primary minerals as ulexite (sodium calcium borate) and borax (hydrous sodium borate). A source of borax—which, in the early years of the twentieth century yielded over half of the world's supply—it is still an important ore of boron, and was the most important source of that element until the discovery of kernite at Kramer in 1926. Ulexite is usually associated, and the colemanite is believed to have originated by its alteration.

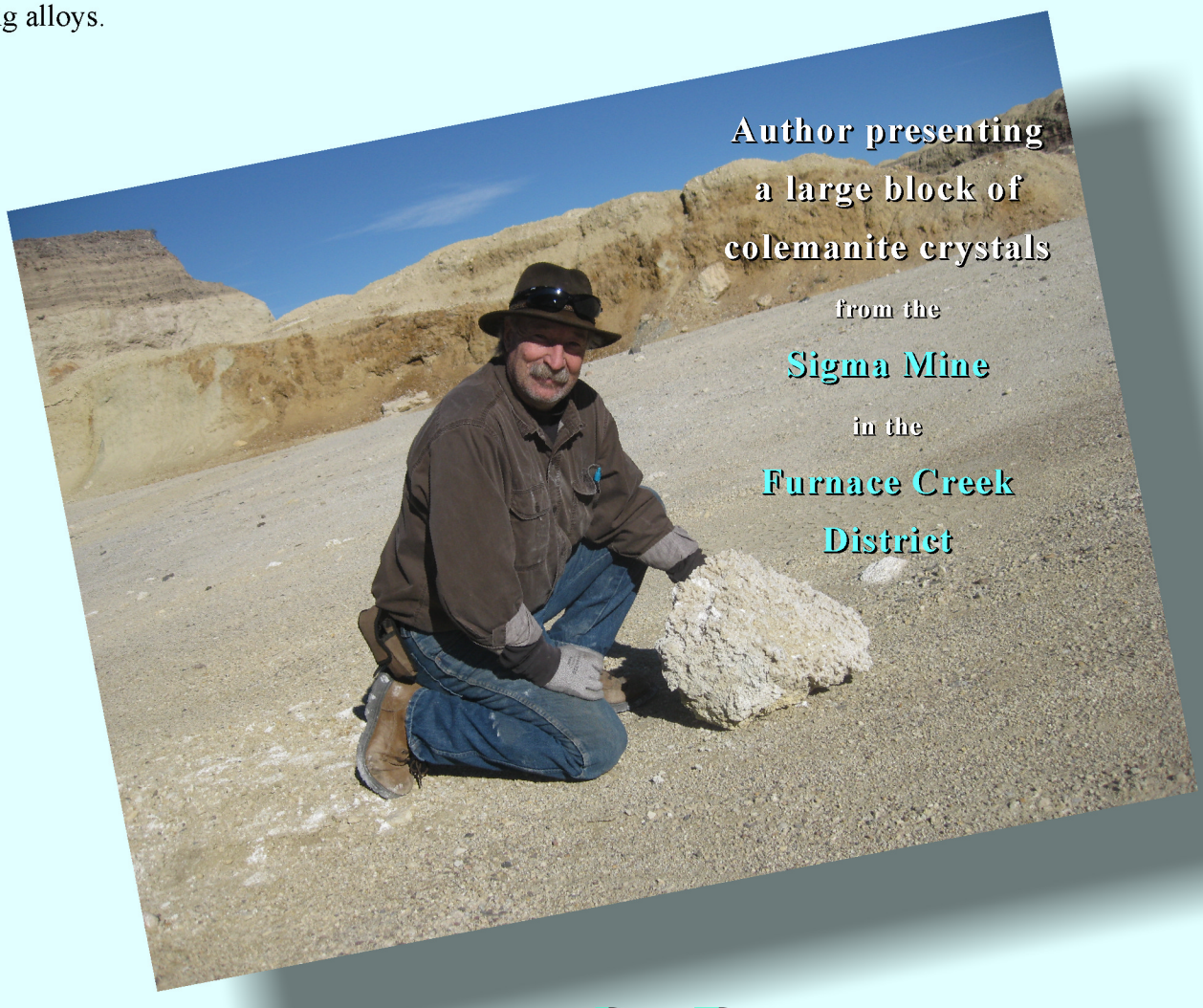
It is a semi-hard mineral (4.5 on the Mohs scale), light, with perfect side-pinacoid cleavage and a white streak. Though commonly found in distinct crystals—sometimes thin and platy; more often well-developed and equant—all colemanite specimens, even massive and granular varieties, are transparent to translucent with a sub-adamantine to vitreous luster, and usually fluoresce a pale cream color in shortwave UV light. Test samples will be insoluble in water, but soluble in hot hydrochloric acid; as the solution cools, white needles precipitate (boric acid). The specimens will fuse easily, decrepitate, and color the flame a yellowish green (see Tests for Boron, page 25).

An unusual and diagnostic characteristsic is the tendency for specimens in collections to collect dust on specific areas of crystal faces. Although colemanite's crystal symmetry should not promote such a pyroelectric quality, according to Frederick Pough in his **Field Guide to Rocks and Minerals**, Fourth Edition, page 164, "it seems probable that there is some structural lack of symmetry responsible for this." Crystal faces also have a very slick feel to the touch, which can serve as a clue to unknown specimens.

Ulexite, borax, colemanite, and kernite have successfully been exploited as sources of borax and boric acid. Most of the current production is from a deposit of mixed kernite and borax at Kramer, California, one of the world's largest borate producers. In the US, the mineral is found only in Los Angeles, Ventura, San Bernardino, and Inyo counties; expansive reserves are found in and near Death Valley. Global occurrences include Bigadic (Turkey), Atacama (Chile), Argentina, and Kazakhstan.

First described in 1884 from an occurrence near Furnace Creek in Death Valley, the mineral is named after William Tell Coleman (1824-1893), owner of the Harmony Borax Works where it was first found. At the time, Coleman had alternatively proposed the name "smithite" to honor his business associate, Francis Marion Smith.

Borax has many uses which depend on its easy solubility in water yielding an anticeptic solution, its low melting point, and its superior fluxing properties. Some of the common uses of borax and boric acid are in medicine, food preservation, disinfectants, deodorants, soaps, and soap powders. Borax is of considerable industrial importance as a solvent of casein and thus used in the manufacture of coated paper, plywood, plaster, paint, and calcimine. It is an essential constituent of tile and sanitary ware. It is also used in the manufacture of heat-resisting glass and as a flux in welding and soldering operations. Boron is increasingly important as a rocket fuel and as an ingredient in very strong alloys.



Colemanite

Specimen IX 28 D

Bladed spherical aggregates on borate/clay matrix.

Sigma Mine
Ryan, Ca

Death Valley National Monument

4 x 2.5 inches

Colemanite

Specimen IX 06 D

Drusy aggregate of equant crystals

Widow #1 Mine
Ryan, CA

2.5 x 1.25 inches

Colemanite

Specimen IX 34 D

Compact aggregate of blocky crystals..

Boraxo (Thompson-Tenneco) Mine
Ryan, Ca

Specimen 3.38 x 3.25 x 2 inches

All specimens from the G. Miles Lehman Collection

Classic Relationship Specimen

The Death Valley region is a famous source for many borate minerals, which are often found together in intimate association. This specimen features a classic relationship of tufts of fibrous Ulexite on a bed of Colemanite crystals from an unnamed prospect near the southern end of the national park. The mineralization occurred as a vein filling in the hanging wall of the host rock.

Specimen IX 02 D

1.25 x 1.5 inches

from the

G. Miles Lehman Collection