Moonmilk

In Bridgeport Cave, near Prairie du Chien, Wisconsin, one finds the ceiling coated with a white putty-like material. It is spongy and moist to the touch. It covers the hard bedrock to a depth of 1 inch over an area measuring 40 feet by 25 feet. This is an example of a mineralogical peculiarity called "moon milk". Moon milk occurs here and there in caves around the world. It has been known from caves in Europe since the middle ages. It was used as a wound dressing, and was renowned for its curative properties. What is this strange substance? What is the origin of its properties? And what does the moon have to do with caves?

The only relation of moon milk to the moon is through an accident of mispronunciation. The Swiss originally referred to this substance as "gnome milk" based on its color and the folklore about the tiny misshapen creatures that supposedly haunted mines and caves. The words "gnome" and “moon" are similar in German, and the term was mistranslated. The name, even though inaccurate, stuck.

Moon milk has today been analyzed by scanning electron microscopes and X-Ray diffraction. It consists mostly of tiny crystals of calcite. In caves where magnesium is available crystals of other minerals such as hydromagnesite, dolomite, huntite and nesquehonite are mixed in. The moonmilk at Bridgeport cave contains a. lot of hydromagnesite. The calcite in moon milk has a peculiar shape. It forms long microscopic rods with twisting ridges running up them like stripes on a candy cane.

When these minerals are dissolved away, there remains an organic residue that is a complex mixture of actinobacteria, mold and fungi. These organisms are crucial to the formation of moon milk. They grow where water seeps out of the rock and carries organic compounds from the overlying soils. The actinobacteria and other organisms feed on these and also interact with the calcium and magnesium from the water and underlying bedrock. The odd calcite rods, for example, have this shape because they are growing on the rod-shaped single-celled actinobacteria.

Moon milk thus represents the product of another biologic system living out of the direct influence of sunlight. Geologists have found such systems in lots of strange places such as in oil wells, salt domes, and hot spring and hydrocarbon seeps on the deep sea floor. Life seems to know no limits in its ability to survive in unexpected places on our planet.

The medieval physicians who extolled moon milk's curative properties were also correct. Some actinobacteria secrete natural antibiotics. We should have guessed it. Gnomes are notoriously ugly, but they are also supposed to be pretty long-lived and healthy.

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References:

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