HELICTITES - WHAT ARE THEY?

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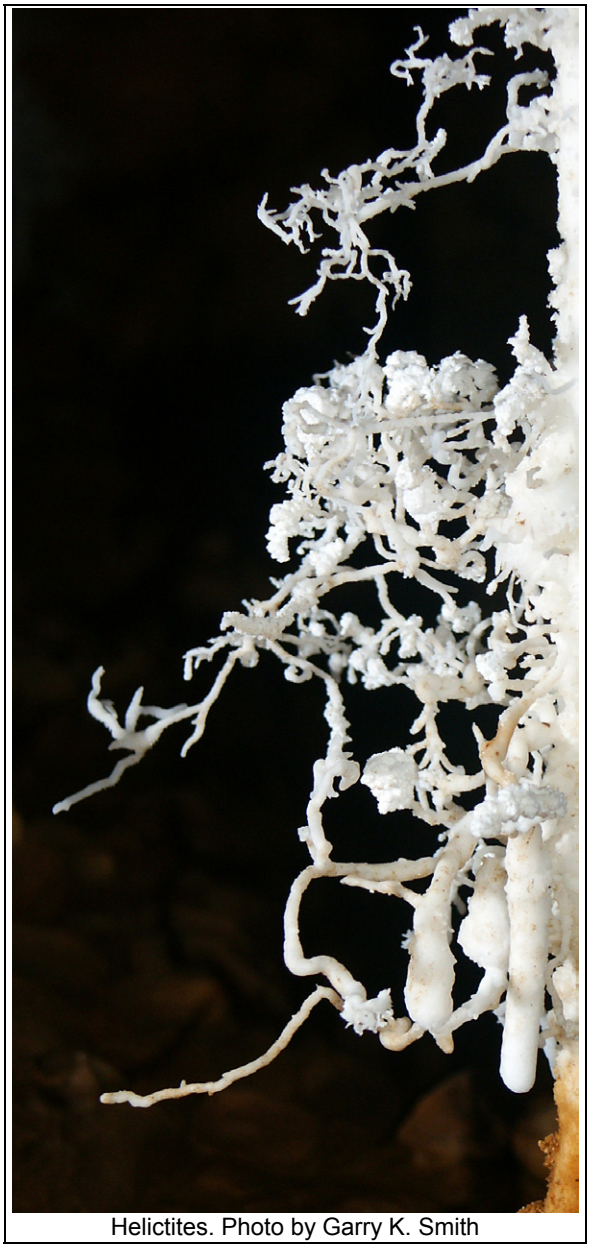
This form of speleothem is usually thin with twists and turns, giving the appearance of defying the law of gravity. The term "helictite" was first used by Dolley, C.S, in 1886 and is derived from the Greek word "helick", meaning to spiral.

Helictites may vary in diameter from less than 1 mm up to 15 cm and their length may vary from a fraction of a millimetre up to a reported 4 metres. They may combine with a straw or branch at any angle or thicken at the tip and form unusual shapes like butterfly wings, bell or hook. Another unusual variety looks like a pearl necklace and is called a "beaded helictite". It consists of tiny 0.5 to 2 mm diameter beads of aragonite along its length. However the most common form of helictite is reasonably thin and uniform in diameter with twists and turns through all angles. A helictite that grows upward from the cave floor is sometimes called a "heligmite".



Helictites. Photo by Garry K. Smith

Helictites can be classified under four general headings:- filiform, beaded, veriform and antler. They are usually composed of calcite or aragonite, however they have been known to grow less frequently from gypsum, anhydrite and some other minerals.

1. **Filiform** (thread-like) are generally less than a millimetre in diameter. They may be flexible and appear like hair filaments.
2. **Beaded**, consist of 0.5 to 2mm in diameter beads of aragonite arranged in a rosary-like or spiral fashion. They may be branched or spiral.
3. **Veriform** (worm-like) are the most common. They may spiral, branch, thicken or combine with straws.
4. **Antler** have straight stems which may branch and appear like antlers. These are helictites with a monocrystalline structure and there has been no rotation of the crystal axis during growth.

The method by which these speleothems develop has been a contentious point for many years. However the generally accepted theory is that helictites form from seeping water issuing from a minute opening. It appears that a porous rock face (usually covered with a thin carbonate coating or crust) is required for the beginning of helictite growth. A small hole (pore) may be forced through the crust by hydrostatic pressure allowing solution to escape. This minute amount of solution de-gasses, thus giving up carbon dioxide and causes the deposition of a carbonate film

around the pore. The moisture also evaporates at the same rate as it is being replenished. Because the seepage is so slow that a drop of water does not form, gravity does not affect the shape. In other words there is never enough water emerging at the extremity of the speleothem for gravity to overcome surface tension and get control of the water movement.

Carbonate continues to be deposited around the pore and the helictite begins to grow out from the wall. The feed solution may remain under hydrostatic pressure or it may revert to being drawn through the minute hole by capillary action. The growth rate is influenced by such factors as:- seasonal rainfall, ground water uptake of carbon dioxide and a number of other factors. However, hydrostatic pressure and capillary action either separately or combined are the key factors which control the growth of helictites.

Because all the solution evaporates at the tip, impurities are deposited along with carbonate crystals as well as stacking of wedge-shaped crystals, cause the helictite to spiral or branch. To a certain extent other factors may influence a helictites shape. These include:- air flow, evaporation, impurities in solution, intracrystalline seepage and water supply. Capillary canal enlargement may occur by dissolution during wet periods. This will increase the amount of water supplied to the helictite tip, so that a straw may form on the end of the helictite.

In 1987 came the first reported finding of helictites which grew under water. Although rare their discovery prompted the classification of helictites into two main categories:- Subaerial and Subaqueous.

Subaerial - meaning formed in contact with air and involves de-gassing and evaporation of the feeder solution.

Subaqueous - meaning formed under water. Several mechanism causing deposition have been suggested by a number of authors however it still appears to be a contentious issue.

All helictites have one thing in common, regardless of size, they grow by the calcite solution being fed to it's extremities along a tiny central capillary canal measuring between 0.008 and 0.5 mm diameter. This microscopic canal runs approximately central to the axis, but tends to favour the convex side of each curve. Some helictites may have secondary canals which radiate away from the central canal to feed solution to the outside, thus increasing the diameter.

Antler Helictites. Photo by Garry K. Smith

The growth rate and shape of helictites is a relatively complex issue and a large number of mechanisms may be involved at any one time, therefore the debate over helictites will continue to be a fascinating subject for years to come.

The main reference for this short article was:- *(Cave Minerals of the World , editions 1 & 2)*. For further reading on this subject, one can't go past this excellent publication.