LAVA STALACTITES: TERMINOLOGY, SHAPE AND POSSIBLE ORIGINS

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A number of different shapes of lava stalactites exist, and the different shapes are readily seen to reflect different origins. Five types are identified and discussed herein, and additional types undoubtedly exist.

Due to the difference in origin, it is important to recognize the different types of stalactites in studies of lava tubes. Terminology must be standardized, or detailed descriptions given, in order for those who study lava tubes to communicate clearly with one another. These five types of lava stalactites are:

1. Common stalactites, remaining relatively unmodified from separation of the roof crust; sometimes called stretched stalactites.
2. Remelt stalactites.
3. Lavacicle stalactites (type locality is Lavacicle Cave, Oregon).
4. Spatter stalactites.
5. Candle-dip stalactites.

For purposes of this paper, the controversy of whether forms that are non-solutional can properly be termed "stalactites" is dismissed as unsubstantial.

Common Stalactites:

These are lava drips that remain from the initial separation of the roof crust from liquid lava below. Since such drips can be expected any time that solid lava (above) separates from liquid lava (below), they are conceptually the commonest form of lava stalactites. The surface includes many vesicles, and is characteristically quite rough.

Remelt Stalactites:

Lava stalactites, or drip pendants, are lava drips that result from remelting of the ceiling surface. They are distinguished from common stalactites in that the individual stalactites are more clearly shaped. The surface is also smoother, and has less vesicles. Very few vesicles appear on the glazed surface of mature pendants. Modification of common stalactites by remelting results in drip pendants. Drip pendants can also form as a result of remelting of other lava surfaces, such as casts or broken faces. Remelt stalactites are tapered and have roughly pyramidal bases. Thoroughly remelted surfaces trap vesicles behind the remelted layer. The gas pressure builds up until it is able to blow off the soft remelted layer, making blowout pockets. Blowout pockets are also known as "pull-offs."

Lavacicle Stalactites

Lavacicle stalactites are generally cylindrical in shape or only slightly tapered, with little or no widening at the base. They resemble soda straws, and occasionally have "lava helictite" forms. Lavacicle stalactites are typically less than one inch in length, but have been reported up to several feet in length. The term "lavacicle" appears to have been coined by Phil Brogan of Bend, Oregon in about 1923, and (according to him) was intended to pertain to both stalactites and stalagmites.

Lava stalactites of this variety were described by Dana (1889) and his description included drawings showing concentric rings on the outside of the stalactites. Dana offered no guess as to the origin of the rings, which he termed "transverse markings." A similar modern study of lavacicle stalactite mineralogy by Baird (1982) refers to growth rings," but offers no elaboration. The author asked Baird at the formal presentation of Baird's paper what the origin of the growth rings might be, but Baird insisted he had "no idea." Longitudinal grooves, as well as concentric rings, have been observed on the outside of lavacicle stalactites. Although he does not mention the rings or grooves, Perret's posthumously published book (1950) states that this type of stalactite is ". . . in part, at least, gas-impelled . . ."

Independently, and before knowledge of Perret's view, J.W. Harter III and the author concluded that lavacicle stalactites:

1. Are extruded by expanding gas bubbles.
2. The concentric rings represent minute pauses as the stalactite is extruded.
3. The longitudinal grooves, and slight tapering (increase in diameter toward the base) remain from the extrusion process.
4. Grow at the base, rather than at the tip.
5. Are not surface remelt phenomena.
6. Have "roots" extending up into the ceiling.

Also independently, Lawrence Chitwood concluded, after study of the stalactites in Lavacicle Cave, that they were extruded, and that there are small cavities in the roof above lavacicle stalactites.

Lavacicle stalactites form stalagmites below them when lava drips to the floor. The stalagmites formed below lavacicle stalactites are composed primarily of bubbles of lava with large vesicles. By contrast, stalagmites formed under remelt stalactites are much smaller in size, and are composed primarily of solid lava drips. If they do not adhere to the floor, the lava drips can sometimes be found unattached. Unattached lava drips, incidentally, may be more rare than calcite cave pearls in limestone caves and they are similarly susceptible to theft.

Spatter Stalactites:

Spatter from molten lava that accumulates on the underside of a roof or other overhang can collect and drip, making

stalactites. These stalactites are typically irregular and lumpy. They are found inside spatter cones, as well as in lava tubes.

Candle-Dip Stalactites:

These stalactites are larger in diameter and more massive than those described above. When a broken one is seen in cross section, it is found that the stalactite is built up of alternating layers of lava and large gas bubbles. The lava layers sometimes have a thin rind on the outer side from remelt. The candle-dip stalactites are named such because they appear to form by the lava level rising and falling repeatedly, coating the stalactites. The process is similar to candle-making where thin layers of wax are repeatedly added by dipping the candle into molten wax. Candle-dip stalactites are comparatively unusual. The author knows of two localities at Diamond Craters, Oregon, and one at Pisgah, California. In the caves at Diamond Craters, the candle-dip stalactites are in chambers that did not have large amounts of through-flowing lava. In the one cave at Pisgah, the candle-dip stalactites are located on one wall of a passage that had through-flowing lava.

DISCUSSION

Dr. William R. Halliday pointed out what might be considered an additional type of lava stalactite. Blade or ribbon-shaped stalactites have been noted in Lake Cave, Washington (Halliday 1963).

Donald Peterson and Lawrence Chitwood each expressed the opinion that candle-dip stalactites should not form in lava conduits, since they would be swept away by the flowing lava.*

Giuseppe Licitra expressed the opinion that volcanic gas emitted from lava as its flows cannot be hot enough to remelt the walls and ceilings of a lava tube. He said that remelt is evidence of combustion.

*Editor's note: They are present in the Lava Bridge System, Klickitat County, Washington, which contains other features typical of lava conduits..

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