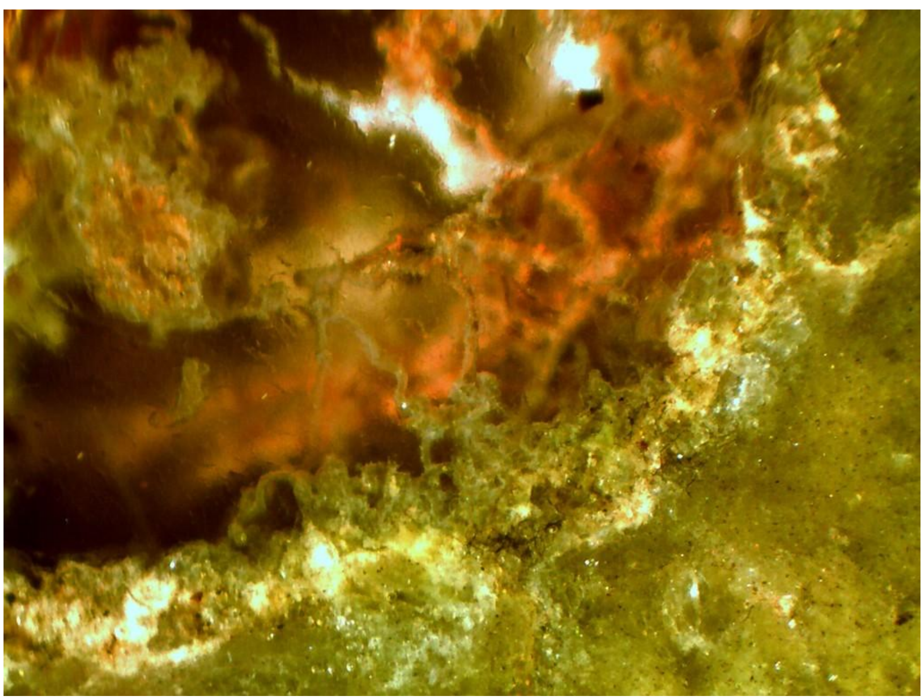
Bacteria Inclusions Rebuttal of Dr. Jenz Goetze, Agates III

On pages 120-128 of Agates III, Dr. Jenz Goetze argues that a variety of acicular and tubular structures are biosignatures of cellular bacteria preserved in silica. I make the complaint briefly here that some scientists refuse to study the clay systems of allophane-imogolite, halloysite, illite, and kaolinite, which are all well-documented tube-forming clays. These mineraloids (slightly crystalline, mostly amorphous compounds) allophane and imogolite are particularly fascinating since they hold so much water (up to 30%) that they are transparent, so hit an emotional and cultural cord with some scientists who wish to attribute them to bacteria. This is part of the argument that agate forms from weathering at exceedingly low temperatures, and so is within the range of biological systems (<95 C).

Shown below, you are looking at fossil bacteria in this Lucky Strike specimen, according to the German literature. Just zoom in to a section that does not show tubes connected to the lava shell at the bottom of this photo and you have a classical photo circulating in several European journals at this time. Unfortunately, the shell of this geode is clearly celadonite and silica rich with phenocrysts of quartz. The peppered texture is close to pumice, which may have produced so much of the silica to mix with the celadonite. The inner wall shown here also shows that this celadonite silica shell is the seed source for the small tubes to the silica center, which is from the diagonal center to the top and continues off camera. Off camera and in the central background, the tubes are all red moss, but they are the same tubes.



Lucky Strike Thunderegg core, at 40x. The shell is silica and celadonite with phenocrysts of quartz. The tubes come right out of the silica shell into the silica center of this thunderegg. Allophane-imogolite can alter to halloysite, another tube-forming clay.

An Ochocos, OR agate. This agate is a system of curtain agate and tubes—two forms of halloysite clay consisting of tubes, and partially to completely unraveled tubes. See a partially unraveled tube on the middle-left edge. While the large clay tubes are completely ignored in the literature as clay and are just considered ambiguous anomalies, their smaller cousins are commonly associated as bacterial structures. Even though assays of the small tubes have been conducted several times indicating phyllosilicates (clays), what this means is simply reported and discarded since scientists don't want to state that agates form commonly with the clays.

From lab data, others studying nanotubes have made halloysite tube structures at 575 C, on the ultra-supercritical water boundary. Three kinds can be made: tubes, unfurled tubes, and cones at that temperature. These match all of the clay inclusions in the Oregon thundereggs we see.

In the literature there is argument over the formula for allophane, which is mostly amorphous and water-rich. Like imogolite, its tube cousin, these can hold enormous amounts of water, up to 30%. There are three other silica compounds sometimes called minerals that have very close formulas. We add iron to a silica water complex and we get hisingerite. We add manganese to this complex, we get neotocite. We just have more silica, we get hyalite. The broad formula is: (Mn, Fe, Mg) $SiO_3 \times H_2O$. From what I can see, we have a cation (positively charge ion) adsorption list with this complex, and it can explain all the tube mineralization forms we see. We can explain black manganese microspheres (in the Brazilian agates), the red microspheres (seen in banded agates, such as the thundereggs from the Baker Mine, NM) with this system. Now, if you go to mindat.org, you see fire agate pictures when neotocite is listed. In other words, the "limonite and silica" definition is in this allophane system.

Photo of the shell of a Brazilian amygdule. These joined spheres match the intermediate systems of allophane-imogolite (proto-imogolite) where allophane forms spheres and imogolite forms tubes. Chaining the spheres to make tubes would seem to be a reasonable process for this transition, but this hits a strong emotional cord in European science that starts to call these cocci bacterial systems. More spheres are attached to the inner wall of this amygdule on the right. Original 40x photo on top, cropped and zoomed on bottom. Many times these form radial, acicularly aligned sprays of spheres and tubes. The critical detail that no bacterium makes this structure, but many clays do, is simply discarded in the literature. It's not even discussed as an issue.

The fire agate has botryoids that are both radial and concentrically banded. Yes, they match the structure of cristobalite, a high temperature quartz. You can see where this leads. It can be shown that an allophonic system forms from silica-rich pumice and ash systems and forms very early after eruptions. Allophane survives less than 10,000 years in volcanic rock before being altered to something else. These are not systems <95 C, the upper limit of biological systems and they are not formed in silica that took millions of years to be deposited. There is a complete, very straightforward suite of allophanes-imogolites that define what we see that does not require a leap of faith to a biological genesis to explain any of it. Most sadly of all though, I have never yet seen a single research paper where the author first considers and then disproves that the clay tube forming minerals could be a source of these structures. It is not crystal quartz so the hell with it, it is biological is an enormous and unfounded leap of faith we get to read. The allophanes and imogolite present two problems to European geologists. First, the presence of clays in their agates makes them rocks. All of the clays are found in the agates. Second, these structures cannot form over millions of years. They have to form in a solid silica gel mass.

Thirdly, there is another system of chemical compounds that is ignored. This is the study of morphologies, or shape-types that are only weakly crystallographic, and occur in aqueous gel systems, and plastic state melts. If you make tubes in a melt, it is called a symplectite. If you make tubes in a silica gel it is called bacteria, because to the Europeans, clays in agate gels do not exist, gels do not exist, clays do not exist in agates, and all inclusions are post-genetic accidents that occurred after the silica formed. However, for those that do consider the possibility that clays can form in agates, you will find that all the morphologies of the clays are found there. Will the clays be studied in agates anytime soon? Probably not, as the formation of a silica-clay gel makes it a rock. This change of thinking simply is not going to occur anytime soon and so we will continue to be entertained with research journals and research papers on who has found the earliest life on earth as evidenced by the allophonic-appearing structures in Precambrian rocks.