**Microbialites: A Brief History**

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Microbialites have a relatively long history of study. This is a capsule summary and unfortunately hast to leave out some important landmarks. Structures that today would be regarded as microbialites have been known for a few hundred years. The first impactful study was probably James Hall’s 1883 description of *Cryptozoan proliferum*, which helped to establish that such structures are fossils and introduced the application of binomial nomenclature. Kalkowsky (1908) called such structures stromatoliths and considered them organic. In 1914 Charles Walcott posited that cyanobacteria were responsible for their development. In the subsequent decades, numerous studies reported on stromatolites, gave many of them binomial names, while some studies questioned the appropriateness of the names. The 1950s and 1960s were major turning points in microbialite studies. First, the Shark Bay microbialites were discovered in 1954 and soon used as living analogs to ancient microbialites. Second, stromatolites were found useful for biostratigraphy in the Proterozoic deposits of the Soviet Union. Similar studies were carried out elsewhere, notably Australia, China, Africa, and India. Binomial names were given to the stromatolites. This and their biostratigraphic utility was and still remain controversial. Post-1960 research started to shift away from ancient microbialites to modern microbialites and the microbes that build them. Prior to this, cyanobacteria were considered the principle microorganism responsible for the structure. This largely remains true today. But, geobiological studies of modern microbial mats (precursors to microbialites) reveal that they are created by metabolically diverse, complex, microbial communities. One metagenomic study found 752 species from 42 bacterial phyla in a microbial mat!

What of the future? Studies on the microbial components of microbialites will continue. We will get a better understanding of the dynamics in the communities. Mars rovers will try to image structures that might be microbialites. The search for the oldest microbialites will continue. I think the real challenge is producing a general theory of microbialite morphogenesis.