

PRECAMBRIAN (PROTEROZOIC) FOSSILS AND DUBIOFOSSILS

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The Proterozoic spans geologic time between exclusively moneran biotas of the early Proterozoic to the Cambrian radiation event with its complex and diverse invertebrate fauna. The latter part of the Proterozoic appears to be a time of experimental life forms, the fossil record of which appears to be only partially known and is still poorly understood. Discussed is a selection of problematic Proterozoic fossils and dubiofossils obtained from various Proterozoic terrains.

1. Black sandstone boulders found on the west fork of the Black River in the western part of the Precambrian St. Francois Mountains region of Missouri yield the structures displayed here. These are tentatively interpreted as fragments of algal mats similar to the calcareous mats responsible for Ozarkcollenia, a stromatolite associated with mid Proterozoic tuffs which crop out nearby. These structures have also been compared to foliose lichens and to radial forms of the ediacarian biota.

2. Newlandia concentrica Walcott 1914 and Copperia tubiformis Walcott 1914. Distinctive and morphologically complex structures originally described by Charles D. Walcott from the Belt Series of the Belt Mountains of Montana are currently placed as pseudofossils in the treatise of invertebrate Paleontology. From newly discovered outcrops as well as examining those studied and collected by Walcott, it is apparent that Newlandia and Copperia formed reefs in the Newland Limestone of the Belt Series. These structures, as such, are biogenic in origin and are believed to represent distinctive and unique types of stromatolites. Probably most of the structures described by Walcott in his Precambrian Algonkian Algal Flora, 1914, are valid stromatolitic form genera and are not pseudofossils.

3. Chauria circularis Walcott 1899. Three dimensional specimens of these problematic Proterozoic fossils are displayed from the Greyson shale of the Big Belt Mountains of Montana. Usually preserved as compressions or carbonaceous films, these specimens have retained their three dimensional form as a consequence of calcite or aragonite emplacement after burial. Chauria probably is a form produced by cyanobacteria similar to moranids.

4. Mottled moneran? mats. Distinctive mottled patterns restricted to specific layers of bedded felsic tuffs occur in water lain pyroclastic sequences of the St. Francois Mountains of Missouri. These problematic structures are suggested to represent the traces of moneran communities which may have lived on damp surfaces of volcanic ash. Organic material of these moneran mats caused local conversion of ferric iron to ferrous iron and its consequent leaching where organic matter occurred produced the mottled pattern of the demonstrated specimens. Bedding planes associated with these patterns also exhibit fossil rain drop impressions and dessication cracks suggesting a possible terrestrial depositional environment of the tuffs. As such these structures might represent one of the older "evidences" of terrestrial moneran communities.

5. Near vertical "burrows" in Quartzite. The early Proterozoic Medicine Bow Quartzite of the Medicine Bow Mountains of Wyoming yields problematic metazoan-like burrows as discussed in the Journal of Paleontology by Kauffman and Steidtmann, 1981. The burrow-like structures exhibited are somewhat different from those discussed by Kauffman and Steidtmann, 1981. Large thin sections exhibited of these fossils show them to be composed of nested cones suggesting that these structures may be explained as a type of peculiar stromatolite either developed in sandstone or sandy carbonate rocks which were later silicified.