

Phosphate replicated and replaced microstructure of molluscan shells from the earliest Cambrian of China

Weimin Feng and Weiguo Sun

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The earliest Cambrian Meishucunian phosphoritic succession in eastern Yunnan, China, contains well-preserved molluscan shells that offer insights into the early evolution of skeletonization. Phosphate internal moulds, phosphate replaced originally carbonate shells, and phosphate coatings show lamello-fibrillar structure, prismatic structure, and regularly foliated structure. The lamello-fibrillar structure appears earlier in the fossil record than laminar structures such as nacreous or foliated structures. It has been identified in fossil mollusks, which occur in China as early as the lower phosphate layer of the Zhongyicun Member of the Meishucunian. Therefore, the lamello-fibrillar structure appears to be primitive in mollusks. The lamello-fibrillar and prismatic aragonite is the most common shell material of molluscan skeletons in the Early Cambrian Meishucunian and equivalents around the world. Although the early molluscan microstructure is not so diverse as that of extant mollusks, it may be of use in high rank taxonomic classification as shown by the early conchiferan mollusks discussed here. These mollusks are characterized by the horizontal fibrillae that are layered and parallel, and thereby differ from hyoliths, in which the horizontal fibrillae appear to be in the form of the bundles of fibres that can branch or anastomose.

Key words: Mollusca, small shelly fossils, microstructure, biomineralisation, Cambrian, Meishucunian Stage, China.

Weimin Feng [fwm@jlonline.com] and Weiguo Sun [weiguo@jlonline.com], Nanjing Institute of Geology and Palaeontology, Academia Sinica, 39 East Beijing Road, 210008 Nanjing.

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