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A Carboniferous chiton (Mollusca, Polyplacophora) at the end of its trail: a unique find from the Czech Republic

M. Pavla^a, R. Mikuláš^{b*}, A.K. Rindsberg^c

^a Czech Paleontological Society, Na pastvisku 10, 74705 Opava, Czech Republic

^b Institute of Geology, Academy of Sciences of the Czech Republic, Rozvojová 269, 16502 Praha 6, Czech Republic (^ presenting author; *corresponding author)

^c Biological & Environmental Sciences, Station 7, University of West Alabama, Livingston, Alabama 35470, USA

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An exceptional find of a chiton preserved at the end of its locomotion trace comes from the Culm Facies, i.e. turbidity-controlled dark shales, greywackes and sandstones. The chiton trace is a smooth, rather indistinct, 7–8 mm wide bilobate ridge (convex epirelief), forming an incompletely preserved loop of estimated extent 5 × 8 cm. At its end is preserved a completely articulated chiton *Proleptochiton* sp., 4.0 mm wide and 11.5 mm long, oriented congruently with the trace. The neighbouring strata provide relatively frequent ichnofossils, e.g., *Chondrites* isp., *Planolites* isp., *Dictyodora liebeana* (Geinitz) and *Diplocraterion* isp.

The chiton trace fossil corresponds to ichnotaxa that have historically been compared to modern gastropod trails. The gastropods are well-known for two different monotaxic locomotion techniques, one for hard substrates such as glass, and another for soft substrates, where the animals move through muscular waves of much higher amplitude than observed on glass. Thereby, adhesion useable for the movement on the hard surface is functionally replaced with friction. Loosening of the sediment by rapid moves of foot muscles is the cause of the structure's convexity, i.e. increasing volume. Similar behaviour is documented in chitons.

The studied specimen is the first locomotion trace fossil attributed to polyplacophorans.

The find documents the burrowing technique of chitons in deep-marine, turbidity-influenced soft substrate during the Viséan (330 Ma). It demonstrates the similarity of chiton and some gastropod traces in soft substrates, and adds to the lengthening list of animals that were fossilized within their traces.

