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Acanthodian fish trace fossils from the Early Devonian of Spitsbergen

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We describe and interpret *Undichna septemsulcata* isp. nov., from the fluvial Old Red Sandstone deposits of the Early Devonian Wood Bay Formation, of Northern Spitsbergen (Svalbard). Its delicate scratch pattern, comprising one unpaired median groove and three pairs of lateral grooves, all with a regular in-phase sinusoidal wave pattern of equal wavelength, allow the reconstruction of the number, position and relative spacing of the fins. The comparatively high-amplitude median groove is attributed to the main propelling action of the tail or caudal fin, the inner pair of the lateral grooves to the action of the pelvic fins, and the low-amplitude outer set of duplicate grooves to bifurcated pectoral fins, respectively. The in-phase geometric pattern is explained by a distance between the unpaired fin (caudal or anal fin) to the pectoral fins corresponding to one wavelength and a position of the pelvic fins half way in between. The direction of movement and the mode of locomotion of the trace maker (a carangiform to ostraciiform type) are deduced. This analysis is leading to an acanthodian (possibly *Diplacanthus*) as the most probable trace maker. By being Pragian or early Emsian (Early Devonian) in age, according to vertebrate and palynomorph biostratigraphy, these specimens are among the world's oldest trace fossils made by a vertebrate.

Key words: Trace fossils, fish trails, Undichna, Acanthodii, Old Red Sandstone, Devonian, Spitsbergen, Svalbard.

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