

LOWER CAMBRIAN *RUSOPHYCUS* FROM ARCTIC CANADA: ICHNOFOSSIL OF A PREDATORY, NON-TRILOBITE ARTHROPOD

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*Cruziana* and *Rusophycus* are commonly assumed to be trilobite trace fossils, although skeletal evidence is almost always absent from host strata. In the Lower Cambrian Dallas Bugt Formation of Ellesmere Island, Arctic Canada, high-energy *Skolithos*-bearing sandstones are overlain by bioturbated, argillaceous, medium-grained glauconitic sandstones of lagoonal aspect, yielding *Rusophycus* along with an assortment of other 'worm' burrows including *Skolithos*, *Diplocraterion* and *Rhizocorallium*.

Many specimens of *Rusophycus* preserve the impression of the carapace—not of a trilobite, but of a strongly transversely vaulted arthropod with a blunt prow that arches to a small portal, and a broad, triangular dorsal outline  $\leq 7$  cm across. About 20 pairs of limbs were closely spaced and were attached to the body along the carapace and the anterior part of the thorax; they were undifferentiated but lengthened posteriorly, although none extended beyond the carapace. Legs bore two small claws. Scratch patterns suggest legs were used in unison, the anterior ones starting with a V-angle of  $140^\circ$  and decreasing posteriorly to  $90^\circ$ ; rarely they were steeper, at  $60^\circ$  to  $20^\circ$  respectively. Legs were strong and pulled inwards either straight or in a slightly convex-forward arc, but were flexible enough to wiggle around obstacles. Subsequent reburrowing produced cross-cutting and opposed scratch marks. No evidence for exopodal brushings is present.

The arthropods dug into the sediment typically at an angle of  $\leq 45^\circ$ , usually horizontally but at times sideways. Overlapping carapace imprints and transverse 'ribs' suggest an often furious, repeatedly plunging motion as the animal pushed deeper and typically pulled backward in the sediment, likely with the leverage of a strong thorax and wide telson. This is consistent with a predatory mode of life, and probably the arthropod was hunting infaunal worms.