

The *Diplichnites aenigma* enigma: Ichnotaxonomic implications of a restudy of Dawson's type locality at Coal Mine Point, Joggins, Nova Scotia

Matt Stimson¹, Andrew MacRae¹, John Calder², Brian Hebert³, Don Reid⁴, and Len Reid⁵ - 1. Department of Geology, Saint Mary's University, Halifax, Nova Scotia B3H 3C3, Canada <Andrew.MacRae@smu.ca> ¶ 2. Nova Scotia Department of Natural Resources, Halifax, Nova Scotia B3J 2T9, Canada ¶ 3. Lower Cove and Joggins, Nova Scotia B0L 1A0, Canada ¶ 4. Maccan, Nova Scotia B0L 1B0, Canada

In 1862, Sir William Dawson, while exploring the celebrated Coal Mine Point strata at Joggins, Nova Scotia, discovered the first example of footprints that would later be attributed to the largest terrestrial invertebrate in the fossil record, *Arthropleura*. Dawson later named the trace fossil *Diplichnites aenigma*, the first species of the new *ichnogenus* *Diplichnites*. Unfortunately, no type specimen was selected, presumably due to the gigantic size of the sandstone blocks at Coal Mine Point that preserve these traces. The lack of a type specimen for Dawson's trackway, its illustration only as a wood cut drawing, and a limited description have caused major problems for ichnotaxonomists over the past 150 years. In light of the nonexistent type specimen, a new ichnospecies (*D. cuithensis*) from Arran, Scotland was erected, abandoning Dawson's species because of these uncertainties. More recent exploration since the 1960s by multiple researchers has added new specimens of *Diplichnites* for study. Key specimens recovered by the late Dr. Laing Ferguson, Bob Grantham, and recent exploration by the authors permit an ichnotaxonomic re-evaluation of the ichnogenus and its original type species. New observations from the type horizon at Coal Mine Point, supplemented by specimens elsewhere from the Joggins Formation, have also shed new light on the morphological variability of *Diplichnites*. These observations better circumscribe the type by accounting for underprint fallout, gait variability, substrate variability and microbial mat sediment stabilization. This work lays the foundation for a long-overdue reevaluation of all *Diplichnites* and related arthropod ichnospecies.