Tetrapods from the Tournaisian of Nova Scotia, Canada and northern Britain: new evidence of tetrapod diversity in the Early Carboniferous

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Tetrapod trackways have been known from the Tournaisian Horton Bluff Formation at Blue Beach, Nova Scotia, for more than 170 years. An extensive new collection of tracks and trackways from several localities in the Horton is now the oldest known diverse tetrapod ichnofauna, with 5 footprint morphotypes, including a smaller *Batrachichnus*-type, suggesting a 0.2 m or smaller trackmaker. Tetrapod body fossils were first found there in the 1960s, but only over the past 15 years has the extraordinary richness of the locality been realized. Regular walking of the beach has revealed a wealth of new material in the talus from the eroding cliffs. Many isolated tetrapod limb and girdle bones have been collected, but diagnosable skull and axial elements are rare. At least four taxa have been identified so far, including one with an *Acanthostega*like femur and another with a *Tulerpeton*-like femur. This may be evidence that Devonian-grade tetrapods continued into the Early Carboniferous. All the diagnostic tetrapod remains are from larger animals, in the range 0.5–1.5 m long. This contrasts with the tetrapods discovered recently from nearly coeval deposits of the Ballagan Formation in the Tweed Basin of northern Britain where, alongside large individuals, much smaller adult forms c 30 cm long are present. These would match the sizes of some of the small tracks from Blue Beach. The associated vertebrate fauna at Blue Beach includes rhizodonts, elasmobranchs, large and small actinopterygians, and several acanthodian groups (scarce gyracanthids, rare climatiids, and abundant acanthodidids). Lungfish are very rare. This differs from that of the Tweed Basin fauna where gyracanthids are common, lungfish are diverse, actinopterygians are small and elasmobranchs are almost entirely absent. These differences probably reflect contrasting geological settings. The Horton Bluff Formation is interpreted as accumulating in marginal marine conditions, and many of the vertebrate bearing horizons appear to be storm deposits. The Ballagan Formation in the Tweed Basin is interpreted as deposition on extensive low-relief vegetated coastal-alluvial plains. There is evidence that both were in close proximity to upland areas. Vertebrate fossils have occasionally been collected from other localities in the Horton Bluff Formation in the Minas Basin. Experience in the Tweed Basin suggests that this augurs well for the prospect of future Tournaisian discoveries in Nova Scotia and other parts of the world.

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