

Late Carboniferous Tectonics and Sedimentation In Stellarton Gap, Nova Scotia

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Stellarton Gap lies between two Avalonian terranes, the Cobequid and Antigonish Highlands. The Carboniferous rocks which underlie it are cut by two major fault systems, the Cobequid and Hollow Faults. These respectively form the southern and northwestern boundaries of the Avalonian blocks. Upper Carboniferous sedimentation patterns are clearly related to these faults. The reddish New Glasgow Conglomerate (Westphalian B) was shed northward, away from them, into Stellarton Gap. Grey sandstones and reddish shales of the overlying "Merigomish Formation", the lowest unit of the Pictou Group (Westphalian C-D), were also shed northward. Grey and red shales and sandstones of the partly time-correlative Stellarton Formation (Westphalian B-C) were deposited in a graben bounded by the fault systems.

Knowing the sense, timing, and extent of movement on the Cobequid and Hollow Faults is critical to interpretation of the late Carboniferous stratigraphy. Observations of minor structures along the faults consistently indicate overall dextral displacement in response to regional northwest-southeast compression. Movement began in Westphalian B time (ca. 306 Ma) and probably ended in Westphalian D time (ca. 296 Ma). The offset of Devonian volcanics on the Cobequid Fault, and Silurian strata on the Hollow Fault, suggests about 20 km

of displacement.

The New Glasgow Conglomerate represents a series of coalesced alluvial fans developed along the fault system. The Merigomish Formation is an alluvial plain sequence characterized by low sinuosity channels. An increase in suspended load deposits upsection suggests that braidplain conditions gave way to an anastomosing(?) regime. Thin oil shales and stromatolitic limestones in the lower part of the formation are lake deposits. The Stellarton Formation comprises mainly lacustrine and deltaic deposits. Scarcity of coarse clastics, except near the graben margins, suggests that subsidence was gradual, with relatively little relief developed. Red-bed members represent periods in which subsidence was relatively slow, or of dry climate and lower water table. The coal- and oil shale-bearing grey-bed members accumulated during episodes of more rapid subsidence, or of more wet climate and elevated water table. Interpretation of the fault-bounded basin, in which the Stellarton Formation was deposited, as a rhomb graben is supported by the orientation and sense of movement on second-order structures within the graben.

The observations outlined above may help to elucidate the relationship between tectonics and sedimentation in other late Carboniferous basins of the Maritimes.