A Paleozoic Northwest Passage and the Timanian, Caledonian and Uralian connections of some exotic terranes in the North American Cordilleran

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Paleozoic to early Mesozoic terranes of the North American Cordillera originated in three distinct regions in Paleozoic time: the western peri-Laurentian margin, western Panthalassa, and the northern Caledonides-Siberian region of the eastern Arctic. Terranes of inferred Arctic affinity form an outer belt within the northern Cordillera, including Arctic Alaska, Farewell and Alexander. Correlatives farther south include parts of the Eastern Klamath and Northern Sierra terranes. The geological history, fossil and detrital zircon provenance data for this set of terranes show strong correlations and linkages among them, as well as many key features in common with the northern Caledonides, the Timanide orogen of eastern Baltica, the Polar Urals and northern Siberia (Taimyr). They probably occupied an intermediate position between northern Baltica, northeastern Laurentia and Siberia, in proximity to the northern Caledonides in early Paleozoic time. Westward dispersion of these terranes is interpreted to result from development of a Caribbean/Scotia-style subduction system between northern Laurentia and Siberia in mid-Paleozoic time – the Northwest Passage – following closure of the Iapetus ocean between Laurentia and Baltica. Diachronous orogenic activity from Late Silurian in Arctic Canada to Early Devonian in north Yukon and adjacent Alaska records passage of some of these terranes. Westward propagation of a narrow subduction zone coupled with a global change in plate motion, linked to closure of the Rheic ocean, are proposed to have led to initiation of subduction along the western 'passive' margin of Laurentia. This is recorded by the Middle to Late Devonian initiation of arc magmatism along western Laurentia and the Late Devonian to Early Mississippian Antler orogeny in the western U.S. and Ellesmerian orogeny in the Canadian Arctic. The Farewell terrane, with its Early Permian, northern Uralian overprint, may have been transported from the Arctic region into Panthalassa as the Northwest Passage and the Uralian Sea closed in Pennsylvanian-Permian time.