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West and East Ganderia in the northern Appalachians and Caledonides, respectively, represent a Gondwanan superterrane situated along the Tornquist margin of Amazonia prior to Furongian drift into the Iapetus Ocean, which opened the Rheic Ocean from west to east. The ocean-facing Penobscot arc-backarc system was established by 515 Ma in West Ganderia. A correlative arc formed at ca. 480 Ma in East Ganderia. In West Ganderia, the Tremadocian Penobscottian orogeny involved closure of the Penobscot backarc basin. Tremadocian Monian tectonism in East Ganderia was mainly related to oblique accretion to East Avalonia and the Megumian Cymru terrane. Penobscottian and late Floian Monian orogenesis led to termination of Early Ordovician arc magmatism, probably due to shallow subduction of buoyant oceanic lithosphere. Early to Middle Ordovician arc-backarc systems were erected on Penobscottian-Monian modified West and East Ganderia. The active edge of West Ganderia accreted diachronously to peri-Laurentia between 475 Ma and 455 Ma, followed by Wenlock to Ludlow Salinic accretion of the inboard Gander margin through closure of the intervening backarc basin. In the Caledonides, East Ganderia and East Avalonia accreted to Laurentia during the correlative Wenlock Scandian orogeny. The Ordovician to Silurian tectonic evolution of Ganderia was markedly non-cylindrical with pronounced partitioning of Salinic-Scandian convergence. Pridoli to Lochkovian closure of the Acadian seaway in the northern Appalachians led to Acadian accretion of West Avalonia to composite Laurentia. Shallow Early Devonian underthrusting of West and East Avalonia beneath Laurentia produced widespread Acadian tectonism and voluminous Early Devonian Acadian magmatism. The Appalachian Meguma terrane formed part of Megumia, which probably formed originally adjacent to East Avalonia and West Africa. The Meguma terrane accreted dextrally to Laurentia during and after the late Emsian to Famennian Neoacadian orogeny, mainly driven by outboard subduction of the Rheic Ocean. No correlative terrane docking took place in the Caledonides.