Tectonically transported basement and platform units in the Stephenville area, western Newfoundland

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The Humber Zone of western Newfoundland represents a Cambrian to Middle Ordovician passive continental margin above which the Humber Arm Allochthon was emplaced in Middle Ordovician ('Taconian') time. In the Stephenville area, Lithoprobe deep seismic profiles show sub–horizontal reflectors extending beneath outcrop of Grenville age basement rocks in the Indian Head Range. These observations indicate that the outcropping passive margin sedimentary successions and their basement represent a later assemblage of thrust sheets here termed the Port au Port Allochthon. Cambro–Ordovician platform successions are exposed at Table Mountain, and in the Phillips Brook and North Brook anticlinoria. Platform strata at Table Mountain are affected by west and east vergent thrusts and reverse faults. Structural repetitions occur within platform rocks along the western edge of the Phillip's Brook Anticlinorium. Platform rocks are thrust over the Taconian Humber Arm Allochthon in this area. East–dipping thrusts occur on the western edge of the Indian Head massif, placing Grenville gneisses above Cambrian sedimentary rocks. Thrust–related structures are cut by steep faults associated with steeply plunging folds indicating dextral strike–slip movement. All these structures are overlain by sub–horizontal Carboniferous strata. These observations imply that both the Grenville basement rocks of the Indian Head Range and their Cambro–Ordovician cover have been tectonically transported. Observations farther west, where latest Silurian rocks are deformed at the thrust front on Port au Port Peninsula, imply that this deformation is of broadly Acadian age. Shortening was apparently followed by dextral strike–slip motion, suggesting an overall Acadian history of dextral transpression.