The style of Late Paleozoic deformation in the Antigonish Basin: an example from the Monks Head section, Antigonish, Nova Scotia

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A shoreland section at Monks Head in northern mainland Nova Scotia exposes a structurally complex package of interbedded limestone, gypsum, and siltstone of the Visean Windsor Group. These rocks are in faulted contact to the east with red sandstone of the Westphalian Port Hood Formation. The Windsor Group rocks are part of the upper basin fill sequence of the Antibonish-Mabou Subbasin that formed in the latest Devonian. Windsor Group rocks are of special interest in this are because the limestone has a high porosity and is petroliferous, implying a potential for petroleum reservoirs in the Antigonish-Mabou Subbasin.

The Monks Head rocks display a complex history of folding, faulting, and vein emplacement involving interplay of extensional and compressional tectonics. Field relationships indicate that these structural features are essentially coeval. Gypsum veins cross cut and are rotated locally by bedding parallel faults. This indicates that vein emplacement occurred throughout the deformational history and thus permits their use as structural markers. Late-stage, large-scale, northeast-trending faults are thought to have been generated in a regional dextral shear regime associated with the Alleghanian orogeny and formation of Pangea. Regional folding in the Monks Head section is associated with these faults, whereas smaller scale faults and folds are the result of the response of the rock layers to shortening. The orientation of gypsum veins, vergence of axial planes, C-S fabrics, and fold axes are related to motion along the Monks Head fault, which led to basin inversion in the Late Carboniferous.