

## Clues to the structural evolution of the Bathurst Mining Camp from a rotated garnet porphyroblast

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Rocks underlying the Bathurst Mining Camp (BMC) represent part of the New Brunswick segment of the Central Mobile Belt of the northern Appalachians. The area has undergone four main phases of deformation ( $D_1$ - $D_4$ ) and five phases of folding ( $F_1$ - $F_5$ ). The first phase of deformation ( $D_1$ ) is related to underplating in an accretionary wedge complex that developed during closure of a back-arc basin. With continued convergence and obduction,  $D_2$  folding reoriented earlier fabrics into near-vertical attitudes. Two major shear-zones, associated with late  $D_2$  sinistral shear, transect the BMC, and in places, e.g., the Forty Four Mile Brook area, have evolved into transpressional thrust zones that separate  $D_3$ -related flat and steep structural belts in the camp. The flat belts have developed where recumbent  $F_3$  folds have reoriented earlier fabric elements into near-horizontal attitudes. The  $D_4$  phase reoriented earlier structures by rotating them into the camp-scale Z-shaped Tetagouche Antiform/Nine Mile Synform pair.

The present geometry of the camp as seen on a geological map of New Brunswick is broadly circular and has morpho-

logical similarities to a clockwise-rotated garnet porphyroblast. A rolled garnet is typically situated within a relatively undeformed area that is bracketed by cleavage planes or septae along which much of the shear component of deformation has taken place. Correspondingly, the BMC is bracketed by the Rocky Brook-Millstream Fault to the north, which shows at least 50 km of dextral offset (shear), and the Catamaran Fault to the south. Both faults transect the Miramichi Anticlinorium and have a prolonged movement history. The latest ductile movements on the Rocky Brook-Millstream Fault were associated with the development of the Tetagouche Antiform and Nine Mile Synform and caused a later clockwise rotation of the Tetagouche Antiform. The main planar fabric element in the camp, a composite  $S_1/S_2$  foliation that outlines the Tetagouche Antiform/Nine Mile Synform pair, is comparable to the inclusion trails in a clockwise-spiralling garnet. The rotated-garnet analogy is useful for demonstrating the development of the  $D_4$  macro-structures and the late-tectonic evolution of the Bathurst Mining Camp.