CAMBRO-ORDOVICIAN STRATIGRAPHY AND STRUCTURE, WESTERN NEWFOUNDLAND
-"JACK LADDER TRIANGLE"

Ian Knight

Mapping of polydeformed and low grade metamorphic equivalents of the Cambro-Ordovician carbonate platform sequence at 1: 50 000 scale continued along the eastern edge of the Lomond map area (12H/06), principally along the shores of Bonne Bay Big Pond and on the adjoining Cormack map area (12H/04) in a triangular area east of the Viking Highway (Route 430) here referred to informally as the "Jack Ladder triangle". There, the Cambro-Ordovician metasediments are surrounded by uplands of Long Range Proterozoic basement. The area hosts the most easterly hinterland of the Goose Arm thrust stack, a complex, polydeformed, tectonic assemblage that lies east of the main elements of the Humber Arm Allochthon, southwest of the Long Range Proterozoic Massif and is truncated along its southern edge by the Deer Lake Carboniferous Basin. The northwest-verging stack comprises several thrust slices that are deformed by a southeast-verging D2 deformation that involves northeast-trending folds, back thrusts and strongly developed, penetrative cleavage. Consequently, some of the early thrusts and their co-structural slices are inverted and folded.

The "JACK LADDER TRIANGLE"

Mapping in the "Jack Ladder triangle" shows a number of important stratigraphic and structural relationships that will constrain the final map of the area.

1) Southwestward-tilted Bradore Formation sandstone to Forteau Formation shale lies unconformably upon Proterozoic granitic basement in a narrow belt along the southernmost edge of the Long Range Massif, near Angle Pond and Smelt Pond, and to the east, near Owl Pond. Northeast-trending late faults offset this relationship and those described in point 2 below.

2) The Long Range massif is thrust over the metasedimentary slices of the thrust stack in the same area. A narrow slice of granitic basement lies upon strongly flattened and transposed Early to Middle Cambrian meta - clastics and carbonates of the Labrador Group and lower Port au Port Group in the Smelt Pond area. A schistose, chloritic mylonite containing fine-grained granulated granite protolith and augen includes a full suite of kinematic structures at the sole of the granite. Locally, the mylonite forms outliers on isolated hills in the area and is the only evidence of the thrust. Largely undeformed granite containing chloritic shear bands occurs several metres above the sole in some of the hills. South of Angle Pond, the granite is thrust over Bradore Formation and the thrust is folded by a later east-verging recumbent fold (D2?).

3) Relationships in the same area of Smelt Pond also suggest that a higher thrust slice places Labrador Group above Upper Cambrian dolostones of the lower Petit Jardin Formation. The thrust is folded. Whether this higher thrust slice is truncated by the Long Range Massif and is part of an imbricate footwall complex has yet to be determined.

4) Slate, phyllite, micaceous pelites and ribbon metasandstones intercalated with a few metre-thick units of white meta-quartz arenites (in places resembling psammites and semipelites) dominate the "Jack Ladder triangle" southeast of Underground Brook. These rocks are equivalents of the Forteau and Penguin Cove/ Hawke Bay formations, are polydeformed, and at a higher metamorphic grade than their equivalents northwest and west of the brook.

5) A southwest trending fault forms the contact of the "Jack Ladder triangle" with a southwest trending upland of Proterozoic basement gneiss and granite. The contact is not exposed but absence of Bradore Formation and the abrupt linear change from basement to Forteau Formation phyllite indicates a fault. Fabrics in the basement near Long Pond and Owl Pond suggest the fault dips northwest with phyllite above basement. Adjacent to the Viking Highway, near Moulands Pond, however, the contact ranges from vertical to southeast-dipping, placing basement locally above phyllite. A well-developed mylonite, deformed by east-verging buckle folds in the granite, strongly suggests that the original structural relationship was a thrust that is now in an inverted position. The southeastern edge of the basement upland is the northwest margin of the unconformably overlying Deer Lake Carboniferous Basin, indicating that all the relationships discussed herein pre-date the Mississippian.

6) No mineralization was discovered in the "Jack Ladder triangle".

OTHER STUDIES

1) Together with Doug Boyce, the upper St. George Group in the Isthmus Bay section, Port au Port Peninsula was logged and collected for its shelly faunas. The upper part of the Hawke Bay Formation at De Gras and Grand Jardin on southern shore of Port au Port Peninsula was also revisited.
2) Recent logging roads in the Blue Pond Thrust Stack, northwest of the Pinchgut Lake were mapped. A previously undiscovered, small footwall window of slate occurs in a depression below the Cambro-Ordovician carbonates indicating that the stack has a likely significant overthrust to the northwest.

ACKNOWLEGEMENTS

Brian Sutton provided excellent assistance. Many thanks.

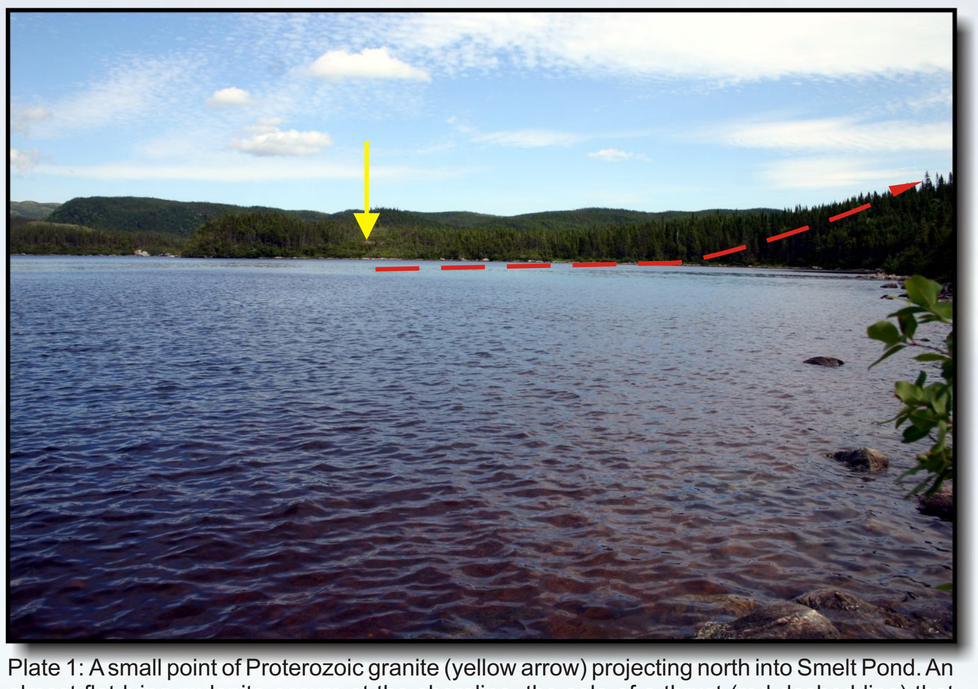

Plate 1: A small point of Proterozoic granite (yellow arrow) projecting north into Smelt Pond. An almost flat-lying mylonite occurs at the shoreline, the sole of a thrust (red dashed line) that carries the Long Range Massif over intensely flattened, polydeformed Cambrian metasedimentary rocks in the wooded hill at the right of the plate.

Plate 2: Southeast-verging folds in deformed foliated limestone of the Middle Cambrian March Point Formation in the footwall to the Smelt Pond thrust.

Plate 3: Virtually undeformed megacrystic granite a few metres above the sole of the Smelt Pond thrust (yellow arrow on Plate 1).

Plate 4: Chlorite-granular granite and schistose mylonite at the sole of the Smelt Pond thrust. A lineation carried by the mylonite plane trends northwest.

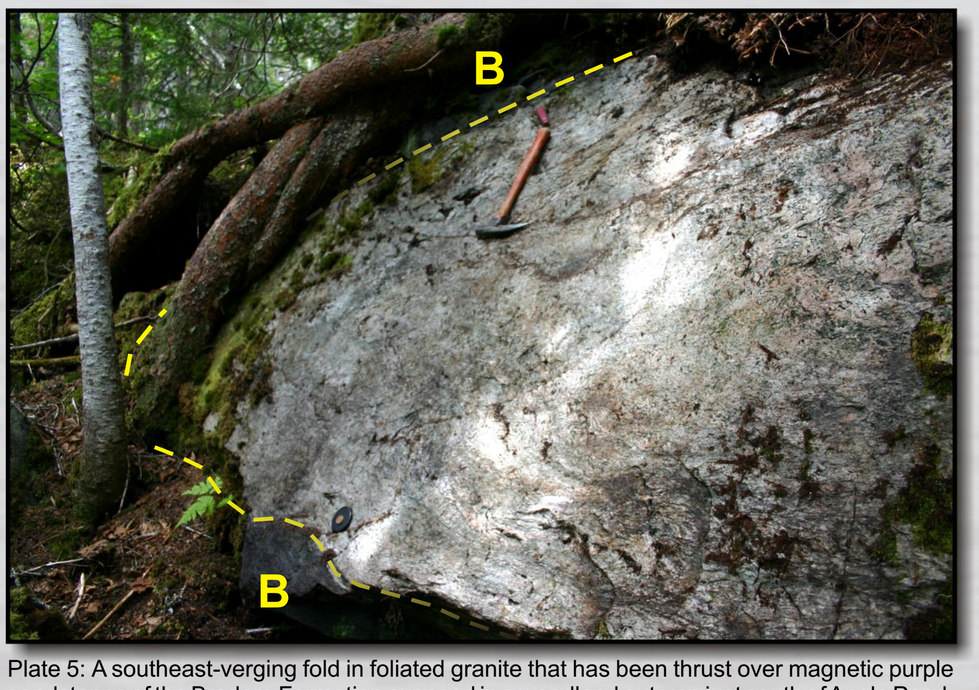

Plate 5: A southeast-verging fold in foliated granite that has been thrust over magnetic purple sandstones of the Bradore Formation exposed in a woodland outcrop just south of Angle Pond. Dashed line indicates folded thrust. B = Bradore Formation.

Plate 6: Close-up view of foliated granite structurally above Bradore Formation sandstone in Plate 5. Note the later crenulation folds.

Plate 7: Folding of a strong foliation in Proterozoic basement along the southeastern edge of the "Jack Ladder triangle". The fabrics suggest the present contact is an inverted thrust that placed the basement over Lower Cambrian metaclastics of the lower Labrador Group.

Plate 8: Typical landscape of the "Jack Ladder triangle", a rolling wooded hilly terrain largely underlain by metaclastics of the Labrador Group. The upland of the southern end of the Long Range Massif is in the background.