

LEGEND

- DEVONIAN OR OLDER**
- MOUNT PEYTON INTRUSIVE SUITE**
- 11 Fine to medium grained pink graphic granite
- MIDDLE RIDGE GRANITE**
- 10 Medium grained, two mica, garnetiferous, leucocratic
- SILURIAN**
- BOTWOOD GROUP**
- 9 Fine to coarse grained, light gray sandstone, siltstone, and shale; minor red shale and sandstone; minor fossiliferous calcareous beds
- MIDDLE ORDOVICIAN AND LATER**
- DAVIDSVILLE GROUP**
- 8 Fine to coarse grained dark graywackes, commonly with shale intercalates, interbedded with gray to black siltstone and shale, minor conglomerate lenses; Ba graphic shale
- 7 Gray to black shale with thin siltstone beds, locally graphic, minor fine to medium grained graywacke beds
- 6 Fine to coarse grained conglomerate with predominantly quartz-porphyr clasts.
- MIDDLE ORDOVICIAN OR EARLIER**
- GANDER RIVER ULTRABASIC BELT (GRUB)**
- 5 Amphibolite, mafic to intermediate volcanoclastic rocks, quartz porphyritic, felsic volcanics, and minor conglomerate
- 4 Serpentine and amphibolite (tremolite) with minor talc-magnetite schist
- 3 Fine to coarse grained gabbro, hornblende and minor amphibolite
- GANDER GROUP**
- 2 Semipelite and pelite with minor psammite and quartzite; concordant amphibolite bands
- 1 Psammite and semipelite

- SYMBOLS**
- Geological contact (defined, approximate, assumed, gradational)
- Main schistosity or cleavage of unspecified age (inclined, vertical)
- Igneous layering (vertical)
- Strain-dip cleavage (inclined, horizontal, dip unknown)
- Bedding, tops known (inclined, overturned)
- Bedding, tops unknown (inclined, vertical)
- Axis of minor F₁ fold
- Fault (assumed)
- Fossil locality
- Rock outcrop, area of outcrop

- MINERAL OCCURRENCES**
- Chalcopyrite cp
- Sphalerite sp
- Galena gn
- Pyrite py

Geology by R.F. Blackwood (1980); field assistance was provided by Lewis Wheaton.

Geological cartography by Mineral Development Division, Department of Mines and Energy, Government of Newfoundland and Labrador.

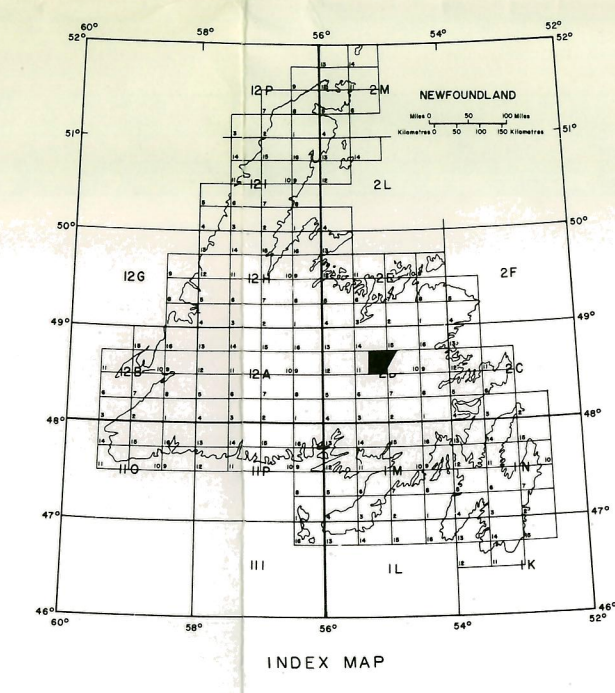
Copies of this map may be obtained from the Publications and Information Section, Mineral Development Division, Department of Mines and Energy, P.O. Box 4750, St. John's, Newfoundland A1C 5T7.

Base map at same scale published by the Surveys and Mapping Branch, Department of Energy, Mines and Resources, Ottawa, 1971.

Elevations in feet above mean sea level.

Approximate magnetic declination, 1969, for centre of map 28° 15' west, decreasing 3.1' annually.

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DESCRIPTIVE NOTES

The Northwest Gander River area and the Southwest Gander River area, in the vicinity of Paul's Pond and northeast, are accessible by excellent "woods" roads, operated by Bowater Newfoundland Limited. Old, locally impassable, Bowater roads are located in the Dead Wolf Brook-Caribou Lake east area. The southern half of the map area was reached by helicopter.

Jenness (1963) mapped the Dead Wolf Pond (2D/10) area as part of the larger, one inch to four miles, Terra Nova map area. The West Gander Rivers (2D/11) map area was included in the larger, 1:250,000 Gander Lake map area by Anderson and Williams (1970). The area is either heavily wooded or covered with bogs; exposure is very poor except for some river sections and the tops of some ridges in the east. Tilt cover ranges from several centimetres to several metres in thickness.

The map area lies along the northeastern margin of the central Paleozoic mobile belt (Williams, 1964) of the Newfoundland Appalachians. It includes parts of the Gander and Botwood Zones (Williams et al., 1974) but is mostly underlain by the latter. Four broad geological subdivisions are defined in the map area. They are from east to west: (1) the Middle Ordovician or earlier Gander Group (McDonnell, 1972), (2) the Middle Ordovician or earlier Gander River Ultrabasic Belt (Jenness, 1963), (3) the Middle Ordovician and later Davidville Group (Kennedy and McDonnell, 1972), and (4) the Silurian Botwood Group (Williams, 1962). The Gander River Ultrabasic Belt or GRUB line is a lithotectonic element that generally marks the boundary between the Gander and Botwood zones. Devonian (?) granitic rocks intrude the Botwood and Gander Groups.

No exposures of Unit 1 occur in the map area. However, it is shown as a continuation of exposed psammite and semipelite defined as Unit 1 of the Gander Group, from the adjoining Gander (2D/10) map area (Blackwood, 1980b) to the north. Unit 1 and Unit 2 are also conformable to the north (Blackwood, 1980a); the main distinction between the two being the concordant amphibolite bands in the latter. The narrow bands are apparently gradational with the host metasediments; locally contacts are diffuse over 1.5 cm with amphibole becoming more profuse towards the mafic bands. The amphibolites are interpreted to represent mafic volcanoclastics. Two foliations overprint Unit 2: a locally preserved first fabric parallel to bedding and a pronounced transpositional fabric that is axial planar to small scale, variable plunging, isoclinal folds. Locally, a crenulation cleavage overprints the main, second fabric. Unit 2 is thoroughly recrystallized by the intrusion of Unit 10 (Middle Ridge Granite; Strong et al., 1974). The dominant, fine to coarse grained, second schistosity is entirely mimetic and the quartzofeldspathic component has generally been polygonized; large (0.5 - 1.0 cm across) crosscutting porphyroblasts are common and include biotite, garnet, andalusite, cordierite, hornblende and staurolite.

Units 3 and 4 are intimately associated and characterize the GRUB line in this area. Although volcanic rocks of Unit 5 are spatially related to the GRUB line and are here included with it, they could be more closely associated with the volcanoclastic component of Unit 2 or even be gradational with Units 6 and 7 of the Davidville Group; contacts are not exposed. The gabbro is not evenly distributed and is defined by hornblende and variable amounts of plagioclase. Locally 2.3 cm wide leucocratic bands are interlayered with 0.52 cm wide hornblende bands. A fine grained, accentuated by weathering, is also locally developed in hornblende. Parts of Unit 4 contain remnant primary olivine and was probably originally quartzite. Amphibolite zones in Unit 5 commonly show 0.5 - 1.5 cm banding with alternating bands being hornblende or plagioclase rich. The amphibolite varies from fine to coarse grained and probably originally gabbro or flows. White, quartz and quartz feldspar porphyry bands are interlayered with the amphibolite and range in width from 50 cm to 4 m. The generally clear quartz phenocrysts are 2-6 mm across and occur in a fine grained felsic matrix; the porphyry bands are interpreted as felsic flows. Interbedded with the volcanic rocks are 1-10 m wide conglomerate bands with clasts that range from 2 mm to 8 cm in diameter. The clasts are mostly quartz porphyry with a distinctive blue hue marking the quartz phenocrysts. These are interpreted as volcanoclastic conglomerates. The main regional deformation is variably developed in the GRUB line. In Unit 3 the amphibolite foliation has been preserved whereas the gabbro and hornblende are massive. Talc-magnetite schist zones represent the most foliated parts of Unit 4. Unit 5 is generally overprinted by a strong foliation which has been interpreted as the quartz and hornblende foliation. Conglomerate clasts are geometrically oblate or prolate for different parts of the unit. Units 3, 4 and 5 are overprinted by the same amphibolite foliation as Unit 1 and 2. Hornblende crystals are disoriented, the felsic volcanics are gabbroitic, and fabrics are mimetic. Locally, due east of the juncture of Dead Wolf Brook and Southwest Gander River, Unit 4 contains elongate olivine, dispersed in a reddish, cross-cutting pattern. Crystals are 12 cm long and 12 mm wide with commonly triangular shaped interstitial material. Nearly all the olivine is pseudomorphed by antigorite and the interstitial material is also altered to antigorite. The "spinifex-like" texture is interpreted to be metamorphic in origin (Evans and Trommsdorff, 1974), related to the intrusion of the Middle Ridge Granite (Unit 10).

The faults bounding the GRUB line are interpreted to have variable displacement and thus would occur at different structural levels along strike. This would explain their apparent discontinuity as well as the local disappearance of the GRUB line along strike. Areas where fault movements have been restricted to a lower structural level than the rocks exposed, the Gander and Davidville Groups continue without interruption and are apparently conformable.

Clasts in Unit 6 are 0.5 to 30 cm in diameter and are similar to the porphyry bands of Unit 5. Mafic patches in the matrix are minor but may include ultramafic, gabbroic or basaltic debris. Hence, Unit 6 is interpreted as a basal conglomerate to the Davidville Group with an originally nonconformable relationship with the GRUB line; it is possible, however, that the unit is part of Unit 5. Unit 6 appears to grade abruptly into Unit 7. Siltstone beds of Unit 7 are 2-12 cm thick and have sharp boundaries; locally the shales are laminated. Graywacke beds are locally 15-25 cm thick but form a minor component of Unit 7. One occurrence of a concordant amphibolite band was noted in a small brook southwest of Caribou Lake. Unit 8 contacts with Unit 7 by having an increase in graywacke beds that range from 500 cm in thickness. These beds are graded with coarse, sharp bases that grade into laminated (2-6 mm thick) tops of siltstone and shale. Unit 8a has yielded the following Canadian fossiliferous: *Climacograptus bicornis* (Hall) or *spiniferus* Ruedemann, *Heterograptus? Orinograptus?* and a stipe of *Dicellograptus* (Lohr) (written communication, 1980). The main foliation in the Davidville Group is a slaty cleavage in the west, a phyllitic fabric in the centre and a fine grained schistosity in the extreme east, reflecting mimetic recrystallization with proximity to the Middle Ridge Granite. This foliation is axial planar to light, gently plunging, recumbent folds that are overthrown to the northwest in the area between the Southwest Gander River and the GRUB line; elsewhere the axial planar fabric is generally easterly dipping. These recumbent folds are interpreted to have developed in response to the tectonic emplacement (trusting) of the GRUB line. This would suggest that faults bounding the GRUB line dip to the southeast, having formed during thrusting, or reverse fault movement, to the northwest. A strain slip fabric is generally superimposed on the main fabric in the Davidville Group. The metamorphic grade varies from low greenschist facies in Unit 8 to low amphibolite facies in the easternmost parts of Units 6 and 7. In the latter, biotite, garnet, andalusite and/or cordierite porphyroblasts overprint the foliation.

The Botwood Group (Unit 9) is interpreted to conformably overlie Unit 8 of the Davidville Group. Sandstone beds in Unit 9 are 30 cm to 1 m thick and locally contain detrital muscovite. The sandstone is laminated and graded with crossbeds and ripple marks occurring locally. Minor conglomerate and shale are interbedded with the sandstone; chert clasts occur in some of the conglomerate beds. Calcareous siltstone and sandstone beds are 20 to 30 cm thick and contain 1 to 3 cm thick limestone beds at one locality on Gander Brook; coral, crinoid stems and brachiopods from that locality are dated as Silurian (Anderson and Williams, 1970). A slaty cleavage overprints Unit 9 and is locally folded about moderately tight, small scale, folds.

Muscovite is ubiquitous in the main body of Unit 10 whereas biotite is present only locally. The garnets are red and generally 1-2 mm across, but are larger in pegmatitic dikes that intrude, and are associated with the leucocratic pluton. The pluton is generally unfoliated except for a weak mica alignment that occurs locally in the contact area. The metamorphic aureole associated with the granite extends some 2.3 km outward into the country rocks. Overprinting porphyroblasts and mimetic recrystallization indicate the post-tectonic nature of the pluton. The small plug of granite (Unit 10) which intrudes Unit 7 along Dead Wolf Brook is considered to be an apophysis of the Middle Ridge Granite; garnets were not noted in the plug. A whole rock Rb-Sr isochron age of 370 ± 15 Ma has been obtained for the Middle Ridge Granite (Bell et al., 1977).

Unit 11 intrudes Unit 9 and forms part of a much larger composite intrusion that includes granite, diorite and gabbro, and is here referred to as the Mount Peyton Intrusive Suite (Mount Peyton batholith of Strong, 1976). The granite is microcline and consists of a granitic intergrowth of quartz and potash feldspar, plagioclase and minor chlorite; it gives a whole rock Rb-Sr isochron age of 380 ± 30 Ma (Bell et al., 1977).

Pyrite and chalcopyrite occur in a 1 m wide shear zone in the small granite plug (Unit 10) on Dead Wolf Brook. NALCO reported pyrite, chalcopyrite, sphalerite and minor galena in volcanic rocks (Unit 5) on the same brook (Potter, 1955). There the mineralization is disseminated in a 30 cm wide felsic host and also occurs as small pods and stringers. Minor sphalerite was also found by Potter (1955) in quartz associated with an apite dike that cuts ultramafics (Unit 3) south of Dead Wolf Brook.

REFERENCES

Anderson, F.D. and Williams, H.
1970: Gander Lake (west) half, Newfoundland. Geological Survey of Canada, Map 1195A (geological map and descriptive notes).

Bell, K., Blenkinsop, J. and Strong, D.F.
1977: The geochronology of some granitic bodies from eastern Newfoundland and its bearing on Appalachian evolution. Canadian Journal of Earth Sciences, Volume 14, pages 456-476.

Blackwood, R.F.
1980a: Geology of the Gander (west) area (2D/10), Newfoundland. In Current Research, Edited by C.F. O'Driscoll and R.V. Gibbons. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 80-1, pages 53-61.
1980b: Gander (Mount Peyton E.), Newfoundland. Newfoundland Department of Mines and Energy, Mineral Development Division, Map 9018.

Evans, B.W. and Trommsdorff, J.
1974: An elongate olivine of metamorphic origin. Geology, Volume 2, pages 131-132.

Jenness, S.E.
1963: Geology of the Gander River Ultrabasic Belt, Newfoundland. Geological Survey of Newfoundland, Report 11, 58 pages.
1963: Terra Nova and Bonavista map areas, Newfoundland. Geological Survey of Canada, Memoir 327, 184 pages.

Kennedy, M.J. and McDonnell, M.H.
1972: The Gander Lake and Davidville Group of northeastern Newfoundland: New data and geotectonic implications. Canadian Journal of Earth Sciences, Volume 9, pages 452-459.

McDonnell, M.H.
1972: The Gander and Davidville Groups: Major tectonostratigraphic units in the Gander Lake area, Newfoundland, M.Sc. thesis, Memorial University of Newfoundland, St. John's, 121 pages.

Potter, R.R.
1955: Report on Caribou Pond - Central Newfoundland. NALCO unpublished report. Newfoundland Department of Mines and Energy File 2D/10/198.

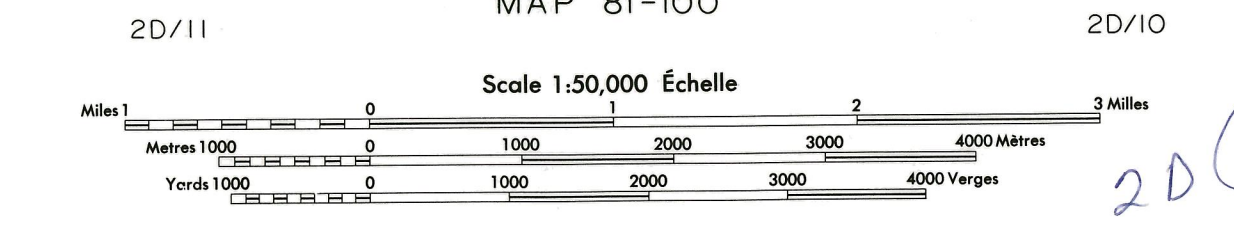
Strong, D.F., Dickson, W.L., O'Driscoll, C.F. and Keen, B.F.
1974: Geochemistry of eastern Newfoundland granitoid rocks. Newfoundland Department of Mines and Energy, Mineral Development Division, Report 74-3.

Strong, D.F.
1979: The Mount Peyton Batholith, Central Newfoundland: a bimodal calc-alkaline suite. Journal of Petrology, Volume 20, pages 119-138.

Williams, H.
1962: Botwood (west half) map area, Newfoundland. Geological Survey of Canada, Paper 62-9, 16 pages.
1964: The Appalachians in northeastern Newfoundland - a two-sided symmetrical system. American Journal of Science, Volume 262, pages 1137-1156.

Williams, H., Kennedy, M.J. and Neale, E.R.W.
1974: The northeastward termination of the Appalachian Orogen. In Ocean Basins and Margins, Volume 2, Edited by A.E.M. Nairn and F.G. Stehli, Plenum Press, New York, pages 79-123.

WEST GANDER RIVERS & DEAD WOLF POND
(East Half) MAP 81-100 (Northwest Portion) 2D/10



2D (28)