GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

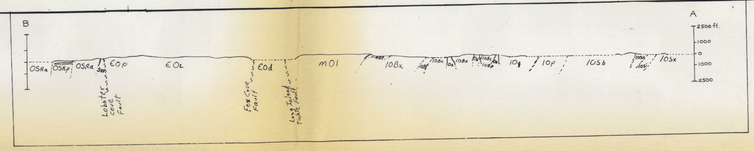
SHEET 2 E/12

LITTLE BAY ISLAND

NEWFOUNDLAND

Scale: One Inch to One Mile = 1/63,360

1 MILE 0 1 2 3 MILES



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Legend - LITTLE BAY ISLAND MAP-AREA

SILURIAN OR DEVONIAN
SPRINGDALE GROUP (Sss)

Sss — Brownish-grey to reddish-brown fine sandstone, siltstone and mudstone, medium to coarse sandstone and conglomerate.

Sw — WOODFORDS ARM PLUTON: pink to brownish-red, medium to fine-grained granite and granodiorite. (Intrudes Roberts Arm Group).

UPPER ORDOVICIAN OR SILURIAN
ROBERTS ARM GROUP (OSRp, OSRb, OSRa)

OSRa — Red to brown and grey to greyish-green rhyolite and dacite flows, agglomerate, tuff and sills.

OSRb — Green to light greenish-grey, intermediate to basic, coarse volcanic breccia and agglomerate (possible includes some pillow breccia.)

OSRp — Dark greenish-grey to reddish-brown and black pillowed basalt, pillow breccia and massive flows, thin lenses and beds of chert, tuff and greywacke.

ORDOVICIAN? (intrusive rocks)

OB — BURLINGTON GRANODIORITE: greenish-grey to grey, medium-grained, massive to foliated granodiorite. (Intrudes Lushs Bight Group).

OL — LONG ISLAND PLUTON: grey to black, medium-grained granodiorite, diorite and gabbro exhibiting multiphase intrusion breccias. (Intrudes Long Tickle Formation).

OD — DOLLARD QUARTZ DIORITE: light grey to dark grey, medium-grained quartz diorite with minor gabbro.

OW — WELLMAN'S COVE PLUTON: light grey to dark grey, medium-grained diorite and quartz diorite with mafic and ultramafic inclusions.

OBH — BOB HEAD PLUTON: dark grey to pink, medium to coarse-grained diorite and quartz monzonite with mafic inclusion.

OSA — SULEY ANN COVE PLUTON: white to pale grey, medium-grained tonalite, quartz monzonite and quartz-feldspar porphyry.

Os — Pink to grey white, medium-grained granodiorite stocks. (Intrudes Cutwell and Lushs Bight Groups).

Og — Fine to coarse-grained, porphyritic to non-porphyritic gabbro and diabase sills. (Intrude Western Arm Group).

LOWER AND MIDDLE ORDOVICIAN
CUTWELL GROUP (1OSl, 1OSx, 1OSb, 1Op, 1Oq, 1OBx, 1OBp, MOp, MOs, MO1)

MO1 — LONG TICKLE FORMATION: fine to coarse, bedded and reworked tuff, coarse agglomerate, massive to pillowed andesite and fine-grained recrystallized, silicified limestone.

MOs — SEAL COVE COMPLEX: red to green intrusive flow-banded dacite and related felsic pyroclastic rocks.

MOp — PARSONS POINT FORMATION: grey-blue, fine to medium-grained, recrystallized, sparsely fossiliferous limestone breccia, medium-grained felospathic greywacke, and black, cherty, tiny shales.

BURNT HEAD FORMATION (1OBx, 1OBp)

1OBp — Green, vesicular, porphyritic andesitic pillow lava, pillow breccia, massive andesite flows, minor tuff and agglomerate.

1OBx — Basic to intermediate reworked tuff, black shale and chert, coarse agglomerate, and minor felsic pyroclastics and slump breccia.

1Oq — QUINTON COVE FORMATION: coarse andesite agglomerate with minor tuff horizons

1Op — PIGEON HEAD FORMATION: black cherty shale and chert, grey to green, fine-grained reworked pyroclastic rocks and arkose minor coarse pyroclastics.

STAG ISLAND FORMATION (1OSl, 1OSx, 1OSb)

1OSb — Basalt Members: black pillow basalt, grey-green glassy pillow basalt and pillow breccia.

1OSx — Breccia Member: coarse, poorly sorted, locally bedded, explosive breccia containing fragments of diabase, gabbro, basalt, recrystallized limestone and pyroclastic rocks.

1OSl — Intrusive Member: green, fine-grained diabase, dykes intruding fine to medium-grained gabbros; green basaltic pillow lava.

WESTERN ARM GROUP (1OS, 1OB, 1OWc, 1OW)

1OW — WESTERN HEAD AGGLOMERATE: coarse, unbedded mafic agglomerate with thin lenses of tuff and cherty tuff.

1OWc — WELSH COVE TUFF: silisic crystal tuff, dacitic welded tuff, chert, argillite and mafic to intermediate tuff.

1OB — BIG HILL BASALT: dark grey pillow basalt with minor lenses of chert and argillite.

1OS — SKELETON POND TUFF: green, coarse crystal lithic tuff, banded red and green chert, fine grained tuff, cherty tuff grey argillite and grey pillow basalt.

1OBg — BRIGHTON GABBRO COMPLEX: very coarse to medium grained hornblende clinopyroxenite and hornblendite intruded by dykes of hornblende gabbro, hornblendite, diorite quartz diorite and anorthosite.

CAMBRIAN AND/OR LOWER ORDOVICIAN
LUSHS BIGHT GOUP (€Ol, €Os, €Op, -ins, €Ol)

€OL — Dark to light green, massive to pillowed basalt, pillow breccia, aquagene tuff and chert, dark grey pillow basalt, sheeted diabase and gabbro.

€Os — Red to green chert and cherty siltstone, tuffaceous sedimentary rocks and minor volcanic conglomerate.

€Op — Dark to light green pillow basalt, pillow breccia, massive basaltic flow and flow breccia, and chlorite schist.

€Od — Dark green to black, fine grained to aphanic, sheeted diabase dykes.

€Og — Dark to light green, medium to fine grained, massive gabbro. (Possibly includes some sheeted diabase.)

Mineral Occurrences, Prospects and Mines

1. Shiners Prospect: Pyrite, chalcopyrite, pyrrhotite and marcasite as sulphide lenses within sheeted diabase dykes and pillow lavas.
2. Young Cove: Pyrite, chalcopyrite and pyrrhotite stringers in chloritized sheeted diabase.
3. St. Patricks Southwest: Pyrite and chalcopyrite in chlorite schist.
4. Delaney: Pyrite, chalcopyrite and pyrrhotite stringers in a chlorite schist zone within pillow basalt and diabase dykes.
5. Little Bay Mine: Pyrite, chalcopyrite, pyrrhotite and magnetite as massive lenses, pods, nodules, stringers and disseminations within large chlorite schist zone in pillow basalt.
6. Sleepy Hollow: Pyrite and chalcopyrite in chlorite schist within pillow basalt and diabase dykes.
7. Hearn Prospect: Pyrite, chalcopyrite, sphalerite, arsenopyrite, galena and gold in quartz-pyrite veins, bands and stringers in a chlorite schist zone within pillow basalt and diabase dykes.
8. Shoal Arm: Pyrite, chalcopyrite, pyrrhotite, sphalerite, arsenopyrite and marcasite in chlorite schist zones within pillow basalt and diabase dykes.
9. Little Bay Head: Same setting as Shoal Arm.
10. Bobs Head: Pyrite and chalcopyrite in quartz and calcite veins in chlorite schist.
11. Woodford Cove: Pyrite and chalcopyrite in schistose pillow lavas.
12. Osmond Cove: Massive pyrite band in schistose pillow lavas.
13. Keatons Adit (Indian Head): Disseminated pyrite and chalcopyrite in a silicified schist zone within schistose pillow lavas.
14. Indian Beach: Pyrite, chalcopyrite and pyrrhotite in bands and stringers in a chlorite schist zone within schistose pillow lavas.
15. Rowsell Cove: Massive banded pyrite and hematite in a red jasper bed within pillow basalt.
16. Paddox Right: Pyrite and chalcopyrite as stringers and disseminations in chlorite schist.
17. Shoal Point: Pyrite stringers and bands in chlorite schist.
18. Jerrys Harbour: Pyrite and chalcopyrite in chlorite schist.
19. Wellmans Cove North: Chalcopyrite and malachite as stringers in chlorite schist.
20. Wellmans Cove: Pyrite and chalcopyrite as stringers and in quartz veins in chlorite schist.
21. Wellmans Cove Shaft: Pyrite in chlorite schist.
22. Fort Anson North: Pyrite in pyritized pillow lavas.
23. Fort Anson North: Pyrite in chlorite schist.
24. Miles Cove Mine: Pyrite and chalcopyrite in chlorite schist and schistose pillow lavas.
25. Sunday Cove Island West: Pyrite, chalcopyrite and chalcocite in chlorite schist and chert.
26. Pilleys Cove: Pyrite and chalcopyrite in sheeted diabase.
27. Silverdale: Pyrite, chalcopyrite, galena and tetrahedrite in a chlorite schist zone within schistose pillow lavas.
28. Rushy Pond Head: Pyrite in schist zone separating Lushs Bight and Western Arm Groups.
29. Wheeler's Shaft: Pyrite, chalcopyrite and pyrrhotite in chlorite schist zone within pillow lavas.
30. Nickeys Nose: Pyrite in basalt within Skeleton Pond tuff.
31. Norris: Pyrite and chalcopyrite in quartz veins cutting gabbro sills.
32. Crow Island: Pyrite, chalcopyrite, pyrrhotite, sphalerite and magnetite in large massive sulphide blocks within a diatreme breccia.
33. Little Stag Island: Same setting as Crow Island.
34. Stag Island: Pyrite and pyrrhotite with minor chalcopyrite at contact between black shales and pillow lavas.
35. Seal Islands: Pyrite and malachite in sheared and altered basalt.
36. Red Point: Disseminated pyrite near contact with granodiorite.
37. Lushs Bight: Limestone and limestone breccia of Parsons Point Formation.
38. Oil Islands Shaft: Massive bands, lenses and stringers of pyrite, chalcopyrite, sphalerite and galena in dacitic agglomerate.
39. Oil Islands South: Pyrite, chalcopyrite, sphalerite and galena in stringers and quartz veins in dacitic agglomerate.
40. Oil Islands West: Pyrite stringers in sheared mafic volcanics.
41. Limestone Island: Limestone lenses within volcanic agglomerate.
42. Iron Point: Disseminated pyrite in volcanic agglomerate and felsic dykes.
43. Suley Ann Cove: Chalcopyrite and molybdenite in quartz veins cutting volcanic agglomerate.
44. Nippers Harbour Pond: Pyrite and sphalerite blebs and stringers in dacite tuff.
45. Nippers Harbour Brook: Disseminated chalcopyrite and magnetite in rhyolite
46. Sunday Cove Tickle: Disseminated pyrite in pillow basalts near contact with felsite dykes.
47. Port Anson Road: Large area of disseminated pyrite in dacitic volcanics.
48. John Thomas Moore Prospect: Disseminations and stringers of pyrite in altered silicified and pyritized pillow basalt.
49. Bear Cove Brook: Pyrite, sphalerite and galena in a highly silicified and pyritized zone within pillow basalt.
50. Freeman's Claim: Pyrite and chalcopyrite as stringers and veinlets in silicified rhyolite tuffs.
51. Strickland: Pyrite in silicified, pyritized pillow basalt.
52. Pilleys Island Mine: Pyrite, chalcopyrite, sphalerite and galena in massive lenses and disseminated throughout dacitic agglomerate.
53. Mansfield: Pyrite, chalcopyrite and galena stringers in dacitic agglomerate.
54. Chen's Showing: Disseminated pyrite and chalcopyrite in dacitic agglomerate.
55. Bouzanne Shaft: Pyrite and chalcopyrite in dacitic tuffs.
56. Bull Road Showing: Pyrite, chalcopyrite, sphalerite, galena and tetrahedrite as massive banded sulphide lenses in dacitic tuff.
57. Bull Road Extension: Pyrite, chalcopyrite and galena disseminations and blebs in dacitic agglomerate.
58. Henderson Showing: Large blocks of massive pyrite and chalcopyrite in dacitic agglomerate.

geological boundary (defined, approximate and assumed)
bedding, tops known (horizontal, inclined, vertical, overturned)
bedding, tops unknown (inclined, vertical)
fyke trend (inclined, vertical)
schistosity, gneissosity, cleavage, foliation (horizontal, inclined, vertical)
fault (defined, approximate, assumed)
anticline (upright, overturned)
synchline (upright, overturned)
fossil locality
mineral occurrence
mineral occurrence: past pit or trench
shaft or quarry: exploration, abandoned production, production (producing)
pit or tunnel

Explanatory Notes - Little Bay Island Map-Area

The oldest rocks in the area are those of the Lushs Bight Group which consists of gabbros, sheeted diabase, pillow lavas, aquagene tuffs and sediments believed to be a remnant of Cambro-Ordovician oceanic crust (Strong, 1972; Smitheringale, 1972). The Brighton Gabbro Complex, which intrudes sheeted dykes and pillow lavas of the Lushs Bight Group in the Pilleys Island area, gives an $^{40}Ar/^{39}Ar$ radiometric age of 495±5 m.y. (Stukas and Reynolds, 1974) suggesting a Cambrian age for most of the Lushs Bight Group. MacLean (1947) reported a single Lower Ordovician brachiopod, Discotreta sp., from the lowermost section of the Western Arm Group which conformably overlies the Lushs Bight Group (Marten, 1971).

The Western Arm Group and the correlative Cutwell Group represent a thick Lower to Middle Ordovician island-arc sequence built on the Cambrian oceanic crust of the Lushs Bight Group (Kean and Strong, 1975). Williams (1962) reported lower mid-Ordovician fossils from the Cutwell Group on Limestone Island on the west coast of Little Bay Island. This limestone horizon is near the base of the Long Tickle Formation (O'Brien, 1975) where it conformably overlies the Burnt Head Formation. Other possible mid-Ordovician fossils were collected by Kean (1973) from the Long Tickle Formation on the south shore of Long Island. The Long Tickle Formation and the closely associated Parsons Point Formation and Seal Cove Complex are all included in the Middle Ordovician while the Burnt Head and underlying formations of the Cutwell Group are assigned to the Lower Ordovician.

A coarse, graded pyroclastic unit, between Fox Cove and Stuckey Cove on the east coast of Pilleys Island, included in the Lushs Bight Group by Strong (1973), is much more similar to Cutwell Island-Bight Group by Strong (1973), is much more similar to Cutwell island-arc type volcanics and is included in that group since its occurs as a fault-bounded block. It is tentatively included in the Long Tickle Formation.

The Halls Bay Head area is also included in the Cutwell Group because of similar lithologies but correlations with Kean's (1973) formations of the Cutwell Group are tenuous. The Halls Bay Head section appears to face dominantly northwards (Donohoe, 1968) suggesting a synclinal structure or fault between Halls Bay Head and the southwest-facing sequence of Little Bay Island. The Cutwell Group is always faulted against the Lushs Bight Group to the south.

Various intrusive rocks of probable Ordovician age intrude the Lushs Bight, Western Arm and Cutwell Groups. The largest of these, the Burlington Granodiorite, outcrops only in the northwest corner of the map-area and is best exposed in the Kings Point map-area (12 H/9) to the west. The remaining intrusions are small stock-like bodies and sills which appear to be contemporaneous with volcanism. The Brighton Gabbro Complex which intrudes the ophiolitic dykes and pillow lavas of the Lushs Bight Group is not part of the true ophiolite but is probably related to the oceanic rather than island-arc magmatism.

South of the Lobster Cove Fault, considerably younger rocks are exposed. The Roberts Arm Group of calc-alkaline volcanics is undated paleontologically or radiometrically. It lies stratigraphically above Ordovician shales, greywackes and plutonic pebble conglomerates similar to the Goldson conglomerates of the Twillingate map-area (2 E/10) to the east. A Silurian age is most probable for the Roberts Arm Group although an Upper Ordovician age is also conceivable. Volcanic units of the Roberts Arm Group consistently face north in the map-area and are commonly slightly overturned.

The Woodfords Arm Pluton which intrudes part of the Roberts Arm Group appears to be a sub-volcanic body which was perhaps a source for the rhyolites and dacites in the uppermost section of the group. Chemical analyses of the pluton are quite similar to analyses of the rhyolites and dacites (J.F. Gillan, pers. comm.).

The Roberts Arm Group is disconformably overlain by red sandstone, conglomerate and mudstone of the Springdale Group. The Springdale Group is also undated but has traditionally been assigned to the Silurian (Williams, 1962) because of lithological similarities to the Silurian Botwood Group to the east.

The major structural feature in the map area is the Lobster Cove Fault which separates the Lushs Bight Group to the north from the Roberts Arm and Springdale Groups to the south. MacLean (1947) suggested that the Lushs Bight Group was thrust from the north over the Springdale Group in the Springdale area to the west (12 H/9). This interpretation seems to be also valid in this map-area since units of the Roberts Arm Group and the overlying Springdale Group all face northward into the fault and the strike of these units parallel the trace of the Lobster Cove Fault. Acadian deformation resulted in the steepening of the fault together with bedding, and undoubtedly there have been later movements on the fault. Other major faults such as those which dissect the Lushs Bight Group may also be steepened thrust faults.

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Compiled by P.L. Dean, Memorial University of Newfoundland, 1976.