MINERAL DEVELOPMENT DIVISION
DEPARTMENT OF MINES AND ENERGY
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

22P/1

LEGEND

RECENT

8 Possible erratics, locality designations only

HELIKIAN OR YOUNGER

7 **Diabase dikes. 7a,** pretectonic; **7b,** posttectonic

6 **Gabbro, metagabbro, metadiorite:** outcrops or small bodies of uncertain relationship and age. **6a,** dark gray, medium to coarse grained, mostly foliated, gabbro and metagabbro inclusions or intrusions in subunit 5c; **6b,** dark gray, medium grained, foliated metadiorite (inclusion) or biotite metagabbro outcrops in subunit 5c; **6c,** gray, medium grained, igneous-textured, gabbro or metagabbro intrusions in, or part of, subunits 2a and 2b; **6d,** gray or green, medium to coarse grained, massive, gabbro or metagabbro inclusions in, intrusions in, or part of, unit 3.

HELIKIAN

5 **Granitoid plutonic suites. 5,** undifferentiated; **5a,** pink, red or buff, fine to coarse grained, seriate to equigranular, undeformed to strongly foliated biotite granite; **5b,** pink or buff, coarse grained, weakly to very strongly foliated or porphyroclastic, K-feldspar-megacrystic, biotite quartz monzonite; **5b1,** gray, medium grained, migmatitic, partly porphyroclastic, biotite tonalite gneiss; **5c,** dark gray or pink, coarse grained, undeformed to very strongly foliated, variably recrystallized, rapakivi-textured, K-feldspar-megacrystic, hornblende biotite granite to quartz syenite, pyroxene bearing in its pristine state and garnet bearing where pervasively recrystallized; **5d,** granite commonly containing blue quartz; **5d1,** dark gray where fresh, green and red or pink where altered, coarse grained, rarely foliated, rarely rapakivi-textured, K-feldspar-megacrystic, hornblende biotite or pyroxene biotite granite; **5d2,** gray to pinkish, medium grained, K-feldspar-porphyritic, biotite granite, commonly containing a primary K-feldspar fabric; **5d3,** gray to brown, fine grained, equigranular, siliceous granitoid rock with undetermined feldspar proportions, as inclusions and marginal phases; **5e,** pink, fine to coarse grained, undeformed to gneissic, equigranular or sparsely feldspar-porphyritic, biotite granite; **5f,** pink, coarse grained, undeformed to gneissic, K-feldspar-megacrystic, biotite granite, quartz syenite and quartz monzonite; **5g,** buff, fine to medium grained, strongly foliated to gneissic, biotite granite and garnet biotite granodiorite to tonalite, locally orthopyroxene bearing; **5h,** gray, fine to medium grained, seriate, quartz- and K-feldspar-porphyritic felsite with an apparently recrystallized but undeformed groundmass; **5gn,** gray, medium grained, granitoid gneiss dikes; **5v,** granitic dikes and veins associated with structural data, and outcrops of granite pegmatite.

4 **Pyroxene biotite monzonite** (mangerite) and **pyroxene biotite quartz monzonite** (farsundite): probably transitional into subunits 3c and 5d. **4a,** gray to brown, medium to coarse grained, rarely xenolith (cognate)-charged, undeformed to weakly deformed, K-feldspar megacrystic and rarely rapakivi textured; **4b,** gray to brown, fine grained, mostly undeformed and sparsely K-feldspar porphyritic.

3 **ATIKONAK RIVER MASSIF:** mostly a layered complex with minor intrusions and/or inclusions, black to light gray, dark gray to white weathering, predominantly coarse to very coarse grained and commonly pegmatitic, only locally foliated, mostly igneous and/or corona textured; **3,** undifferentiated;

Troctolitic association: 3a,* layered and laminated troctolite, leucotroctolite and anorthosite with minor melatroctolite, commonly with intercumulus orthopyroxene and magnetite and rarely with residual patches of pegmatitic norite and xenoliths of anorthosite or pyroxene-bearing rocks;

Anorthosites: layers and inclusions within, or intrusions into, the layered complex. **3b,** undifferentiated; **3b1,** outcrops, areas or layers of anorthosite and olivine anorthosite belonging to the troctolite association; **3b2,** outcrops, areas or layers of anorthosite and hypersthene anorthosite belonging to the noritic association; **3b3,** a predominantly isotropic, white weathering anorthosite with abundant labradorescent plagioclase, probably intruding the layered complex;

Beaver Pond gabbro: 3c, a small layered intrusion composed mainly of medium grained olivine gabbro, troctolite and gabbro with subordinate pyroxene- and oxide-rich pods and layers, probably crosscutting the layered complex;

Transition group: 3ad, layered and laminated troctolite, leucotroctolite, hypersthene troctolite and anorthosite interlayered with layered and laminated norite and leuconorite; **3af,** similar troctolite association rocks interlayered with layered and intergranular-textured norite and leuconorite;

Noritic association: 3p, undifferentiated; **3d,** layered and laminated norite, leuconorite and anorthosite; **3e,** a small layered intrusion of medium grained, oxide-rich leuconorite and norite with subordinate anorthosite layers and inclusions; **3f*,** predominantly layered and intergranular-textured norite, leuconorite and anorthosite with rare magnetite-rich pods or layers; **3bf,** texturally similar to subunit 3f but predominantly anorthositic; **3g,** layered and laminated anorthosite, magnetite anorthosite and hypersthene magnetite anorthosite with interlayers of 3d and characterized by red-brown plagioclase; **3h,** dikes, net veins and plutons intruding most other subunits in the massif, commonly with abundant magnetite; **3h1,** seriate, medium to coarse grained, intergranular-textured norite and leuconorite; **3h2,** homogeneous, very coarse grained, intergranular-textured norite;

Uncertain association: 3x, structural and textural equivalents of the rest of the Atikonak River massif, complete replacement of the ferromagnesian mineralogy by hydrous assemblages either statically, commonly with corona textures, or dynamically. Hydrous replacement is common throughout the massif but is only designated such where the diagnostic relict mineralogy is not recognizable - probable protoliths are given in parentheses after the subunit character.

*3a2 and 3f2 indicate outcrops where a small percentage of randomly distributed, white plagioclase crystals occur scattered in the more usual gray-colored rock giving the hand specimen a striking appearance.

2 **Basic plutonic suites:** locally layered, medium grained, recrystallized with rare preservation of igneous textures, and metamorphic textures that include moderate to strong mineral fabrics, porphyroblastesis and random to layered leucosome development. **2,** undifferentiated; **2a,** light to dark gray leuconorite, leucogabbronorite and quartz leuconorite; **2b,** black and white, or green (moderately to strongly foliated), gabbro and leucogabbro with minor olivine gabbro; **2c,** dark gray leuconorite and gabbronorite with minor biotite norite and magnetite anorthosite; **2d,** gray, commonly light-weathering and dark-spotted leucogabbro-norite; **2e,** black to green amphibolite and granitoid-layered amphibolite to tonalite gneiss, obiquitous as enclaves and plagioclase-biotite echlieren in subunits 5e and 5f; **2f,** black, coarse grained ultramafic amphibolite and black, medium grained mafic amphibolite dikes; **2g,** brown-weathering, serpentinized, layered ultramafic rock.

PALEOHELIKIAN OR OLDER

1 **Supracrustal gneisses:** predominantly gray to pinkish, medium grained, metamorphosed, dynamically recrystallized, very well layered gneisses in an intercalated sequence. **1a,** sillimanite-bearing, biotite-poor, granite-layered pelitic to semipelitic paragneiss; **1b,** more biotite-rich, muscovite-bearing equivalents of 1a; **1c,** more homogeneous psammitic paragneiss and quartzite with pelitic laminae; **1d,** gray to black, commonly dark green- or brown-weathering, two-pyroxene metabasic gneiss and amphibolite gneiss, commonly agmatized or sheeted with 1f; **1e,** cordierite-bearing la-type paragneiss; **1f,** foliated to gneissic, tonalitic to granitic, orthogenies sheets, net vein systems and minor intrusions, commonly associated with, and containing strips and inclusions of, 1d, may include layers of granitoid paragneiss.

NOTES: No chronological order implied between or within Helikian units, however, preliminary age determinations indicate that Units 3 and 4 and subunits 5c, 5d, 5e, 5f, 5h, and 5gn are probably Neohelikian.

Granitoid terminology follows IUGS recommendations (Streckeisen, 1976; Earth Science Reviews, Volume 12, pages 1-33).

Granitoid dikes and veins are common in Units 1, 3, 4 and 5 and subunits 2a, 2b and 2c and are not shown on the map unless they demonstrate a chronology between units.

Color index divisions as follows:

Unit 2		Unit 3
0 Anorthosite	0	Anorthosite
10 Leucogabbro, leuconorite leucogabbronorite	5	Olivine anorthosite, hypersthene anorthosite, magnetite anorthosite
35 Gabbro, norite, gabbronorite	10	Leucotroctolite, leuconorite
65 Metagabbro, melanorite, melagabbronorite	25	Troctolite, norite
90 Ultramafic	50	Melatroctolite, melanorite
100	90	Ultramafic
	100	

NOTES: g, m and s respectively denote gentle, moderate and steep estimated readings. Wavy strike lines and dip ticks denote generalized measurement of undulating structures.

The development of S_1 may have occurred during the Paleohelikian Labradorian orogeny (1700-1600 Ma), during the Neohelikian Grenvillian orogeny (1100-1000 Ma), or at some interim time. The timing of S_1 in Unit 1 and subunits 2a, 2b and 2c on the one hand (west of the Atikonak River massif) and S_1 in subunits 2d and 2e on the other (east of the Atikonak River massif) may not be the same. West of the Atikonak River massive ΦS_1 may be equivalent to S_2 in the granitoid rocks (subunits 5a, 5b, 5c).

S_2 and subsequent structures developed during the Grenvillian orogeny.

A question mark implies uncertainty relating to that information which follows the question mark.

Geology by G.A.G. Nunn, N. Noel and S. Wells of the Labrador Mapping Section, Mineral Development Division, Department of Mines and Energy, St. John's, Newfoundland, 1986.

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 5C7.

Base maps at 1:50,000 scale published in 1960 by the Surveys and Mapping Branch, Department of Energy, Mines and Resources, Ottawa, contours at 50 foot intervals.

Approximate magnetic declination, 1984, was 29°5' at the centre of the map area. Decreasing 5.7' annually.

Elevation in feet above mean sea level.

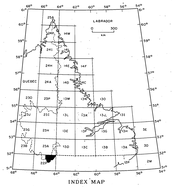
The Quebec-Labrador boundary has not been surveyed and monumented on the ground at date of publication. It's position, therefore, is only approximate.

Some of the names of lakes shown on this map are of informal usage and are not shown on NTS maps of the area.

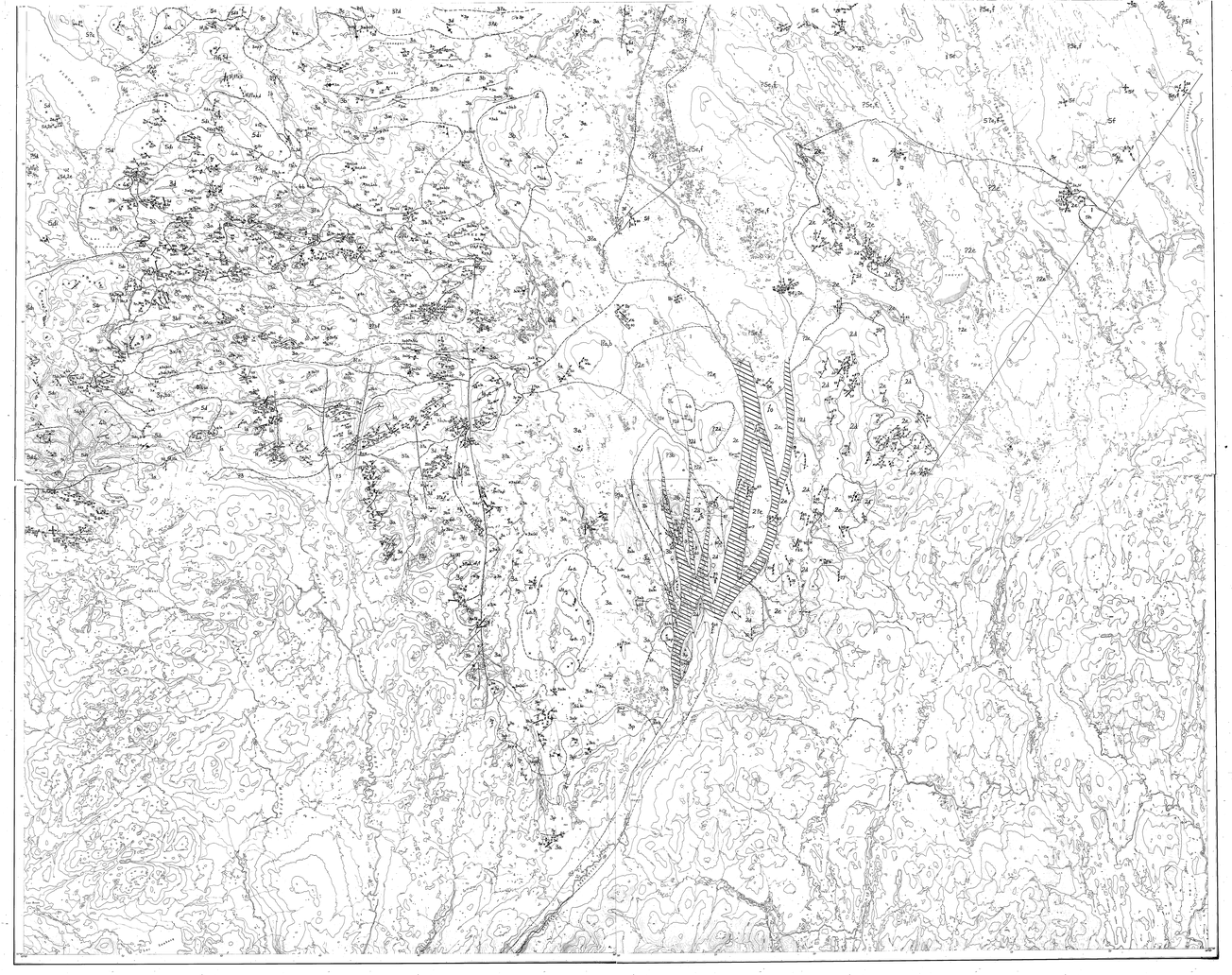
Field work and publication costs were provided under the Canada-Newfoundland Mineral Development Agreement, 1984-1989 by contributions from the Federal Department of Energy, Mines and Resources and the Newfoundland Department of Mines and Energy.

Legend and symbols are common to Maps 86-67 and 86-68. Some map units and symbols may not appear on this map.

This preliminary solid geology map is based mostly upon field observations. In areas of poor control, contacts have been assumed with recourse to aeromagnetic and topographical data where these were deemed significant. This map was compiled at 1:50,000 and photographically reduced and is subject to revision and correction.



INDEX MAP



SYMBOLS

Rock outcrop, large outcrop, area of abundant outcrops....
Geological boundary (defined, approximate, assumed).....
Gradational contact.....
Outcrops with contact.....
Fault (inferred).....
Thrust, porphyroclastic shear zone (approximate, uncertain).....
Amphibolite-granulite facies boundary, tick on higher-grade side (approximate, assumed).....
Bedding, tops unknown (inclined).....
Igneous layering, lamination (dip direction unknown).....
Igneous layering, tops known (inclined, vertical, overturned).....
Igneous layering, tops known (direction of dip unknown)...
Igneous layering, tops unknown (subhorizontal, inclined, vertical).....
Igneous lamination (inclined, vertical, dip unknown).....
Igneous layering and lamination parallel (overturned, inclined, vertical).....
Gneissic layering - S_B (inclined, vertical, dip direction unknown).....
Mineral foliation - S_1 (inclined, vertical, dip direction unknown).....
Mineral foliation - S_2 (inclined vertical, dip direction unknown).....
Mineral foliation - S_3 (inclined).....
Fracture cleavage - S_4 (inclined), generation unknown.....
Gneissic layering and mineral foliation parallel (inclined, vertical).....
Igneous layering and mineral foliation parallel (inclined, vertical).....
Igneous lamination and mineral foliation parallel (inclined).....
Lineations - L_1 (horizontal, inclined, vertical).....
- L_2 (horizontal, inclined, vertical).....
Lineation with associated planar structures (oblique pitch, oblique pitch, oblique pitch, vertical, down dip, horizontal).....
Lineation parallel fold axes (F_1, F_2).....
Type of lineation (mineral, aggregate, rodding).....
Shear zone - major (approximate, assumed, width unknown)..
" " - major, sense of movement known (reversed)....
" " - narrow zones and terminations (assumed).....
" " - minor, sense of movement unknown (inclined, vertical, dip direction unknown).....
" " - minor, sense of movement known (dextral, sinistral, upthrow, downthrow, oblique slip).
" " - minor, localized in granitic veins.....
Foliation in minor shear zones (inclined, vertical).....
Lineation in minor shear zones, plunge given (oblique pitch, pitch down dip).....
Lineation on shear plane, plunge given (oblique pitch, striations).....
Synform (inferred).....
Antiform (inferred).....
Minor fold axes (F_1, F_2, F_4).....
Plotted fold axis (F_3).....
Minor folds - S (F_1, F_2, various schematic examples).....
- Z (F_1, F_2, various schematic examples).....
- M, W (F_1, various schematic examples).....
- isoclines.....
Measured minor folds.....
B lineations (intersections, crenulations).....
B lineations with associated planar structures.....
Glacial lineations - striae (direction known, unknown).....
- roche moutonée.....
- grooves.....
- crag and tail.....
Combined glacial features.....
Dikes with subunit designations (inclined, inclined gneissic, vertical, schematic).....
Subunit layers with designations (1a, 1c, 1d, 2a).....
Mineral occurrences (magnetite, labradorite).....
Provincial boundary.....

THE GEOLOGY OF THE ATIKONAK RIVER MASSIF - SOUTH PART (22P/NE), SOUTHWESTERN LABRADOR AND QUEBEC.

SCALE 1:100 000 ÉCHELLE

Miles 1 0 1 2 3 4 5 Milles
Kilometres 1 0 1 2 3 4 5 6 Kilometres

MAP 86 - 68