was mapped at 1:25000 during summer 1985. Field work was concentrated along the coast where exposure is excellent. Outcrops are lower in number and quality inland, making the projection of contacts into the interior, especially interplutonic contacts, uncertain. The area was previously mapped by Faribault (1893), Weeks (1959) and Stevenson Cape Canso is in the extreme eastern part of the Meguma terrane, lying south of the Minas Geofracture where it projects into Chedabucto Bay. The rocks form two main divisions - the Cambro-Ordovician Meguma Group and Devonian granitoid plutons. The Meguma Group consists of an older psammitic Goldenville Formation and a younger pelitic Halifax Formation. The Devonian plutons comprise a complex assemblage of crosscutting intrusions characterized by the presence of two micas. They are probably similar in age to the South Mountain batholith, as shown by a 368<sup>±</sup>8 Ma Ar/ Ar plateau date (Reynolds et al, 1981) obtained from muscovite in pegmatite collected south of Whitehead. The Meguma Group was deformed and metamorphosed during the Acadian Orogeny. After granitoid intrusion, all units were subjected to a prolonged shearing episode. Thus, even though igneous terminology is used for Units 3 to 9, undeformed rocks only occur in the southern third of the map area. The Goldenville Formation (Unit 1) is subdivided into three lithologies. Unit la consists of thinly bedded, laminated metawacke containing 10-50% phyllite. The unit ranges up to 150 m thick and appears to represent a zone of transition between the Goldenville and Halifax formations. However, this transition zone is absent in some places (e.g. 2 km east of Half Island Cove). Unit 1b consists of metawacke interbedded with 1-10% phyllite. Beds range from 0.01 to 2 m thick and are characterized by the presence of numerous structures such as grading, cross-lamination, sole marks and slump features. These are particularly well displayed along the south shore of Sheep Island southwest of Whitehead where a northward-younging monoclinal sequence about 750 m thick is exposed. Unit 1c is composed almost entirely of fairly massive metawacke. Stratification is poorly developed, being defined by slight variations in weathering and intensity of cleavage, the presence of less resistant lenses containing amphibole and garnet, and the rare occurrence of thick phyllite beds. Units 1b and 1c appear to be time-equivalent, at least in part. The Halifax Formation (Unit 2) is subdivided into four lithologies. Unit 2a consists of laminated phyllite that locally contains 5-10% garnetiferous quartzite beds ranging from 1 to 5 cm thick. The phyllite commonly contains porphyroblasts of cordierite and minor andalusite within approximately 2 km of granitoid plutons. Unit 2b is composed of graphite schist interbedded with thin layers of muscovite-rich phyllite and metawacke. These rocks occupy a synclinal structure along the north shore and are locally interlayered with Unit 2a in the Whitehead area. The pelitic beds typically contain cordierite and andalusite porphyroblasts. Unit 2c is andalusite schist containing 5-10% beds (1-5cm thick) of buff-weathering garnetiferous quartzite. These rocks form three bands in Unit 2a north of Whitehead as well as hornfelsic screens and xenoliths farther east. An additional, band of andalusite schist previously mapped by Faribault just north of whitehead was not located during the present study. However, a possible eastward extension of this band does occur between Burnt Island and Prices Island in Whitehead Harbour. Unit 2d consists of two 100-200 m thick layers of thinly bedded metawacke and minor phyllite that locally grades along strike into massive metawacke. Lithologically, this unit is identical to the Goldenville Formation. However, placing it in the Halifax Formation provides a simpler interpretation Approximately twenty large granitoid plutons and numerous smaller bodies, many of which are too small to map separately, intrude the Meguma Group. They are divided into six units based on composition, texture and crosscutting relationships. All but one of the interplutonic contacts observed are intrusive, giving an age sequence that is fairly well defined except for Unit 7 and parts of Unit 6. The one exception is between Units 6a and 8 north and south of Admiral Lake where the contact may be gradational. haracteristic feature of plutons between Andrew Island and Kyak Brook is the widespread occurrence of intrusive agmatite. Dyke-host and xenolith-host contacts in agmatite to be fracture-controlled. Plutonic rocks along the south

The Chedabucto Peninsula east of longitude 61 13'

DESCRIPTIVE NOTES

Unit 7 consists of medium grained muscovite

Medium-to coarse-grained seriate muscovite-biotite

Two sills of rhyolite (Unit 9) carrying phenocrysts

Mixed rocks are relatively common. A highly variable mixture (Unit Agm) of metawacke (Unit 1c) intruded by dykes

leucogranite to leucogranodiorite exposed on small islands west of White Head Island and around Synders Lake. The age

composition between Units 4 and 7 suggests the two units may

granite (Unit 8) containing 1-10% microcline phenocrysts up

to 3 cm long is known to intrude all plutonic units except

of quartz, plagioclase and microcline intrude Unit 2a in two

places along the northwest shore of Whitehead Harbour. They

are similar in composition to Unit 6a and may represent

apophyses of the large pluton exposed 1-2 km to the

and larger masses of biotite-muscovite granite (Unit 6) and

muscovite leucogranite pegmatite and aplite is poorly

exposed over a large area north of Dover. Smaller areas of

similar rocks occur around Glasgow Head. It grades into

adjacent plutonic or metasedimentary units by gradual

decrease in the proportions of pegmatite/aplite and either

metawacke or medium grained granite. A second type of mixed

rock (Unit Mig) is exposed on islands north and east of

Canso. It is composed of schlieric tonalite gneiss,

metawacke (Unit 1c) inclusions, and medium grained to

pegmatitic granite (Unit 6c?) dykes arranged in discontinous

and the origin of the tonalite gneiss is uncertain. However,

its composition suggests it may be correlative with Unit 3.

The abundant micaceous clots and schlieren may be the result

of reaction with both metasedimentary xenoliths and granitic

three events which may have partly overlapped in time. The

oldest structures are assigned to the Acadian Orogeny. These

include a variably-developed slaty cleavage to schistosity

(S<sub>1</sub>) which is probably related to large synclines and

anticlines  $(F_1)$  which are apparent at map scale.  $S_1$  is

typically oriented parallel bedding and is defined by

muscovite, biotite and chlorite. The F<sub>1</sub> macrofolds are tight

to ioclinal, overturned to the north or south, and plunge

to the similar orientation of structures superimposed during

recognize. The only place where they were identified with

any certainty is in Unit H2c northeast of Prices Island

where younger deformation is absent. Post-tectonic

porphyroblasts of andalusite, cordierite and biotite

overgrew S, in metasedimentary rocks of favourable

granitoid plutons are restricted to the southern part of the

map area where later shearing effects are absent. Thus,

highly indurated sedimentary hornfels are only preserved northeast of Prices Island and in screens and xenoliths

farther south and east. The most characteristic feature of

the hornfels is the presence of abundant fibrous sillimanite

which partly replaces Acadian porphyroblasts of andalusite

(Keppie, 1985) produced a complex assemblage of structures

in the northern two-thirds of the map area that overprint

and locally destroy older features related to the Acadian

Orogeny and contact metamorphism. In the more pelitic rocks

of the Meguma Group, a strong schistosity (S2) is developed,

defined by muscovite, biotite and chlorite, which crenulates

S1 in F2 fold closures. Mesoscopic F2 folds are common and

are invariably Z-shaped, plunging gently to moderately to

the east-northeast and west-southwest. A macroscopic F2 fold

of identical style is developed in Unit 2a just north of

Whitehead. S2 varies from a weak fracture cleavage to a

strong augen gneissosity in granitoid rocks. In two

east-west zones centered on The Tittle and the area between

Dover Passage and Fisherman Island, a mylonitic C-S fabric is developed. At least two sets of shear (C) planes can be

identified locally and their geometric relationship with So is uniformly compatible with dextral movement. Subhorizontal

slickensides and a locally formed mineral lineation are

mesofolds identical in symmetry to the F, folds described

above locally deform C and S fabrics in the Canso area.

Shearing probably became more brittle as time progressed, as shown by the widespread occurrence of crosscutting brittle

shear zones and late microstructures such as grain

fractures. Dextral and sinistral strike-slip faults, easily recognized in the Meguma Group along the north shore,

represent the final stages of deformation. Locally-developed crenulation cleavages of more than one age postdate S<sub>2</sub> in

occur in the map area. The most significant consists of

scheelite, chalcopyrite and sphalerite in stratabound quartz

veins that crosscut a garnetiferous quartzite bed in Unit 2a

at Lazy Head. Similar mineralization has been reported from a drill hole in Unit lc just west of Canso. Pyrite and pyrrhotite, locally accompanied by minor chalcopyrite, are

abundant in graphite schist (Unit 2b) along the north shore.

Traces of pyrite and chalcopyrite were found in micaceous

clots in granite of Units 5 and 8 on the east side of Dover

Bay. Beryl, chalcopyrite and molybdenite are known to occur

Reynolds, P.H., Zentilli, M., and Muecks, G.K. 1981: K-Ar and Ar/ Ar geochronology of

p.386-394.

Geology by J.D. Hill, 1985

Magnetic declination 1986, 23°30' W

decreasing 6.5' annually

Agmatite, characterized by alternating outcrops of metawacke (Unit 1), medium grained two mica granite

pegmatitic granite (Unit 6).

(Unit 6) and muscovite leucogranite pegmatite and aplite.

Migmatite, comprised of schlieric tonalite gneiss

containing numerous inclusions of metawacke (Unit 1), interlayered with lenses of medium grained to

Weeks, L.J.

MIXED ROCKS

that intrude Unit lc southeast of Half Island Cove.

in trace amounts in lenses of muscovite granite pegmatite

Whitehaven Sheet, Nova Scotia; Sheet

No. 26, Geological Survey of Canada

Scotia; in Appalachians Geotraverse (Canadian Mainland);

Geology and tectonics of Nova

Associations of Canada Annual

Meeting, guidebook to excursion 1,

granitoid rocks from southern Nova

geological evolution of the Meguma

Zone of the Appalachians; Canadian

Journal of Earth Sciences, v.18,

Chedabucto Bay, Nova Scotia;

Geological Survey of Canada, Map

Cape Canso, Guysborough and Richmond

Counties, Nova Scotia; Geological

Survey of Canada, Map 1074A.

Geological and Mineralogical

Scotia. Its bearing on the

Several economic mineral showings of minor importance

the Halifax Formation, but their significance is unknown.

Contact metamorphic effects caused by emplacement of

A prolonged episode of ductile dextral shearing

composition toward the end of the Acadian Orogeny.

and cordierite in Unit H2c.

gently to moderately east-northeast and west-southwest. Due

a younger shearing event, Acadian folds are difficult to

Tectonic and metamorphic features can be grouped into

layers 1 mm to 5 m thick. These rocks are highly deformed

Unit 7 and parts of Unit 6. It is commonly agmatitic, containing numerous angular xenoliths of Unit 5, some of

of Unit 7 is unknown. However, the similarity in modal

represent the same magmatic episode.

which exceed 100m in diameter.

coast locally possess a subhorizontal flow foliation and layering. Farther north, the original igneous fabric is

obliterated by one or more tectonic foliations. All of the

granitoid rocks show significant subsolidus recrystallization and replacement textures in thin section,

regardless of whether they are deformed or relatively pristine. In general, microcline replaces plagioclase,

biotite and muscovite replace both feldspars, and

aplite dykes composed of muscovite leucogranite locally

sillimanite needles crosscut all minerals. Pegmatite and

containing accessory biotite, garnet or tourmaline intrude

all of the plutonic units, especially Units 5 and 6c.

Approximate modes representative of each unit are given

Medium grained biotite tonalite (Unit 3) occurs as remnants of what were once one or more larger plutons east of Dover Harbour. A characteristic feature is the presence of 1-5% disc-shaped metasedimentary xenoliths up to 50 cm long which are oriented parallel to a biotite foliation. The tonalite is intruded by dykes of Units 5, 6a and 8. Fine-to medium-grained biotite-muscovite granite to granodiorite (Unit 4) is exposed at the north end of Dover Bay and at Big Branch Lake. The age is uncertain but probable dykes of Unit 6b crosscut Unit 4 northwest of Eagle Head. In addition, xenoliths of aplitic granite that appear to be correlative with Unit 4 occur in Unit 5a on the northwest side of Wreck Island. Dykes of Unit 8 crosscut Unit 4 north of Wreck Island. The age relationship between Units 3 and 4 is unknown. Unit 5 consists of coarse grained seriate muscovite-biotite granite containing 15-35% microcline phenocrysts ranging from 1 to 8 cm long. A garnet-bearing variant (Unit 5b) is exposed between Mahons Lake and Andrew Island. Grey-weathering aplite (Unit 5c) carrying small phenocrysts of quartz and feldspar locally forms mappable bodies associated with the coarse grained phases of Units 5a and 5b. The aplite is both intrusive and gradational with its host. Unit 5 contains xenoliths of Units 3 and 4(?) and occurs as xenoliths in Units 6a and 8. The relationship between Units 5 and 8, which are similar in composition, is particularly intimate, in that they form agmatite (Units A5 and A8) over large areas. Unit 6 forms several large plutons, at least one of which is composite. Medium grained biotite-muscovite granite to granodiorite (Unit 6a) is the dominant phase. It contains xenoliths of Unit 5 in Whale Cove and at Whistler Point in Glasgow Harbour. Dykes of Unit 8 crosscut Unit 6a at Whistler Point. South of Hazel Hill Lake, dykes(?) of slightly coarser grained granite containing 1-2% more biotite (Unit 6b) intrude Unit 6a. The relative age of medium-to coarse-grained biotite-muscovite granite (Unit 6c) north of Canso is unknown. A small body of garnet-bearing biotite-muscovite granite (Unit 6d) is exposed along the north shore of Mahons Lake. Two small bodies (dykes?) of quartz syenite (Unit 6e) occur within Unit 6a around Fox

Rhyolite sill with phencrysts of quartz, plagioclase and microcline. May be correlative with Unit 6.

8 A8 Medium to coarse grained seriate muscovite-biotite granite, with phenocrysts of microcline up to 3 cm long. A8 is agmatitic, containing 10-50% xenoliths of Unit 5.

7 Medium grained muscovite leucogranite to leucogranodiorite. Age unknown, but may be correlative with Unit 4.

6 A6 Multiple intrusive medium grained two mica granite to granodiorite. A6 is agmatitic, intruded by numerous dykes of Unit 8. a - biotite-muscovite granite;

b - muscovite-biotite granite; c - medium to coarse

grained biotite-muscovite granite, intruded by numerous dikes of aplite and pegmatite; d - biotite-muscovite granite with accessory garnet; e - quartz syenite

5 AS

Coarse grained seriate muscovite-biotite granite containing microcline phenocrysts up to 15 cm long.

A5 is agmatitic, containing 10-50% dikes and small intrusions of Unit 8. a - lacks accessory garnet; b - with accessory garnet; c - aplitic granite, both intrusive and gradational with Unit 5.

4 Fine to medium biotite-muscovite granite to granodiorite.

Medium grained biotite tonalite.

Meguma Group (1,2)

2 H2
Halifax Formation: schist, phyllite, minor metawacke and quartzite. H2 is hornfelsic. a - laminated phyllite, locally porphyroblastic, with thin beds of metawacke and garnetiferous quartzite; b - graphitic schist, commonly porphyroblastic, containing thin metawacke beds; c - andalusite schist, commonly containing thin beds of garnetiferous quartzite; d - metawacke, locally interbedded with phyllite.

Taim Goldenville Formation: metawacke, minor phyllite and schist. A1 is agmatitic, crosscut by numerous dykes of granite (Unit 6). H1 is hornfelsic. a - thinly bedded metawacke, with 10-50% phyllite, transitional to Halifax Formation; b- thinly bedded metawacke and minor phyllite, with numerous primary structures; c-thickly bedded metawacke, locally containing minor phyllite.

Drift-covered area

Geological boundary (defined, approximate, assumed)
Bedding, tops known (inclined, overturned, S1 parallel)
Bedding, tcps unknown (inclined, vertical, S1 parallel)
Igneous mineral layering, foliation
Igneous mineral lineation
S foliation (inclined, vertical)
S2 foliation (inclined, vertical)
S3 foliation (inclined, vertical)

Geological boundary (defined, approximate, assumed) ..... Bedding, tops known (inclined, overturned, S, parallel) ... Bedding, tops unknown (inclined, vertical, S1 parallel) ..... Igneous mineral layering, foliation ..... Igneous mineral lineation .... S, foliation (inclined, vertical) S<sub>2</sub> foliation (inclined, vertical, gneissic layering) ... S2 C-planes (inclined, vertical L2 intersection or mineral lineation, striations Lo minor fold axis .... Dykes, repeated, pegmatite or aplite .. Dyke, granitoid (unit indicated) .. F, axial trace (syncline, anticline) F<sub>2</sub> axial trace (syncline, anticline) Granitoid dike or small pluton, shape unknown (unit indicated) ..... Miarolitic cavities ... Metasedimentary xenoliths (5-30%, >30% of bedrock) .... Granitoid xenoliths, unit indicated (5-30%, >30% of bedrock) ....

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Park Ledge Grassy Island Cow Rock Cranberry Calf Rock\* Pink Rock + Black Rocks \*Cape Rock Big Branch t\*Old Man Rock Gull Island Ledges y----Dover DOVERKetch Harbour Head Port / Felix Harbour Port Felix " 26' Harbour Islands 5a, Richards DOVERMAP 1276 GEOLOGY CAPE CANSO NOVA SCOTIA Scale 1:25 000 Universal Transverse Mercator Projection © Crown Copyrights reserved OPEN FILE DOSSIER PUBLIC 1276 Bald Rock @ GEOLOGICAL SURVEY OF CANADA OMMISSION GEOLOGIQUE DU CANADA OTTAWA + Sculpin Rock Black Market Market W. C. 61° 13′

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Mineral occurrences .....