GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

11 E/6

LEGEND

MESOZOIC

TRIASSIC

9 — *ANNAPOLIS FORMATION: conglomerate, sandstone, red shale*

CARBONIFEROUS OR LATER
PENNSYLVANIAN (?)

8 — *Conglomerate*

MISSISSIPPIAN
CANSO GROUP

7 — *Sandstone, shale*

WINDSOR GROUP

6 — *Limestone, shale*

PALAEOZOIC

HORTON GROUP

5 — *Conglomerate, sandstone, shale;* **5a**, *may be Canso Group in part;* **5b**, *amygdaloidal basalt*

DEVONIAN

4 — *Granite:* **4a**, *granite with inclusions of 2 and/or 3;* **4b**, *pegmatitic and aplitic granite dykes;* **4c**, *granitized and injected bedded rocks*

ORDOVICIAN
MEGUMA GROUP (2,3)

3 — *HALIFAX FORMATION: black slate, andalusite and sericite schist; minor quartzite*

2 — *GOLDENVILLE FORMATION: quartzite; minor slate*

PROTEROZOIC

FOURCHU GROUP

1 — *Volcanic breccia, tuff, lava, sandstone, chloritic schist;* **1a**, *felsitic dyke*

Rock outcrop ×
Zone with andalusite-rich layers
Bedding (inclined, vertical, overturned, dip unknown)
Schistosity (inclined, vertical, dip unknown)
Gneissosity (inclined, vertical, dip unknown)
Drag fold (arrow indicates direction of plunge)
Lineament (from air photographs)
Fault (defined, approximate, assumed)
Joints (horizontal, inclined, vertical)
Anticline (defined, approximate, arrow indicates direction of plunge)
Syncline (approximate, arrow indicates direction of plunge)
Glacial striae
Fossil locality ✆
Quarry Granite ⚒
Mineral prospect or abandoned mine (andalusite, **and**; copper, **Cu**; gold, **Au**; iron, **Fe**; tungsten, **W**) Cu ×

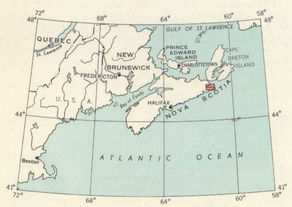
Geology by I. M. Stevenson, 1957, 1958

Geological cartography by the Geological Survey of Canada, 1964

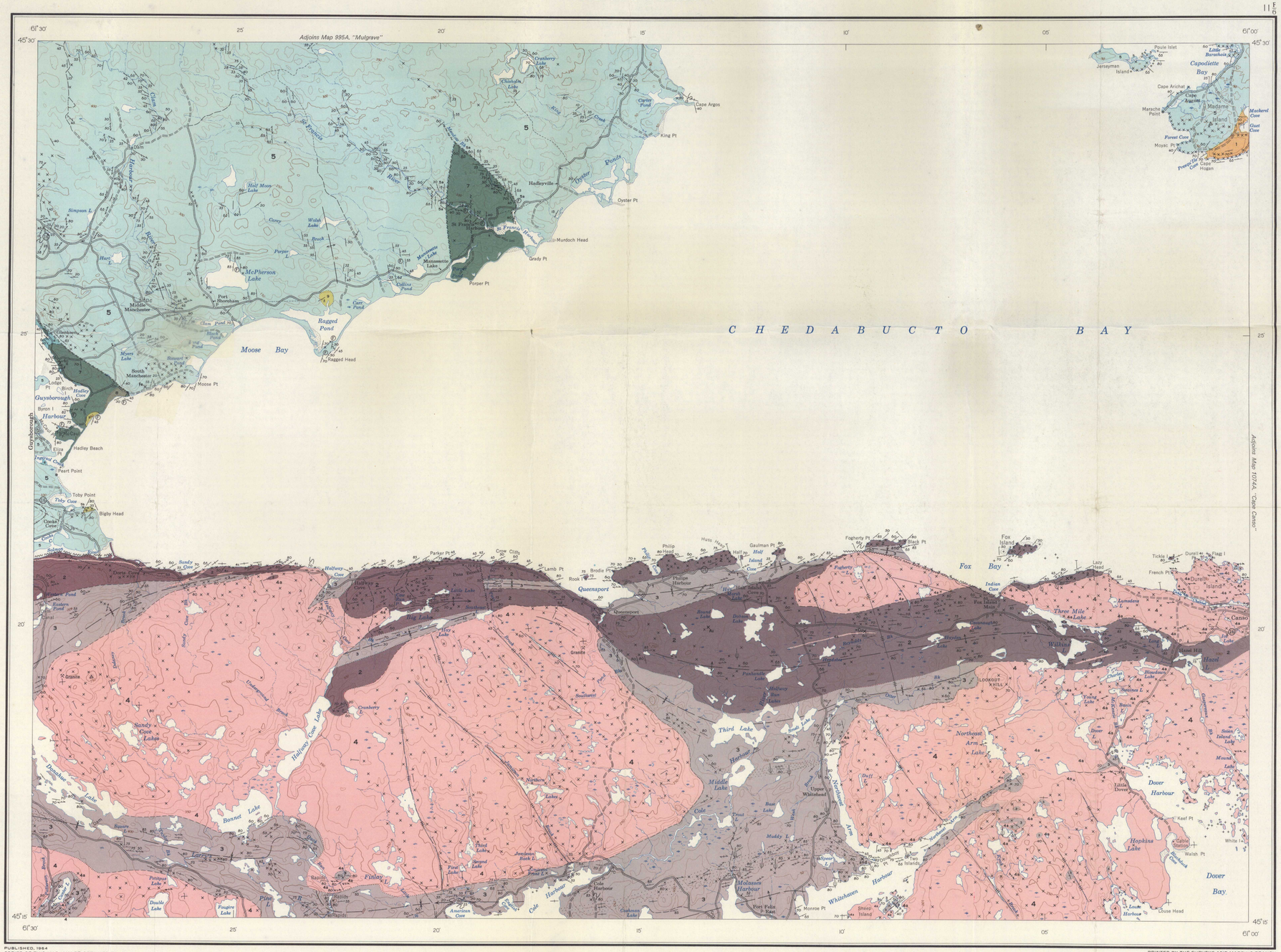
Road, all weather
Other roads
Cart track
Trail
Abandoned railway
Power transmission line
Telephone line
Horizontal control point △
Church, cemetery
School
Post Office P
Intermittent stream
Marsh
Foreshore flats
Rock, bare or awash
Lighthouse
Pier, dock or wharf
Contours (interval 50 feet)

Base-map compiled and drawn by the Surveys and Mapping Branch, 1954, modified by the Geological Survey of Canada, 1964

Approximate magnetic declination, 24°19' West decreasing 2.4' annually



INDEX MAP



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MAP 1156A

GEOLOGY

CHEDABUCTO BAY

NOVA SCOTIA

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

Miles 1 ½ 0 1 2 3

DESCRIPTIVE NOTES

The oldest rocks in the area occur on Madame Island, and form part of the Fourchu Group (1) of Late Precambrian[1] age. They consist of an assemblage of volcanic breccia, lava, tuff, sandstone, and chloritic schist, cut by a felsitic dyke (1a) several tens of feet wide.

South of Chedabucto Bay, quartzites and slates of the Meguma Group (2, 3) of probable Ordovician age have been deformed into a series of tight folds with east-striking axes and steeply dipping axial planes. The Goldenville Formation (2) consists of alternate bands of quartzite and slate, with the former predominant. The quartzite varies in composition from orthoquartzite to subgreywacke. It is grey to greenish grey, breaks with a conchoidal fracture, and commonly passes gradationally into thin layers of siliceous, micaceous slate. The Goldenville Formation is normally overlain by black, graphitic, alumina-rich slates of the Halifax Formation (3); these slates contain thin layers of schistose, greyish green quartzite similar in appearance to quartzite of the Goldenville Formation. At various localities in the area, the Halifax Formation contains layers of andalusite-rich schist, separated on either side from black slates of the Halifax Formation by several hundreds of feet of quartzite and grey slate. The main layer is about ½ mile wide, and extends from Doughboy Point westward to Cole Harbour. Smaller layers are found southwest of Donahue Lake and near Middle Lake. The origin of the andalusite-rich bands is in doubt, but they probably represent contact metamorphism of slate beds of appropriate composition[2]. Structurally, the andalusite-rich layers appear to form part of the Halifax Formation, which was steeply folded prior to intrusion of the granite. The quartzites and slates of both formations commonly contain cubes of pyrite along the bedding planes. The contact between the two formations is conformable, and although distinct in some places, it is arbitrarily chosen in others.

Rocks of the Meguma Group have been intruded by grey to pink granite (4) of Devonian age[3]. As a result, the sediments bordering the granite masses have been commonly metamorphosed into garnetiferous andalusite-staurolite-cordierite schists for various distances from the contact. The granite (4) varies considerably in composition, texture, and colour, depending on the proximity of the sedimentary rocks. Those granites remote from the contact are composed of white to flesh-coloured feldspar, biotite, and clear to smoky quartz, and their texture varies from coarse grained to porphyritic. Near the contact with the sediments, the granite grades abruptly into a schistose gneissic rock, which in turn passes into a metamorphosed sedimentary rock. Over much of the area the granite contains inclusions of Meguma sediments (4a), particularly near its contacts. Such inclusions are particularly abundant in the area north and east of Whitehaven Harbour.

Dykes of grey to pink granite (4b) cut the Meguma strata at many places near the granite masses. Most of the dykes consist of coarse-grained feldspar, quartz, and biotite, but a few grade into fine-grained, sugary, aplitic material. Numerous veins of clear and milky quartz cut both granites and sedimentary rocks.

On Durell Island, north of Canso town, strata of the Goldenville Formation have been extensively granitized and injected to form migmatites (4c) in which the original structures are preserved.

The Horton Group (5) of early Mississippian age is separated from Meguma strata by a fault that follows Salmon River. On Madame Island, rocks of the Fourchu Group are separated from those of the Horton Group by an angular unconformity. The Horton Group consists of coarse- to fine-grained clastic rocks of continental origin. The predominant colours are grey-green, brown, grey, and black. Horton strata in this map-area are in general more highly metamorphosed than elsewhere in Nova Scotia, and over much of the region they are schistose grey-green phyllites with well developed cleavage, commonly at various angles to the schistosity. These rocks are well exposed on the upper reaches of Clam Harbour River. On the south shore of Toby Cove, near Bigby Head, purple amygdaloidal basalt (5b) is intercalated with Horton strata. The age of the volcanic rock is in doubt, but it is probably early Mississippian. A few scattered remnants of red limestone of the marine Windsor Group (6) occur on the shores of Guysborough Harbour. It is probable that this limestone disconformably overlies the Horton Group, and is in turn unconformably overlain by strata of Canso age (7). Fossils indicate that the Windsor limestone on McCaul Island is of late Windsor age.

Fossil evidence has indicated the presence of Canso strata near the mouths of Meadow Brook and St. Francis River, on the shore 1½ miles southwest of Moose Point, and along the east side of Guysborough Harbour. Canso rocks are markedly similar in appearance to those of Horton age, with the possible exception of a preponderance of black slate and a scarcity of conglomerate in the former. Canso strata are notably lacking in fossil content. Additional areas of Canso rocks are undoubtedly present elsewhere in the area north of Chedabucto Bay.

On the shore southwest of Moose Point, a peculiar, coarse, brown, friable conglomerate (8) unconformably overlies Canso sediments. The age of the conglomerate is in doubt, but it is markedly similar in texture and appearance to conglomerate of Pennsylvanian age found elsewhere in Nova Scotia. Numerous fragments of Horton rocks are present in the conglomerate.

Pale brownish red conglomerate, sandstone, and shale of Triassic age (9) outcrop at three localities near the head of Chedabucto Bay. Vertebrate fossils from the outcrop near McCaul Island are of Triassic age. These rocks are identical in appearance and composition to those of the Annapolis Formation found along the shores of Minas Basin, 80 miles to the west. In Chedabucto Bay, the nature of the contact between the Triassic and underlying rocks is unknown, but where the contact is exposed, as at Bigby Head, it is a fault.

All rocks in the area have undergone considerable faulting, but surface expression of most of the faults has been obscured by glacial drift. A major east-striking fault, located along Salmon River, separates rocks of the Meguma Group from rocks of the Horton Group to the north. Submarine contours indicate a steep scarp near and parallel to the south shore of Chedabucto Bay, which suggests extension of this fault eastward to Durell Island and beyond. The faulted contact between the Horton and Canso Groups on St. Francis River and Meadow Brook is largely hypothetical, but the highly disturbed rocks in much of the bed of Meadow Brook are indicative of a fault parallel to this brook. The beds on St. Francis River have been cut by numerous north-striking faults with unknown displacements.

Two major sets of joints, striking northwest and northeast respectively, are well developed in areas underlain by granite. The northwest-striking set is the more prominent, and in several localities it forms topographical lineaments that may readily be traced for several miles.

The region has been subject to at least two major periods of deformation. During the first, strata of the Meguma Group (2, 3) were compressed into a series of tight, east-trending folds. The post-orogenic Devonian granites were relatively undisturbed. During the second — a post-Mississippian and pre-Triassic period of folding — sediments of Mississippian age were folded about northward-trending axes. The Devonian granites apparently acted as resistant buttresses during this second period of folding. Triassic rocks are only gently folded.

The entire region has been extensively glaciated. Glacial striae indicate a general southerly movement of the ice.

Drilling and surface trenching have recently been carried out on a tungsten deposit on the coast southeast of Fox Island. The ore consists mainly of scheelite that formed as a coating on fracture surfaces and as tiny veinlets in the Goldenville quartzite.

A steeply dipping band of andalusite-rich schist, about 1,000 feet wide and 3 miles long, has been prospected and sampled near Doughboy Point. A showing of andalusite was also recently sampled at Black Point.

Iron was mined many years ago from a shaft near South Manchester. The ore consisted of massive, specular hematite veins cutting Horton quartzites. Numerous veins of ankerite and specular hematite cut Horton and/or Canso strata at Clam Harbour River, St. Francis River, Bigby Head, and elsewhere in the area. Prospecting has been carried out for gold and copper, which occur in small amounts in pegmatite dykes and quartz veins at several localities. A deposit of chalcopyrite in Tickle Channel was recently investigated by drilling.

Granite has been quarried at several localities, but the largest quarry, near Queensport, is at present inoperative.

Aeromagnetic anomalies near Larry's River and southwest of Donahue Lake are apparently caused by a higher-than-normal concentration of magnetite in Halifax slates. Small anomalies ½ mile west of Stewart Pond and 1 mile north of Hadley Cove were examined, but no direct cause for them was found.

[1] Weeks, L. J.: Southeast Cape Breton Island, Nova Scotia; Geol. Surv. Can., Mem. 277 (1954).
[2] Schiller, E. A.: Petrology and Petrography of Certain Andalusite Slates and Schists in Guysborough County, Nova Scotia; Michigan State Univ., M.Sc. thesis (1959).
[3] Fairbairn, H. W., Hurley, P. M., Pinson, W. H., and Cormier, R. F.: Age of the Granitic Rocks of Nova Scotia; Bull. Geol. Soc. Amer., vol. 71, pp. 399-414 (1960). Klein, G. de V.: Triassic Rocks of Nova Scotia; Geol. Soc. Amer., Mem.—(April 1961).

5.1.6
A. Geol.
N.S. Chedabucto Bay
SCALE - 1" To one mile.
MAP 1156A
e3

1156A