GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 11 E/7

LEGEND

CENOZOIC

17 Glacio-fluvial sand and gravel

PALAEOZOIC

PENNSYLVANIAN

CUMBERLAND AND/OR PICTOU GROUPS

16 Brown and grey sandstone and mudstone, red conglomerate, and black carbonaceous shale

RIVERSDALE GROUP

15 Grey shale and siltstone, black shale, and minor grey quartz wacke

MISSISSIPPIAN

14 Diabase and other intrusive rocks

CANSO GROUP

13 Red, green and grey mudstone, argillite, and fine-grained wacke; minor grey argillaceous limestone

WINDSOR GROUP

12 Undivided, red and grey calcareous shale, grey argillaceous limestone, gypsum, anhydrite, and red conglomerate; 12a, grey argillaceous limestone, maroon siltstone gypsum and anhydrite; 12b, red and grey calcareous and non-calcareous shale, siltstone and mudstone, grey argillaceous limestone, gypsum and anhydrite

HORTON GROUP

11 11a, medium to dark grey siltstone, shale and fine-grained quartz wacke; 11b, light grey medium-to coarse-grained quartz feldspar arenite and dark grey siltstone; 11c, red and greenish grey mudstone and siltstone; minor grey pebble conglomerate

DEVONIAN

10 Light grey biotite and muscovite granite; minor syenite

SILURIAN

ARISAIG GROUP (4-9)

9 Undivided

8 STONEHOUSE FORMATION: Bluish grey, maroon, and grey siltstone, wacke and calcareous siltstone

7 MOYDART FORMATION: light greenish grey fine-grained quartz wacke

6 McADAM FORMATION: medium grey silty shale, dark grey thinly bedded shale, light bluish grey siltstone, and thin layer of hematite rich quartz arenite

5 ROSS BROOK FORMATION: light grey fine-grained quartzite and quartz wacke, purplish grey siltstone, dark grey silty shale and basal light grey conglomerate

4 BEECHHILL COVE FORMATION: light greenish grey quartzite and quartz wacke and thin basal conglomerate

ORDOVICIAN

BROWNS MOUNTAIN GROUP

3 JAMES RIVER FORMATION: interbedded greenish-grey to black banded argillite, dark green to purplish andesite, tuff and agglomerate and dark greenish grey greywacke

MEGUMA GROUP (1-2)

2 HALIFAX FORMATION: black slate, greenish-grey quartz wacke, greywacke, phyllite, and andalusite schist and dark grey to black biotite schist

1 GOLDENVILLE FORMATION: greenish-grey quartzite and minor slate

Rock outcrop . . . . . ×

Geological boundary (defined, approximate, assumed) . . . . . ~~~

Bedding, tops known (inclined, vertical, overturned) 70 90 80

Bedding, tops unknown (inclined, vertical) 70 90

Schistosity (inclined, vertical) 70 90

Drag-fold (arrow indicates plunge) 30

Fault (defined, approximate, assumed) . . . . . ~~~ ~~~ ~~~

Anticline (defined, arrow indicates direction of plunge) 30

Syncline (defined, arrow indicates direction of plunge) 30

Gravel deposit . . . . . ⁘

Fossil locality . . . . . F

Quarry . . . . . ⚒

Mineral occurrence . . . . . × Cu

Shaft (abandoned) . . . . . ⧈

Sink holes . . . . . SH

MINERALS

Andesite	and	Gypsum	gyp
Anhydrite	anhy	Lead	Pb
Copper	Cu	Limestone	ls

Geology by D. G. Benson, 1960, 1961

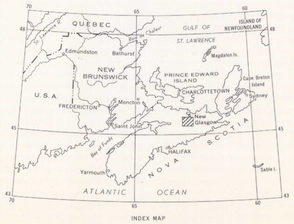
Cartography by the Geological Survey of Canada, 1962

Approximate magnetic declination, 23° 16' West, decreasing 2 .4'annually

Geographical names subject to revision

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa

PUBLISHED, 1962
COPIES OF THIS MAP MAY BE OBTAINED FROM THE DIRECTOR, GEOLOGICAL SURVEY OF CANADA, OTTAWA



INDEX MAP

MAP 3-1962
GEOLOGY
HOPEWELL
NOVA SCOTIA

Scale: One Inch to One Mile = 1/63,360
Miles
1 1/2 0 1 2 3

LEGEND

Roads, all weather . . . . . ═══
Other roads, dry weather . . . . . ═══
Trail . . . . . ═══
Railway . . . . . ═══
Power transmission line . . . . . ═══
County boundary . . . . . ═══
Post Office . . . . . P.O.
School . . . . . s
Intermittent stream . . . . . ═══
Marsh . . . . . ═══
Contours (interval 50 feet) . . . . . ═══
Height in feet above mean sea-level 565

Base-map prepared by Surveys and Mapping Branch, 1954 with revisions by the Geological Survey of Canada, 1962

PRINTED BY THE SURVEYS AND MAPPING BRANCH

DESCRIPTIVE NOTES

The area is covered with varying thicknesses of glacial deposits, so that outcrops generally occur only in the stream valleys. Stratified gravel deposits up to 80 feet thick are numerous.

The classification of sandstones used here is that of Williams, Turner and Gilbert[1], i.e. sandstones consist of wackes, which contain greater than 10 per cent argillaceous matrix, and arenites, which contain less than 10 per cent argillaceous matrix.

The Meguma Group (1,2) is best exposed along Cox Brook. The division between the Goldenville Formation (1) and the overlying Halifax Formation (2) is chosen as the top of the highest quartzite bed. The rocks of both formations are highly folded and show results of low-grade metamorphism. Aeromagnetic highs are caused by the andalusite and biotite schists.

The Browns Mountain Group (3) is unfossiliferous, but as it underlies Lower Silurian rocks it is interpreted as Ordovician. It consists of interbedded volcanic rocks, sediments, and pyroclastic rocks. Some of the volcanic rocks display a diabasic texture. These rocks may belong to the James River Formation which is exposed to the northeast[2].

Owing to poor outcrop distribution and insufficient index fossils it is not always possible to divide the Arisaig Group (4-9) into its constituent formations. The Beechhill Cove (4) and Ross Brook (5) Formations are recognized because of their lithologies and their relationships to the underlying volcanic rocks (3). The McAdam Formation (6) contains a diagnostic 'iron-ore' bed, which is fossiliferous. Isolated groups of outcrops between Bridgeville and Forbes Lake contain good collections of fossils typical of the Moydart (7) and Stonehouse (8) Formations. The rocks of the Arisaig Group in this area are generally coarser grained than those in the type section[3,4] of the group, and those in the area to the north described by Maehl[4]. The rocks show well-developed cleavage and, near the faults, one or two fracture directions.

Light grey, medium-grained Devonian[5] granite (10) appears to have intruded the older rocks and caused the development of the andalusite and biotite schists in the Halifax Formation (2). The areal extent of the granite is based mainly on the distribution of large frost-heaved boulders. Its composition varies from a muscovite-rich variety to a biotite-rich variety. A small body along West River St. Mary's has a composition nearly like that of syenite.

The age and continental origin of the Lower Mississippian Horton Group are confirmed by the fossil plants they enclose. These sediments are commonly characterized by the presence of mica along the bedding planes, angular quartz and feldspar grains, and more than 10 per cent argillaceous matrix. They are divisible into three lithologic units. The siltstone unit (11a) is separated from the Riversdale (15) and Canso (13) Groups by a fault. It is overlain to the south by the arenite unit (11b), which is in turn overlain by the mudstone unit (11c). The Horton Group unconformably overlies the Goldenville (1) and Halifax (2) Formations with progressive onlap. A thin upper Horton conglomerate is found along West River St. Mary's. The group has been closely folded, resulting in repetition of many beds. The presence of a volcanic bed within the siltstone unit (11a) is suggested by two concentrations of dark green amygdaloidal basalt boulders about 1.5 miles from the mouth of Big Stewiacke River. The Horton Group is best exposed on Pembroke, Stewiacke, Big Stewiacke, and Little Stewiacke Rivers.

Basal Windsor red conglomerate (12) lies unconformably on Goldenville quartz wacke (1) on Cox Brook and also outcrops near upper Horton mudstone on Bentley Brook. Subzone "F" and "C" and upper Windsor fossils were found, but it was not possible to map subdivisions of the Windsor Group in this region. In the northeastern part of the map-area Windsor limestone unconformably overlies the Silurian and Ordovician complex (3-8). Subzone "F" limestone (12a) was found near the Silurian-Ordovican contact and Subzone "E" fossils were found elsewhere (12b). The best exposures of Windsor strata are found on West Branch East River and on East River of Pictou below Springville.

The Canso Group (13) contains only non-marine fossils. Some of the finer-grained siltstone bands have calcareous layers a few inches thick, which produce a peculiar, banded, tan-and-dark-grey-weathered surface. Near some of the boundary fault zones the most common rock type is argillite. The strata are highly folded and are cut by several faults. The contact with the Windsor Group was not observed, but may be an unconformity in some localities. Good exposures occur on Middle River and Archibald Brook.

There are a few small dyke-like intrusions (14) into the Canso (13) and Windsor (12) rocks. Boulder concentrations are common, but outcrops are rare. The most common type of dyke-rock is dark green diabase with highly altered ferromagnesian minerals. Contact relationships with the sedimentary rocks have not been observed, but minor metamorphic haloes are found. Fine-grained dark green hornfels, 500 feet east of the Lorne railroad-crossing, has several veins of of scapolite, probably caused by metasomatic reaction of intruded calcareous sediments with an unobserved intrusive body. A small body, of unknown age, about 1 mile south of Lorne crossing, resembles a gneissic granite.

The Riversdale Group (15) bears a strong lithologic similarity to the adjacent Horton siltstone unit (11a). Less mica is present in the Riversdale rocks, and they are generally less disturbed structurally than the Horton rocks. Plant remains found in rocks near the headwaters of Calvary Stream confirm their assignment to the Riversdale Group.

It is difficult to tell whether rocks belong to the Pictou and/or Cumberland Groups (16). Spore analysis of specimens from two outcrops suggests correlation with the Pictou Group, and the fossil plants contained by these rocks indicate that correlation with the Pictou Group is more likely. However, coal exposed on the small stream west of Ben Lake resembles coal of the Cumberland Group at Kemptown, 5 miles to the west[6], which suggests that both the Pictou and Cumberland Groups are present. The observed lithologies support this suggestion.

The area has undergone at least two periods of deformation. The older rocks were folded in pre-Mississippian time, probably during the Acadian orogeny, and the folding was accompanied by granitic intrusion. Uplift took place intermittently during early Mississippian time, possibly by resumption of movement along old faults. The land was depressed during Windsor time and evaporite deposits formed in isolated basins that may have resulted from continuing fault-movement. The second period of deformation, which began late in the Pennsylvanian period, resulted in folding of the rocks, with faulting in some areas. The diabase dykes and other small igneous bodies were emplaced in post-Mississippian time.

Gypsum has been used locally for plaster and fertilizer. Galena occurs in surface outcrops in some old workings in Windsor limestone near Pembroke. Copper minerals occur around two small adits at an old copper showing near Lansdowne. About 1890, small amounts of limonite were mined along the Silurian-Windsor contact near Bridgeville. Prospect pits were dug in the hematite-rich arenite bed within the McAdam Formation (6). There are abandoned limestone quarries at Springville and Black Rock. Recently, surface work has been done on siderite veins in the Horton siltstone unit (11a) on West Branch East River just north of the mouth of Cross Brook.

[1] Williams, H., Turner, F. J., and Gilbert, C. M.: Petrography; San Francisco, W. H. Freeman & Co. (1958).
[2] Williams, M. Y.: Arisaig-Antigonish District. Nova Scotia; Geol. Surv., Canada, Mem. 60 (1914).
[3] McLearn, F. H.: Palaeontology of the Silurian Rocks of Arisaig, Nova Scotia; Geol. Surv., Canada, Mem. 137 (1924).
[4] Maehl, R. H.: The Older Palaeozoic Rocks of Pictou County, Nova Scotia, Nova Scotia Dept. Mines, Mem. 4 (1961).
[5] Fairbairn, H. W., et al.: Age of the Granitic Rocks of Nova Scotia; Bull. Geol. Soc. Amer., vol. 71, pp. 399-414 (1960).
[6] Stevenson, I. M.: Truro Map-area, Colchester and Hants Counties, Nova Scotia; Geol. Surv., Canada, Mem. 297 (1956).

MAP 3-1962
HOPEWELL
NOVA SCOTIA
SHEET 11 E/7

JUN 13 1962

Library
Geological Survey of Canada

This map has been produced from a scanned version of the original map
Reproduction par numérisation d'une carte sur papier