GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 21 B (East Half)

LEGEND

MESOZOIC

TRIASSIC

11 — NORTH MOUNTAIN FORMATION: basalt; 11a, conglomerate, sandstone

PALAEOZOIC

DEVONIAN
UPPER DEVONIAN

10 — PERRY FORMATION: conglomerate, sandstone

SILURIAN

9 — Diabase, gabbro

8 — Rhyolite, andesite, basalt, diabase; tuffs and breccias; minor shales, slates, and cherty argillites

7 — Shales, slates, cherty argillites; minor rhyolite, andesite, basalt, and diabase

SILURIAN OR ORDOVICIAN

6 — Andesite, hornblende-feldspar gneiss, minor slate

5 — WHITE ROCK FORMATION: quartzite, andesite

ORDOVICIAN
LOWER ORDOVICIAN
MEGUMA GROUP

4 — HALIFAX FORMATION: slate, minor argillite and quartzite

3 — GOLDENVILLE FORMATION: biotite quartzite, minor quartzite, mica schist; 3a, argillite

PRECAMBRIAN

COLDBROOK GROUP (?)

2 — Rhyolite, andesite, basalt, diabase; tuffs and breccias; minor clastic sedimentary rocks

GREEN HEAD GROUP

1 — Quartzite, argillite, schist, limestone

A — Granite

Drift-covered areas
Geological boundary (approximate)
Bedding, tops unknown (inclined, vertical)
Bedding, tops known (horizontal, inclined, overturned)
Fault (approximate, assumed)
Anticline (approximate trace of axial surface)
Syncline (approximate trace of axial surface)
Glacial striae (direction of ice-movement known, unknown)
Mineral occurrence (copper - Cu; lead - Pb, zinc - Zn) ×Cu

Geology of northwest quarter by F.J. Alcock, 1946; of southeast quarter by F.C. Taylor, 1960

Compiled by F.C. Taylor, 1960

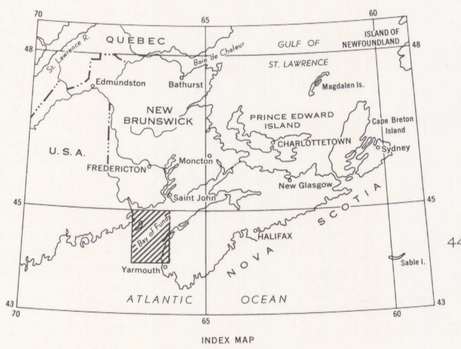
Main highway
Roads (all weather, dry weather)
Railway
Lighthouse
International boundary
Provincial boundary
County boundary
Marsh
Sand
Height in feet above mean sea-level 145

Cartography by the Geological Survey of Canada, 1961

Approximate magnetic declination, 20° 58' West

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

In response to public demand for earlier publication, Preliminary Series maps are issued in this simplified form and will be clearer to read if all or some of the map-units are hand-coloured



INDEX MAP

PUBLISHED, 1961
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DESCRIPTIVE NOTES

The entire area was glaciated in Pleistocene time. The ice flowed mainly east-southeast; however, glacial striae indicate that it flowed southward in the last stages of glaciation. Till and glacio-fluvial sands and gravels cover most of the Nova Scotia mainland so that outcrop is common only along the coast and in stream valleys where erosion has been effective.

The oldest rocks (1) consist of massive white quartzites; reddish, grey and greenish quartzites; shale, sandstone and, locally, conglomerate; mica schists and limestone. Some beds may have originally been tuffs. In places crossbedding as well as bedding is exhibited. Cleavage is well developed in competent rocks whereas less-competent rocks are contorted and drag-folded. On the basis of lithology and structure these rocks (1) are correlated with the Green Head group of the Saint John area.

On Kent Island, limestone and quartzite of the Green Head group (1) are intruded by red granite (A). Similar red granite occurs on The Wolves where, in places, it contains inclusions of greenstone, some of which are partly granitized. Red, granitic dykes cut this complex. The relationship between the granite (A) and volcanic rocks (2) is unknown. Alcock[1] has interpreted this granite as Precambrian, possibly on the basis of granite boulders in Coldbrook conglomerate (2). He cites no other evidence of the age of this granite.

The Green Head group (1) is overlain mainly by volcanic rocks (2), but also by interbedded sedimentary strata. The volcanic rocks are chiefly green, locally amygdaloidal andesite, but light-coloured rhyolite is common in places. The sedimentary rocks consist of reddish and purple clastic beds, including a conglomerate band, on Ross Island, that contains well-rounded boulders of quartz, quartzite, and granite. These rocks are probably unconformable on the Green Head group (1). On Ross Island the volcanic rocks dip away from the older, sedimentary rocks, and on White Head Island the contact of the volcanic rocks, which compose most of the island, bevels the bedding planes of the Green Head quartzites. No fossils are known in any of the sedimentary beds associated with the volcanic rocks, but lithologically these rocks more closely resemble the Coldbrook group of the Saint John area than they do the Silurian volcanic rocks on Campobello Island[2].

The oldest rocks in the eastern (Nova Scotia) side of the map-area belong to the Meguma group. The Goldenville formation (3) consists mainly of well-bedded, fine- to medium-grained, grey biotite quartzite, but it includes small amounts of argillite (3a), green quartzite and mica schist. A few top determinations are provided by crossbedding and grain gradation, which along with bedding and rare ripple-marks are the primary structures present. Thinly bedded, strongly cleaved slates of the Halifax formation (4) conformably overlie the Goldenville formation. These slates are primarily dark grey, but are locally black, light grey, and green, with minor white laminae. Small amounts of grey-green argillite and quartzite are included with the Halifax formation.

At Cape St. Mary, the Halifax formation (4) is conformably overlain by quartzite, slate and volcanic rocks (5). The fine- to medium-grained, white to pale yellow quartzite occurs in three layers- the largest is 130 feet thick. Although brecciated here and there, the quartzite is chiefly well bedded and locally crossbedded. Interbedded with the quartzite are amygdaloidal andesitic volcanic rocks and 70 feet of grey slate. This quartzite is typical of the White Rock formation[3] and is therefore correlated with it.

Conformably overlying the uppermost quartzite bed is 70 feet of grey and dark grey, well-bedded slate, which in turn is overlain by 50 feet of grey-green, fine-grained, schistose andesite (6). Although this is the only exposure of volcanic rock above the White Rock formation at Cape St. Mary, the structure and stratigraphy elsewhere in southwestern Nova Scotia suggest that volcanic rocks are present in a syncline about the village of Mavillette. Only a single poorly exposed outcrop of hornblende-feldspar gneiss occurs in the area of volcanic rocks east of Lake George, but the presence of numerous exposures in the map-area to the south suggests that the volcanic rocks extend throughout the area shown.

Campobello, Deer, and adjacent islands, are all underlain by an assemblage of sedimentary and volcanic rocks (7, 8); the latter are much greater in volume. The commonest varieties are dark greenish basalts and andesites, and grey to white, reddish, and purplish rhyolites locally showing flow structure. Fragmental varieties, including breccia and banded tuffs, also occur. Dark shales, locally rusty brown, and slates, argillites, and cherty argillites are interbedded with the volcanic rocks. Although these rocks are unfossiliferous they are lithologically similar to rocks that are palaeontologically dated as Silurian, of the St. George and Eastport areas. Dykes and stocks of gabbro and diabase (9) in New Brunswick are probably related to these volcanic rocks (7, 8). Gabbro (9) in Nova Scotia is possibly related to the volcanic rocks (6).

Several small islands between Campobello and Deer Islands, are composed of pinkish grey to dark red conglomerate and sandstone (10). The conglomerates consist of boulders of volcanic rocks, quartzite, quartz, and granite. These rocks are correlated with similar strata of the Perry formation in the Eastport and St. Andrews areas to the northwest.

The youngest rocks in the map-area are chiefly massive basalt and diabase flows (11). Characteristically they show well-developed amygdaloidal tops with the amygdules consisting of quartz, calcite and zeolites. Associated with the flow rocks on Grand Manan Island are small amounts of reddish and brownish sandstone and conglomerate (11a). These rocks are lithologically similar to others in the Bay of Fundy area that are known to be Triassic.

In Nova Scotia, the main structural feature is a large syncline whose axis extends from Cape St. Mary to a position 2 miles east of Little Brook. Cleavage-bedding relationships show that it plunges generally less than 10 degrees southward. An anticline northwest of St. Bernard is exposed along the coast in biotite quartzite of the Goldenville formation (3). North Mountain basalt is offset along north-trending faults at Westport and Tiverton. In New Brunswick, a north-trending fault brings Triassic rocks into contact with Precambrian rocks on Grand Manan Island. Another fault, roughly parallel to this one, places the Upper Devonian Perry formation in contact with Silurian volcanic rocks.

Copper sulphides, chiefly bornite, are present on Simpson Island, but insufficient amounts have been found for profitable mining. At Welshpool on Campobello Island, small veins of calcite and quartz, which cut a dark volcanic rock, contain small quantities of sphalerite, galena, chalcopyrite, and pyrite. Small amounts of galena are also present at the northeastern end of the island. The quartzite of the White Rock formation (5) is used as a source of silica at Chegoggin, Nova Scotia, and the same use could be made of the rock at Cape St. Mary. White quartzite (1) on White Head, Ross, and Nantucket Islands could possibly be put to the same use.

[1] Alcock, F.J.: Grand Manan, New Brunswick; Geol. Surv., Canada, Map 965A (1948)
[2] Alcock, F.J.: Campobello, New Brunswick; Geol. Surv., Canada, Map 964A (1948)
[3] Smitheringale, W.G.: Geology of Nictaux-Torbrook Map-area, Annapolis and Kings Counties, Nova Scotia; Geol. Surv., Canada, Paper 60-13 (1960)

MAP 48-1960
GEOLOGY

ST. MARY BAY

DIGBY, YARMOUTH, AND CHARLOTTE COUNTIES
NOVA SCOTIA AND NEW BRUNSWICK

Scale: One Inch to Four Miles = 1/253,440
Miles
4 2 0 4 8 12

MAP 48-1960
ST. MARY BAY
NOVA SCOTIA AND NEW BRUNSWICK
SHEET 21 B (East Half)