CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

SHEET 11 K/15

## LEGEND

### PALÆOZOIC

#### MISSISSIPPIAN

**WINDSOR GROUP**

- **9** — *Limestone, limy siltstone, gypsum; minor sandstone and conglomerate*

**HORTON GROUP**

- **8a-8c** — **8a**, *grey, micaceous sandstone, conglomerate, shale; minor limy siltstone;* **8b**, *pink arkosic conglomerate, sandstone, and siltstone;* **8c**, *greyish red, limy siltstone and arkosic sandstone; possibly pre-Horton*
- **8** — *Micaceous conglomerate, graphitic shale and schist; minor limestone*

#### DEVONIAN OR EARLIER

- *Rhyolite porphyry; minor agglomerate, tuff, and intercalated sedimentary rocks*

### PRECAMBRIAN (?)

- **6** — *Gabbro dykes*
- **5** — *Coarse-grained porphyroblastic biotite granite*
- **4** — *Composite gneiss; granite and syenite with numerous inclusions*
- **3a-3c** — **3a**, *pink granite and pegmatite;* **3b**, *hornblende syenite;* **3c**, *granodiorite*
- **2** — *Altered anorthosite*
- **1a-1f** — **1a**, *chloritic schist and gneiss;* **1b**, *biotitic schist and gneiss;* **1c**, *hornblendic schist and gneiss;* **1d**, *garnetiferous schist and gneiss;* **1e**, *crystalline limestone;* **1f**, *calcareous meta-sedimentary rocks and silicic meta-volcanic rocks*

*Bedding (horizontal, inclined, overturned, upper side of bed unknown)*
*Foliation and schistosity (inclined, vertical)*
*Lineation (plunge known)*
*Anticlinal axis (defined, approximate)*
*Synclinal axis (defined, approximate)*
*Fault (defined, approximate, assumed; solid circle indicates downthrow side)*
*Fossil locality* ⊕
*Mineral occurrence* × Cu

### MINERAL OCCURRENCES

| | | | |
|---|---|---|---|
| *Chalcopyrite* | Cu | *Fluorite* | Fl |
| *Galena* | Pb | *Gypsum* | Gyp |
| *Pyrite* | Py | *Sphalerite* | Zn |

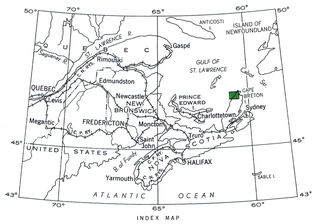
*Geology by E. R. W. Neale, 1954*

*Road*
*Trail*
*County boundary*
*Park boundary*
*Stream (intermittent)*
*Contours (interval 250 feet)*

*Approximate magnetic declination, 26°39′ West*

*Cartography by the Geological Cartography Unit, 1956*

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




## DESCRIPTIVE NOTES

The area consists chiefly of the deeply dissected northern part of an uplifted peneplain known as the Cape Breton Highlands. Remnants of this flat-topped upland include swampy areas and sparsely wooded barrens that range from 1,400 to 1,500 feet in elevation. They are underlain chiefly by resistant crystalline rocks. Narrow lowland areas, underlain by easily eroded sedimentary rocks, extend into the upland along the valleys of Grande Anse and North Aspy Rivers. The lowland areas are partly bounded by steep, fault-line scarps.

A thin veneer of coarse glacial till covers parts of the upland. Exposures in the valley of South Blair River suggest that this till has a maximum thickness of about 60 feet. Stratified drift, up to 40 feet thick, covers parts of the Grande Anse and North Aspy lowlands. These are the only evidences of Pleistocene glaciation noted.

The oldest rocks of the area are crystalline limestone (1e) and chloritic, biotitic, hornblendic, and garnetiferous schist and gneiss (1a-1d) derived by metamorphism from sedimentary, volcanic, and possibly intrusive rocks. Chloritic schist (1a), a dark green to black rock, has largely formed at the expense of biotitic (1b) and hornblendic (1c) schist and gneiss in zones of mechanical deformation. Garnetiferous schist and gneiss (1d), both micaceous and hornblendic varieties, contain up to 30 per cent red garnet crystals. Dark grey, finely laminated, calcareous meta-sedimentary rocks and pale pink, slightly schistose, silicic meta-volcanic rocks (1f), exposed near the mouth of Big Southwest Brook, are tentatively mapped in this unit. They are, however, less metamorphosed than the other components and may be younger.

Anorthosite (2) occurs in several small, isolated bodies and in two sinuous, belt-like bodies that may be folded sills. Fresh specimens are light grey and consist almost wholly of striated plagioclase crystals with small amounts of chloritized hornblende. Typically, however, the anorthosite is a light greenish grey to white rock in which the plagioclase is largely altered to epidote, white mica, and scapolite.

Rocks of unit 3 are intrusive into those of units 1 and 2. Granite (3a), the most abundant of these, is pink, massive, medium grained, and consists essentially of microcline, sodic plagioclase, and quartz, with 2 to 10 per cent muscovite and biotite. Near faults and shear zones it is fractured and chlorite is the chief accessory mineral. In the area west of North Aspy River and north of the Cabot Trail it grades locally into hornblende syenite (3b). This syenite is a massive to slightly gneissic, medium-grained, reddish brown rock that consists chiefly of potash feldspar with 10 to 25 per cent chloritized hornblende. Grey, slightly foliated, biotite granodiorite (3c) outcrops south of the headwaters of Glasgow Brook and along parts of the Grande Anse and Mackenzie River Valleys.

In some localities the granite and syenite have intruded (or replaced) the country rock (1) parallel with its foliation to form pink and grey banded composite gneiss (4). In other localities, they contain numerous angular inclusions of the country rock and the resulting mixed rock is also mapped as unit 4. Biotitic and hornblendic inclusions are most common in the southwestern part of the area and southeast of North Aspy River whereas chloritic inclusions are most common near and northwest of North Aspy River. Many of the inclusions are feldspathized. The end product of such feldspathization is the coarse-grained, porphyroblastic biotite granite (5) near the headwaters of Grande Anse and Mackenzie Rivers. This is a pink, massive rock of granitic composition that contains euhedral crystals of feldspar up to 3 inches long.

Thin gabbroic dykes (6) cut all the rock units described above.

Rhyolite porphyry (7) occurs chiefly as volcanic flows that lie with angular unconformity on rocks 1 to 5 described above. On Grande Anse and South Blair Rivers it also occurs as small, crosscutting plutons that may have been volcanic conduits. The rhyolite contains subhedral to euhedral phenocrysts of reddish orange potash feldspar (anorthoclase) and clear to smoky quartz in an aphanitic, greyish red groundmass. Beds of rhyolitic and andesitic agglomerate and crystal-lithic tuff occur within rhyolite porphyry flows in the valley of Meat Cove Brook and on the coast north of Pollett Cove. Small amounts of sandstone and siltstone, characterized by conchoidal fracture, are interbedded with rhyolite on Meat Cove Brook.

Mississippian sedimentary rocks (8-10) lie disconformably on the rhyolite porphyry flows (7) and with angular unconformity on all older rocks (1-6). The Lower Mississippian Horton group (8) includes parts of three dominantly non-marine formations. Beds (8c) that outcrop on Meat Cove Brook are tentatively interpreted as a basal formation of the group, but, as they are more indurated than typical Horton strata, they may be of pre-Mississippian age. Elsewhere rocks of unit 8b form the lower part of the group. They consist chiefly of angular to subrounded fragments of granite, syenite, quartz, and pink feldspar in a siliceous matrix. Rhyolite fragments are locally abundant. The shale and sandstone members of unit 8a contain abundant, poorly preserved plant remains that include those of the pteridosperm, *Aneimites acadica* Dawson.

The dominantly marine, Upper Mississippian Windsor group (9) outcrops in the east-central part of the area and at Pleasant Bay, on the west coast. In North Aspy Valley it lies conformably on the Horton group. The Windsor group consists chiefly of grey, massive to laminated limestone and limy siltstone. White to pale grey gypsum and anhydrite are exposed only in the vicinity of Pleasant Bay village but karst topography near North Pond suggests that they also underlie that region. Thin beds of grey to pink, arkosic sandstone and conglomerate are interstratified with the marine members.

Rocks in Wilkie Brook Valley mapped as Mississippian Undivided (10) are probably dynamically metamorphosed members of the Horton group (8) but may be younger.

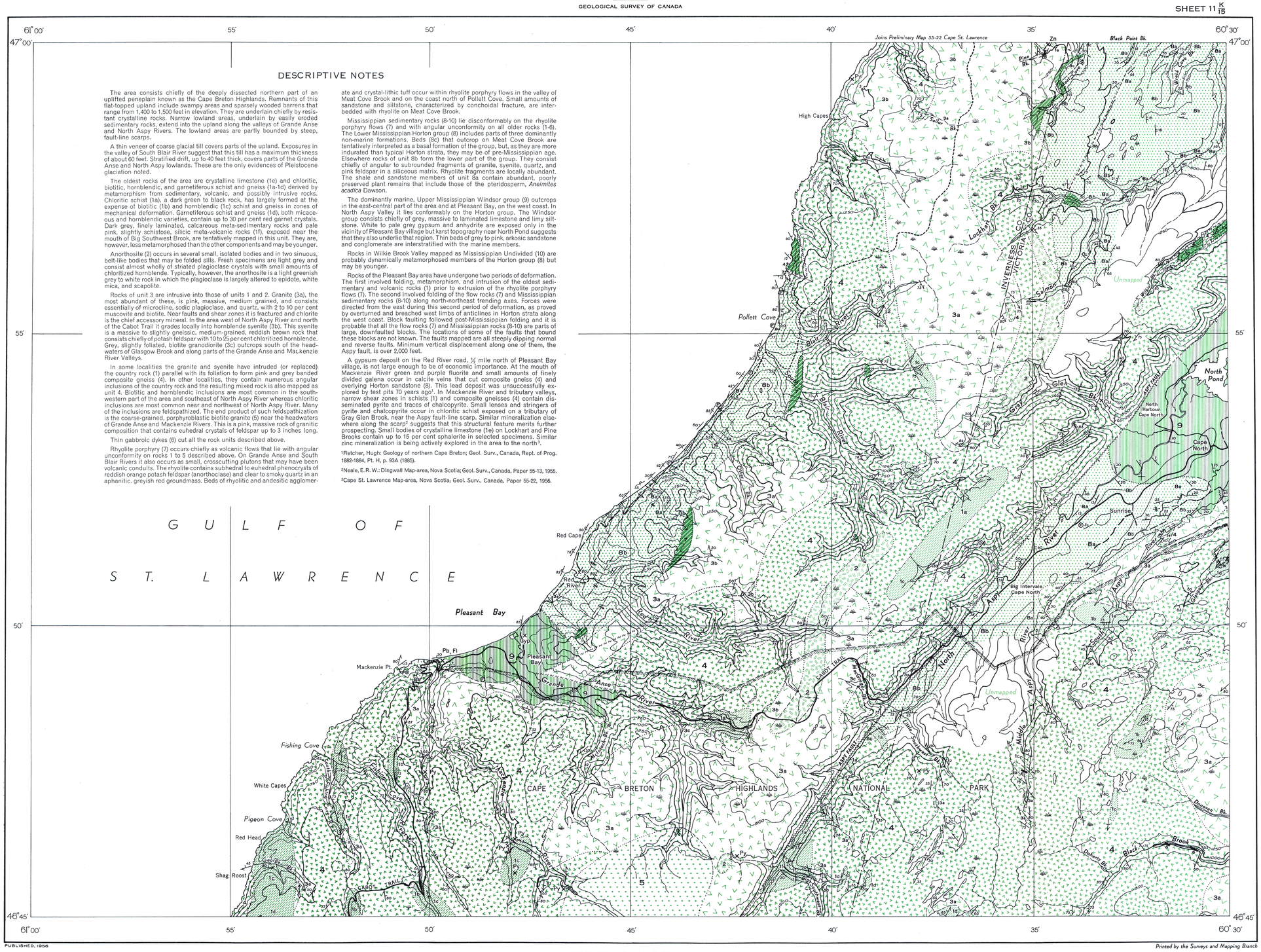
Rocks of the Pleasant Bay area have undergone two periods of deformation. The first involved folding, metamorphism, and intrusion of the oldest sedimentary and volcanic rocks (1) prior to extrusion of the rhyolite porphyry flows (7). The second involved folding of the flow rocks (7) and Mississippian sedimentary rocks (8-10) along north-northeast trending axes. Forces were directed from the east during this second period of deformation, as proved by overturned and breached west limbs of anticlines in Horton strata along the west coast. Block faulting followed post-Mississippian folding and it is probable that all the flow rocks (7) and Mississippian rocks (8-10) are parts of large, downfaulted blocks. The locations of some of the faults that bound these blocks are not known. The faults mapped are all steeply dipping normal and reverse faults. Minimum vertical displacement along one of them, the Aspy fault, is over 2,000 feet.

A gypsum deposit on the Red River road, ½ mile north of Pleasant Bay village, is not large enough to be of economic importance. At the mouth of Mackenzie River green and purple fluorite and small amounts of finely divided galena occur in calcite veins that cut composite gneiss (4) and overlying Horton sandstone (8). This lead deposit was unsuccessfully explored by test pits 70 years ago[1]. In Mackenzie River and tributary valleys, narrow shear zones in schists (1) and composite gneisses (4) contain disseminated pyrite and traces of chalcopyrite. Small lenses and stringers of pyrite and chalcopyrite occur in chloritic schist exposed on a tributary of Gray Glen Brook, near the Aspy fault-line scarp. Similar mineralization elsewhere along the scarp[2] suggests that this structural feature merits further prospecting. Small bodies of crystalline limestone (1e) on Lockhart and Pine Brooks contain up to 15 per cent sphalerite in selected specimens. Similar zinc mineralization is being actively explored in the area to the north[3].

[1]Fletcher, Hugh: Geology of northern Cape Breton; Geol. Surv., Canada, Rept. of Prog. 1882-1884, Pt. H, p. 93A (1885).

[2]Neale, E. R. W.: Dingwall Map-area, Nova Scotia; Geol. Surv., Canada, Paper 55-13, 1955.

[3]Cape St. Lawrence Map-area, Nova Scotia; Geol. Surv., Canada, Paper 55-22, 1956.

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PRELIMINARY MAP 55-24

# PLEASANT BAY

INVERNESS AND VICTORIA COUNTIES
CAPE BRETON ISLAND
NOVA SCOTIA

Scale: One Inch to One Mile = $\frac{1}{63,360}$

Miles 1 ½ 0 1 2 3

PRELIMINARY MAP 55-24
PLEASANT BAY
NOVA SCOTIA
SHEET 11 K/15

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