GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 11 F/5

LEGEND

CENOZOIC

11	Sand and gravel

MESOZOIC

TRIASSIC

10	Red sandstone, siltstone, and shale

PRE-TRIASSIC

9	Diabase; 9a, gabbro; 9b, amygdaloidal diabase, 9c, quartz rhyolite porphyry, may be equivalent to 5 ; 9d, undivided schistose andesite (5) and diabase (9), may include rocks older than 5

PALAEOZOIC

MISSISSIPPIAN

WINDSOR GROUP

8	Grey limestone; 8a, pink limestone

HORTON GROUP

7A 7B	7B. Grey and grey-brown arkosic sandstone and grit; minor pebble-cobble conglomerate and siltstone 7Aa. Grey slate, argillite, siltstone, and quartzite, with minor conglomerate; 7Ab, grey and maroon slate, siltstone, and sandstone, with minor purple beds; 7Ac, maroon slate, siltstone, and sandstone

MISSISSIPPIAN OR PRE-MISSISSIPPIAN

6	Maroon conglomerate; minor mudstone, siltstone, and sandstone
5	Maroon amygdaloidal and porphyritic andesite, dacite, and rhyolite; minor maroon and purple pyroclastic rocks and intercalated fine-grained sediments

DEVONIAN

4	Granite, medium grained, gneissic in part; 4a, granite and Goldenville rocks (1) in nearly equal proportions; 4b, coarse-grained granite, porphyritic and/or gneissic in part; 4c, pegmatite

DEVONIAN OR EARLIER

3	Amphibolite, garnet amphibole gneiss, composite gneiss, hybrid rocks (age relationships to units 1 and 2 unknown)

ORDOVICIAN OR EARLIER

MEGUMA GROUP (1, 2)

2	HALIFAX FORMATION: mica chlorite schist; cordierite schist; staurolite, chiastolite, ottrolite, graphite schist; minor mica meta-quartzite; 2a, andalusite, cordierite schist
1	GOLDENVILLE FORMATION: meta-quartzite, quartz schist; minor staurolite schist; 1a, sheared, fine-grained arenite, may be younger than 1 or 2

Rock outcrop . . . . . ×
Geological boundary (defined, approximate, assumed)
Bedding, tops known (horizontal, inclined, vertical, overturned, dip unknown)
Bedding, tops unknown (inclined, dip unknown)
Cleavage, slaty or axial plane (inclined, vertical, dip unknown)
Gneissosity (inclined, vertical, dip unknown)
Schistosity (inclined, dip unknown)
Flow layering in volcanic rocks (inclined, vertical)
Lineation (plunge unknown)
Dragfold (arrow indicates plunge)
Fault (defined, approximate, assumed)
Joint (inclined, vertical)
Anticline, approximate (arrow indicates plunge)
Syncline (approximate)
Glacial striae (direction of ice-movement known, unknown)
Fossil locality . . . . . Ⓕ
Mine or quarry . . . . . ⚒
Mineral prospect or occurrence . . . . . × Fe

MINERAL SYMBOLS

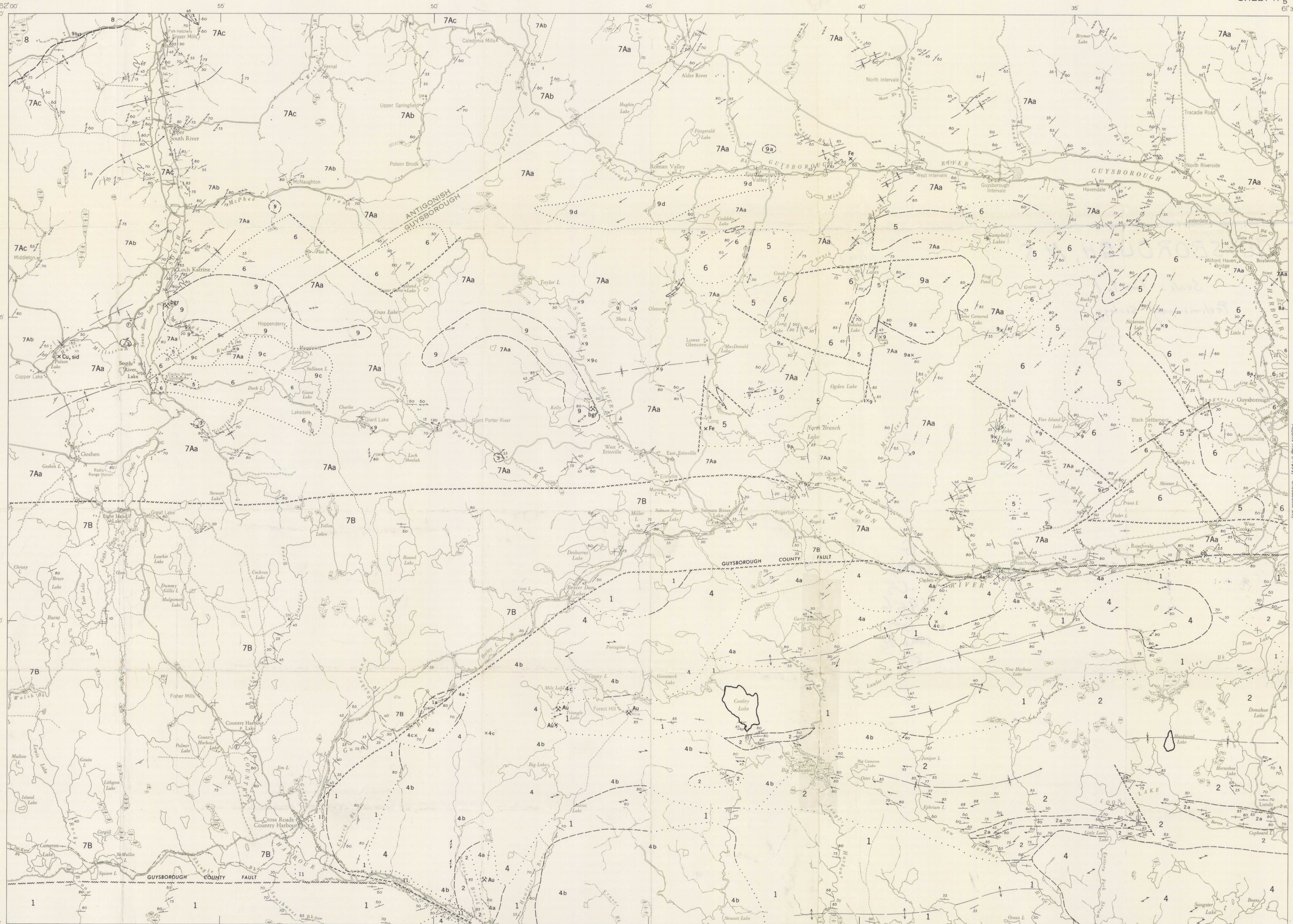
'Black Granite' (diabase) . . bgr   Gold . . . . . Au
Copper . . . . . Cu   Iron . . . . . Fe
Siderite . . . . . sid

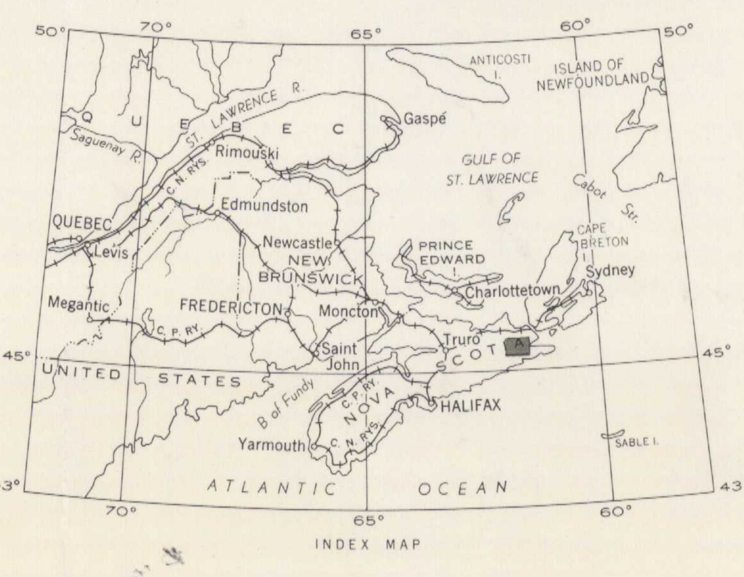
Geology by E. Schiller, 1959 and 1960

Cartography by the Geological Survey of Canada, 1961

Approximate magnetic declination, 24° 13' West

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





MAP 27-1961
GEOLOGY
GUYSBOROUGH
NOVA SCOTIA

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

Miles 1 ½ 0 1 2 3

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

LEGEND

Road, hard surface
Other roads
Trail or portage
Abandoned railway
County boundary
Telephone line
Building, Post Office
Intermittent stream
Marsh

Base-map prepared by the Surveys and Mapping Branch, 1950

DESCRIPTIVE NOTES

The Guysborough County fault-escarpment separates the highly metamorphosed and resistant rocks of the Ordovician (?) Meguma Group in the southern part of the map-area from relatively less resistant late Palaeozoic sedimentary and igneous rocks that lie north of the fault. South of the fault, an uplifted peneplain, known as the Southern Upland, forms a highland mass that slopes gently southward to the Atlantic Ocean. North of the fault a dissected terrain of predominantly Carboniferous rocks forms a lowland that extends northward beyond the map-area.

Pleistocene ice moved generally southward across the map-area. The higher areas are commonly devoid of glacial deposits, whereas low-lying areas are generally covered with both stratified and unstratified drift that ranges in thickness from tens of feet to a maximum of about 200 feet.

The oldest rocks of the map-area belong to the Goldenville Formation (1)—an interbedded assemblage of light-coloured meta-quartzites and quartz schists. Conformably overlying the Goldenville is a sequence of micaceous and graphitic porphyroblastic schists and minor meta-quartzites of the Halifax Formation (2). From the town of Lundy, a well-defined west-striking belt of andalusite-cordierite schist (2a), locally disrupted by faults, can be traced for 6 miles. Sheared, fine-grained arenites (1a) that outcrop on Gum Brook southwest of Hurley Lake may represent post-Meguma rocks brought up along the Guysborough County fault. In areas of little or no outcrop, division of the Meguma Group into its constituent formations was aided by the use of aeromagnetic data[1]. In general the Halifax Formation is characterized by a higher magnetic intensity than the Goldenville Formation.

Pre-Mississippian metamorphic rocks (3) occur as inliers within Mississippian strata. These inliers are composed of amphibole garnet gneiss, amphibolite, and hybrid rocks. The largest inlier occurs in Giant Lake Brook, a mile south of South River Lake. Similar rocks are not known within the Meguma Group. Age relations between this unit and the Meguma Group are unknown.

Rocks of the Meguma Group have been intruded by granites (4) of Devonian age[2]. The granites are medium to coarse grained, generally rich in muscovite and biotite, and locally gneissic and porphyritic. They are best exposed in the sparsely wooded barrens. Pegmatitic veins (4c) cut the Meguma Group, whereas larger bodies of pegmatite occur within the granitic rocks.

Volcanic rocks (5), which may be pre-Mississippian, form an irregular, fault-disrupted outcrop pattern south of Guysborough River. Maroon amygdaloidal and porphyritic rhyolites, dacites, and andesites are predominant. Maroon and purple fine-grained tuffs, agglomerates, and intercalated fine-grained sediments are present in small amounts.

Unit 6, which may also be pre-Mississippian, consists of maroon pebble-cobble conglomerates, interbedded with thin shale, siltstone, and sandstone beds. Grey siltstones and argillaceous quartzites near Black Settlement are included in this unit. In one locality the conglomerate unit (6) apparently overlies the volcanic rocks (5), but elsewhere the relationships are obscure. Though similar conglomerates are associated with the Horton Group in other parts of Nova Scotia, there is no evidence in the map-area to accurately date this rock unit.

Lower Mississippian Horton strata are divided into two lithological units; one of these (7A) can be subdivided into three units (7Aa, 7Ab, 7Ac) chiefly on the basis of colour variations. Unit 7Aa, which consists of grey and grey-green slate, argillite, and quartzite and minor conglomerate, forms the dominant lithological unit in the map-area. In the western half of the map-area unit 7Aa grades laterally to the northwest from an entirely grey and grey-green unit into an entirely maroon unit (7Ac). Transitional rocks (7Ab) consist of interbedded grey and maroon slates, argillites, and quartzites and minor purple strata of similar lithology. No conglomerate occurs in units 7Ab and 7Ac. Lepidodendropsis-Triphylloptoris flora were found within rocks of unit 7Aa north and east[3] of the map-area; Paraparchites sp. ostracods occur north of North Branch Lake. Conchostraca found on the west side of South River Lake suggest that the rocks there are also part of the Horton Group. No flora or fauna were found in units 7Ab and 7Ac. No complete section of units 7Aa, 7Ab, and 7Ac is available owing to the complexly folded and faulted nature of the strata.

Rocks of units 7Aa, 7Ab, and 7Ac are part of a wide belt of tightly folded Mississippian strata that extends beyond the limits of the map-area. Relations of the Horton Group (7) to unit 6 appear to be both conformable and disconformable.

Grey and grey-brown arkosic sandstones (7B), with conspicuous muscovite along bedding planes, occur in the southwestern part of the map-area. To the south, this unit is faulted against rocks of the Meguma Group (1, 2), and to the north it is probably faulted against strata of unit 7A. Adjacent to the southerly fault, coarse conglomeratic beds predominate; northward, conglomerate is absent, the sandstone becomes progressively finer grained, and siltstone interbeds are increasingly common. Thin seams of coal and carbonaceous shale occur locally. Lepidodendropsis corrugata flora and the spore Vallatisporites, found in rocks on the south side of Country Harbour Lake, indicate a Horton age for this unit. Little can be said about the structure of unit 7B because of paucity of outcrop. In general, low dips are common, which indicate broad, open folds. This unit is much less indurated and deformed than unit 7A.

Windsor, basal limestone (8) conformably overlies unit 7Ac in the northwest corner of the map-area. The strata are overturned at this contact. North of the town of Guysborough, pink limestone (8a) unconformably overlies unit 6. Similar limestones are interpreted to be part of the Windsor Group in the adjacent area to the east[3].

Dykes, sills, and small plutons of diabase (9) and gabbro (9a) have intruded units 5 - 8. Diabase (9) only cuts Horton (7Aa) strata. Small bodies of quartz rhyolite porphyry (9c) appear to intrude rocks of unit 7Aa. Dark-coloured, slightly schistose in part, crystalline rocks (9d) consist of undivided units 5 and 9 . Aeromagnetic data[1] were helpful in delineating these intrusive rocks.

Triassic red shales and sandstones (10) outcrop only in the bed of Salmon River 1 1/2 miles west of the eastern boundary of the map-area. Similar rocks outcrop at the mouth of Chedabucto Bay, east of the above-mentioned locality[3]. These rocks are correlative with those of the Minas Basin and indicate that in Nova Scotia, Triassic basins of deposition were more extensive than previously described.

Recent deposits of sand and gravel (11) occur in the Country Harbour River valley.

The rocks of the map-area have undergone at least two periods of deformation. The oldest deformation is represented by the regional and contact metamorphism of the Meguma Group. The east-striking folded belt of Meguma strata was invaded by Devonian granitic rocks to produce a low to medium grade of metamorphism that is indicated in the porphyroblastic schists of the Halifax Formation. The second deformation is indicated by the folding of Mississippian strata into tight northeast-striking folds and the development within them of a pronounced slaty cleavage, which generally deviates in strike and dip from the bedding. This folding occurred between Mississippian and Triassic time. Evidence of strong deformation is lacking in unit 7B. Possibly this unit was protected from deformation by an underlying, fault-bounded block of resistant basement rocks.

The structure of the Triassic rocks in this map-area is not apparent. To the east, however, Triassic rocks are faulted and slightly folded[3].

A complex system of faults has caused the irregular distribution of rock types in the map-area, but surface expression of most of the faults has been obliterated by glacial deposits. The Guysborough County fault was probably active from late Palaeozoic into Mesozoic times. The present fault-line scarp represents Triassic or post-Triassic normal faulting. Greater than normal shocks at Cross Roads County Harbour during the 1929 Newfoundland earthquake appear to have been related to the Guysborough County - Country Harbour fault intersection.

Siderite accompanies copper sulphides in an east-striking brecciated zone at Copper Lake. The deposit was originally explored by underground workings in the late 1800's and early 1900's. Since that time, work was sporadic. The latest work has shown that the sulphide content is negligible and that siderite is the only potential economic product.

The Forest Hill gold district produced about $500,000 in gold up until 1930. Recent endeavours to put the Forest Hill property into production have proven unsuccessful. The gold occurs both free and associated with sulphides, in quartz veins of the Goldenville Formation.

Bloating tests of the argillites and slates of unit 7Aa of the Horton Group indicate a potential source of lightweight aggregate.

Diabase has been quarried under the trade name "black granite" at South River Lake and West Erinville.

Specularite occurs throughout the Mississippian strata. During the winter of 1960, diamond-drilling by the Nova Scotia Department of Mines on a specularite property in the Lower Glencove area transected a few disseminated specularite-pyrite zones of no commercial value.

Very small amounts of beryl are present in pegmatites (4c) of the Devonian granites.

Well-sorted outwash sand and gravel, suitable for asphalt paving materials, occur in Country Harbour River valley.

[1] Geological Survey of Canada: Aeromagnetic Map of Guysborough, Nova Scotia; Geophysics Paper 241 (1955).
[2] 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).
[3] Stevenson, I. M.: Chedabucto Bay, Nova Scotia; Geol. Surv., Canada, Map 3-1959 (1959).

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