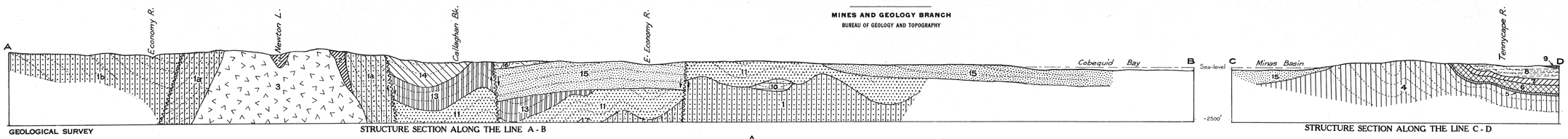
CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

BUREAU OF GEOLOGY AND TOPOGRAPHY



GEOLOGICAL SURVEY

STRUCTURE SECTION ALONG THE LINE A - B

STRUCTURE SECTION ALONG THE LINE C - D

BASS RIVER

COLCHESTER AND HANTS COUNTIES

NOVA SCOTIA

Scale: 2 inches to 1 mile

1 0 1 2

LEGEND

MESOZOIC

TRIASSIC

16 — Basalt

15 — ANNAPOLIS FORMATION: red sandstone, conglomerate

CARBONIFEROUS

PENNSYLVANIAN

CUMBERLAND and/or PICTOU GROUP

14 — Mainly red sandstone; conglomerate

13 — Mainly grey sandstone; shale

PENNSYLVANIAN (undivided)

12 — Conglomerate, sandstone

RIVERSDALE GROUP

11 — Red shale and shaly sandstone; grey shale and shaly sandstone

MISSISSIPPIAN

WINDSOR GROUP (Upper Part)

10 — Massive and shaly grey limestone

WINDSOR GROUP (Lower Part)

9 — Anhydrite, gypsum

PALAEOZOIC

8 — TENNYCAPE FORMATION: red shale, sandy shale

7 — Anhydrite, gypsum

6 — PEMBROKE FORMATION: massive red limestone, limestone conglomerate

5 — MACUMBER FORMATION: red to grey shaly limestone

4 — HORTON GROUP: Grey and red shales, sandstone, arkose

PRE-CARBONIFEROUS (?)

3 — Granitic rocks; 3a, aplite; 3b, quartz porphyry and quartz-feldspar porphyry

2 — 2a, sedimentary and volcanic rocks cut by numerous small bodies of granite; 2b, recrystallized sedimentary and volcanic rocks, with some granitic injections; 2c, granitic rocks altered by assimilation of volcanic material to composition of a diorite; 2d, undifferentiated contact rocks

1 — 1a, tuff, breccia; acid and basic flows; grey shale and sandstone; 1b, grey shale

Outcrop or outcrop area

Bedding (horizontal, inclined, vertical, overturned)

Fault (position defined, position approximate)

Fault (assumed)

Anticline

Syncline

Observed Karst topography (used to delimit areas underlain by gypsum where outcrops are lacking)

Mineral prospect or abandoned mine

Limestone quarry (active) — Ls.

Gypsum quarry — Gyp.

List of Mineral Prospects or Abandoned Mines

IRON

1. Specularite prospect on Economy River
2. Gerrish Mountain magnetite prospect
3. Bass River magnetite prospect

MANGANESE

4. Tennycape mine
5. Faulkner mine
6. Parker mine
7. Scott mine
8. Macdonald mine
9. Minasville school, old mine
10. Thompson prospect
11. Reynolds mine
12. Lower Economy prospect
13. Tennycape Estuary prospect
14. East Walton prospect

Geology by L. J. Weeks, 1939-1944

Road, well travelled

Road, not well travelled

Trail

Marsh

Contours, interval 50 feet

DESCRIPTIVE NOTES

The oldest formations in the area, an assemblage of volcanic and sedimentary rocks (1a, 1b), are divided into two groups whose age, and whose relationships to each other have not been established. With the exception of a small outlier near Bass River, these rocks are found only within Cobequid Mountains. The mixed assemblage (1a) on the south side of the mountains lacks lithological uniformity for any considerable distance across its strike. Farther north in the mountains, a group of grey shales (1b) shows remarkable uniformity throughout. Wherever these two groups are in contact the shales dip at low angles toward the mixed rocks, and the latter may also dip toward the shales. The contact is, therefore, considered to be a fault, and the stratigraphic relationships of the two groups are not determinable. The shales appear, in general, to be less deformed than the mixed rocks, and are probably younger. The two groups are older than the Pennsylvanian, Riversdale group (11), and their structural relations in the fault block north of Economy and at Bass River seem to indicate that they are pre-Upper Windsor. Their age is probably pre-Mississippian and either Devonian or Silurian.

Rocks of the earlier groups (1) are intruded by granite, and by minor acid intrusions associated with it. The granite (3) is usually coarse grained and relatively free of ferro-magnesian minerals, in places being termed alaskite. Where dark minerals are present, hornblende is most common. Biotite is lacking, although biotite granites are found elsewhere in Cobequid Mountains. Aplite (3a) is a pink, sugary textured rock, and is exposed for about a mile on Economy River where it retains its fine grain throughout. Quartz-feldspar porphyry and quartz porphyry (3b) are very similar to aplite, with addition of relatively large phenocrysts of quartz, and, in places, of orthoclase. The field evidence is not such as to eliminate the possibility of these porphyries being extrusive. The age of the granitic rocks has not been established.

Bordering the main body of granite is a zone of contact rocks (2) in which three types are indicated. The most common type (2b) is that in which the earlier rocks were recrystallized without loss of original structures, and granitic material injected into them. In places (2a) this zone is marked by numerous small bodies of granite cutting the older rocks and becoming more numerous toward the main body of granite. The third type (2c) has resulted from assimilation, by the granite, of more basic material, and has taken on the composition of rocks, varying from quartz diorite to gabbro, and, in one instance, an amphibolite.

The pre-Carboniferous rocks (1, 2, 3) are cut by small dykes and bodies of diabase. These are dark grey to black, with a grain varying with the dimensions of the body from microscopic to about 2 millimetres in size, and may be confused with certain of the contact rocks (2c). The diabase intrusions are either too small or too poorly exposed to be mapped. They are quite common on the northeast branch of East River, on Economy River between the large body of aplite and the granite to the south, and on Bass River for over a mile north of the south face of Cobequid Mountains.

Rocks of the Horton group (4) are fossiliferous, and their age is early Mississippian. Structurally they form part of the so-called Walton anticline, which is bounded on the south by a syncline in Windsor and Pennsylvanian rocks occupying the valleys of Kennetcook and Fivemile Rivers. Locally the Horton beds are folded into a series of minor anticlines and synclines, one of the latter being deep enough to include some Lower Windsor strata.

Overlying the Horton rocks with apparent conformity is the Macumber formation (5), 20 to 35 feet thick. It is unfossiliferous, and is included tentatively in the Windsor group because of its lime content, no limestones being known in the Horton.

The Pembroke formation (6) overlies the Macumber, and consists of red to red-brown, massive limestone and limestone conglomerate. Pebbles in the latter include angular fragments of the Macumber formation, as well as rounded pebbles of pre-Carboniferous rocks. The Macumber fragments suggest an interval of erosion, and the possibility that the Macumber formation may represent the top of the Horton.

A bed of anhydrite, locally altered to gypsum; overlies the Pembroke formation, apparently conformably. This bed (7) is about 100 feet thick. Although exposures are few, the extent of the bed has been mapped with considerable accuracy by noting the pitted, Karst topography resulting from solution of the sulphate deposit.

Overlying the anhydrite bed is the Tennycape formation (8), consisting of well-bedded, extremely uniform, bright red shale and sandy shale. The rock is quite soft while wet, but dries to a hard, porous mass. The formation is more than 400 feet thick.

A second bed of anhydrite (9), also locally altered to gypsum, overlies the Tennycape formation. Although Tennycape rocks and gypsum are exposed a few feet apart on the north branch of Tennycape River, and although neither shows any evidence of deformation, there is the possibility that this anhydrite bed is part of the other (7) overthrust onto the Tennycape. Both the gypsum and the soft sandy shales would act as a lubricant for such a movement, permitting it to take place with a minimum of deformation. The rocks overlying this sulphate bed (9) are not exposed, and for this reason it has been necessary to leave a part of the southeast corner of the map unpatterned.

Beds of Upper Windsor age (10) occur north of Cobequid Bay in a narrow belt protruding through Pennsylvanian rocks. They consist of limestone, and are usually quite well bedded. Fossils obtained from them are of late Upper Windsor age.

Pennsylvanian strata of the Riversdale group (11) are exposed in a fault block, protruding through the Triassic rocks, which overlap them on the south, and are downfaulted against them on the north. The Riversdale rocks carry diagnostic fossil shells.

Paralleling the south face of Cobequid Mountains, and separated entirely from the Riversdale group by an intervening belt of Triassic rocks, is a belt of Pennsylvanian sediments whose group designation is somewhat in doubt. The lower, and southern, part of the belt (13) consists of grey beds varying from fine shales to sandstones, the latter occurring in thin beds. Fossils from these beds are of either Cumberland or Pictou age. The upper part of the belt (14) is unfossiliferous, and consists of brownish red, coarse conglomerate and coarse and fine sandstone. As the Pictou group is known elsewhere to be composed of rocks similar to those of the upper part of this belt, and as the coarser rocks overlying the finer shales and sandstones suggest that a break may exist between the two divisions, it is suggested that the lower members (13) are of Cumberland age, and the upper members (14) of Pictou age.

Across most of the map-area, rocks of supposedly Pictou age (14) are down-faulted against the rocks of Cobequid Mountains. Near the west side of the map-area, however, Pennsylvanian rocks (12) rest unconformably on the older rocks of the mountains. They are quite similar lithologically to the supposedly Pictou rocks south of the mountains elsewhere, and like them are unfossiliferous. It is believed, however, that the Cobequid fault here may have left a remnant of the basal Pennsylvanian series on the south side of the mountains, and that this remnant (12) is most probably of Riversdale age.

Unconformably overlying the Pennsylvanian series are rocks of Triassic age, referred to the Annapolis formation (15). They comprise bright red, coarse to fine conglomerate and sandstone, and except near faults dip at low angles. A series of basalt flows of considerable thickness (16) overlies those parts of the Annapolis formation exposed in the area, and may actually be interbedded with it. The rock has everywhere the composition of a basalt, but its texture and appearance vary in different parts of an individual flow.

The rocks of the map-area have all undergone considerable faulting, but, with few exceptions, only those faults of post-Triassic age can be recognized and mapped.

Manganese deposits occur as replacements of limestone, usually that of the Pembroke formation. They also form stringers in rocks of Horton and Riversdale age, and replace the cement in Triassic sandstone and conglomerate.

Iron occurs as films of specularite along fractures in pre-Carboniferous volcanic and sedimentary rocks (1). Magnetite is known in the Triassic basalt on Gerrish Mountain, on the west border of the map-area, and also in the volcanic and sedimentary rocks on Bass and Economy Rivers.

Gypsum has been quarried from the first or lower anhydrite bed in the Windsor group. Limestone is at present being quarried for agricultural purposes from Upper Windsor rocks at Upper Economy.

PRELIMINARY MAP 45-26

Surveyed and compiled by the Topographical Survey. Issued 1946