GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

PRELIMINARY SERIES

SHEET 21 O/16

LEGEND

PALAEOZOIC

DEVONIAN OR YOUNGER
POST LOWER DEVONIAN
15 — Dykes: 15a, orthoclase porphyry; 15b, diabase; 15c, basic and ultrabasic. (11a may be related to 15b)

DEVONIAN
MIDDLE DEVONIAN (?)
14 — Red-brown and grey-brown, poorly sorted conglomerate and sandstone

LOWER OR MIDDLE DEVONIAN
13 — Grey and grey-brown crossbedded sandstone, minor conglomerate; 13a, minor rhyolite; (may be in part equivalent to 10)

LOWER DEVONIAN
12 — 12a, green, grey, and red-brown amygdaloidal basalt, minor sedimentary rocks; 12b, andesite and basalt, minor tuff and breccia (age of 12b uncertain)

11 — 11a, diabase and gabbro; 11b, contact metamorphic rocks, including rusty weathering carbonate and amphibolite (age of 11a uncertain)

10 — 10a, grey-green finely laminated micaceous argillite and siltstone, calcareous in part; 10b, grey, green and maroon argillite, minor sandstone; 10c, tuffs and flows interbedded with 10a

SILURIAN
UPPER SILURIAN
9 — 9a, lithic greywacke assemblage, which includes interbedded grit, sandstone, siltstone, and argillite, calcareous in part; minor dark grey cherty argillite; 9b, lithic greywacke assemblage, which includes red and green conglomerate, grit, sandstone, siltstone, and argillite; 9c, grey, and light grey limestone and calcareous argillite, minor maroon argillite

MIDDLE AND/OR UPPER SILURIAN
8 — Grey-green fissile argillite, basic volcanic rocks

7 — Volcanic rocks and associated intrusions: 7a rhyolite, trachyte andesite, tuff, minor sedimentary rocks; 7b, orthoclase porphyry, and muscovite-quartz-orthoclase porphyry dykes; 7c, fine-grained granitic stock. (7b may include some 15a)

MIDDLE SILURIAN
6 — Sedimentary rocks: 6a, buff-weathering limestone; 6b, bioclastic limestone, 6c, red-brown and grey siltstone, sandstone, calcareous in part and volcanic boulder conglomerate

5 — Grey-green flaggy micaceous argillite; dark grey finely laminated argillite, calcareous in part; minor laminated limestone and argillite

ORDOVICIAN
MIDDLE ORDOVICIAN (?)
TETAGOUCHE GROUP
4 — Light grey meta-gabbro

3 — Sericite-quartz schist, chlorite-quartz schist, augen schist, phyllonite; may be metamorphosed equivalents of 1 and 2; may include some 1 and 2

2 — Dark grey to black argillite, phyllite, and graphitic schist; maroon and green argillite, phyllite, and schist; diabase sills (?)

1 — Grey, finely laminated argillite, thin beds of quartzite

Rock outcrop . . . . . ×
Geological boundary (defined, approximate, assumed) . . . . .
Limit of geological mapping . . . . . • • • • •
Bedding, tops known (inclined, overturned) 1/1
Bedding, tops unknown (inclined, vertical, dip unknown) 1/1
Cleavage, foliation (inclined, vertical, dip unknown) 1/1
Fault (defined, assumed) . . . . . ~~~~
Glacial striae (direction of ice-movement unknown) . . . . . ⟋
Fossil locality . . . . . (F)
Mineral occurrence . . . . . ×Cu

MINERAL SYMBOLS

Copper	Cu	Pyrite	py
Lead	Pb	Silver	Ag
Zinc	Zn		

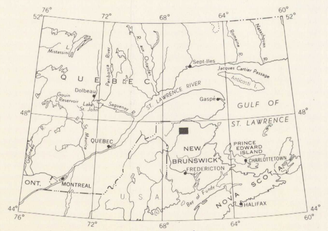
Geology by R. R. Potter, 1962

Cartography by the Geological Survey of Canada, 1963

Road, all weather . . . . . ═══
Other roads . . . . . ═══
Cart track, jeep road . . . . . ═══
Trail . . . . . ═══
Building . . . . . ▪
Parish boundary . . . . . ═══
Horizontal control point . . . . . ▲
Intermittent stream . . . . . ═══
Marsh . . . . . ═══
Contours (interval 50 feet) . . . . . ═══
Height in feet above mean sea-level 764

Base-map by the Surveys and Mapping Branch, 1957

Approximate magnetic declination, 23° 13' West, decreasing 2.9' annually



Adjoins Map 620A, "Matapedia"

Adjoins Map 621A, "Campbellton"

Adjoins Map 8-1963, "Tetagouche Lakes"

PUBLISHED, 1963
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MAP 8-1963
GEOLOGY
UPSALQUITCH FORKS
NEW BRUNSWICK

Scale: One Inch to One Mile = 1/63,360
Miles
1 ½ 0 1 2 3

DESCRIPTIVE NOTES

The map-area lies within a belt of deformed Palaeozoic rocks that extends from northern Maine to Chaleur Bay. It is easily accessible by private roads of the New Brunswick International Paper Company from Dalhousie and Campbellton, about 20 miles north of the map-area.

The map-area may be divided into several structural units. Highly deformed Ordovician? rocks (1-4) of the Tetagouche Group outcrop in its south-eastern part. Folded Silurian (8-9) and Devonian (10b, 12, and 13) sedimentary and volcanic rocks outcrop north of the Tetagouche Group and south of the fault, which is parallel to Meadow Brook, Oxbow Brook, and Mulligan Gulch. Block-faulted Middle Silurian sedimentary rocks (5, 6) occur in the northwestern part of the map-area. They trend northeast and, in general, dip steeply southeast. In the northeastern part of the map-area, these rocks are disconformably overlain by a fairly complete succession of gently dipping Silurian and Devonian volcanic and sedimentary rocks, including map-units 7, 10a, 12a, and 14.

Bedding in sedimentary rocks of units 1 and 2 was observed only in a few places. This and other primary structures have been obscured by shearing parallel to bedding and cleavage at a high angle to bedding. Quartzo-feldspathic laminae up to 5 mm. thick occur in the sheared rocks. They have been displaced along the younger cleavage, to form a phyllonitic rock with pseudoporphyritic texture (3). The older shearing and younger cleavage are best developed on one or both sides of large faults, possibly thrusts, which are indicated on the map. Gradational changes between units 1 and 3 have been observed on a large hill, approximately 3 miles south of Southeast Depot. There comparatively undeformed rocks of unit 1 occur approximately 1,000 feet south of the fault, phyllonitic rocks approximately 500 feet from the fault, and augen schists with quartz and feldspar phenocrysts nearer to the fault. There is some suggestion of a southerly direction to tectonic transport at this locality, and deformation is confined mainly to the south, or footwall side of the fault. Map-unit 4 may have been deformed by a similar fault. If such is the case, it is the only evidence for major faulting between the Tetagouche Group (1-4) and the Silurian rocks of map-unit 9b.

Excellent exposures of units 5 and 6 were noted on Northwest Upsalquitch and Upsalquitch Rivers. Well preserved brachiopods are abundant in grey-green flaggy micaceous argillite of map-unit 5. Corals, brachiopods, and gastropods are common within 6b and parts of 6c. The finely laminated argillaceous and calcareous rocks of 5 and 6a indicate a fairly stable depositional environment. Map-unit 6c contains large rounded boulders of volcanic material, and minor interbedded limestone with Middle Silurian fauna, which suggests crustal instability and indicates that vulcanism started at some time in the Middle Silurian.

Amygdaloidal and porphyritic basic lavas occur at the base of map-unit 7; however, distinctive red, red-brown, and orange rhyolitic and trachytic rocks (7a) are the predominant rock types in this unit. Laminated and spherulitic varieties of these silicic flows are common. There is some indication of repetition of lithology by block faulting, but the complete stratigraphic succession is not fully understood. Individual flows and tuff horizons dip uniformly to the south at 30 to 40 degrees. Numerous dykes (7b) cut both this unit and the Middle Silurian rocks (5) north of Norton Gulch. Many of these dykes as well as the granitic stock 7c, may be feeders for the rhyolitic and trachytic flows.

Sedimentary rocks (8) of probable Late Silurian age outcrop near McCormack Fire Tower. Basic volcanic rocks occur at the lower and east of McCormack Lake. The exact relationships of these sedimentary and volcanic rocks are not known.

Good exposures of unit 9 occur on southeast Upsalquitch River, north of Southeast Depot, and lower parts of Ramsay Brook. There, graded bedding, poor sorting, scouring, and cyclothemic repetition of beds containing coarse and fine detrital lithic fragments can be observed. Unit 9b appears to overlie 9a. Brachiopods and corals occur within 9b near Eighteenmile Brook, just east of the map-area[1], and crinoid columns are common within unit 9a.

Lower Devonian rocks (10a), which are probably equivalent to the Dalhousie Formation[2], appear to disconformably overlie the volcanic rocks of unit 7a. Lower Devonian brachiopods, corals, and trilobites are well preserved, and are particularly abundant near the base of this unit. Thin basic volcanic flows are common in the eastern part of the map-area. A thin columnar rhyolite flow occurs a few tens of feet above the base of unit 10a, and is well exposed on Akroyd Brook. A small angular unconformity within the sedimentary rocks of this unit was noted on Little Southeast Upsalquitch River, approximately 2 miles northeast of its mouth.

Multicoloured argillites, siltstones, and sandstones (10b) are highly folded in the area north and northeast of McCormack Fire Tower. Near Budworm City Airstrip, similar beds dip uniformly to the south. Anomalous attitudes were obtained near a deformed zone that is approximately parallel with Ramsay Brook. The only fossils found within this unit occur in rock fragments near Jerry Ferguson Brook. There is a possibility that they were derived from unit 10a, north of the fault, hence the exact age of 10b is uncertain.

A medium-grained diabase stock (11a) outcrops on Ramsay Brook, and on the International Paper Company Road, 1 mile east of the bridge crossing Ramsay Brook. Rusty weathering metamorphic rocks (11b) occur near this bridge and approximately 2 miles to the east. Diabase and associated metamorphic rocks were noted in the core of a small anticline on Southeast Upsalquitch River, a few hundred feet south of the mouth of Murray Brook.

Lower Devonian sedimentary rocks (10a) are overlain by massive basic amygdaloidal flows (12). These flows are well exposed on Southeast Upsalquitch and Little Southeast Upsalquitch Rivers. Similar rocks were noted near Third Portage Lake. Map-unit 12b is a complex assemblage of basic volcanic rocks. The relationships between these, and adjacent map-units are unknown.

Devonian sedimentary rocks (13) are exposed on a road east and southeast of Third Portage Lake. A brachiopod from a drill hole 1 mile south of Third Portage Lake was identified by L. M. Cumming as a Lower or Middle Devonian form.

Devonian sandstones and conglomerates (14), which contain plant remains[3], are well exposed near the mouth of England Brook.

Many dykes of orthoclase perphyry (15a) were mapped in the northeastern part of the map-area. They are very similar to dykes associated with the Silurian volcanic assemblage (7), but are much younger and have been emplaced along fractures within Middle Silurian and Lower Devonian rocks. Diabasic dykes (15b) are common throughout the area. Grey-green basic or ultrabasic dykes (15c) were noted in the southern part of the map-area. They commonly contain quartz-epidote veins with minor picrolite and chrysotile.

In the northern part of the map-area, the gentle dips of Silurian and Devonian strata, the absence of folds, and the sheet-like volcanic flows may reflect the stabilized nature of this part of the Appalachian region after Taconic deformation. Undoubtedly some crustal movement was associated with the extrusion of the Silurian volcanic rocks (7).

Lithological similarities between parts of the Tetagouche Group (1, 2), and parts of the Silurian and Devonian units 9b and 10b could suggest a conformable relationship. However the differences in degree of deformation north and south of the contact may indicate an angular unconformity, a fault, or a faulted unconformity. The nature of this contact, and the age of deformation of the Tetagouche Group is therefore uncertain.

A pyrite and base-metal deposit, approximately 2 miles east of Third Portage Lake, is being explored by New Jersey Zinc Exploration Co. (Canada) Ltd. Minor pyrite and chalcopyrite occurs in the metamorphic aureole of the diabase stock (11a). Some work has been done on a small base metal prospect on Northwest Upsalquitch River, approximately 1 mile southwest of Upsalquitch Forks. Some pyrite was noted in slightly silicified calcareous rocks (5) north of Norton Gulch, near the contacts of orthoclase-porphyry dykes (7b). Although nothing of economic importance was observed within the volcanic rocks of map-unit 7, their tectonic setting and age of intrusion suggest the possibility of associated gold-silver mineralization[4].

[1] Sims, W. A.: Geological Notes, Map M-6, Junction of Murray and Ramsay Brook. Restigouche County; N. B. Dept. Lands and Mines, Mines Branch, Paper 59-3 (1961).
[2] Alcock, F. J.: Geology of Chaleur Bay Region; Geol. Surv., Canada, Mem. 227 (1935).
[3] Ells, R. W.: Report on the Geology of Northern New Brunswick, Embracing Portions of the Counties of Restigouche, Gloucester and Northumberland; Geol. Surv., Canada, Rept. of Progress for 1875-80, Part D, pp. 1-47 (1881).
[4] McCartney, W. D., and Potter, R. R.: Mineralization as Related to Structural Deformation, Igneous Activity, and Sedimentation in Folded Geosynclines; Can. Min. J., vol. 83, No. 4, pp. 85-87 (1962).