ONTARIO DEPARTMENT OF MINES

PRELIMINARY GEOLOGICAL MAP No. P. 390

FOSTER TOWNSHIP

DISTRICT OF SUDBURY

Scale 1 inch to 1/4 mile

N.T.S. Reference: 41I/4, 41I/5
G.S.C. Aeromagnetic Maps: 1522G, 1523G
O.D.M. Aeromagnetic Map: 63

FOSTER TOWNSHIP

MARGINAL NOTES

Location: Foster township, an area of 36 square miles, lies about 36 miles southwest of Sudbury, Ontario and 6 miles east of the town of Espanola. The township is accessible by a motor road leading east from Highway 68 at Espanola. Mapping was carried out during the 1966 field season and is a part of the continuing project to map the north shore region between Sudbury and Blind River.

Mineral Exploration: Exploration has been carried on in the past for cobalt, copper, and gold. In the 1966 field season, an occurrence of tungsten and copper in the centre of the township was tested by diamond drilling.

General Geology: The rocks of the area are of Precambrian age and are of four main age groups. The oldest are metasediments which are divisible into pelitic, conglomeratic, psammitic, and calcareous types. The metasediments are intruded by older metamorphosed gabbroic rocks. The metagabbros are in turn intruded by younger amphibolite dikes. Northwest-trending olivine diabase dikes are the youngest rocks in the area.

The Precambrian rocks are unconformably overlain by unconsolidated deposits of sand, gravel, and clay of Cenozoic age.

The metasediments are divisible into four lithostratigraphic units. These units are, from oldest to youngest; lower quartzite, conglomerate, calcareous metasediments, upper quartzite. This sequence is repeated three times across the township by faulting.

The lower quartzite unit occurs in the north and south portions of the township, and in the centre in the core of the St. Leonard anticline. It is over 5000 feet thick, and consists of interbedded protoquartzites, subarkoses, subgreywackes, and pelites. Cross-bedding of both planar and tangential types is notably abundant. A few thin lenses of polymictic conglomerate are present.

The lower quartzite unit is conformably overlain by 1000 to 2000 feet of predominantly conglomeratic metasediments. Locally there are interbeds of pelite, limy pelite, and protoquartzite. The conglomerate is a polymictic paraconglomerate with a greywacke or calcareous greywacke matrix. Pebbles, cobbles, and boulders of quartz, quartzite, granite, and greenstone ranging from less than 1 inch to several feet in diameter constitute 15% to 50% of the rock. The matrix commonly weathers rusty due to the presence of abundant pyrite.

The calcareous unit is approximately 1200 to 1800 feet thick and occurs in the northern, central, and southern parts of the township. It consists of calcareous argillite and siltstone, calcareous quartzite, chert and chert breccia, and impure magnesian limestone. A typical sequence includes magnesian limestone at the base, followed by calcareous argillite and siltstone, chert breccia, and finally by calcareous protoquartzites. Near gabbro bodies, these rocks have been metamorphosed to scapolite hornfels, hornblende hornfels, and diopside-grossularite skarns. Primary structures such as ripple marks, mud cracks, slump structures, graded bedding, cross-bedding, and sedimentary dikes are common.

The upper quartzite unit occurs in the centre of the township where it is in gradational contact with the calcareous unit. It consists of several thousand feet of interbedded subarkose, protoquartzite, calcareous argillite and protoquartzite, and pelite. Cross-bedding and laminated bedding are present. A few thin polymictic conglomerate lenses occur in the formation.

The metasediments are probably of Huronian age. The lower quartzite, the conglomerate, the calcareous unit, and the upper quartzite are tentatively correlated with the Upper Mississagi, Bruce, Espanola, and Serpent formations of the Bruce Group.

Several sill-like metagabbro bodies intrude the metasediments. The metagabbro is a dark green to black rock composed mainly of amphiboles, plagioclase, and quartz. The unaltered gabbro, which occurs as remnants in several of the bodies, is brown to black in colour, and is composed of pyroxenes and plagioclase.

Numerous black amphibolite dikes occur in the township. Most are less than 10 feet wide but several are in excess of 50 feet. They appear to trend in two dominant directions, northeast and northwest.

Northwest-trending olivine diabase dikes 50 to 500 feet wide intrude the older rocks. They dip vertically. The dike rock has a diabasic texture and is composed of plagioclase, pyroxene, olivine, and sufficient magnetite to produce magnetic anomalies.

Structural Geology: The township is divided by faults into three structural zones. The northern zone extends northward from the St. Leonard fault; the central zone is bounded by the St. Leonard fault and the Loon Lake fault; the southern zone extends southward from the Loon Lake fault.

The northern zone is a homocline with the bedding dipping steeply south and facing south for the most part. There are, however, isoclinal folds in the calcareous unit and in the upper quartzite.

The central zone consists of the St. Leonard anticline. The axis of this fold trends northeast and plunges southwest at angles of approximately 50° to 70°. The axial plane is curved but approximately vertical.

The southern zone is again a homoclinal sequence much interrupted by faulting.

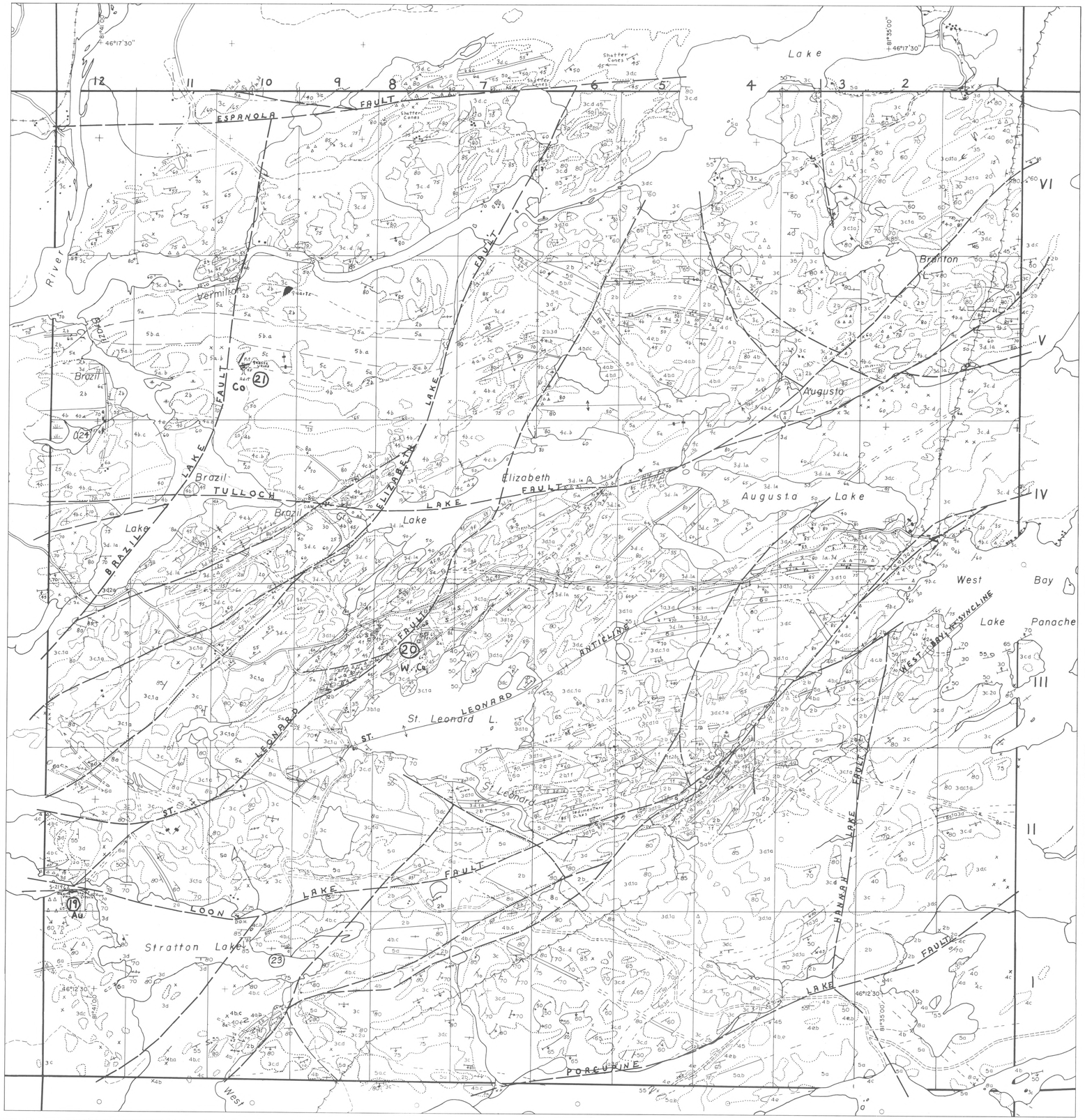
The faults trend in three dominant directions; east-west, northeast, and northwest. Movements on the east-west faults have produced major stratigraphic breaks and repetitions and consequently must have been on the order of several thousands of feet. The northeast and northwest faults have apparent horizontal effects of a few hundred to a few thousand feet.

There is a variety of minor structures of several ages present. These include foliations, lineations, minor folds, and breccia. The structures as now seen are the result of several successive deformations. The first deformation was pre-breccia but apparently involved the older metagabbro. It produced major east-west folds, and associated cleavage and lineation. The second deformation was post-breccia and produced cleavage, lineations, and minor refolding approximately parallel to the first deformation folds. The third phase produced cleavage, minor folds, and crinkle lineations which trend roughly north-south.

Economic Geology: The area has been explored for gold, base metals, and tungsten. A silicified shear zone in lot 12, concession II contains minor amounts of pyrite and gold.

Cobaltite, pyrrhotite, and minor chalcopyrite occur in a quartz-carbonate vein at the contact of actinolitic metagabbro and calcareous hornfels in lot 10, concession V. The occurrence has been explored by pitting, diamond-drilling, and an adit driven about 100 feet into the hillside to intersect the vein.

During the summer and fall of 1966, Texas Gulf Sulphur Ltd. tested an extensive zone of tungsten and copper mineralization in lots 7, 8, and 9, concession III by diamond-drilling. Mineralization occurs over a length of some 3600 feet in two main, en echelon east-west trending zones. The zones are up to 15 feet wide. The northern zone occurs in hornfels and skarns of the calcareous metasedimentary unit near metagabbro bodies while the southern zone lies immediately to the south in rocks of the lower quartzite unit. The disseminated mineralization consists of the tungsten minerals scheelite and powellite, and the sulphides pyrite, pyrrhotite, and chalcopyrite. In addition, there is minor arsenopyrite and molybdenite present. Assays of up to 1.75% WO_3 and 1% Cu have been reported, but it is likely that overall grades are much lower. The potential of this deposit is not yet known.



LITHOLOGIC LEGEND

Espanola-Whitefish Falls Area

CENOZOIC
- PLEISTOCENE AND RECENT
  - Sand, gravel, clay
  - Unconformity

PRECAMBRIAN

8 — LATE DIABASE INTRUSIONS
- 8a Diabase
- 8b Trap
- Intrusive Contact

7 — MONGOWIN PLUTON
- 7a Granophyre
- 7b Diorite, granodiorite
- 7c Peridotite, amphibolite
- Intrusive Contact

6 — AMPHIBOLITE AND LAMPROPHYRE INTRUSIONS
- 6a Amphibolite
- 6b Porphyritic amphibolite
- Intrusive Contact

5 — GABBROIC INTRUSIONS
- 5a Hornblende metagabbro
- 5b Pyroxene gabbro
- 5c Actinolite amphibolite
- Intrusive Contact

METASEDIMENTS

4 — CALCAREOUS METASEDIMENTS
- 4a Marble, impure limestone
- 4b Calcareous siltstone, argillite
- 4c Calcareous quartzite
- 4d Chert, chert breccia
- 4e Scapolite hornfels
- 4f Skarn

3 — QUARTZITE
- 3a White medium-grained orthoquartzite
- 3b White fine-grained orthoquartzite
- 3c Feldspathic quartzite, arkose
- 3d Biotitic quartzite, protoquartzite
- 3e Ferruginous quartzite
- 3f Green micaceous quartzite

2 — CONGLOMERATE
- 2a Polymictic conglomerate, protoquartzite matrix
- 2b Polymictic paraconglomerate, greywacke matrix
- 2c Polymictic paraconglomerate, laminated argillite matrix
- 2d Polymictic paraconglomerate, calcareous greywacke matrix
- 2e Polymictic orthoconglomerate, greywacke matrix
- 2f Oligomictic quartz-pebble conglomerate

1 — PELITE
- 1a Muscovitic and chloritic metapelite
- 1b Biotitic metapelite
- 1c Plagioclase metapelite
- 1d Chloritoid metapelite
- 1e Garnet metapelite
- 1f Laminated argillite
- 1g Greywacke, subgreywacke
- 1h Cherty argillite, argillaceous chert.

△△△ Breccia

Au ..... Gold
Co ..... Cobalt
Cu ..... Copper
S ..... Sulphide mineralization
Si..... Silica (quartzite)
W ..... Tungsten

GEOLOGICAL AND MINING SYMBOLS

- Glacial striae.
- Small bedrock outcrop.
- Area of bedrock outcrop.
- Bedding, horizontal.
- 75 Bedding, top unknown; (inclined, vertical).
- Bedding, top (arrow) from grain gradation; (inclined, vertical, overturned).
- Bedding, top (arrow) from cross bedding; (inclined, vertical, overturned).
- 80 Foliation; (inclined, vertical).
- 85 Lineation with plunge.
- Geological boundary, observed.
- Geological boundary, position interpreted.
- Fault; (assumed).
- 80 Jointing; (horizontal, inclined, vertical).
- Drag folds with plunge.
- Anticline, syncline, with plunge.
- Drill hole; (vertical, inclined).
- quartz Q Vein, vein network.
- Shaft; depth in feet.

LIST OF OCCURRENCES

19. Lot 12, concession II - gold
20. Lots 7, 8, 9, concession III - tungsten-copper
21. Lot 10, concession V - cobalt
23. Lot 10, concession I - sulphide occurrence
24. Lot 12, concession IV - lot 12, concession V - sulphide occurrence

SOURCES OF INFORMATION

Geology by K. D. Card and assistants, 1966.
Geological Map 1504A, Espanola Area, Sudbury District, Ontario, Geol. Surv. Canada, 1917 (with Mem. 102).
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Ontario Department of Mines aeromagnetic maps, Foster (63), Mongowin (66), and Curtin (67) townships.
Basemap from maps of Forest Resources Inventory, Ontario Department of Lands and Forests.

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