Project 8401B

Review Geology, Forbes Lake Vicinity

by R. Macdonald

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Two weeks were spent this summer in the area between Larocque, Forbes, McIntosh, Mountney, Nipew and Devil Lakes reviewing earlier mapping, partly as a contribution to the compilation of the Lac la Ronge (NTS 73P) sheet area (Lewry, this volume). One objective was to examine the northwestern margin of the Central La Ronge Metavolcanic Belt along Larocque and Forbes Lakes. Lewry (1983) had indicated the existence of a regional-scale shear zone, the McLellan Lake Thrust, along the southeastern margin of this belt, and a feature of similar magnitude was suspected to exist on the northwestern margin.

Larocque Lake

Pearson and Froese (1959) showed the shores of Larocque Lake to be underlain by volcanic rocks. As reviewed this summer, these metavolcanics comprise fine-grained flows, tuffs and porphyries, which strike uniformly to the northeast and dip steeply or moderately steeply to the northwest, apparently as part of a regional homocline. Primary features such as amygdales and relict phenocrysts are present, and a coarse agglomerate with felsic clasts up to 25 cm long occurs at the south end of the lake. These rocks have all attained amphibolite facies grade.

Although 'straightened' parallel to the long axis of the lake, most of these rocks do not appear to be strongly deformed, as penetrative tectonic foliation is generally weak, minor folds were not encountered and few lineations were observed. The contact with the Ismond Lake granite appears to be relatively unsheared and is marked by a zone of xenolith assimilation.

Forbes Lake North

The northern shores and islands of Forbes Lake expose a variety of felsic rocks. Pale siliceous fine- to medium-grained, finely laminated and slightly flaggy quartzo-feldspathic rock occurs on islands in the centre of the lake (sf).[1] Relict feldspar phenocrysts, partly sheared quartz eyes and disc-like aggregates of biotite are common constituents. This rock is considered to be a slightly sheared and foliated equivalent of the rhyolitic rocks at Larocque Lake (rh).

Fine- to medium-grained 'felsite' (rh,sfx) sills or flows, in places with fine fluxion (flow) texture, occur in narrow bands a metre or two thick.

Most rocks encountered on Forbes Lake are felsic or intermediate, fine to medium-fine grained and variably textured. Pherocrysts of partly sheared and granulated feldspar and quartz are common (fv,av). At several locations a darker grey rock (probably andesite) was observed to contain amygdales. A commonly occurring rock (fvt) contains pervasive but locally impersistent layers and lenses of coarser intermediate material in a finer and slightly more felsic groundmass; the layers typically average 2 to 5 mm in thickness, repeated at intervals of about one or two centimetres. This texture is possibly inherited from tuff or ashflow tuff.

Some of the felsic rocks show fine 'ribbing' on the weathered surface (fvr), mainly due to primary fluxion texture rather than tectonism.

A medium-fine grained uniform grey biotitic quartzofeldspathic rock (gg), occurring largely between Bateman Lake and the northern end of Forbes Lake, may have either a volcanic ('andesitic') or greywacke-tuff precursor.

Mafic rocks comprise massive amphibolite with calc-silicate lenses and compositionally banded gneisses. These are probably entirely metavolcanic, primarily basaltic flows and banded tuffs (mv,mt,mba,mct). The mafic tuffs are typically heterolithic fine- to coarse-banded rocks, locally with fine- and coarse-grained material in irregular alternate bands which are considered to approximate original bedding. Where these coarse bands exceed more than a few centimetres in thickness the rock resembles gabbro. Mixed (mafelsic) tuffs (mtf) also occur.

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[1]These and subsequent codes refer to rock types placed in the Precambrian Original Data file in Regina (N. Lee).

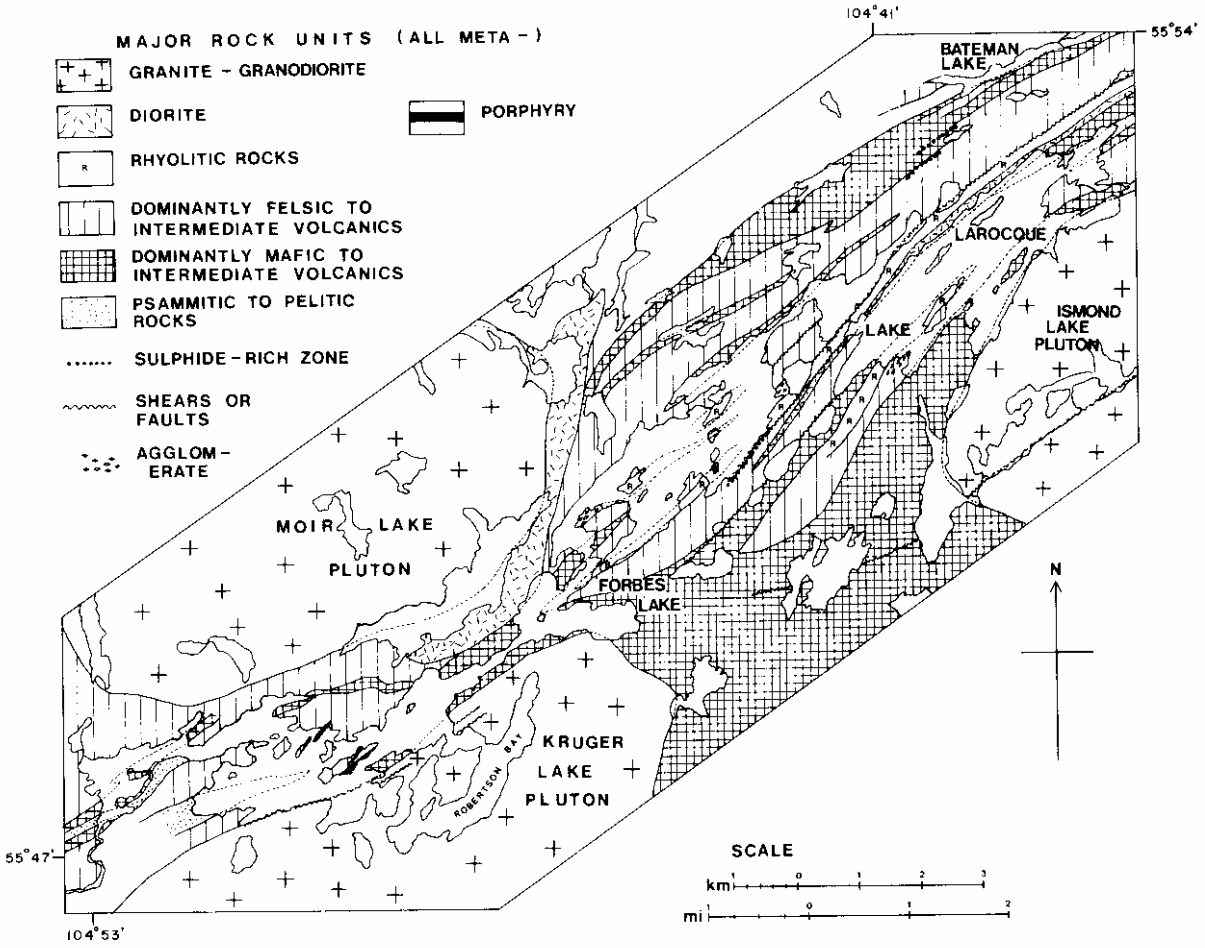

Figure 1 - Geological map and re-interpretation, Forbes Lake area.

The rocks of the northern part of Forbes Lake strike similarly to those in Larocque Lake, as part of the same northwesterly dipping regional homocline. Although primary structures are preserved in many places, a tectonic foliation (including shear foliation) occurs locally, particularly along the southeastern shore of the lake.

Forbes Lake South

Along the southern half of Forbes Lake the metavolcanic and tuffaceous rocks are interspersed with rusty pelites, psammopelites (ps), banded rocks of less certain origin (mix,swbi) and what appear to be flaggy psammites (rn). Granitic dykes and masses also occur. Sills of fine-grained granitic porphyry occur on the islands opposite Robertson Bay.

Shearing is more pronounced here than in the northern part of Forbes Lake. Parts of the western contact of the Kruger Lake pluton are sheared and zones of shearing occur in the granite along the neck of Robertson Bay. The supracrustal rocks nearby also contain minor folds and are strongly lineated. This lineation plunges both subhorizontally in the strike direction and down dip to the northwest, suggesting more than one tectonic event.

Comment

Pearson and Froese (op. cit.) mapped the rocks around Forbes Lake wholly as metasediments, including quartzite and greywacke. The author believes that most rocks seen this summer along the northern part of Forbes Lake and a significant number in the southern part of the lake are metamorphosed volcanic flows, sills or pyroclastics of felsic to intermediate composition. Metasediments occurring in the area are probably mainly in the tuff-sediment transition. The 'hornblende and calc-silicate gneisses' of Pearson and Froese are derived largely from mafic and associated metavolcanics. The Forbes Lake rocks are

locally more deformed and recrystallized than those in the adjoining metavolcanic belt. This factor has probably contributed to the difficulty in distinguishing them from metasediments.

Other Areas

The shorelines of several other lakes were examined, mainly to check rocks originally mapped as metasediments in what is now termed the Crew Lake belt (cf. Lewry, this volume).

The volcanic rocks striking southwest from Renwick Lake lie close to the metasediments previously mapped by Pearson and Froese (op. cit.) and Ray (1981) along the southeast shore of McIntosh Lake. These include uniform fine- to medium-grained grey biotitic rock, banded hornblendic and biotitic gneisses, and amphibolite. Fine garnet occurs in some of the hornblendic and biotitic rocks. Sillimanite and muscovite, which would confirm a sedimentary origin, were not observed.

Metamorphic rocks of convincing sedimentary origin occur on Mountney Lake, together with grey-green tuffaceous-looking rocks and a magmatic complex of at least five intrusive phases. A basic intrusion on the southeastern shore shows well preserved regular rhythmic bands about 4 cm apart.

Hornblendic calc-silicate rocks and associated supacrustal rocks along the central parts of Nipew lake are similar to the hornblende gneisses mapped by Pearson and Froese (op. cit.), and are similarly interpreted as volcanogenic. Several magmatic phases are also exposed on Nipew Lake. Granite along the northeast arm of the lake displays multiple shear foliations suggesting the presence of a major shear zone parallel to the length of the lake. Features similar to all those found in Nipew Lake also occur on Hayman Lake.

On Devil Lake there is a transition across the McLelland Lake thrust from meta-arkose of the McLennan Group (Lewry, op. cit.) northeasterly to grey andesitic rocks which are well exposed at the rapids. The 'mafic sediments' of Padgham (1960) exposed on the northeastern side of Devil Lake appear to be mafic tuffs and flow rocks.

Implicatons for Exploration

The hornblende and calc-silicate gneisses mapped by Pearson and Froese locally contain considerable amounts of sulphide, particularly in the Pateman Lake vicinity and along the south shore of Forbes Lake. Although pyrrhotite is the principal sulphide recorded to date, the recognition of the volcanic environment, as well as their constitution as an iron-formation (Harper, 1983) and the presence of local shearing are factors favourable for gold exploration.

Perhaps a more important potential for gold exploration is the postulate that rocks mapped as metasediment in the Crew Lake belt in and west of Forbes Lake may contain significant amounts of volcanic material. Many of these rocks appear to be felsic to intermediate in the volcanic-sedimentary transition. Comparisons may possibly be made with the regional environment at Hemlo.

References

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