

4. GEOCHEMISTRY OF EASTERN NEWFOUNDLAND GRANITOID ROCKS

(Project 4-3, Canada-Newfoundland Mineral Exploration & Evaluation Program)

D.F. Strong*, W.L. Dickson*, C.F. O'Driscoll* and B.F. Kean

Twelve hundred and eighty-five rock samples from 33 granitoid plutons of eastern Newfoundland (Fig. 1) were quantitatively analysed for Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K, P, Zr, Sr, Rb, Zn, Cu, Ba, Ni, Cr, and F and semiquantitatively for Sn, Mo, Nb, Bi, and Pb. The plutons range from Precambrian to Devonian in age and from one to 2500 square miles in area. They occur within a total area of 20,000 square miles and within three different tectonic zones: the Avalon platform, the Gander Lake metamorphic belt, and the eugeosynclinal Central Mobile Belt. The chemical data allow for the following generalization:

1. There is a general trend of increasing K_2O and associated elements from west to east in plutons of the Central Mobile and Gander Lake belts but not those of the Avalon Platform. By analogy with such trends elsewhere, this is taken to reflect the existence of an eastward-dipping subduction zone during the formation of these plutons.

2. There are differences between the plutons of the northern and southern halves of the Gander Lake Belt, brought out by both regression and discriminant function analysis. In particular, the plutons of the Fortune Bay area (especially the Ackley City and Harbour Breton) have substantially higher background concentrations of Cu, Zn and F, and these are thus regarded as showing the greatest mineral potential.

3. The St. Lawrence pluton is the only one studied which displays strong peralkaline characteristics (high alkali:alumina ratio, high Zn concentration), and as it is the only granitoid body in Newfoundland with an operating mine (fluorite), any other peralkaline plutons should be explored with some care. Two plutons containing riebeckite, and therefore probably peralkaline, are the Traytown pluton in the same geological setting as St. Lawrence, and the LaScie granite on the Burlington Peninsula. These were not analysed in the present study but work on the Traytown pluton is now in progress.

*Department of Geology, Memorial University of Newfoundland

4. Beryllium appears to be associated only with the garnetiferous leucogranites which tend to be concentrated on the western margins of the Gander Lake belt.

5. There is a continuous variation in the "distribution ratios" of Tauson and Kozlov, (1972) in Newfoundland granites. Nevertheless there is a tendency for some grouping, with the Twillingate plutons being readily classified as a "plagiogranite" and the Fredericton and Rocky Bay plutons showing plagiogranite affinities. The St. Lawrence pluton is similar to the "plumasitic leucogranites" in Zr and Sr values, and this latter similarity is consistent with the fact that the agpaitic granites are the type most commonly enriched in F, Be, Sn, etc.

6. A number of new mineral occurrences were discovered during the routine sampling, namely Mo in the Deadman's Bay and Holyrood plutons, Cu in the Belleoram, Cu, Mo and K in the Harbour Breton, F in the Gander Lake and Bay L'Argent, Be in the Middle Ridge, and W in the Gander Lake west plutons.

References

- Tauson, L.V., and Kozlov, V.D.
 1972: Distribution functions and ratios of trace elements concentrations as estimators of the ore-bearing potential of granites; Proc. 4th. Int. Geochemical Expl. Symp.; in: Geochemical Exploration 1972, London, p. 37-44.

