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1986/45. Chromite in Owen Conglomerate in the Lyell area.

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Abstract

Chromite was found in 20 of 24 samples of Owen Conglomerate from the Lyell area, albeit very variable in abundance. It is partly to completely altered to hematite in many samples, and where now absent may have been originally present but have been completely altered. Traces of gold, chalcopyrite, galena and sphalerite occur with pyrite in some samples.

Twenty-four samples of quartz sandstone and conglomerate (localities on fig. 1) were received for determination of the distribution of chromite. The results are summarised in Table 1. The abundances are relative; for chromite in the heavy mineral (H.M.) concentrates less than about 1 vol.% is considered trace (in some only one grain was seen) and abundant is more than about 5 vol.% (up to about 90 vol.% in 112). The H.M. yield gives a rough indication of the proportion of chromite in the original rock - up to about 4 vol.% in 112, but usually much less than 0.1%. The abundance ranges are, very approximately; trace : ‹0.01%, abundant : ›0.05%. This depends upon the grain size of the rock, however, as only the +63 µm-180 µm fraction was separated for examination.

There is a significant negative correlation between the proportions of hematite and chromite in these samples. Hematite is present in all but six samples: 109-112, 114 and 115, some of the most chromite-rich samples. Where they co-exist, hematite often appears to replace chromite, forming euhedral pseudomorphs of reticulated hematite containing irregular chromite cores. The chromium is presumably released to form 'fuchsitic' micas, etc.

Chromite is usually subrounded to well-rounded where it is not pseudomorphed. Fine alteration along rims and cracks is typical, as are a system of fine cracks, particularly around the rims. Internal reflections and translucent edges are usually dark red-brown at best, and the alteration masks the colour further. Inter- and intra-granular reflectance variations may indicate some compositional variations, probably pre-depositional, but weathering, diagenesis and metamorphism may contribute to this.

Pyrite is found in half of the samples, ranging from very finely dispersed grains in gangue, to broken fragments of larger grains. Framboidal aggregates are common, and are often overgrown by coarser, euhedral pyrite. Some pyrite occurs as reticulated aggregates of bladed to prismatic crystals. Chalcopyrite is common as very fine inclusions (seldom more than 10 µm diameter) in pyrite, and gold, galena and sphalerite are rare as associates or inclusions. Gold occurs as fine inclusions up to 2µm, galena as irregular inclusions up to about 20 µm, and sphalerite up to about 20 µm adjacent to euhedral pyrite. Most pyrite is closely associated with a carbonate and medium-grained quartz, rarely in chert or coarse-grained quartz, and sericite is a minor associate. The association is not typical of Mt Lyell ores - chlorite, magnetite, rutile, hematite, siderite, chert and sericite are absent to minor - even though some pyrite-chalcopyrite-gold textures are similar. Framboids are rare in Mt Lyell ores. The framboids, reticulated aggregates and euhedral crystals suggest perhaps

some original diagenetic sulphide recrystallised by later low to medium-temperature hydrothermal solutions. The preparation of the concentrates has destroyed much genetic information, but there is no indication of any oxidation of pyrite, and little pyrite appears to be in clasts. It may have been derived from Devonian granite-related veins cutting the conglomerate.

Other heavy minerals, almost ubiquitous, include rutile, zircon, tourmaline, 'leucoxene' and goethite. Monazite and anatase are rare.

Table 1
Distribution of chromite in the Lyell area

Field no.	Chromite in H.M. concentrate	% Yield H.M.	Chromite in rock	Hematite	Sulphides
100	xx	0.4	x	xxx	x
101	xx	0.9	xx	xxx	-
102	xx	1.7	xx	xxx	-
103	xx	3.2	xx	xxx	-
104	xx	1.1	xxx	xx	x
105	xx	0.2	xx	x	-
106	xxx	0.9	xxx	xxx	-
107	-	0.12	-	x	-
108	xxx	0.2	xx	xx	-
109	xxx	0.3	xx	x	x
110	xxx	0.2	xx	x	-
111	xxx	1.2	xxx	-	-
112	xxx	4.5	xxx	-	-
113	xxx	0.04	xx	x	xx
114	xxx	0.1	xx	-	xx
115	xx	0.13	x	x	x
116	-	3.6	-	xxx	x
117	-	9.7	-	xxx	-
118	-	1.9	-	xxx	-
119	x	0.5	x	xx	x
120	x	0.3	x	xxx	x
121	x	1.9	x	xxx	-
122	x	0.4	x	xxx	xx
123	x	0.3	x	xxx	x
124	x	0.6	x	xxx	x

Legend: xxx: abundant, xx: moderate; x: trace; -: not detected
See text for definitions.

[2 September 1986]

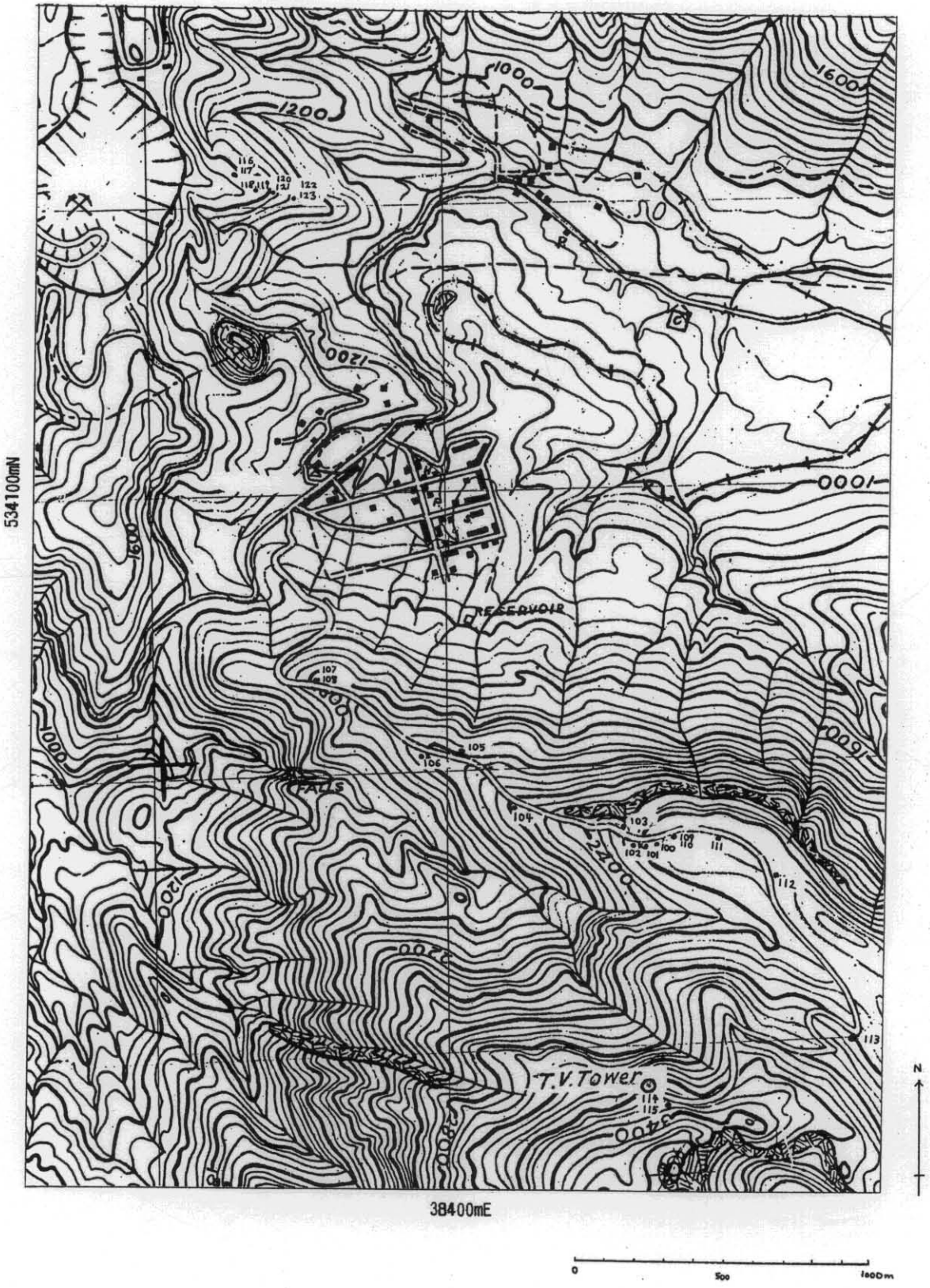

Figure 1. *Sample localities.*

5 cm