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NICKEL NEAR BEACONSFIELD

By TERENCE D. HUGHES

Introduction

Five miles west of Beaconsfield and about the valley of Anderson Creek is a large mass of serpentine. This has been extensively prospected and to a minor degree worked in the past for asbestos and from that aspect has been described in a recent departmental publication, "Mineral Resources No. 9". The serpentine has also been used by terrazzo makers. In some places the serpentine is covered by fairly extensive deposits of chromiferous iron oxide, up to 50 feet deep, which has been formed by decomposition of this rock. This iron has also been the subject of numerous investigations and in 1876-77, ten thousand tons of pig-iron were produced from it.

Although some nickel had been reported in the iron ore and pig-iron analyses, its presence in any thing like commercial quantities in the serpentine was not considered until within the last year, when Mr. Pitulej and his associates have been actively prospecting. They have put in two trenches and taken numerous samples and have reached the conclusion that nickel in commercial quantities may exist in the serpentine in the southern portion of its outcrop. Consequently a brief visit was paid to the area on June 20th and 21st last and samples taken from the trenches and some outcrops.

Location and Access

The area of serpentine examined is in the southern-most part of its outcrop and lies adjacent to the Beaconsfield-Holwell road. From Launceston it may be reached either through Beaconsfield,

Holwell or Flowery Gully. If the Holwell road is followed from Beaconsfield, at six miles from the latter and just beyond the crossing of Brandy Creek, a road may be seen leading off through the timber to the west. A car may be driven 15 chains up this road to where the first trench has been dug at the most easterly outcrop of the serpentine. Due to the carting of timber the road beyond here is fit only for a Land Rover. The countryside in this area is open and pleasant, having little undergrowth and few steep hills. A water-race, supplying Beaconsfield, traverses much of the area and, as well as providing good exposures of serpentine, has an excellent foot-track along its edge.

Geology

The sedimentary geology of this area is comparatively simple, but this general simplicity is complicated by various basic and acid intrusions. A few outcrops of Cambrian rocks, resembling a partially-silicified mudstone, may be seen near both the eastern and western edges of the southern part of the area. These rocks dip to north-east and form part of the western leg of a syncline whose axis is in the vicinity of the Tamar River. The Pre-Cambrian rocks below these beds outcrop boldly in the Asbestos Range and the Ordovician limestones above them are located at Flowery Gully.

These Cambrian rocks were intruded, probably later in the same age, by ultra-basic rocks, which have largely altered to serpentine. In this southern part, the serpentine has intruded in the form of two tongues parallel with the strike of the sediments. These ultra-basics (and the sediments) were in turn intruded, in the Devonian, by a group of acid intrusives of various composition. None of these rocks are visible in the area investigated but further north, Taylor shows on his map intrusions of syenite, aplite and hornblende granite.

The Nickel

The serpentine outcrops only intermittently, but here and there in the outcrop may be seen a light-coloured variation, in places almost white in colour. Sometimes this latter grades into normal serpentine by means of a black and white dappled intermediate type; sometimes the boundary is quite distinct so that an intrusion is suggested. It is the contention of the prospecting party that nickel values increase in the serpentine near the boundaries of this white rock. A sample of the white material was analysed and a thin section made of the serpentine in contact with it. The analysis showed:—

SiO_2	36.36 per cent	CaO	33.4 per cent
Al_2O_3	18.07 per cent	MgO	3.97 per cent
Fe_2O_3	2.36 per cent	Na_2O	0.11 per cent
FeO	0.90 per cent	K_2O	Nil
MnO	0.26 per cent	H_2O+	3.46 per cent
TiO_2	0.25 per cent	CO_2	Nil

G. Everard, who examined a thin section, says that " this rock contains very little definitely crystalline material, but consists rather of isotropic and cloudy opaque matter." There seem to be at least two theories as to its origin. It may be due to the alteration of certain enclosed sediments and Everard suggests " it may be a fritted calcareous mudstone, the iron magnesea and water having been

introduced by absorption from the serpentine, while carbon dioxide has been driven off by heat. Serpentine enclosed in the white rock, near the contact, has partly reverted to olivine, with possible release and concentration of nickel in the contact zone. Nearby igneous intrusion is postulated as a source of heat." On the other hand this white rock may have been formed by the crystallisation of minerals from solutions introduced during the acid intrusive phase and these solutions, while not introducing the nickel, may have played some part in concentrating it in those parts of the serpentine nearby. The origin of the nickel is, of course, from the basic intrusives, but unfortunately it is not possible, at this stage, to identify the actual nickel mineral or minerals. Everard, after examining thin sections of the material assayed, says that "specific nickel minerals were not observed in the serpentine and it seems that the serpentine is itself nickeliferous."

Laboratory tests, however, have suggested that the nickel mineral may be a silicate.

Development

Two trenches have been put in by the syndicate, one at the extreme eastern part of the eastern leg of serpentine and one in the eastern part of the western leg. These are not deep, and the rock exposed is similar to surface outcrop.

Six samples were taken by me from various places in the serpentine and may be tabulated as follows:—

Sample No.	% Nickel
1	0.07
2	0.42
3	0.45
3a	0.65
4	0.47
5	6.70

No. 1 sample was taken from a rather extensive outcrop along a subsidiary track, three-quarters of a mile north of the main track and near a small race. This was from normal serpentine without any white mineral showing.

No. 2 was taken across six feet of an outcrop of serpentine, showing some white material. This outcrop was cut by the Anderson's Creek race and its position is shown on the attached plan.

Nos. 3 and 3a were from the easterly trench; No. 3a being over 1 ft. 6 in. in the most easterly part of the trench and No. 3 over 7 ft. 6 in. adjoining. These sample distances were measured horizontally in a direction approximately at right angles to the strike of the intruded sediments.

No. 4 was taken intermittently over about 100 feet in the vicinity of the westerly trench.

No. 5 was of selected material showing much bluish-green mineralisation.

Recommendations

The sampling has shown that portions of the serpentine contain nickel of about 0.5 per cent. Now this figure would be approaching ore grade if it could be proved—

1. That the grade (or a slight improvement of it) occurred over large volumes of serpentine so that very big open-cut mining could be attempted.
2. That the nickel was in the form of such a mineral which would allow for fairly simple extraction.

The results of the sampling are sufficiently encouraging to warrant further development, but at present of a minor nature only. I would suggest a series of shallow bores at very flat angles drilled in a continuous line in a south-westerly direction, starting from the eastern boundary of the serpentine north of No. 1 trench. All the core should be assayed in, say, ten foot samples.

REFERENCE

Taylor, B. L., 1955, "Asbestos in Tasmania". Geological Survey Mineral Resources No. 9.

NICKEL PROSPECT — ANDERSON CK. AREA

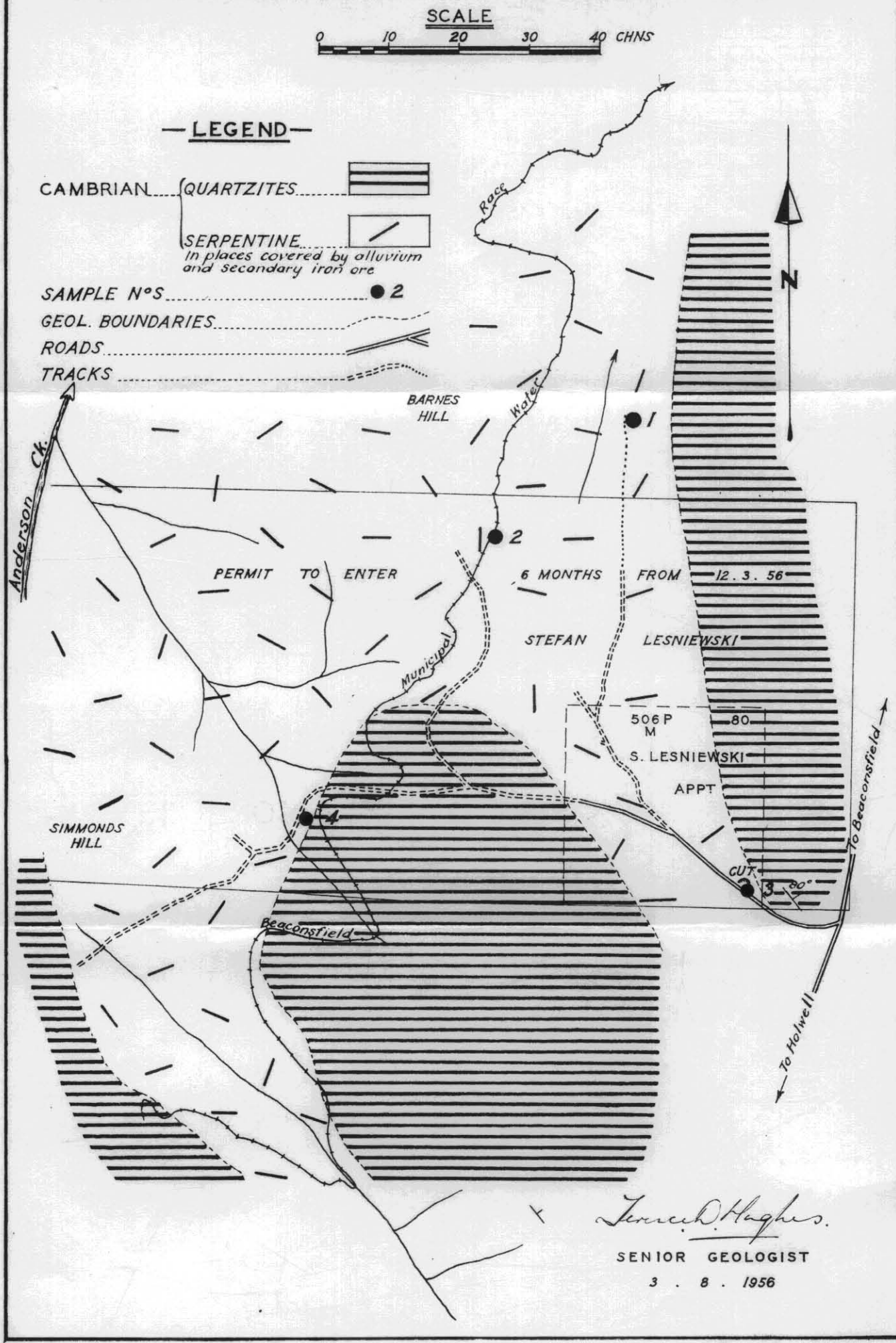

PLATE 2

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5 cm