

TR7-69-76

17. ALLUVIAL CHROMITE DEPOSITS, ANDERSON CREEK AREA, BEACONSFIELD

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INTRODUCTION

The presence of chromite as a constituent mineral of the serpentinous rocks and iron ores of the Anderson Creek area has long been known but it was not until 1958 that any investigations were made into the possible occurrence of deposits of economic grade. Previous to 1958 the Ben Lomond Mining Company had been active in the area but attention was at that time concentrated on the nickeliferous content of surface clays and weathered serpentinous rocks. It was only during the course of these investigations that the chromite fraction in the clays was recognized as a potentially economic source of Cr_2O_3 and subsequent exploratory work centred more strongly on the location of payable concentrations.

Investigations by personnel of the Department of Mines commenced in the latter part of 1961 and continued until November, 1962. Summaries of the nickeliferous clay investigations were given by Hughes (1957; 1959; 1962) and Stefanski (1959; 1960).

LOCATION AND ACCESS

The present known chromiferous deposits are situated along the Anderson Creek ultrabasic complex approximately 2 miles west of the township of Beaconsfield, County of Devon. Four localities containing significant concentrations are at present known. Of these three are situated in the upper NW corner of the Salisbury Mineral District in the vicinity of Barnes Hill and Simmonds Hill, and the fourth in the Beaconsfield Mineral District near Leonardsburgh, approximately $2\frac{1}{2}$ miles north of the other deposits.

Access to Leonardsburgh is by an all weather road from Beaconsfield. Access to the southern deposits is by way of the Beaconsfield-Holwell road for a distance of 4 miles, thence west along a logging (all weather) road known as Pugh's Road. Subsidiary timber tracks lead northerly from Pugh's Road to the deposits at distances of approximately 30, 60 and 90 chains from the Holwell Road. The subsidiary tracks are passable only in dry conditions for conventional traffic.

The area is lightly covered with timber and low scrub and the development of satisfactory all weather alternative routes would not be difficult.

GENERAL GEOLOGY

Topographically the ultrabasic complex forms a long valley or basin flanked to the west by the Cambrian and Precambrian rocks of the Asbestos Range and to the east by ridges, intermediate in height, of Ordovician rocks. The valley is enclosed at both northern and southern ends by low hills of Permian rocks.

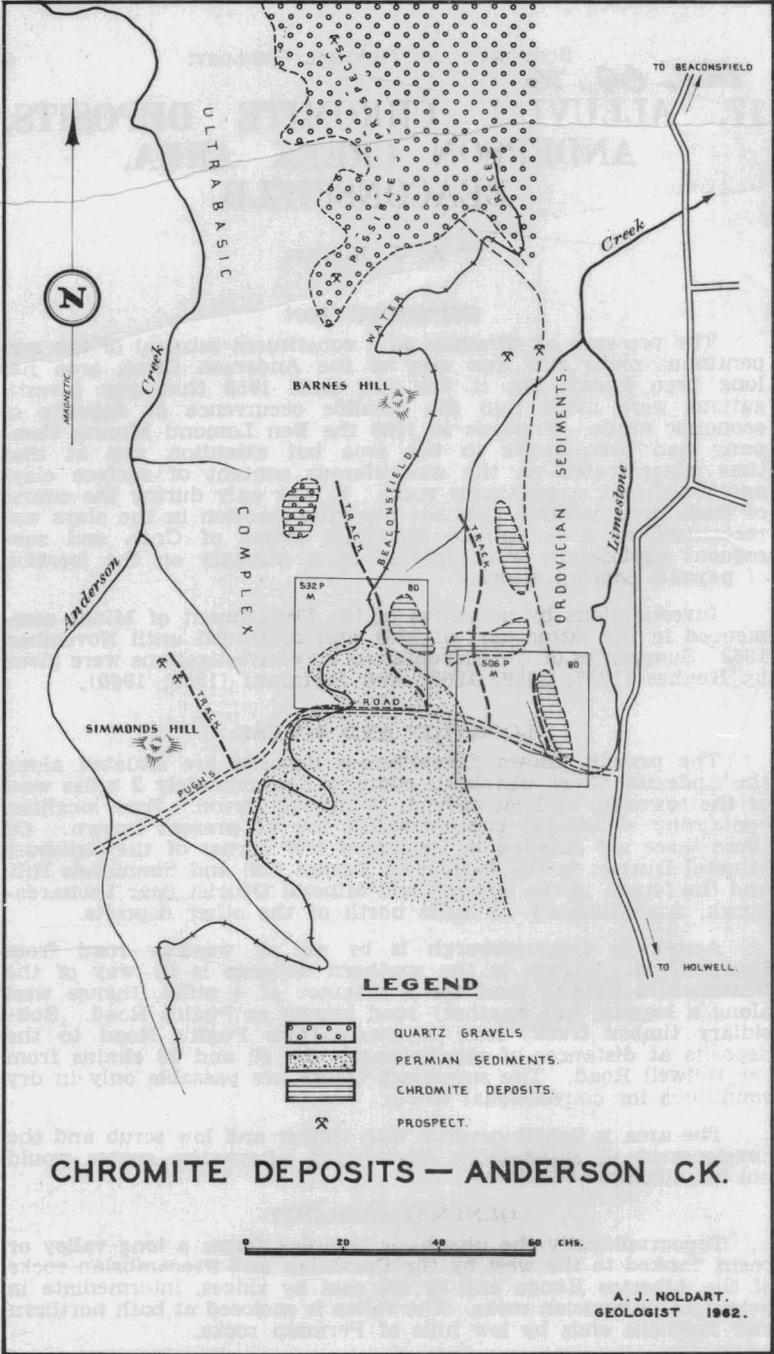
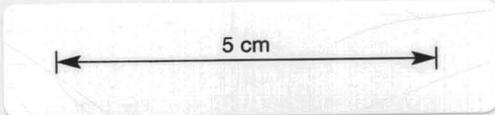


FIGURE 21.



The low relief of the ultrabasics is broken by occasional minor features. Settlers Range, Mt Vulcan, and Mt Scott are the most prominent of these smaller hills in the northern section of the valley, with Simmonds Hill and Barnes Hill equivalent features in the southern section.

The lithology of the area is fully covered by Taylor (1955) and Green (1959) and details will not be repeated here. Briefly, the country rocks underlying the deposits are in all cases members of the serpentine belt which is intrusive in the west into Cambrian slate, siltstone, greywacke, &c., and overlain in turn by Ordovician sandstone, quartzite and conglomerate members of the Cabbage Tree Conglomerate and Caroline Creek Sandstone sequences.

Small octahedra of chromite are common in the serpentinous rocks and have been noted in local concentrations as "veinlets" up to 2 inches wide in the parent rock. Some thin bands and occasional disseminations of chromite grains also occur in the lower sequences of the overlying Ordovician rocks. No chromite has been found in the meta sedimentary rocks composing Simmonds Hill and Settlers Range.

Much of the area is covered with Tertiary deposits. A thick capping of late Tertiary quartz gravels obscures most of the contact with the Ordovician rocks in the eastern flank and forms a small outlier capping a small serpentine hill immediately west of Barnes Hill. The caps and slopes of Barnes Hill, Mt Vulcan and Mt Scott are obscured by secondary deposits of pisolitic iron ore, partly concretionary in limonite-hematite admixtures and also considered to be Tertiary in age although older than the white quartz gravels.

DEPOSITS

For the purposes of this report the various occurrences will be designated as the Barnes Hill, Limestone Creek, Simmonds Hill and Leonardsburgh deposits.

1. Barnes Hill Deposit

This is the richest deposit yet located. It covers an area of about 13½ acres occurring as a partially exposed "deep lead" outcropping around the crest of a small hill. The upper portion of the hill (about 10 acres) is capped with Tertiary quartz gravels varying in thickness from a few inches to upwards of 20 feet at the crest. Immediately below the gravels the serpentinous rocks have been leached to a compact, very plastic, greenish-brown to brown clay. The zone of leaching also varies from a few inches to several feet in depth.

The chromiferous concentrations occur immediately above the clay surface and extend upward into the lower gravel beds. The thickness of the chromiferous zone is not constant but ranges from zero to a maximum of 4-5 feet. A small chromite fraction is contained in the clay zone. Mineral concentration has been controlled to a large extent by the pre-existing surface contours of the clays—the probable pre-leaching surfaces of the serpentinous rocks. Local rolls, gutters, hollows, &c., of the clay surface have caused local concentrations and heavy enrichments in small pockets resulting in extreme variations in thickness and grade. In all samples taken the uppermost limit of the chromiferous zone was fairly sharply defined.

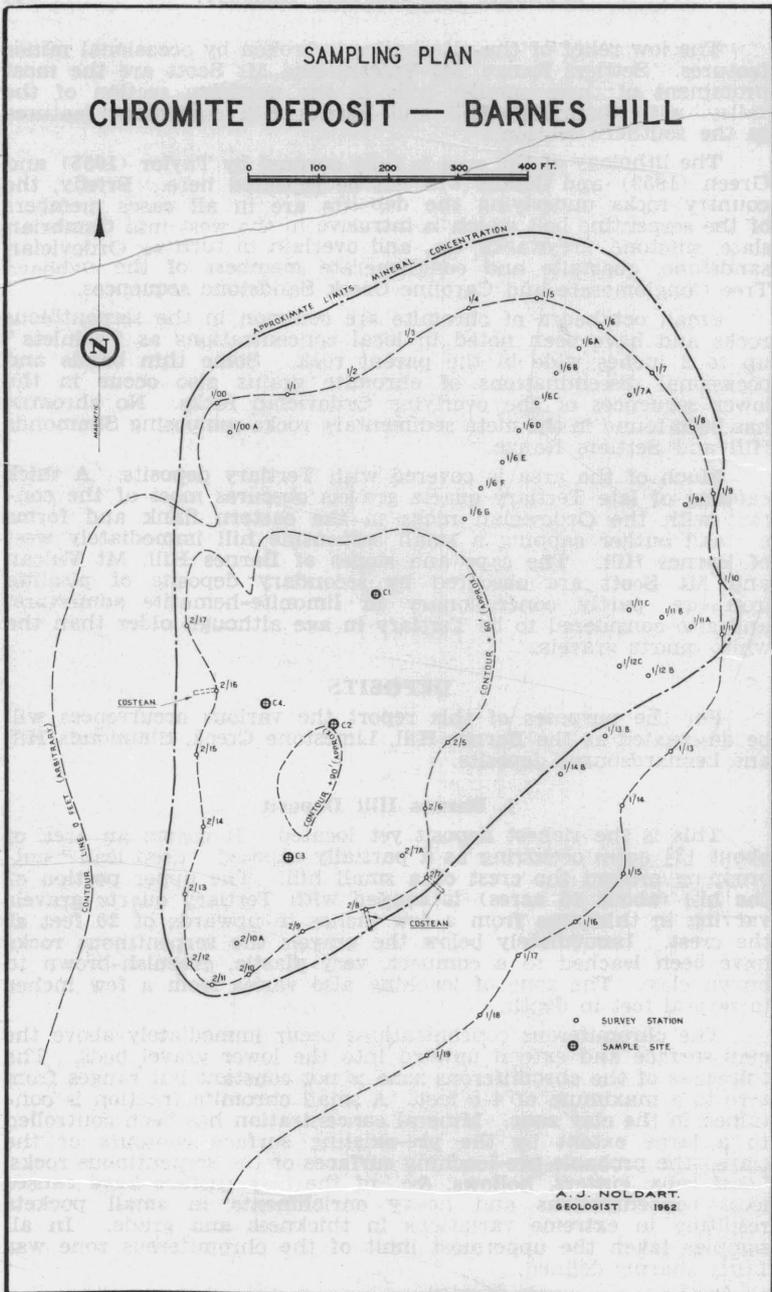
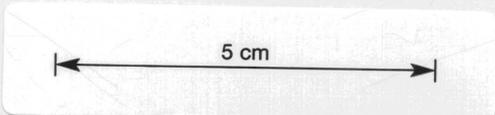


FIGURE 22.



The deposit proved to contain the highest grade concentrations tested to date and some 55 test holes and costeams were sunk with varying results. The majority of the holes bottomed on the underlying clay surface but due to limitations of the testing equipment it was not possible in all cases to penetrate to or through the mineralized zone. Periodic samples were taken of the upper 3 feet of the clay zone.

All samples taken were submitted to the Department of Mines Laboratory, Launceston. Assay results supplied by the Laboratory indicate an average content of 240 lbs. of chromite concentrate per cubic yard of gravel over a 36 inch zone immediately overlying the clay. Adopting a conversion factor of 2,600 lbs. of gravel per cubic yard, potential reserves for the Barnes Hill deposit are tentatively placed at 7,500 tons of chromiferous concentrates distributed over an area of 13-14 acres. It must be noted that any estimate of reserves given is subject to extreme variations in both thickness and grade of the chromiferous zone and cannot be regarded as proven.

2. Limestone Creek Deposits

These are located SE of Barnes Hill between the Beaconsfield water race and the low ridge forming the west bank of Limestone Creek. They are located on the slopes of tributary drainage channels of the main creek.

Four main areas of potential economic grade were located but it is probable that other small concentrations occur nearby. The deposits differ from the Barnes Hill deposit in that they are enrichments in surface gravels and are considered to represent reworked and redistributed mineral concentrations consequent on erosion and removal of pre-existing Barnes Hill type gravels. It is probable that some small localized enrichment has occurred in the eastern deposits due to breakdown of the Ordovician beds.

The known areas of enrichment range from 6 to 12 acres in extent and in general are considerably lower in both grade and thickness of the mineral zone. Testing of these deposits indicate enrichment in the surface gravels in depths from a few inches to 2-3 feet. In the majority of holes sunk the underlying clay zone also proved to contain significant mineral concentrations but of lower grade than the gravels. Some clay content is present in all surface gravels of these deposits. It was noted that where the ferruginous grade of the gravels increased, a corresponding decrease in chromite content occurred, consequently investigations were confined to the less ferruginous portions of the drainage slopes.

In all, over 100 test holes were sunk to test the deposits. The test holes were pan sampled only and Laboratory assays were carried out on occasional check samples only. Samples taken in this area in the initial exploration work by Department of Mines personnel were submitted to the Department of Mines Laboratory, Launceston for testing and concentration. The results are given in this volume (p. 171).

As indicated above the majority of the samples taken are subject to Laboratory confirmation but an overall average grade of 5% by weight over depths ranging from 18-24 inches from the surface is at present indicated. Together the four deposits are tentatively estimated to contain a total of 6,000 tons of concen-

trates over an area of 35-37 acres. Other small patches could exist in the vicinity of the areas checked but would not appreciably increase potential reserves.

Auger samples were taken in the black clay alluvium of the drainage channel central to the deposits with negative results.

3. Simmonds Hill and Leonardsburgh Deposits

These deposits are similar in all respects to the Limestone Creek deposits. They have not been fully investigated and no sampling has been carried out since they were first located. No estimate of grade, distribution or reserves can be given but it is doubtful if more than a few acres would contain significant concentrations in either locality.

4. Other Prospects

Some prospecting was carried out on the western margin of the Tertiary quartz gravels overlying the eastern section of the ultrabasic complex. Slight indications only were obtained in two small localities and testing was discontinued. It is possible that localized concentrations could exist beneath this extensive blanket cover and systematic boring on grid patterns would be necessary to test the prospect adequately.

CONCLUSIONS AND RECOMMENDATIONS

1. Chromiferous deposits of economic grade occur in the basal zone of the late Tertiary quartz gravels overlying the Anderson Creek ultrabasic complex in the vicinity of Barnes Hill.

2. Other deposits of lower but still potentially economic grade occur in the Quaternary-Recent gravels on the drainage slopes of the western tributaries of Limestone Creek.

3. The mineral content of the leached clay-weathered serpentinite zones is not of economic grade. Chromite does not occur in the alluvium of the present drainage channels.

4. Whilst the deposits are of economic or potentially economic grade, known tonnages available are too small to warrant exploitation.

5. Small deposits of a similar nature to the Limestone Creek deposits probably exist at other localities along the Anderson Creek valley.

6. Deposits of a similar nature to the Barnes Hill deposit could exist below the Tertiary quartz gravels obscuring the eastern margin of the complex NE of Barnes Hill.

7. The gravel overburden at the Barnes Hill deposit is similar in all respects to that actively being quarried in the Beaconsfield-Beauty Point areas and could be utilized for similar purposes.

8. All deposits could be made readily accessible in the event of mining operations being undertaken. Sufficient water supplies for such operations would be available from Anderson Creek.

Chromite Values—Barnes Hill Deposit

Hole No.	Sample Depth		Length (ins.)	Chromite Value		Remarks
	From	To		lb./c.yd.	Approx. %	
1/0	0'	3'	36	186	8.7	White gravels — clay bottom
1/0a	0'	5'	60	149	6.3	White gravels — clay bottom
1/1	0'	2' 6"	30	23	0.9	White gravels — clay bottom
1/2	0'	2' 6"	30	110	4.6	White gravels — clay bottom
1/3	0'	4' 6"	54	121	5.0	White gravels — clay bottom
1/4	0'	4' 6"	54	34	1.3	Clay sample
1/5	0'	2'	24	94	3.9	White gravels — clay bottom
1/6	0'	3'	36	46	1.8	Clay sample
1/6a	0'	4' 6"	54	570	23.9	White gravels — clay bottom
1/6b	0'	4' 3"	51	135	5.6	White gravels — clay bottom
1/6c	0'	1' 9"	21	16	0.6	White gravels — clay bottom
1/6d	0'	4'	48	397	16.7	White gravels — clay bottom
1/6e	0'	2'	24	12	0.5	White gravels — clay bottom
1/6f	0'	3'	36	61	2.5	Clay sample
1/6g	0'	3' 6"	42	6	0.2	White gravels — hole incomplete due to water
1/7	0'	2'	24	29	1.2	White gravels — clay bottom
1/7a	0'	2'	24	55	2.3	12" white gravels — 12" clay sample
1/8	0'	3' 3"	39	104	4.4	White gravels — clay bottom
1/8	3' 3"	5' 3"	24	608	25.5	White gravels — clay bottom
1/9	0'	3'	36	36	1.4	Clay sample
1/9a	0'	4' 6"	54	85	3.5	White gravels — clay bottom
1/10	0'	3' 6"	42	41	1.6	White gravels — clay bottom
1/11	0'	2'	24	234	9.8	Ferruginous gravels — clay bottom
1/11b	0'	2' 9"	33	138	5.7	White gravels
1/11b	2' 9"	5' 3"	30	441	18.4	White gravels — clay bottom
1/11c	0'	2' 9"	33	7	0.3	White gravels — hole incomplete due to water
1/12c	0'	6' 6"	78	166	6.9	White gravels — clay bottom
1/13	0'	3'	36	87	3.6	White gravels — clay bottom
1/13b	0'	5' 6"	66	88	3.8	White gravels — clay bottom
1/14	0'	2'	24	36	1.4	White gravels — clay bottom
1/14b	0'	4'	48	79	3.3	White gravels — clay bottom
1/15	0'	5'	60	23	0.9	White gravels — clay bottom
1/16	0'	2' 6"	30	88	3.6	White gravels — hole incomplete due to water
1/17	0'	2' 6"	30	135	5.6	White gravels — hole incomplete due to water
1/18	0'	1'	12	64	2.7	White gravels — hole incomplete due to water
1/19	0'	2'	24	47	1.8	Clay sample
2/5	0'	5' 6"	66	4	0.2	White gravels — hole incomplete due to water
2/6	0'	4' 4"	52	8	0.3	White gravels — hole incomplete due to water
2/7	Costeen Sample		21 ave.	835	35.0	White gravels — clay bottom
2/7	Costeen Sample		18 ave.	42	1.7	Clay sample
2/7a	0'	3' 6"	42	2	Trace	White gravel overburden — hole incomplete due cemented layer
2/8	Costeen Sample		9 ave.	47	1.9	Mineral section only sampled
2/9	0'	5'	60	11	0.4	White gravels — clay bottom
2/10	0'	4'	48	109	4.6	Clay sample
2/10a	0'	13' 6"	162	3	0.1	Bulk sample of overburden gravels — hole incomplete due cemented layer
2/11	0'	2'	24	Trace	Trace	White gravels — clay bottom
2/12	0'	2' 6"	30	Trace	Trace	White gravels — clay bottom
2/13	0'	8' 6"	102	Trace	Trace	Bulk sample white gravels — hole incomplete due cemented layer
2/14	0'	2' 3"	27	354	14.9	White gravels — clay bottom
2/15	0'	3' 9"	45	1	Trace	White gravels — clay bottom
2/17	0'	7' 3"	87	Trace	Trace	Bulk sample overburden gravels — hole incomplete due cemented layer
C1	19'	22'	36	70	2.9	White gravels — sampled with percussion drill — values quantitative only
C1	22'	25'	36	101	4.2	
C1	25'	28'	36	95	4.0	
C2	16'	19'	36	55	2.3	
C3	16'	19'	36	184	7.8	
C4	17'	20'	36	51	2.1	Holes penetrated to clay bottom and clay sampled but heavily contaminated from overlying gravels

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