

REPORT ON THE BORING OPERATIONS
UNDERTAKEN IN CONNECTION WITH THE
BEACONSFIELD CHROMIFEROUS IRON ORE
DEPOSITS.

INTRODUCTION.

The chromiferous iron ore deposits occur at Anderson's Creek some three miles west of Beaconsfield. During 1929 a boring campaign with the departmental diamond drill was carried out under the supervision of Mr. J.B. Scott, State Mining Engineer. Bore-holes were put down in three areas - Mt. Vulcan, Mt. Scott and Barnes Hill. In the report of the boring operations, Mr. J.B. Scott states :-

"on the Mount Vulcan area 13 holes were bored, aggregating 861 feet. The average depth of the ironstone on this area, covering approximately 50 acres, proved to be 32 feet, ranging in depth from 10 feet to 61 feet 6 inches.

On an adjacent area, known as Mount Scott, two holes were put down, one to a depth of 53 feet and the other to 60 feet, the depth of ironstone averaging 32 feet.

On Barnes Hill, situated about a mile to the south of Mount Vulcan, six holes were drilled, aggregating 351 feet, the average depth of chromiferous iron covering the area bored being 47 feet, ranging from 19 to 66 feet. The holes, being in the nature of scout bores, embraced approximately 20 acres, which, however, did not include the ultimate boundaries of the deposit".

QUANTITY OF ORE

As far as the quantity of ore was revealed by the boring campaign, the following extracts from the above report by Mr. J.B. Scott have application.

MT. VULCAN. - Thirteen bore-holes proved an average depth of 32 feet of ore over an area of approximately 50 acres.

MT. SCOTT. - Only two bore-holes were put down and so no reliable estimate of average depth and area of the deposit can be made.

BARNES HILL - Six scout bore-holes proved the presence of an average depth of 47 feet of ore over approximately 20 acres. The total area, is however, greater than this figure.

NATURE AND QUALITY OF THE ORE

The deposit consists of hill detritus consisting of ochreous and hard types of iron ore. The ochreous portion consists of hematite and possibly some limonite. The harder portion may be hematite (probably concretionary) or magnetite.

The magnetite is derived from the veins of the latter which exist in the serpentine bedrock. The hematite has been derived from the oxides of iron formed during the weathering and disintegration of the serpentine.

It is thus apparent that the deposit is not uniform throughout and this probably applies to the quality of the ore. It is stated that the harder portions are of better grade than the softer ones. While this may be so, selective mining would have to be resorted to, to make use of the better grade ore. This would at once increase the cost of mining and considerably reduce the reserves.

The ore yielded very little core and assays were carried out on the cuttings from the holes. The very large number of assays involved were carried out in the Mines Department Laboratory, Launceston. From the assays of the sections of each bore-hole the following tables have been compiled by Mr. F. Blake, Field Geologist.

TABLE I. - Shows the assay of the material from each bore-hole in the three areas and was compiled from the assays of the sections of each hole.

TABLE II - Shows the average assay of the material from each area as represented by the cuttings from the bore-holes.

TABLE III - Shows the contents of metallic iron and chromium in the material from each area.

It is seen from the assays in Table II, that the material consists essentially of oxides of iron (54-60%) or the equivalent in metallic iron (38 to 43%) with lesser amounts of silica (12 to 17%), alumina (10 to 13%), water (7.9 to 9.7%) and chromium oxide (5.1 to 7.8%). The remaining constituents are present in small amounts viz. magnesia (0.5 to 0.9%), manganese oxides (0.07 to 0.47%), titanium oxide (0.04 to 0.42%), sulphur (0.07 to 0.12%) and phosphorus (up to 0.02%).

It is obvious that the only constituents likely to be of economic importance are those of iron and chromium. It now remains to be seen whether these metals are present in sufficient amount to render the material of any value.

IRON AND CHROMIUM ORES

IRON - The greater proportion of iron ores being produced and smelted throughout the world contains over 50% metallic iron. Iron ore containing as low as 35% iron is, however, used in small quantities.

It is obvious, therefore, that the Beaconsfield ore would be a low grade one and it would not be used when higher grade ores are available unless it had some special advantage.

The silica content is higher than that usually present in iron ores especially the high grade ones.

CHROMIUM - The only ore of chromium is the mineral chromite which contains 68% of chromic oxide (=46% metallic chromium). Chromium ores are used for three main purposes viz. for making ferrochrome, for the production of chromium chemicals and for chrome refractories. The ferrochrome contains 65% - 70% chromium and the ore used for this purpose is sold on a basis of 50% chromic oxide and must contain 45% - 50% of chromic oxide. The ore to be used for the production of chemicals must have as high a content (over 50%) of chromic oxide as possible. The ore for refractories can be of lower grade but 41% or more of chromic oxide is demanded while silica must not exceed

5 to 8%. It is obvious, therefore, that the Beaconsfield ore is useless as a source for the production of ferrochrome, chromium chemicals and refractories.

SOURCE OF CHROMIUM STEEL. - The ferrochrome alloys manufactured from chromite contain over 60% chromium and are used in the making of chromium steels i.e. special steels containing a small percentage of chromium and probably other metals. It may be asked as to whether it would not be possible to make chromium iron and steels directly from low grade chromiferous iron ores. While such a process is apparently feasible and easy of accomplishment yet in practice it is found to present difficulties which add considerably to the cost of production. Generally, therefore, these ores are not utilised. From Greece and Cuba, however, such ores are used but this is due to the nickel content of the ores which gives chromium-nickel steels of special qualities. In this process, the chromium is partly removed in the slags.

The Beaconsfield ores do not contain sufficient nickel to enable them to be considered as analogous to the ores of Greece and Cuba.

CONCLUSIONS. - It is seen from the above that the chromiferous iron ores are of such a composition that they cannot be used for the manufacture of ferrochrome, refractories or chemicals.

Its only possible use is in the manufacture of chromium iron steel, but at present this process is not favourably viewed by the metallurgists. As to whether this view point will alter in the near future it is impossible to predict, but unless such happens the Beaconsfield chromiferous iron ores will have no commercial application.

Signed P.B. Nye

GOVERNMENT GEOLOGIST.

Hobart,
September 8th, 1930.

CHROME IRON ORE.

AVERAGE ASSAY OF MATERIAL FROM EACH BORE-HOLE.

TABLE 1. - MT. VULCAN AREA

Bore No.	Thickness in feet of iron ore assayed	SiO ₂ p.c.	Fe ₂ O ₃ p.c.	FeO p.c.	Cr ₂ O ₃ p.c.	Al ₂ O ₃ p.c.	MgO p.c.	CaO p.c.	TiO ₂ p.c.	P ₂ O ₅ p.c.	S p.c.	NiO p.c.	Mni & MnO ₂ p.c.	H ₂ O p.c.	Remarks
1	33	17.21	44.41	1.05	3.46	16.57	1.49	Nil	0.57	0.037	0.59	0.15	0.72	11.17	27' to
2	35	12.74	62.37	0.57	6.71	7.88	1.45	"	Trace	0.005	0.06	0.11	0.35	8.13	34' not
3	27	11.71	65.28	Nil	4.42	8.42	1.14	"	0.08	0.0003	0.05	0.19	0.62	8.05	assay-
4	26	4.64	69.90	8.95	11.16	2.54	1.73	"	Nil	0.01	0.038	0.17	1.38	3.79	ed
5	18	3.99	79.67	Nil	8.96	0.35	0.87	"	"	0.003	0.08	0.17	1.71	4.006	
6	45	6.03	62.29	1.29	4.81	15.29	0.35	"	"	Nil	0.71	0.04	0.43	9.84	Surface
7	49	10.05	60.61	1.67	5.52	12.91	0.39	"	"	0.002	0.13	Nil	0.09	9.89	to 12'
8	60.5	14.25	57.77	1.68	5.20	9.04	0.59	"	0.09	Nil	0.10	0.05	0.82	10.35	not as-
9	45	11.57	61.38	4.11	4.63	5.16	0.96	"	0.07	0.001	0.07	0.14	0.27	10.79	sayed
10	25	14.81	49.39	4.03	4.11	17.92	0.22	"	0.41	Nil	0.05	Trace	Trace	9.03	
11	30	13.73	65.38	4.99	3.40	4.35	0.88	"	Trace	Trace	0.02	0.35	"	6.90	
12	10	22.40	56.95	4.12	3.90	1.69	0.22	"	"	"	0.02	0.10	"	10.60	
13	35	23.76	41.56	Nil	3.79	13.62	0.96	"	0.63	0.01	0.14	0.05	0.09	10.56	

MOUNT SCOTT AREA.

1	50	12.19	60.80	2.20	6.26	9.74	0.73	Nil	Trace	Trace	0.09	0.05	0.16	7.55	
2	60	22.32	43.75	3.54	5.12	16.44	0.37	"	0.01	"	0.15	Trace	Nil	8.18	

BARNES HILL AREA.

1	19	4.00	62.30	4.41	6.19	10.22	0.53	Nil	Nil	0.02	0.13	0.01	Nil	12.16	
2	33	9.77	55.08	4.64	6.29	13.20	0.49	"	Trace	0.02	0.11	0.02	"	10.58	
3	70	16.50	46.96	1.96	7.76	11.86	1.22	"	0.39	0.002	0.08	0.19	0.51	8.76	
4	40	15.77	48.35	1.88	9.268	12.83	0.76	"	0.29	0.10	0.11	0.10	0.19	10.32	
5	60	13.81	57.09	2.07	7.54	9.58	1.33	"	0.0	0.10	0.11	0.04	0.02	7.66	
6	76	15.91	49.61	1.52	8.33	11.15	0.80	"	0.96	0.04	0.17	0.02	0.06	11.07	

TABLE 11.

AREAS

Mt. Vulcan.	438.5	12.28	59.10	2.20	5.18	10.11	0.85	Nil	0.14	0.0006	0.07	0.10	0.47	9.07
Mt. Scott	110	17.72	51.50	2.93	5.63	13.39	0.53	"	0.04	Trace	0.12	0.02	0.07	7.89
Barnes Hill	298	14.17	51.74	2.31	7.80	11.39	0.95	"	0.42	0.02	0.12	0.07	0.16	9.75

TABLE 111.

PERCENTAGES OF METALLIC IRON AND CHROMIUM IN MATERIAL FROM EACH AREA.

<u>AREAS</u>	<u>IRON</u>	<u>CHROMIUM.</u>
p.c.	p.c.	p.c.
Mt. Vulcan	43.086	3.522
Mt. Scott	38.335	3.938
Barnes Hill	38.021	5.304
