

and, if so, whether you can furnish me with any further information in regard to the samples in question, such as particulars of the localities or districts in New Zealand from which these samples were obtained.

I am, &c.,

F. A. ABEL,  
Secretary and Director.

Sir Westby B. Perceval, K.C.M.G., Agent-General for New Zealand,  
13, Victoria Street, S.W.

### (Sub-Enclosure to Enclosure in No. 1.)

REPORT on samples of IRON ORE, LIMESTONE, and HÆMATITE, PAINTS received from the AGENT-GENERAL for NEW ZEALAND.

#### 1. Iron-ores.

THE samples consisted of large lumps of a dense purplish-brown ore. Examination with a lens showed that it was probably brown hæmatite (hydrated ferric-oxide) in a semi-crystalline condition, often disposed in striæ or twisted laminae, and occasionally in a honeycombed form. The numerous large cavities in the lumps contained deposits of an ochre-coloured earth. An average sample was prepared from a large number of pieces, and when submitted to chemical examination gave the adjoined results as the mean of three analyses, in which the greatest range of variation on the components present in small proportions was not more than 0·07 per cent., and on the iron not more than 0·18 per cent. The figures correspond fairly well with the analyses of certain brown hæmatite ores obtained from Northamptonshire (England), and made under the direction of Dr. Percy (Percy's Metallurgy, "Iron and Steel," p. 208). These analyses are given for purposes of comparison:—

	New Zealand Ore.		Northampton Ores.	
Silica and gangue ... ..	12·41	...	7·58	5·33
Hydrosopic moisture ... ..	1·24	...	—	1·80
Combined water and organic matter ... ..	10·87	...	11·89	12·40
Ferric oxide ... ..	76·26	...	74·12	76·00
Alumina and phosphates ... ..	0·13	...	1·55	2·30
Manganese ... ..	Trace	...	0·57	0·40
Gold ... ..	Trace	...	—	—
Sulphur ... ..	Trace	...	Trace	—
Phosphorus ... ..	Trace	...	3·17	1·03
Magnesia ... ..	—	...	0·18	0·11
Lime ... ..	—	...	0·76	0·40
Carbonic acid ... ..	—	...	0·57	—
Percentage of iron ... ..	53·38	...	51·88	53·2

The New Zealand ore is decidedly superior to the Northampton ore represented by the above analyses, on account of its freedom from phosphorus.

As traces of gold were discovered in the average sample analysed, a special examination was made of a large average sample of the ore for this metal, and a minute quantity of gold extracted. Specially-selected lumps were also separately examined, and a sample weighing 21lb., consisting of specially-selected lumps, was examined by the cyanide process, but in no case was more than a trace of gold discovered.

#### 2. Limestone.

The sample consisted of irregular lumps of a very dense and highly crystalline limestone, for the most part of a bright white colour, but with dark grey-coloured streaks and occasional rusty-yellow patches. An average sample was prepared, and its constituents determined qualitatively and then quantitatively. The figures subjoined are the mean of two very closely concordant analyses, checked by a second pair made by another worker.

	Per cent.
Lime ... ..	54·65
Carbonic acid ... ..	43·24
Silicic acid ... ..	1·11
Ferric oxide and alumina ... ..	0·135
Magnesium ... ..	Trace.
Moisture ... ..	0·48

It thus appears that this limestone is a very pure carbonate of lime, the impurities amounting at most to less than 2 per cent. (excluding water). A special examination was made for phosphorus, with a negative result.

#### 3. Hæmatite Paints.

The samples were of two colours, yellowish-brown and purple-brown, the latter being evidently produced by exposing the original (yellow-brown) material to heat. Both corresponded in character to Calley's "brown" and "purple-brown" Torbay paint.

The brown paint contained somewhat over 2 per cent. of water, while the purple-brown paint contained somewhat less than 1 per cent. The proportion of siliceous matter varied considerably in different bags of the same kind of paint (ranging from 9 to 20 per cent.), and the ferric oxide ranged in amount, in the original yellowish-brown paint, between 69 and 76 per cent.; in two samples of the purple-brown paint it amounted to 83 and 87 per cent. respectively.