

Copper.

Copper is found here in various forms: to enumerate their precise number, or the many localities it is reported to be taken from, would occupy too much time and space. Those I can substantiate mostly are marked upon my map, showing a large extent of country in which we may meet with extensive lodes in some future period. The samples placed before you are prepared from ores extending over 200 miles of country. The ores met with here are generally of good quality, realizing from 20 to 75 per cent. of copper, and could readily be worked, having advantages at our command. The current price is £112 per ton for commercial copper in pigs; and in two forms I present in my samples, I have often known it to realize from 6s. to 8s. per pound, for particular purposes in chemistry and arts.

Chrome.

Without going into the history of chrome, I will mention briefly some of its useful applications. From the salts, we derive a variety of compounds. First, dyes of various hues, as brown, fawn, drab, straw, lemon, yellow, amber, orange, red, blue black, black, rich yellow brown, bottle green, invisible green, rich green, olive purple, the whole of which can be varied by scientific manipulation. They are fast and permanent colours. Their use is not confined to dyeing alone, but extends to many branches of art, as colouring of tinsel and tinfoil, and emblazoning in varnishes for decorative purposes, glass staining, and pigments in water and oil for the artist and painter. The commercial colours are principally lemon, yellow, and orange; but in my series, I introduce greens and reds, not that they are new, but for the purpose of showing that we have greater advantages in preparing them than in England,—one of these, well known to be essential in the manipulation of colours, being better light, and, again, cheapness. Chromic salts are also largely used in bleaching oils and fatty substances.

Our supply of chrome is inexhaustible. In taking the south of our Province, we find the jade, so highly prized by the Maoris as greenstone, stained with the oxide of chromium; also, the chromic iron sand in the different eddies between Collingwood and Rewaka. We find the ore at Croixelle's, Dun Mountain, and Aniseed Valley; at the latter place, large quantities of disintegrated, showing the presence of chromium over an extent of more than 200 miles.

The articles required for manufacturing the chromes are wood ash, lime, acid, and lead.

The wood ash can be prepared almost in all parts of our Province, from the abundance of timber and scrub at command. In clearing of ground, it might be made a profitable branch of industry alone. The smaller branches of trees and scrub yield the largest amount of material for working chrome.

The acid can be produced from black birch, and other hard woods, by burning it in a rudely constructed oven, having a pipe leading therefrom,—thus the charcoal would remain for the market, and the acid would be ready to be refined for sale, or to be used for forming the acetate of lead.

The crude acetate of lead is prepared from common lead, or the oxide from the smelting furnace, by boiling with the crude acid. In this state it is ready for the dyers or the preparation of chrome. It can also be refined, for higher branches of art.

Lime we have abundance of near Collingwood, Motupipi, and Dun Mountain, &c., &c.

The working plant will comprise:—1st, a crushing machine; 2nd, a reverberatory hearth; 3rd, iron tanks for boiling (such as are brought out by vessels for holding water); and 4th, common tubs for crystalization. After crystalization, crystals are ready for the market, and the supernatant liquor, mixed with the acetate of lead, forms, when dry, the beautiful pigments for the painter.

It must be especially noted that the refuse ash used as fuel in boiling down the liquors of chrome, acetate of lead, destructive distillation of acid, and the fire of the reverberatory hearth, are utilized for the material therein contained.

The reverberatory hearth can be constructed at the mine, against the side of the hill, and puddled with fireclay and sand from Collingwood or the Grey. A trench made up the side of the hill, and covered with stones and earth, would give a column for draught and carry off the fumes. With the above appliances, and rude sheds, all would be ready for operation, and the manufactured chrome would be brought down in a perfected state ready for exportation.

The price of ash in England is £39 in bulk; chromate of iron, £10 per ton. Both are imported.

The proportions required for working are four parts of chromic ore, two parts of ash, and one of lime; that is:—

	£	s.	d.
4 tons of ore, £10	40	0	0
2 „ ash, £39	78	0	0
1 „ lime, say £1	1	0	0
Incidental expenses of haulage, fuel, &c.	2	10	0
	£121	10	0

Again must be added the interest annually on the heavy outlay for plant, buildings, &c., designated as “chemical works,” under the Act.

The value when manufactured would be about £240. The whole of this sum, including profit, labour, and cost of raw material, would thus be kept in the Province; whereas in England the division would present itself thus:—

	£	s.	d.
Value of manufactured article	240	0	0
Cost of raw material	121	10	0
	£118	10	0

Net result retained in England for profit and labour only £118 10 0

This will show a balance in favour of Nelson works of more than 50 per cent, which would much more than compensate for any excess in the price of labour. And this excess is rapidly becoming more apparent than real, in consequence of the great advance taking place in England, in the wages of skilled workmen.