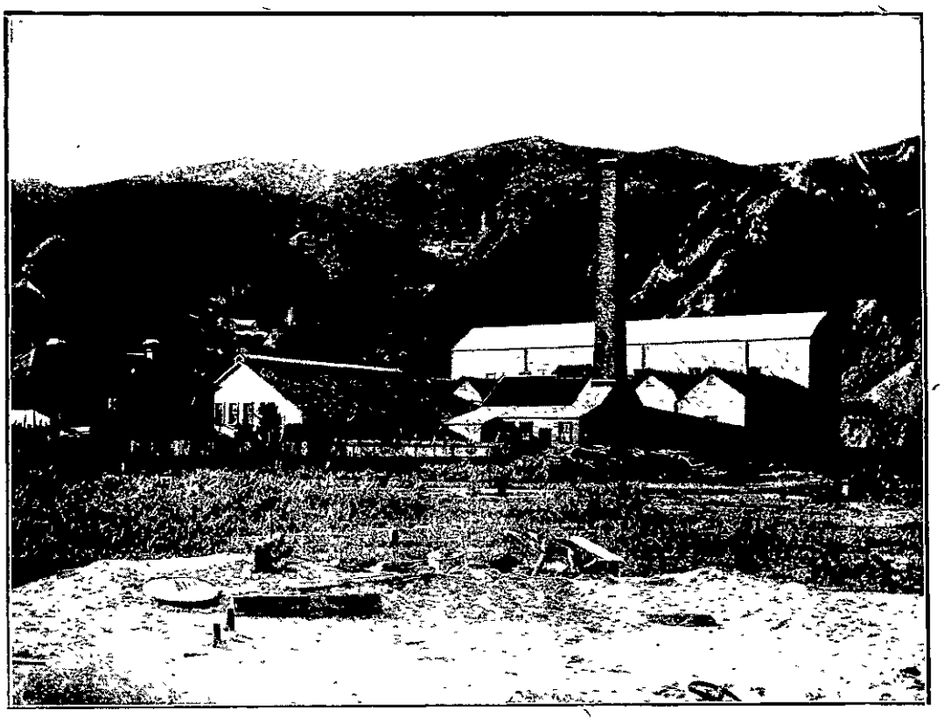
In the beginning, a quartz reef is an easy thing to tackle. Take the history of the Bendigo reef—the mine once known as the Cromwell mine. The three ragged men who opened it first marked out their claim on the line of the reef which just there obligingly cropped out above the surface and kept in sight for them to follow easily. Then they began to take out stone, putting in "shots," blasting their way in, and lifting tons upon tons of stone out—taking it to grass ready for the stampers to tell them what they thought about it. The "reef" dipped at a certain angle, therefore the long dyke the men left after taking out the quartz cut the claim at an angle going down by degrees into the depths of the earth. At first it was plain sailling. Any miner of the rough and ready order knew that he must have timber wherewith to hold the walls of his chasm apart, and could put the pieces in at the right places and ot the right sizes. He generally erred on the right side, using timber far too heavy. It was expensive, but it was safe, and in that stage who cares for expense? The visitor looked down into the chasm, shuddering; wondered why there was so much smoke; thought it curious that any man could see any difference between the "wall" and the "reef"; had an idea that it would be much nicer if there was none of that horrid "dip"; and thought the management lucky to have a stream of water at hand to turn the big wheel (overshot) which brought the stone to the surface, and started it on towards the battery, and worked the battery besides. He asked questions innumerable, but all he got in reply was the roar of the stampers, There were but four, but they deafened the whole of a mountain valley for miles. Imagine what a hundred must be like. The Waihi has one battery of 90 stamps making rude proclamation of the wealth of that mine to all and sundry night and day. It is the heavy artillery of industrial war, accompanying the getting of the money of which there never is enough to go round in this world of care and slumps.

Crushed by the stamps the quartz comes out in the form of sand through a grating—usually very fine—in the side of the stamp box by the aid of water, of which a small stream is kept flowing through, and takes its leisurely way over the plates and ripples amongst which it comes into contact with mercury. The mercury absorbs the gold, the quartz mud flows away as "tailings," and while these pile up hideous, with a chance of further profit through some improvement in the method of gold-getting—and some tailings have made a few fortunes—the amalgam is taken to the retort and there the gold is separated from the mercury and sent to some convenient window in some speculative city, where it lies like the bait that tempteth the gudgeon in the slimy pool, and is eventually divided between the expenses of the mine and the pockets of the shareholders.

This is the easy stage of the quartz mine. The first difficulty occurring is of the engineering order. The mine getting deep, the timbering requires a greater degree of skill than the ordinary miner possesses, or the simpler style of "boss," has at his command. The original reef is lost, and has to be found; or other reefs or leaders which may turn into reefs at any moment have come into view, and have to be followed up. The need for drives arises, for winzes, for timbering of the elaborate order. Water being reached, pumping machinery has to be procured, with power for the driving of the same. The mine growing extensive, begins to resemble



THAMES GOLDFIELD, SHOWING MOANATAIARI BATTERY.

a catacomb radiating out into the various parts of the earth, a place in which a stranger turned loose without a ball of twine to bring him back would never again be in a hurry for his dinner. Here comes the need for surveyors to plot and plan, for managers who can cope with the unexpected and solve the unknown, for mechanics and artisans and handy men galore. Geology puts in a claim to be consulted, and the higher mechanics joggle the memory with their advice, The time has come for the rules of sanitation to be observed: fans for the air-draught get installed; cages are provided for taking the men up and down; trucks arrive for the conveyance of men, stores, and ore; and the claims of metallurgy loom up with sudden vastness. The last is not the least. On one side stands the refractory ore—and ores of the refractory order have puzzled the simple miner (and shall we say the still simpler company promoter?) from time immemorial; on the other side, the ruin and devatsation of the mines; between them, stands metallurgy.

Take one case—that of the great Waihi mine. Before the cyanide days, that mine only saved 64 per cent. of its gold, and 31 of its silver. With the application of the cyanide these percentages jumped up to 91 and 48 respectively. This proves, with other evidence, in abundance, the wisdom of the Government policy which bought the rights of the cyanide process for £10,000, and set the mining industry on fresh legs. The small charge made was cheerfully paid until the whole of the purchase money, having been returned to the Treasury, the patent is at disposal of the mining people free, gratis, and for nothing.

The reason is herein touched of other State aids to the mining industry. There are many schools of mines, for example, all established by Government means and all under Government control. These establishments are in every way up to date, and they turn out far more experts than are wanted in the Dominion mining industry. But though we have to let the rest of the world share in the good fruit of our expenditure in this direction we enjoy the fruit a good deal ourselves, too. As to the stamp of the young men—the test is simple of their quality. Do they pass muster anywhere else? If they do, then are we not a fatuous mutual admiration society of petty procedure and pettier status. The subjects taught are mechanical drawing, chemistry (theoretical and practical), steam and steam engines, mineralogy, assaying, mine and land surveying, mathematics, mining in all details.

Now, how do the boys fare after they have swallowed that repast? It is a fact that there are students of ours holding responsible positions in connection with mines in all parts of the world. General Booth, when here in the nineties, declared with astonishment that he had seen numbers of our men trained in our institutions serving in the mines of Johannesburg with great credit. Last year it was officially reported that the list of men securing appointments was larger than in past years, and that the following appointments outside the Dominion had been secured by students of the schools of mines here:—

Mining Engineer, Woodbush mine, Petersburg, South Africa.
Assistant Manager, Woodbush mine, Petersburg, South Africa.
Assistant Manager, Ashanti Goldfields Auxiliary Company, West Africa.
Mining Engineer, Minerals Separation Company, London.
Chief Surveyor, Central Africa Protectorate.
Assistant Engineer, Pennsylvania Railway Company, U.S.A
Assistant Surveyor, Jumper's Deep, Ltd., Cleveland, Johannesburg.
Consulting Engineer, Rand, South Africa.
General Manager, Tasmania.
Metallurgist, Cumberland, South Australia.
Consulting Engineer, London.

There were many local appointments, of course, the above being given as a test of the merit which the local selection can never be, for obvious reasons. Ten men going out to appointments in one year, fifteen years after General Booth found so many of the trained of the Dominion mining schools doing well in far off lands, make a fair proof that the appreciation accorded to the mining training of the Dominion is based on results.

(To be continued.)