1893.

NEW ZEALAND.

MINES DEPARTMENT:

ELECTRIC POWER FOR DRIVING MINING MACHINERY

(REPORT ON PRACTICABILITY OF USING, AT KUAOTUNU AND THAMES, BY THE INSPECTING ENGINEER, AND MR. R. E. FLETCHER, ELECTRICAL ENGINEER).

Presented to both Houses of the General Assembly by command of His Excellency.

No. 1.

Mr. H. A. GORDON, F.G.S., Inspecting Engineer, to the Hon. R. J. SEDDON, Minister of Mines.

Mines Department, Wellington, 22nd July, 1893.

SIR,— Re *Electrical Plant, Kuaotunu.*

In accordance with your instructions to examine and report, in conjunction with Mr. Fletcher, on the practicability of working the crushing-plants on the Kuaotunu Goldfield by means of electricity, I arranged with Mr. Fletcher for him to report on the electrical plant, the cost, &c., and I would report generally on the possibility of getting the water as the motive-power to generate electricity, and on the actual power required to work the whole of the crushing-plants on the Kuaotunu Goldfield. I have the honour to report as follows:—

There are at the present time four different crushing-plants at work at Kuaotunu: namely, those belonging to the Try Fluke Company, with 11 heads of stamps; the Great Mercury, Mariposa, and Red Mercury Companies, each with 10 heads of stamps, and Curtis's Battery with another 10 heads, making a total of 51 heads; there are also belonging to these companies 17 grinding and amalgamating-pans, 3 settlers, and 8 berdans.

The power required to work the stamps, assuming the weight of each stamp to be 800lb., working with a drop of 6in., and making 90 blows per minute, would be as follows: $\frac{800 \times 0{\cdot}5 \times 90 \times 51}{33{,}000} = 55{\cdot}76$ theoretical horse-power; but about four-tenths of this power would have to be added for friction, which would make the power required to work a stamp-battery equal to about 78-horse power. The grinding and amalgamating-pans require about 4-horse power each; therefore, $17 \times 4 = 68$-horse power required for the pans. Settlers require, say, 2-horse power each, and berdans 0·5-horse power each to work them; therefore, the settlers require 6-horse power, and berdans 4-horse power, making a total of $78 + 68 + 6 + 4 = 156$ total power required.

The motive-power at the present time is supplied by five steam-engines; and, unless the whole of these crushing-plants were erected under one roof and under one management, the only saving that would be effected by using an electrical plant would be the amount expended in fuel. All other expenses would be about the same. Therefore, before going into the cost of motive-power to generate electricity, it might be well to observe that in order to reduce the cost of crushing to a minimum, it is actually necessary for the whole of the present companies to combine, and, instead of having five separate plants with five sets of men attending them, to have one central plant, and each of the different companies to connect their mine with that plant, either by aërial or ground tramways. This in itself would lessen the cost of crushing considerably, even by using the same motive-power as at present, and the same thing would apply if the central battery were worked by electric motors. Although I have stated that it would require 156-horse power to work the present crushing plants on the field, two of these companies have abandoned the use of grinding and amalgamating-pans and substituted a Cassel plant; and since our visit to the field another company has arranged to erect a Cassel plant. Therefore a less power than what I have stated would be sufficient to do the work, or, at least, there would be ample power to erect more stamps if at any time fresh developments were made. The question, therefore, at issue is: Where is the place from which water can be obtained to generate the electricity?

After visiting the field, and having an interview with each of the managers of the mines, they deemed it desirable to work their present plants and not to erect a central one, merely having electricity as the motive-power. Mr. Fletcher and myself showed them that to do so not only meant a loss of power, but that the expense of working a central plant was about the same as