

## WORK IN THE SOUTHERN PART OF THE HOT LAKES DISTRICT.

In my report for 1905 attention was drawn to the remarkable discovery of gold and silver occurring in appreciable quantities in the siliceous sinters at Whakarewarewa, in the Hot Lakes District. In that same statement the hope was expressed that a detailed survey would soon be undertaken of the diverse and ever-varying phenomena of that wonderful thermal region. This survey seems all the more necessary as our information concerning the area increases. During the reconnaissance of this season, investigations were limited to the southern part of the Taupo volcanic zone—namely, to the thermal centres of Wairakei, Taupo, Orakeikorako, and Tokaanu. A hurried trip was made to the volcanic cones of Ruapehu and Ngauruhoe, but the heavy snow which covered their summits and the plain between the two mountains prevented an adequate examination. The beautiful wooded valley of Wairakei, with its numerous geysers, boiling cauldrons, and hot mud-pools, forms one of the most fascinating resorts for the tourist in New Zealand. It is no less interesting for the student of vulcanology and of economic geology. Analyses were made of sinters from geysers at Wairakei, which are all depositing abundant silica. The sinter from the Red Coral Geyser and from the Heron's Nest Geyser contained no metals except iron in the state of ferric oxide; but the sinter from the Black Geyser, in addition to ferric oxide, contained, as shown by the following analysis, manganese-dioxide, antimony, and silver.

Ferric oxide	...	...	...	...	...	0.32 per cent.
Manganese-dioxide ( $\text{MnO}_2$ )	...	...	...	...	...	15.05 „
Antimony	...	...	...	...	...	0.48 „
Silver	...	...	...	...	...	6 gr. per ton.

Even more remarkable were the results derived from analyses of sinters from Taupo, where interest centres around the Spa and the Terraces. The Spa, situated on the edge of the Waikato River, has some fine geysers (the principal being the Crow's Nest Geyser). At the Terraces, not far from the shores of Lake Taupo, the most conspicuous feature is the long, low, black terrace, which gives the place its name. The colouring is apparently due in the main to vegetable matter, and possibly in part to manganous oxide. From the sinters at the Spa, ferrous oxide, ferric oxide, manganous oxide, and both gold and silver were obtained, as shown by the following analyses:—

## Crow's Nest Geyser—

Ferric oxide	...	...	...	...	...	0.39 per cent.
Silver	...	...	...	...	...	12 gr. per ton.
Other metals	...	...	...	...	...	Nil.

## Horror Pool—

Ferric oxide	...	...	...	...	...	0.32 per cent.
Silver	...	...	...	...	...	6 gr. per ton.
Gold	...	...	...	...	...	1 gr. „

## Paddle-wheel Ben—

Ferric oxide	...	...	...	...	...	1.36 per cent.
Manganous oxide ( $\text{MnO}$ )	...	...	...	...	...	0.20 „
Silver	...	...	...	...	...	6 gr. per ton.

Analyses, which resulted as follows, were made from the upper, middle, and lower parts of the Black Terrace:—

## Upper—

Ferric oxide	...	...	...	...	...	2.08 per cent.
Other metals	...	...	...	...	...	Nil.

## Middle—

Ferric oxide	...	...	...	...	...	0.56 per cent.
Manganous oxide	...	...	...	...	...	0.05 „
Other metals	...	...	...	...	...	Nil.

## Lower—

Ferric oxide	...	...	...	...	...	0.64 per cent.
Manganous oxide	...	...	...	...	...	0.06 „
Silver	...	...	...	...	...	9 gr. per ton.
Gold	...	...	...	...	...	2 gr. „

The thermal centre of Orakeikorako, situated on either side of the Waikato River some sixteen miles below the outlet from Lake Taupo, exhibits some hot pools of exquisite colours, some beautiful terraces, a variety of steam-jets, and an alum cave. Analyses of sinters from this locality showed no metal other than iron, which was, however, present in both the ferrous and ferric states.

The interesting Maori village of Tokaanu, to the south of Lake Taupo, has long been famous for its hot springs and steam-jets. Sinter from this centre was found on analysis to contain ferric oxide, but no other metal. These various results, obtained from several relatively widely separated centres, are of great interest to the science of economic geology, owing to the illuminating evidence thus afforded as to the origin of metals in quartz veins. A detailed study of all the springs in the Taupo volcanic zone should be of great advantage as bearing on auro-genesis in New Zealand, as well as in other parts of the world.

## VISIT TO PETROLEUM-FIELD IN POVERTY BAY.

On my return from Taupo a very short visit was paid to the petroleum-bearing country near Gisborne, and a preliminary investigation made of the valleys of the Waihuka and Waipaoa Rivers, in both of which signs of petroleum have been known to exist for some time. Boring operations have been carried out in the past along the Waipaoa and its tributary, the Waingaromia, but with little