

MAGNETIC OBSERVATIONS IN THE ONEKAKA-PARAPARA DISTRICT.

By W. M. JONES.

A few weeks were spent in a reconnaissance survey of the magnetic properties of the country in the Onekaka-Parapara district containing the iron-ore and other mineral deposits, variations of vertical intensity being measured with a Schmidt Balance of Askania construction. The results are summarized as follows :—

- (1) The limonite ore-bodies themselves do not in general produce disturbances of more than a few tens of gammas in the vertical intensity, and in view of greater disturbances due to other causes it does not appear feasible to trace their concealed extensions directly by magnetic survey.
- (2) On the other hand, a range of disturbance of over 1,000 gammas was found at Onekaka. Passing over the floor of the quarry from east to west, a continuous increase of 150 gammas in four chains was measured, while a few chains to the south a highly disturbed area was located, the variations amounting to as much as 800 gammas over half a chain. This indicates that the disturbing body is very close to the surface. The maxima observed were not over exposures of ore, but over crystalline limestone which does not itself contain appreciable quantities of magnetite. A suggested explanation is that an intrusive of a basic or ultra-basic igneous rock here approaches very near the surface. If this is so, its immediate proximity to the ores may be important as regards their structure and possibly their genesis. Alternatively, the possibility of magnetite or martite at a little depth in the ore-bodies is to be considered, although this would be difficult to fit in with conceptions of the ores as low-temperature replacements of limestone.

Another magnetic "high" of 140 gammas was found on the Ngarino Ridge, and smaller disturbances on other parts of the Washbourn and Tukuru Blocks. The igneous rock adjoining the Parapara deposits is acidic, and could not be expected to produce strong magnetic disturbances.

- (3) Farther afield, in the Collingwood-Bainham-Takaka districts, a number of areal anomalies of hundreds of gammas are already apparent from the scattered readings taken to date. In some cases these are directly connected with exposed bodies of basic or ultra-basic igneous rock, and indicate the extensions of these bodies below either the ancient sedimentaries of the Aorere and Mount Arthur Series, or the Tertiary and Recent sediments in the Takaka and Aorere Valleys. If we assume, as seems reasonable from the nature of these sedimentaries, that they are in general incapable of producing anomalies of more than 100 gammas, the other anomalies can also be attributed to igneous rock-bodies not reaching, or not yet discovered at, the surface. In view of the undoubted connection of some of these rock-bodies and the mineralization of parts of the area, information thus obtainable as to their distribution and structure might prove very useful.

The greatest disturbance so far recorded in this area is from the ultrabasic rocks exposed in the Rameka Valley, about four miles south-east of Takaka, where a negative anomaly of 2,000 gammas at the mill gives place to a positive one of 2,200 gammas at the mouth of the gorge. This disturbance continues in a diminishing degree across the Takaka Valley at least as far as Takaka, where it amounts to 400 gammas. The Doctor's Creek - Appo's Creek is also the site of a "high" of 500 gammas. The schist at one point was observed to have undergone alteration, with a vein of limonitic material which proved on analysis by the Dominion Laboratory to contain 52.4 per cent. of Fe_2O_3 and 3.9 per cent. of P_2O_5 . This is of interest, as its position can hardly be reconciled with an origin by deposition from surface waters. Other patches of limonitic ore were mapped by Bell in this neighbourhood, and the close association both here and at the Onekaka-Parapara deposit, of igneous rocks with the iron-ores, suggests the former as the parent of the latter, although no doubt concentration and transportation by surface waters has also taken place.

GEOPHYSICAL WORK IN THE ROTORUA DISTRICT.

By C. M. N. WATSON-MUNRO.

In connection with the visit to New Zealand of Dr. A. L. Day, late Director of the Geophysical Laboratory of the Carnegie Institute of Washington, for the purpose of making volcanological studies, it was suggested by the Secretary that a magnetic exploration of the thermal regions would assist in determining the distribution of basic intrusions and their possible relation to thermal or volcanic activity. Accordingly, in January, February, and March, 1937, in association with Dr. Day, officers of the Dominion Observatory made a reconnaissance magnetic survey in the Rotorua district.

Observations taken in the Tarawera-Waimangu area indicated that the bulk of the basic material was distributed at the Tarawera end of the rift, from which much fragmental basic material was ejected during the latter stages of the 1886 eruption. In the thermal regions at Wairakei, Waiotapu, Tikitere, and Waimangu the values of magnetic vertical intensity were characterized by a drop of about 200 gammas below normal. These observations could not be explained by contour effects and were not sufficiently low nor accompanied by corresponding high values to be due to strong basic intrusions, and a possible explanation was that either the rocks had lost their magnetite content by propylitization or that the high temperatures below had prevented them from attaining their full