

2. MANGAKAHIA SUBDIVISION.

(By H. T. FERRAR.)

Field-work began in Mangakahia Survey District on the 23rd November, 1925, and ceased on the 10th January, 1926, owing to the field party being transferred to Central Otago for the purpose of carrying out a soil survey of irrigation areas for the Public Works Department. During this short period the greater part of Mangakahia Survey District was examined, and the work was carried into Motatau Survey District. The area surveyed was about 120 square miles. Messrs. F. J. Turner, M.Sc., and W. E. La Roche, B.Sc., both of Auckland University College, acted as geological assistants. Mr. Turner, who was in charge during the last fortnight, left the work in such a state that it can be readily continued.

PHYSIOGRAPHY AND CULTURE.

The country examined lies mainly at the southern end of Mangakahia Valley, where plains and low hills, 400 ft. to 500 ft. above sea-level, are almost surrounded by steep bush-clad hills, some of which attain to heights of more than 2,000 ft.

The drainage of the district is effected mainly by the Mangakahia River, a tributary of the Northern Wairoa, and its affluents. The survey, however, was carried into the Ramarama Valley, which drains into the Bay of Islands.

The settlers of the district, mostly dairy-farmers, occupy the alluvial flats, but by degrees they are spreading to the bush-clad hill-country and transforming it into pasture-land. The low hills mentioned above are mostly unoccupied except for parties of kauri-gum diggers. The hydro-electric power-house of Wilson's (N.Z.) Portland Cement (Limited) is situated near the south-east corner of Mangakahia Survey District.

GENERAL GEOLOGY.

No geological work in the area under review has been carried out since Sir James Hector, over sixty years ago, journeyed down the Mangakahia Valley: his hand-coloured geological map of North Auckland, dated September, 1866, forms a basis for the detailed survey now begun.

Most of the igneous and sedimentary rock series described in previous annual reports dealing with the geology of North Auckland, and in Geological Bulletin No. 27, occur in the present area. The oldest rocks are the shattered non-fossiliferous greywackes and argillites of supposed Hokanuiian or Trias-Jura age. These form a low ridge on the eastern side of the district near Aponga. Next in order of age are the tilted and faulted beds of sandstone and claystone (with greensand in places) of Waiparan or Upper Cretaceous age. Fragments of the fossil bivalve *Inoceramus* were found well down in this series in the bed of the Hikurangi Stream to the east of Te Horo Church. Altered dolerites and other basic igneous rocks form the high bush-clad hills. These igneous rocks overlie the Cretaceous claystones and sandstones, and, like the ultrabasic intrusions of Rodney Subdivision, are of approximately Eocene age.

Comparatively undisturbed micaceous sandstones, which are extensions of the Whangarei Formation from the adjacent subdivisions, and therefore of Oamaruan or Oligocene-Miocene age, overlie the Eocene igneous rocks. Locally gravel-beds of Pliocene age overlie the Oamaruan (Whangarei) sandstones unconformably, and are followed by basalt-flows belonging to the Kerikeri Series of former reports. The basalts cover a triangular area bounded by the Titoki-Poroti Road on the north, the Wairua Stream on the east, and the Mangakahia River on the west. They are of late Pliocene or early Pleistocene age. Carbonaceous sands of Pleistocene age and Recent alluvium and swamps cover small areas.

ECONOMIC GEOLOGY.

Coaly partings in the younger sandstone series in Mangakahia Survey District, and the presence of workable coal in this series elsewhere, have led to the belief that buried coal-seams will be found in the district. Geologic study shows that this belief is erroneous. Limestones suitable for cement-making or of use in agriculture are absent. There are, however, clays of economic worth, and the vast quantities of roadmaking material that can be furnished by the igneous rocks are a valuable asset. The lithological map which is being made is of value in connection with land-classification and the economic development of lands at present unoccupied.

3. KAITANGATA - GREEN ISLAND SUBDIVISION.

(By M. ONGLEY.)

Owing to the survey of the Kaitangata coalfield and adjoining districts having been extended to include the Green Island coalfield, the name "Kaitangata Subdivision," used in the last two annual reports, has been altered to "Kaitangata - Green Island Subdivision." From November, 1925, to May, 1926, the writer continued the geological survey of the Kaitangata - Green Island Subdivision, and for a month had the assistance of Mr. T. C. Hewitt, M.Sc., of Otago University. The country about Brighton, Saddle Hill, Green Island, Boulder Hill, and Whare Flat was mapped, and the coal-measures and sedimentary rocks were followed into the Dunedin volcanic area, on which Dr. W. N. Benson, Professor of Geology at Otago University, is working. The schist areas in Clarendon, Maungatua, and Waipori survey districts were partly examined, and the mining areas near Waipori were briefly inspected.