

been examined; many rock specimens and minerals have been identified; and samples of clays from various parts of New Zealand have been received. The more important of the specimens have been handed to the Dominion Analyst. The Geological Survey is especially indebted to the Laboratory for the comprehensive analyses of a suite of rock-specimens collected by Professor R. Speight from Banks Peninsula, and for similar analyses of igneous rocks from the Whangarei and Waihi districts.

During the year Mr. G. E. Harris, draughtsman, drew eleven survey-district maps, four detailed geological maps, and several sections and plans to be reproduced by photo-lithography. In addition he prepared twenty-two field sheets and thirty-two tracings and drawings.

#### LIBRARY.

During the year numerous publications were received in exchange for Geological Survey bulletins. The library, which now contains about 6,500 volumes in addition to a large number of pamphlets, is invaluable for reference purposes to the members of the staff. A considerable proportion of the clerk's time is occupied in the care of the library and in the listing of additions to it.

#### OFFICE AND LABORATORY ACCOMMODATION.

Ever since its reorganization in 1905 the Geological Survey has been cramped for accommodation. Seeing that the principal work is, or should be, research, the accommodation needed is not so much ordinary offices as laboratories—that is, workrooms. Adequate library and storage space is also needed. As time goes on, the methods of scientific research become more and more elaborate, and the need of equipment more pressing. Officers of the Survey are at present compelled to restrict research to lines that need little special plant and equipment. The reduction in efficiency resulting from this cannot be measured, but it is considerable. Probably opportunities to make valuable discoveries have already been lost; and it is certain that without up-to-date equipment the Survey cannot keep abreast of modern science, or be, as it should, a great factor in the development of the natural resources of this country.

### SPECIAL REPORTS.

#### 1. DARGAVILLE SUBDIVISION.

(By H. T. FERRAR, Geologist, and W. H. CROPP.)

##### INTRODUCTION.

The systematic survey of the North Auckland Peninsula, commenced by the senior writer in 1919, was continued during the past season. An area of some 543 square miles was surveyed at comparatively small cost, field expenses being considerably reduced, the work accelerated, and other economies effected by having two geologists with one field-party. The following survey districts—namely, Ruakaka, Tangihua, Maungaru, Kaihu, and Kai-iwi—in Whangarei and Hobson counties, were mapped between the 4th October, 1921, and the 8th May, 1922. This area will form part of the Dargaville Subdivision.

##### PHYSIOGRAPHY.

The area mapped is a strip of country,  $12\frac{1}{2}$  miles broad from north to south, stretching westwards across the North Auckland Peninsula from Marsden Point on the east coast to Bayly's Beach on the coast west of Dargaville. Physiographically, the area is a dissected peneplain of limestones, claystones, and sandstones, with an average height of 500 ft. above sea-level. From this plain rise fault-block mountains of greywacke and igneous conglomerates, which in part have been stripped of their covering of younger sedimentary rocks. The greywacke blocks are approximately 1,000 ft. high, but the igneous-conglomerate ranges rise steeply to heights of more than 2,000 ft. The higher peaks and more secluded valleys still retain their forest cover, but the greater part of the area has been almost completely denuded of timber. Where the soils are fertile the country is well grassed and forms excellent pasture, but where the land is poor it lies idle, the kauri forests having given place to fern and tea-tree.

The drainage of the area is simple in the main, but intricate in detail. The watershed between the east and west coasts lies close to the east coast, the main drainage eastward being by way of the Ruakaka and Waipu North rivers. The Waiotama, Tangihua, Tauraroa, Waiotira, and Mongonui streams drain the middle of the subdivision. The Northern Wairoa, draining the western portion, receives the Kirikopuni, Tangowahine, Awakino, and Kaihu streams from the north-west, and at Dargaville it broadens to an estuary, which merges into the northern part of Kaipara Harbour.

##### GENERAL GEOLOGY.

Prior to the present survey the area had been traversed by Hector in 1866 and by Cox in 1879. Their views as to the relative positions of the different rock formations require to be modified by the results obtained during the last few years. The account of the stratigraphy as detailed in last year's annual report holds good for the area under review. The uncertainty that still exists as to the precise age of the various beds will gradually diminish as the survey is extended. In order to solve several economic problems it is necessary to establish the sequence of the rock formations.