

minerals received were ilmenite from Tangihua Range, North Auckland (said to occur in considerable amount); coal from the more southern of the Poor Knights; vivianite from near Mount Karioi, south-west of Raglan; precious opal from Tokatoka and from Rotorua-Atiamuri road, eleven miles from Rotorua (in small masses only); pilolite (a flexible leather-like clay) from Mr. J. Wall's property, north-west of Paemako, Piopio district.

Many complete analyses of rocks from various parts of New Zealand were made and much other analytical work was done for the Survey in the Dominion Laboratory.

The draughtsman (Mr. G. E. Harris), with a small amount of temporary assistance, drew ten maps, each covering one or more survey districts, for photo-lithographic reproduction; several mineral and prospecting maps; and sixty-three field-maps. In addition he attended to many small matters, including the correction and colouring of map-proofs.

GENERAL.

Previous to 1905 the work of the Geological Survey was mainly exploratory. The greater part of New Zealand was covered by reconnaissance surveys, but hardly any detailed mapping was done, and several important aspects of geology were somewhat neglected. During the past twenty-two years on an average over 1,000 square miles per annum has been surveyed in detail, and since 1911 a large amount of palæontological work has been done. It is considered that the detailed geological mapping of a country should be done within a period of, say, thirty to forty years, not only because the completion of the geological map is a prime necessity, but because the advance of science renders the old work partly obsolete in a generation or less, and it then needs revision. Moreover, there are many functions that a Geological Survey can fulfil in addition to its ordinary work of deciphering the geological history of a country and embodying it in maps and reports, but the staff cannot adequately attend to these until a large amount of geological information has been accumulated and facilities for advanced work provided.

At present the Geological Survey is equipped only for the work it has been doing—namely, geological mapping and the partial elucidation of the geological history and structure of the country. Few geological surveys are doing more than this, but more is required. Over three-fourths of the Dominion is as yet geologically unsurveyed in any detail, and therefore an acceleration of the rate of mapping is highly desirable. This, of course, is a matter of increased staff and funds. The progress of science during the past twenty-five years makes new methods of far-reaching importance possible, but all are expensive. More and more exact measurements of all kinds in place of the rough determinations and guesses of the past are called for. Of great importance are geophysical researches, such as gravity determinations, detailed magnetic surveys, and prospecting by means of electrical, seismographic, and gravity methods. In addition there are fundamental researches, such as those being handled in the Carnegie Geophysical Laboratory and elsewhere, which, however, need not be attempted in New Zealand at the present time.

Many minor researches, for which a well-equipped laboratory and more or less elaborate apparatus are required, might be mentioned. Provision of this kind would increase the usefulness of the Geological Survey, and enable it to give a greater degree of practical assistance to mining, engineering, agriculture, and many secondary industries.

SPECIAL REPORTS.

I. MURCHISON SUBDIVISION.

(By J. HENDERSON and H. E. FYFE.)

INTRODUCTION.

Work in the Murchison Subdivision was begun early in November, 1926, and was continued till the end of May, 1927. The area examined lies immediately south of the Motueka Subdivision, and next season the exploration will be extended to the eastern borders of the Buller-Mokihinui and Reefton subdivisions (described in Bull. Nos. 17 and 18). In all about 670 square miles was examined, including the survey districts of Tainui, Hope, Howard, and Arnaud, and parts of Motupiko, Rotoiti, Maunga, Matiri, Tutaki, and Rotorua.

PHYSIOGRAPHY AND STRUCTURE.

The lowland south-west of the city of Nelson extends south into the Murchison Subdivision, the eastern boundary of which lies in the highlands east of the depression along the watershed of the Motupiko and Buller rivers. The mountains west of the Nelson lowland (which in the Motueka Subdivision form a broad rugged mass of highlands, reaching to the west coast of the island), in the Murchison Subdivision are divided by a structural depression into two groups of ranges, in this report called the central and western highlands.