Whangarei and Bay of Islands Subdivision.

Work in the Whangarei and Bay of Islands Subdivision has been conducted by Mr. H. T. Ferrar, Geologist, assisted by Mr. W. H. Cropp, A.O.S.M., Geological Assistant. The area surveyed during the past two seasons extends from some distance south of Whangarei to north of the Bay of Islands, and has as its principal centres of population Whangarei, Hikurangi, Kawakawa, and Russell. From an economic point of view the mineral resources of this area are important, though not spectacular, the precious metals being found only in small quantity. They include deposits of coal, limestone, clay, and ores of mercury, silver, and manganese.

As one consequence of the detailed survey it is believed that the stratigraphical succession in North Auckland, long a puzzle, has been correctly solved. This, combined with other data, has a very important bearing upon the areal extent of the coalfields, which are now found to be isolated areas of comparatively small extent. However disappointing this result may be, it enables those areas where coal-prospecting is advisable to be defined, and thus much useless expenditure in searching for coal in localities where it does not exist may be avoided. Incidentally, owing to the soils, except in swamp areas, being almost everywhere of types distinctly connected with the underlying rocks, the geological map, with slight modifications, may be considered to be a soil-map.

Tokomaru Subdivision.

The Tokomaru Subdivision lies immediately north of the Gisborne and Whatatutu subdivisions, described in Geological Survey Bulletin No. 21 (1920). It includes the survey districts of Hikurangi, Mata, Waipiro, Arowhana, Tutamoe, and Tokomaru, and will probably be extended northward to East Cape.

The chief reason for a geological survey is the possible presence of petroleum in commercial quantity. Many attempts, some by no means well directed, have been made to find oil in the Gisborne - East Cape district, and all, notwithstanding various favourable indications, have been unsuccessful. Geological survey will certainly increase the chances of success. During the past season Messrs. M. Ongley and E. O. Macpherson, Assistant Geologists, have examined almost the whole of Arowhana, Tutamoe, and Hikurangi survey districts.

Oil-indications, including oil-bearing rock, are numerous, the geological structures are fairly favourable, and rocks capable of carrying large amounts of oil (potential "oil-sands") form part of the strata. Hence, as shown in the interim report by Messrs. Ongley and Macpherson on later pages, the presence of petroleum in commercial quantity is probable. Lest the casual reader may think that this probability approaches a certainty, he may be warned that not more than one district in six which appear geologically favourable for petroleum-production becomes a producing oilfield. In the present case, as is insisted on in the report, much field and other work has yet to be done before a final opinion upon its oil possibilities can be given.

Tangarakau Subdivision.

The presence of coal in the Tangarakau district has been known for many years, and from time to time favourable reports concerning the quality and thickness of the seams have appeared in the newspaper press. Last winter, owing to the shortage of coal in Taranaki, numerous requests for a geological examination of the Tangarakau Valley were made to the Government. Here, it was thought, a coal-mine not far from the rail-head at Tahora might be developed. Consequently it was decided to make a detailed geological survey of the district. A preliminary visit by myself to the Tangarakau Gorge, made last October, did not reveal much of promise, but in November Messrs. H. A. Ellis, Geological Assistant, and H. M. Marshall, Topographical Assistant, began field-work under my direction. The coal-bearing area was found to be of a very rugged character, and topographically to be very imperfectly mapped. Messrs. Ellis and Marshall, when field-work ceased, had mapped a wide belt of country extending from Kohuratahi to north of Ohura. This area contains numerous coal-outcrops, many of which were located for the first time during the course of the survey. The coal-seams, however, are thin, variable, and in places much affected by faulting. The thickest outcrops seen, one on the east side of Tangarakau Gorge, and another four and a half miles north-west of Ohura, measured 5 ft. North-west of Ohura the main seam, as it approaches the workable Waitewhena area, shows signs of thickening. As mentioned also on page 11, bands of conglomerate suitable for roadmaking purposes have been found in various places.

Palæontological Work.

During the past year Mr. John Marwick, M.A., Assistant Geologist, has been engaged mainly on the examination of the Tertiary Mollusca in the Geological Survey collections. Special attention has been given to the identification of the fossils collected during the past two field seasons by officers engaged in detailed surveys, and this work has been of great assistance in elucidating various doubtful points.

Several reports dealing with Tertiary, Cretaceous, and Mesozoic fossils have lately been received from specialists in other countries, and these, it is hoped, will soon be published. Mr. Frederick Chapman, A.L.S., F.Z.S., of the National Museum, Melbourne, reports that he has made considerable progress in his memoir on the collections of Foraminifera and Ostracoda sent to him some time ago. This work is a labour of love, performed entirely in the spare time of a busy man.

Publications.

The only publications actually issued by the Geological Survey during the year under review were the Fourteenth Annual Report and Bulletin No. 21, entitled "The Geology of the Gisborne and