One officer was allotted to the Naseby Subdivision, and another has devoted his whole time to the study of deposits of detrital gold in Otago and Southland, in general, on areas not covered by the routine survey. Bulletins are already available for Hauraki and the West Coast, but additional work on special portions of these areas has been undertaken.

In addition to the above, systematic work has been pursued in the Eketahuna and Amuri Subdivision and, in all, an area of about 1,035 square miles was mapped in detail. During the year, the Annual Report and Bulletin No. 34, "The Geology of the Dargaville-Rodney Subdivision," by the late Dr. H. T. Ferrar, was published.

The geological reports published in this Annual Report deal with, and are included because of, their more immediate economic significance and as a preliminary to their more extensive publication in Bulletin form in due course.

GEOPHYSICS.

So far, geophysical methods have been little used in any country in relation to alluvial-gold deposits, but the researches carried out by the Department have shown that they possess considerable value, and routine seismic methods have now been developed. Moreover, it is confidently anticipated that these methods will become simpler in application as experience is gained, while the apparatus may be expected to become more portable.

During the year geophysical methods have been applied to a variety of problems. Old river-beds have been traced across the Cromwell Flat, and, at Cornish Point, the geophysical findings may be said to have proved useful. Work was also carried out in connection with contouring the basement rock and quartz conglomerates on several areas in the Manuherikia Valley, and several interesting further details have been indicated, bearing out the general theory of their origin put forward in Bulletin No. (S.I.R.) 40. A comprehensive series of measurements was made in connection with an ancient buried river-bed in the Waikaia area. These are illustrated in the section of the report by Mr. Macpherson (see page 46).

The work so far carried out has indicated possibilities of discovery and investigation of detrital deposits formed millions of years ago, at times when the topography and drainage of the region were very different from what they are now. The crust has been deformed, and parts of the auriferous deposits, depressed by faulting and folding, were covered with geologically younger beds or otherwise protected from erosion. Then more accessible portions, or gold derived therefrom by subsequent cross drainage, were worked for many years and are now for the most part exhausted, rendering necessary continued geological and geophysical data to prospect them in depth to the best advantage. Geological mapping indicated important points in the structure while geophysical work gave more detailed information as to their approximate position and depth. Each deposit has its own difficulties and requires careful consideration, as to the methods to be used to attack the problem and overcome unexpected features. The geophysical party was fortunate in having behind it the resources of the Department in its Geological Survey, the Magnetic and Seismological Observatories, and the Dominion Laboratory. It must be stressed, however, that geophysical prospecting does not render unnecessary the older well-established methods. Its usefulness lies in reducing their cost by eliminating unlikely areas, and by giving more precise information regarding locations and hidden structures.

In many cases complete geophysical survey as to depths, &c., was not practicable from considerations of finance available, and owing to a full programme, but work has been carried out during the year at Millar's Flat, Clutha, Cromwell Flat, Cornish Point, Upper Waikaia, King Solomon and neighbouring claims, Mahakipawa, several alluvial areas near Murchison, Matakanui, Vinegar Hill, Drybread, Round Hill. A site for a dam in the Upper Shotover was investigated for depth to basement rock. A similar investigation was carried out for the Dunedin City Corporation in connection with the carrying of water-supply pipes across the Taieri River.

Work is in progress at Wetherstones, Waihi, and Progress Mine, Reefton, while there are many applications for work under consideration. Arrangements are in train with the Mines Department and Unemployment Board so that the paramount consideration with the programme of work shall be that of likelihood of developments for definite employment and gold-production.

OBSERVATORIES.

Three observatories—the Dominion Observatory, Christchurch Magnetic Observatory, and Apia Observatory—come under the jurisdiction of the Department, and during the year there have been improvements made towards rendering fuller co-operation in the work of all three and in the compilation of data relevant to magnetism, astronomy, atmospheric electricity, and seismology. The Dominion is now much better equipped than in the past with a range of earthquake-recording instruments, which have been placed in suitable locations. A comprehensive Bulletin on the Napier earthquake was published during the year (No. 43).

The continuance of the work at the Apia Observatory has only been made possible through general financial assistance provided by the Rockefeller Foundation of New York, the Carnegie Institution, and the British Admiralty. The Department desires to place on record its indebtedness for the appreciated support provided by these bodies.