

## REGIONAL SURVEYS.

Dr. A. R. Lillie and Mr. C. A. Fleming completed the mapping of the Dannevirke Subdivision, and the former has nearly finished the manuscript of the report.

Mr. R. W. Willett continued the mapping of the Orepuki Subdivision into June, 1941. Dr. J. Marwick was with him for several weeks, and extensive fossil collections were made from the important Clifden section. Owing to his being engaged on mineral surveys, Mr. Willett was unable to resume work in the 1941-42 summer season.

## COAL SURVEY.

The mapping of the Grey Coalfield is approaching completion, the chief area as yet unsurveyed in great detail being that about Paparoa. The geologists engaged on this work have now a good grasp of the structure and sequence of the coal measures, and the coal-mining industry is making increasing use of their services; from a third to a half of their time is taken up in elucidating fault and thinning problems in the working mines, in selecting sites for prospecting bores, and in suggesting areas for exploitation by co-operative parties.

Mr. H. E. Fyfe visited the Mangapehi Coalfield and confirmed Mr. M. Gage's opinion as to the need for immediate boring and the programme to be followed. He also visited the Tatu Mine, in the Ohura district, in the workings of which the Cunningham Fault, mapped on the surface by Mr. N. Pratt some years ago, has now been encountered.

## PALEONTOLOGICAL WORK.

Dr. J. Marwick was assisted during the winter months by Mr. C. A. Fleming, who identified the mollusca in the many collections from the Tertiary strata of the Dannevirke Subdivision.

Dr. Marwick made large collections from the well-known Clifden section in Southland and, in collaboration with Dr. Finlay, is endeavouring to place on a firm basis the subdivisions of the Middle Tertiary sequence of New Zealand. He and Mr. Fleming also visited North Westland, where the latter collected from the thick later Tertiary argillaceous sandstones of the Blue Bottom and by his work helped to determine the structure of an area where drilling is now proceeding.

## MICROPALAEONTOLOGICAL WORK.

Dr. H. J. Finlay, assisted by Mr. N. de B. Hornibrook, identified the foraminifera in the cores from oil-wells and in many samples forwarded by field geologists. Outside this routine work he spent much time in examining micro-faunas from the Miocene and Lower Pliocene portions of the Tertiary sequence from all parts of New Zealand where these are present. Beds of this age are of particular interest to the oil companies, and several lengthy discussions were held with their geologists and our field officers.

## PETROLOGICAL WORK.

Dr. C. O. Hutton determined many samples of minerals, both natural and artificial. An important investigation was to ascertain the mineral compositions of ganisters imported for lining steel furnaces used in railway workshops. Locally-occurring magnetite, suggested in place of imported material in the manufacture of intermediate frequency transformers and tuning coils for radio apparatus, is now used successfully. The Shell and Superior companies forwarded numerous heavy residues for determination; their identification helped to verify points of the stratigraphy of Tertiary sediments. Petrological examinations were made of schists from the upper Waikouaiti and Wakatipu districts, and mineral separations as well as investigations of igneous rocks from Brocken Range, East Wellington, and Lake Waiholo, Otago.

## GEOPHYSICAL WORK.

Mr. N. Modriniak continued investigations of possible dam-sites on the Waikato River between Atiamuri and Cambridge. He used seismic and magnetic methods. Mr. J. Healy carried out the geological studies in connection with these investigations and was able to map geologically a considerable area of this little-known region.

On Kawau Island Mr. W. H. Wellman measured the electrical currents naturally produced by the oxidation of sulphides of the copper lode worked there nearly a hundred years ago. His observations suggested that another lens containing sulphides lies a little north of the old workings on the same belt of mineralization. Prospecting by the usual methods is required to ascertain the cause of the observed anomalies.

At Clarendon, near Milton, basic lava overlies Tertiary sediments containing phosphatic horizons. Wind-blown silts thickly cover the surface and largely conceal the sequence. Mr. H. W. Wellman began magnetic work at the end of March, 1942, in order to fix the base of the lava so that prospecting by cuts and drill be made easier.

## SPECIAL EXAMINATIONS.

*Phosphates.*—Mr. E. O. Macpherson examined and mapped the phosphate occurrences at Clarendon. Before the higher-grade phosphates from Nauru and Ocean Islands came on the market phosphate rock was worked in this area, in all about 140,000 tons being produced. The phosphate forms irregular masses associated with Tertiary limestone, and calcareous beds in overlying sandstone are also strongly phosphatic. The generally-accepted theory of origin is that the phosphate segregated during the erosion of the limestone and so occurs in more or less isolated masses at the heads of gullies. Mr. Macpherson suggests that the phosphate was formed from bird droppings on a land surface and that there is a fair chance of large quantities being present under the overlying sandstone and basalt. He draws attention also to a second phosphatic horizon in the sandstone some 20 ft. to 30 ft. above the main horizon. This, though of lower grade, may, by processing, yield a commercial product. He recommends prospecting by cuts, adits, and bores.

*Talc.*—Mr. Macpherson examined and mapped talc deposits on D'Urville Island and the adjacent mainland. Rocky Point, in Catherine Bay, is the locality most likely to yield commercial talc. The talc lenses are partly concealed under surface debris and slope deposits, and prospecting is necessary to expose them. Outcrops of talc also occur at Cherry Bay, and near Cape Horn, in Admiralty Bay. At the latter a recent slip covers the talc more or less completely.