

Failing that, the difficulty might be overcome by appointing some one to the Meteorological Office staff who was specially qualified to give advanced instruction in the subject and who would be free to devote most of his time to duties of that nature and in the directing of meteorological research.

Gradually a satisfactory network of observing stations is being built up, both the close net of rainfall stations and the more sparse one where temperature and other elements are also recorded. Soil surveys and intense investigation of agricultural problems have, indeed, brought forward prominently the need for climatological data and the demand for new stations has been rather difficult to cope with.

Weather charts are now prepared four times a day, and special reports for aviation are broadcasted thrice daily, apart from special forecasts. These improved services have been much appreciated.

The production of the weather charts required for forecasting involves the co-operation of various countries over a wide area. Thus for New Zealand forecasters reports from Australia are of vital importance, and a complete understanding of the meteorological situation is often impossible without reports from the south-western Pacific. When trans-ocean flights are in operation frequent reports from both regions will become still more essential. The exploratory flight of the Pan-American Airways clipper from San Francisco to Auckland provided valuable experience regarding the efficiency of the weather service from the Pacific Islands. With the co-operation of other Governments and other Departments in New Zealand it is anticipated that a much improved service will be available shortly. It is clear, also, that a conference will have to be called before long between representatives of countries concerned with meteorology in this quarter of the globe in order that an adequate reporting system may be organized. One of the principal problems in connection with such an organization is that of communications. Meteorological institutions must be in very close touch with their reporting stations, with all main aerodromes and air bases, with aircraft in flight and with each other. Particularly in the case of trans-ocean flights must free intercommunication by radio be available. The provision and co-ordination of communication services is therefore receiving earnest attention.

Observations in the upper air, especially of wind and temperature, are of importance not only because of the increased knowledge they provide the weather forecaster, but also because of the practical value to aircraft in flight. In so far as is possible with the resources at our command, it will therefore be necessary to develop a network of upper air observing stations.

Attention is again called to the publications of the Meteorological Office, to which reference will be found in the Director's Report.

GEOLOGICAL SURVEY.

The field surveys this year were in the Dannevirke, Reefton, Wakaia, and Blackburn districts. Excluding the Reefton and Blackburn areas which were examined years ago, about 400 square miles of country was mapped in detail. Two bulletins have been published, and others are in the press and in the course of preparation for publication.

The Dannevirke Subdivision is part of the petroliferous province which extends along the whole of the east coast of the North Island. The rock sequence and structure is similar to those of the adjacent Eketahuna Subdivision. West of the Ruahine Ranges lies a wide gravel-covered lowland between which and the sea are a series of folds and elongated fault-blocks subparallel with the mountains and the coast. The stronger folds in the possibly oil-bearing eastern part are too broken and eroded to be likely to contain commercial accumulations of oil, but there are a few minor structures that may warrant further attention.

Studies have been made of the water-supply problems of parts of Hawke's Bay.

In the Reefton district intensive work has shown that the lodes occupy shears close to the axes of folds in the ancient rocks. The largest group of lodes follows the trough of a syncline which extends south through Boatmans, Ajax Hill, and Crushington. The Blackwater Lode is near the crest on an anticline which continues north under gravels and is perhaps the same fold as that in which the veins at Merrijigs appear. The Big River is in a much faulted syncline farther east, but the relations of the Globe-Progress Lode are doubtful. Owing to unfavourable weather and the diversion of an officer to other work no examination of the remaining area at Kirwans and Alexander was possible. This will be finished next spring.

Mapping in Wakaia Subdivision was completed this season. Two systems of faults cross the district at right angles. The older, parallel with the north fronts of the Kaihiku and Hokanui hills, is represented by the zone of dislocation followed by Winding Creek and part of Dome Creek. Crust movements along the north-north-east faults of the other system largely determine the present topography, which consists essentially of subparallel tilted blocks forming ranges separated by valleys occupying fault-angles. Parts of a former Tertiary cover involved in the faults have escaped erosion and contain richly auriferous gravels.

For many years the Blackburn coalfield has been regarded by some as a vast untapped reserve of fuel. Unfortunately, more detailed investigations in this area have but confirmed the unfavourable features the survey of twenty-five years ago disclosed. The total probable coal amounts to only 5,000,000 tons.

Aerial photographs of a considerable area of Dannevirke Subdivision facilitated field-work. In the future it is hoped to make more use of this modern method of topographic survey, and to this end photographs of part of the Glenorchy Subdivision have already been made, and the remainder of this extremely rugged district will be covered next season.

The geophysical work has been mainly confined to a thorough investigation of the Reefton field and to studies of the structure associated with oil seepages in three areas. The whole of the results of the work to date have been prepared for publication in bulletin form with a view to indicating the applicability and usefulness of these methods of survey. Publication was delayed pending the receipt of the results of boring and prospecting of some of the areas dealt with.