

The revival in mining has led to increased demands upon the assaying work of the Laboratory. Gold-saving devices have been tested, while problems concerning mine-ventilation have continued to receive attention. Following the coal-briquetting investigations conducted a few years ago by the Laboratory, it is gratifying to know that one commercial plant for dealing with slack coal has now commenced operations.

Through the examination of materials for all Government purchasing Departments, the quality of these has been kept up to standard, and considerable savings must necessarily result therefrom. The gas supplies of the main towns has been under constant inspection for calorific value, purity, and pressure, and this has shown that all were of satisfactory quality.

For the Police Department over six hundred analyses have been made, and there has been an increasing demand from this Department for work connected with the detection of crime.

This summary of the routine work of the Laboratory has been prepared to show the considerable extent to which chemistry is regularly called upon to assist the Government in ways which are seldom realized as being essential to the adequate operation of its various departmental activities.

Definite research work has been undertaken upon the incidence of goitre, production of low-temperature tar, fruit-tree sprays, pyrethrum, and ragwort, and kauri-gum. The manufacture of sodium chlorate has also been the subject of investigation, while considerable headway has been made towards the determination of the chemical constitution of the active principle involved in ragwort-poisoning.

METEOROLOGICAL BRANCH.

The Director's report refers to the scheme for an international polar year, which was very successfully carried out so far as the Northern Hemisphere was concerned. Unfortunately, little could be done in the Antarctic. A certain amount of extra work was undertaken in connection with it by the Dominion Meteorological Service.

Forecasting problems are discussed in some detail. The most noticeable tendency as regards the public attitude to weather forecasts is the increasing appreciation of, and demand for, from the farming community per medium of wireless. The Director lays especial stress on the importance of the forecasting methods introduced by the Norwegian School. These methods are now almost universally accepted as constituting a very notable advance on anything previously in vogue. Particularly is the method of value in connection with the short period forecasts which are required for aviation services. There seems little doubt that within a very few years there will be regular air services not only in New Zealand, but also across the Tasman Sea. It follows that the building-up of an adequate meteorological service for aviation should be commenced as early as possible. This will involve facilities for the modern methods of forecasting mentioned above. It will take some years for the necessary additional staff to gain the requisite experience. The means of collecting and distributing information by telegraph and wireless will need to be expanded.

It has been found necessary to refuse numerous requests for the establishment of additional meteorological stations. The maintenance of the stations involves a great deal of work in the Meteorological Office in addition to the expenses of equipment and inspection. The present number is as many as it is possible to cope with under existing conditions.

In addition to the making of the usual observations of wind in the upper air at Wellington, facilities have been given Mr. J. Holmboe, of the Ellsworth Antarctic Expedition, to prepare and send up a number of "radio-sondes." These instruments are carried by large balloons to high levels in the atmosphere and, in the course of their ascent, signal down by wireless the temperature and pressure in the layers through which they pass. Mr. Holmboe has been assisted by Mr. R. G. Simmers and at times by other members of the Meteorological Office staff. The information gathered will be of great interest, since in the Southern Hemisphere, data from great altitudes are almost entirely lacking.

The usual periodical publications containing various meteorological statistics have been printed. Two papers on winds, which will be of value especially to aviation, were also published during the year.

The Meteorological Branch is to a large extent dependent for the daily observational data, without which it could not exist, on the gratuitous services of public-spirited persons; and the Director's remarks regarding the country's indebtedness to them are heartily endorsed.

GEOLOGICAL SURVEY.

The application of the science of geology in all its branches to the public welfare is the ideal of the Geological Survey. Systematic surveys, including the collection of facts, their comparison with those from other districts and countries, and their presentation to the public, together with inferences deduced from them, are but means to this end. Another equally important objective is the working-out of new generalizations and principles. Basic geological investigations, such as in New Zealand only the State can support, are essential for any planned national economy.

The increasing demands which industry, in its various branches, is making on the Geological Survey shows clearly that practical men realize that pure geology of to-day is applied in industrial science of to-morrow, and they look to the State to furnish the fundamentals as a basis for their local and specific problems.

The general policy has been to push ahead with the systematic geological reconnaissance of the whole country, since only one-third has so far been systematically mapped. Progress is necessarily slow with a much curtailed staff. In view of the depression and the importance of development of the gold-mining industry, from the point of view of employment, part of the activities of the Geological Survey has been directed more towards the problems of economic geology.