

of the expenditure, the staff, and the programme of investigation proposed. The industry itself is expected to pull its weight both financially and by direct personal interest and guidance. In no instance is a programme of investigation developed apart from the direct touch and active co-operation of those intimately concerned with the industry itself.

With regard to the laboratories and scientific services maintained wholly by the Department, these are concerned with fundamental scientific problems underlying industry, or of State administrative Departments of national rather than of sectional interest; yet it is intended that they should be of the fullest possible use (in so far as their extent permits) to industries and industrial concerns finding themselves confronted by particular scientific problems which cannot be solved by other means.

Up to the present the energies of the Department have been concerned mainly in an endeavour to induce the units of the greater primary industries of the Dominion to co-operate for the purpose of equipping themselves with thoroughly sound scientific outfits. As a result, the dairy, wheat, meat, seed and plant, flax, mineral content of pastures, cool storage, noxious-weeds control, pig, pork and bacon, wool, leather, and fuel researches and research organizations, have been established. While co-operative effort has been advocated among the various industries, separately and in turn, the wider aspect of co-operation possible between the scientists themselves who are engaged in the various spheres of activity that have arisen has not been lost sight of. It is part of the policy of the Department to develop the principle of team-work among the scientific workers who will be employed in the different spheres of industrial investigation. So wide and specialized have the various phases of science become in recent times that it is realized that association of one scientist with another for the purpose of reference and discussion of special problems is indispensable if progress is to be made. This association should be the means of ensuring that the Dominion will be provided not only with trained men for dealing with the technical problems of its various industries, but also with a combination of scientists capable of supplying mutually the deeper expert knowledge underlying fundamental problems.

The scientists under appointment for the various research associations, together with the permanent staff and University staffs, should provide such a team.

DOMINION LABORATORY.

The Dominion Laboratory, originally established as the Mines Department Laboratory, now carries out the analytical and chemical work required by all Government Departments except that of Agriculture. The central laboratory is at Wellington, and there are branches at Auckland, Christchurch, and Dunedin. The work is wide in scope and varied in character.

The chemical composition of many imports is required by the Customs Department, either to determine their classification for tariff purposes, or in the case of foodstuffs, to ascertain whether they comply with New Zealand standards.

Type rocks are carefully analysed for the Geological Survey, and metals determined in various ores. Mineral waters, natural gas, and oil are also analysed. At the present time work is proceeding on a large number of samples of water, gas, sulphur, and rock from Rotorua, Taupo, and White Island.

The work for the Main Highways Board has greatly increased. A "Rotarex" separator, installed during the year, has facilitated analysis of bituminous concrete. A close check is kept on tar preparations used for roading.

The work for the Mines Department comprises chiefly analysis of coal, clay, various minerals, mine-air (to check the ventilation of mines), and mine-dust (to ensure that safety provisions *re* stone-dusting of coal-mines are being carried out). Prospectors' samples are also examined, and any person finding a mineral may forward it to the laboratory for identification free of charge, provided the locality is given.

Regular and systematic analysis of foods, including milk, for the Health Department has resulted in a general improvement in recent years in the average quality of many foodstuffs sold in New Zealand. Milk-analyses are also carried out for Plunket nurses in the four centres.

Analyses of stores are carried out for the Post and Telegraph, Public Works, Railways, Stores Control, and other Departments, both to determine the relative quality of samples submitted on tender, and to check the quality of goods supplied. This work is regarded as highly important.

Regular tests of town gas for calorific value, purity, and pressure are carried out in the four centres, and will be extended shortly to some of the country towns.

A certain amount of research work is carried out by the Laboratory, some of which is preliminary to the formation of research associations, and some on minor subjects not covered by any research body.

In connection with an investigation by the Health Department of the incidence of goitre, a research on the iodine content of soil and water in the Wellington District has been undertaken and is now nearing completion.

A research on moulding-sands for foundry use has enabled some desirable physical properties to be defined and investigated, and will greatly assist in the search for suitable sands in New Zealand.

Two minor investigations now completed had reference to the gold-plating of duralumin and to the manufacture of roofing-tiles.

A considerable amount of work has been done in adapting the nitrite process of curing meat to existing practice in New Zealand meat-works. This was most successful.

Some preliminary examinations have been made of wool, wool-scouring liquors, and bacon.

The Fuel Research Association formed during the year will carry out its researches at the Wellington laboratory, a member of the staff having been seconded to the charge of the work. A Fischer retort has been installed for low-temperature carbonization.

The Dominion Analyst is continuously consulted on industrial and research matters.