Among the more important aims of this programme are the establishment of the most suitable types of paint for exterior wood surfaces in the different climatic areas, a comparison of the recently developed two-coat painting system with the traditional practice of 3-coat painting, the development of accelerated durability tests for paints for exterior wood surfaces, the effect of wood species on paint durability, the effect of preservative treatment of timber on paint durability, and the amassing of information on which paint specifications can be drawn up and kept up to date with developments in paint technology. It is expected that the general public will benefit from this work through information disseminated by the New Zealand Standards Institute by means of paint specifications.

Small-scale paint mixing and grinding equipment has been installed and will be used for manufacture of the experimental formulations. These experimental formulations will be exposed in various parts of the Dominion and systematic inspections and records will be kept of the behaviour of the paints. It is expected that the information obtained from the long-term paint research programme will lead to very substantial savings per annum in the cost of painting State-owned buildings.

A certain amount of work has been carried out on industrial problems through the sponsorship of the Manufacturers' Research Committee.

Members of the staff have acted on the Paints and Sectional Coatings Committee of the New Zealand Standards Institute and on Inter-departmental Committees for Paint Investigation. These Committees have sponsored many of the above investigations.

As in the past, members of the staff have been required to give advice and information on painting problems to Government Departments and industry.

Building Research

The work carried out during the year has comprised the examination of a number of materials such as roofing-tiles, asbestos-cement products, enamelled sinks, plastics, cements, wallboards, &c. A considerable part of the time of the officers in this section has been taken up in advisory and consultative work on such subjects as manufacture of various types of building-materials, particularly concrete products, and utilization of local raw materials in the building industry. A certain amount of work has been done in investigating the causes of failure of building-materials.

The greatest part of the Laboratory's work on building-materials continues to be on paint, which is dealt with in another section of this report.

Chemical Engineering

Work on the dehydration of vegetables was discontinued. A complete new layout for the apple-dehydration factory of the Internal Marketing Division at Motueka was designed, and the factory has been put in running order for the 1946 season. An improved method of tunnel-dehydrator operation was worked out and an original design of apple-sulphiting equipment which is now giving satisfactory service was installed. The chief advantages of this piece of equipment are that it is compact, its design allows of easy control of the sulphiting process, it is easy to operate, it is easily cleaned, and the design obviates discoloration of the fruit.

The investigation of tobacco-kiln design has been continued in collaboration with the Tobacco Research Station. As a result of a survey of conditions in tobacco-kilns, a modified type of kiln was designed and will be tested during the 1946 season.

A unit for the drying of fescue seed to the design developed by the Chemical Engineering Section has been in operation in Invercargill and has proved of great value to the industry. The design of the commercial unit has been revised with a view to simplification of construction. The installation of several new units is projected.

A general-purpose drying plant for the Agronomy Division, Lincoln, with 1,000 square feet of tray surface was designed and put into operation in December.

A heated-sphere anemometer to a design developed at the University of Illinois was constructed and calibrated for the measurement of low air-velocities in connection