

DOMINION PHYSICAL LABORATORY

Director : DR. E. COOPER

The year has been a busy one, considerable assistance having been given to a large number of New Zealand manufacturing concerns in the form of tests on materials and equipment, the design and supply of special measuring-apparatus, replacement parts for machinery and small precision tools, and investigations into manufacturing difficulties. In addition, the Laboratory has spent approximately 50 per cent. of its time on work along similar lines for Government Departments. The Laboratory is anxious to devote more energy to the development of New Zealand's natural resources—for example, this year has seen considerable progress on the construction of a pilot plant for fibrating wood with the object of making mouldable wood fibre, further work has been done on the design of more efficient plant for the concentration of vitamin in fish-oil, and a start has been made on the problem of extracting titanium from New Zealand ironsands. These latter types of work are entirely dependent on the supply of experienced research staff.

The Laboratory has performed work in one category or another for 271 separate firms and institutions throughout New Zealand, indicating the extent to which industry is utilizing laboratory facilities.

Work is organized in three main groups—general physics and instrument testing, electrotechnology, and engineering.

PHYSICAL LABORATORY (General Physics, Testing of Materials, Instrument Development and Calibration).

Major projects which have been worked upon during the past year by this section are :—

(1) *Timber-impregnation*.—Vacuum pressure impregnation of *Pinus radiata* with water-soluble forms of synthetic resins has been carried out.

(2) *Physical Properties of Rock taken from the Site of the Proposed Cobb River Dam*.—The State Hydro-electric Department has requested the Laboratory to undertake the measurement of certain physical properties—density, compressive and shear strengths, modulus of elasticity in compression in the dry and wet conditions—of rock extracted from various parts of the site of the proposed Cobb River Dam.

(3) *Investigation of the Physical Conditions accompanying Frosts in Central Otago*.—Fruitgrowers in Central Otago are faced each spring with threats of serious damage to crops from frosts, mainly of the radiation type. Several different kinds of attempts to combat such frosts have been tried abroad, but until more is known about local conditions it is not possible to advise as to the most favourable method of application. Accordingly, an extensive programme of observations has been organized for both autumn and spring conditions, and upon this it is hoped to be able later to devise means to mitigate the frost hazard.

(4) *Thermal efficiency of open-hearth fires in State houses*.

(5) *Examination of the Conditions affecting the Moulding of Plywood*.—A firm engaged in moulding plywood in various forms using pressure and heat in a single process experienced difficulty in producing stable and unwarped mouldings. An officer from the Laboratory visited the factory to inspect the process and conditions of manufacture and made certain recommendations concerning the moisture content of the timber and the glue-spreading technique.

(6) *The Use of Radio-active Elements as Tracer Materials*.—Plans are in hand to keep a physical check on all such material coming into the country and to co-ordinate and control its distribution.

(7) *Measurements of the Efficiency of Dairy Water-heaters*.—Various makes of dairy water-heaters have been supplied by their agents to the Laboratory for the determination of their efficiencies.

(8) *Heat-insulation of Houses and Mould in Houses*.—Reports on this work have been included in the Building Research report, p. 7.