

CERAMICS

Under the general supervision of a Ceramic Resources Committee, the investigation of raw materials used by the industry has been placed on a decidedly improved basis. In furtherance of the policy of working in close collaboration with the Geological Survey, officers of the Laboratory interested in this work have been given every opportunity of inspecting clay deposits in the field. Close contact has been maintained with the industry by frequent visits to potteries, sometimes at the special request of the management. Acting largely upon a strong recommendation from the Director, Dominion Laboratory, three of the leading potteries last year appointed works chemists to their staffs. In each case the appointee was given a period of instruction in clay-testing technique at the Dominion Laboratory, a policy that has resulted in cordial relations with the industry and a welcome at all times to the works.

During the year detailed examinations were made of clay deposits from the following localities: Charleston, Waimangaroa, Whangarei, Kiriapaka, and Kaka-Tadmor. In addition, the more systematic survey of the clay resources of the North Auckland district was advanced a step further by the completion of tests on a series of samples collected from bores and clay-pits in the Kauri and McLeod Bay areas. Extension of this systematic survey to the South Canterbury district is already under way.

During the year a member of the staff was sent overseas to study latest developments in ceramics in England and the United States of America. Upon his return it is hoped that finality will be reached in a scheme for the standardization of clay-testing that has been under consideration for some time.

Equipment from overseas to be used in the testing of refractories is now coming to hand.

COAL SURVEY

The physical and chemical survey of the coal resources of the Dominion has been continued by the Coal Survey Laboratory and by the field staff appointed by the Geological Survey. Work has continued in the Greymouth, Westport, Southland, Tatu, Mangapehi, and Waikato fields, and samples have been received from all over New Zealand.

The Coal Survey issued twenty-four reports during the year and also sent out four information circulars.

A start was made on a detailed examination of coal ashes obtained from run-of-mine samples of coal. This examination included complete analyses of the ash and the determination of fusion characteristics in oxidizing and reducing atmospheres.

Investigations were carried out to determine the washing characteristics of Wallsend, Blackball, and Strongman coals.

Two reports were issued on the occurrence of boron in the ash of Waikato coal. The amount present is phenomenal, and for seven mines averaged 3.4 per cent. B_2O_3 in the ash, and the ash was 2.8 per cent. of the coal.

In addition to the regular work of the Survey, forty samples of coal and related materials, including coal dusts and limestones, were analysed, and fusion temperatures determined for a number of substances.

The possibility of using waxes present in peats and low-grade coals for industrial purposes received some consideration, and a number of such coals were extracted with benzol to determine their wax content. A report was prepared on the suitability of New Zealand coals for use in the manufacture of plastics.

PAINTS AND PROTECTIVE COATINGS

The very considerable amount of paint investigational work carried out during the year may be subdivided into requirements for (a) defence and (b) civilian use.

Defence.—In addition to routine examination of paints and varnishes to specification for the Navy, Army, and Air Force and the United States Forces, several special investigations were made involving research and the application of new methods. These included (1) evaluation photographically of the infra-red reflecting properties of pigments and camouflage paints; (2) exposure and ultra-violet light tests of green camouflage paints to evaluate fading; (3) laboratory comparison of the infra-red reflecting properties of paints for armoured fighting vehicles; (4) specular and diffuse reflection properties of camouflage finishes for aircraft; (5) camouflage of water surfaces; and (6) black and coloured skin dressings for jungle fighting.

For the Munitions Controller, special examinations of varnishes on hand grenades and mortar bombs were made. A routine salt-spray test was introduced, advice given on metal-cleaning procedure, and corrosion problems studied. For Army Inspection numerous paints and varnishes were examined to specification.

Civilian.—Routine examination of a very large number of paints for the Housing and other Departments was carried out. Members of the staff acted on the Paints and Coatings Committee of the Standards Institute and on inter-departmental committees for paint investigation. Special investigations included (a) suitability of New Zealand whiting for putty-manufacture; (b) luminous paints for gun-sights, &c.; (c) casein paints; and (d) fire-resistant paints. Advice to Government Departments on paint problems was frequently given.

RUBBER

Special problems that arose during the year included (a) particle size and other determinations of rubber fillers; (b) preparation of rubber solutions; (c) investigation of rubber-tire preservatives; (d) milking-machine rubber-ware; (e) corrosion due to latex on mortar-bomb tail covers; (f) a report on the possibility of manufacturing synthetic rubber in New Zealand; (g) investigation of methods of analysis of rubber.