

As a result of complaints that recent supplies of copper used for laundry boilers corroded much more rapidly than the copper formerly used, work was commenced on the examination of the metal used for this purpose. A number of samples of scales from boilers and calorifiers were examined to determine if they had resulted from corrosion of metal parts. In one case metallic copper dissolved from a boiler feed-pipe was being deposited on steel boiler-tubes. A deposit in the fuel-feed housing of an aero engine was found to have resulted from the corrosion of a magnesium-alloy casting. Sludge in the insulating-oil of a transformer contained a large proportion of lead derived from the corrosion of the lead sheathing of a cable, by the action of organic acids produced by the oxidation of the oil.

The Laboratory was consulted with regard to the possibility of corrosion of water-mains and plumbing fittings by domestic water-supplies. During the year analyses were made of water samples from the Rangitikei River, proposed sources of supplies near Gisborne, Hawera, and Wellington, and from existing supplies at Trentham, Silverstream, Orongorongo, and Wainuiomata. Advice on the suitability of pipe-material and methods of water treatment for correction of corrosiveness was given. In the case of two small supplies, suggestions were made for overcoming trouble due to staining of sanitary ware by metal salts in corrosive waters.

OIL, BITUMEN, AND TAR

Although it was expected, following the cessation of hostilities during the year, that a very considerable reduction in the demand from this section would occur, such has not been the case. Despite inadequate staffing, the output, though subject to delays which have caused concern, has actually increased markedly. The number of aircraft fuels examined has remained approximately the same as for the year 1944, but the number of other samples, including those not connected with the Armed Forces, has increased. The amount of investigational work associated with lubrication failures, theft of aviation fuel, police investigation, &c., has also increased. A feature of the year's activities has been the number of critical examinations made for lead in aviation fuel. This is no doubt due to the long storage of fuel in the more remote islands. Some of these samples gave phenomenally high figures for tetra-ethyl lead content.

The total number of samples examined during the year was 464, compared with 425 in the previous year. Of this total, aviation fuels accounted for 333, routine examinations of other products numbered 63, and the remaining 68 samples either required partial examination or were associated with special investigations.

The materials examined included aero lubricating-oils, anti-corrosion oils, aviation fuels, Diesel fuels, Diesel lubricating-oils, engine coolants, hydraulic fluids, kerosenes, lubrication sludges, motor fuels, motor lubricating-oils, petroleum jellies, spray oils, steam-cylinder oil, turbine lubricating-oils, transformer oil, and used oils of various types.

The section has also been of service in an advisory capacity, and this service has been appreciated by the interests concerned.

Examples of investigational work performed during the year are as follows:—

- (1) Lubrication failures due to excessive sludge formation. In certain cases this was associated with contamination by engine coolant.
- (2) Further examination of accepted methods for rating the protective capacity of anti-corrosion oils.
- (3) Study and application of methods for detecting adulteration of various products—chiefly in connection with suspected theft of aviation fuel.
- (4) Investigation, by semi-micro methods, of an arson case for the Police Department.

During the war years the activities in road materials were much reduced owing to the restricted roading programme then in operation. It is expected, however, that there will be an increase in roadbuilding and maintenance in the next year, and this work is likely to increase correspondingly.