

Canning of Toheroas.—Following a complaint from Great Britain that excessive amounts of tin, lead, and zinc had been found in New Zealand canned toheroas, and that copper and arsenic were also present, careful analyses were carried out in Wellington. The proportions of metals found were not higher than normal for shell-fish generally, and the high figures obtained in Great Britain were not confirmed. Inspection of the canneries revealed no likely source of metallic contamination, and it seems evident that, where reasonable care is taken, canned toheroas do not contain metals in injurious amounts.

Succinic Acid in Beer.—Succinic acid is a normal product of fermentation, but, being in small quantity, is seldom detected in the routine examination of beer. It was present in one sample in sufficient quantity to interfere with the determination of preservative. A short investigation followed, and a note on the subject has been forwarded to the *Analyst*.

Industries and Commerce.

The materials examined for the Department of Industries and Commerce were commercial products having a relation to New Zealand industries, and were submitted chiefly by the Technical Advisory Officer.

Mines Department.

The Mines Department is concerned, directly or indirectly, with all the mineral work carried out in the Dominion Laboratory. Prospectors' samples were again few in number, and of comparatively little value. The possibility of the development of deposits of non-metallic minerals is being more generally recognized, and special attention has been given to uses of bentonite, feldspar, serpentine, and various types of clays. The most outstanding work on the mineral side has been the regular analyses of Onekaka iron-ore and Patea black sand, for the Iron and Steel Department. Iron was determined in 1,142 samples, and fuller analyses made when required. Twenty-six samples of limestone adjacent to Onekaka were also analysed, and one sample of dolomite from Mount Burnett. Forty-six mine airs from various collieries were analysed. The Department has been active in support of the work of the Coal Survey detailed below.

Police.

The most interesting investigation for the Police was carried out at Auckland, the problem being that of identification of clay, in connection with a case of arson in which human remains were found after the fire. A heavy claim for insurance was involved, and it was suspected that the remains were those of a body obtained by robbing a grave. For proof it was essential that the grave be located. Clay found on a shovel left by the accused was compared with clay from twenty-eight cemeteries in the district, and, as a result, one cemetery was selected for closer investigation. Examination of clays from different parts of this cemetery narrowed the search down to a certain area. Exhumation of the only grave in this area of a required date revealed an empty coffin.

As far as can be ascertained, an entirely novel method was used in the examination. The clay on the shovel contained four varieties of diatoms, and counts of these enabled the grave to be located. Confirmatory evidence was obtained from surface factor of the clays, true specific gravity, sedimentation test with particle count, and malachite-green absorption.

GAS-INSPECTION.

The major town gas-supplies of the Dominion were tested regularly throughout the year for calorific value, purity, and pressure. With one or two exceptions for which there was adequate explanation, all complied with the regulations on every occasion. Gas-meters tested totalled—Christchurch, 3,841; Auckland, 5,629; Wellington, 12,518.

RESEARCH.

Chemical Engineering Section.

The semi-commercial seed-dryer referred to in the last annual report of the Department proved successful in operation, and drawings for a commercial unit to treat 5 cwt. per hour have been prepared. An inexpensive experimental sample drying-plant was designed for the Plant Chemistry Laboratory, and is quite effective for the purpose. At the request of the Air Department, the Assistant Chemical Engineer was sent to Australia to investigate the operation of the C.F.R. engine for determining the knock rating of aviation fuels, and one of these engines is now installed at the Laboratory. Tests of aviation fuel supplied to the Government are now regularly carried out. Since the outbreak of war the staff has been fully occupied, in association with officers of the Public Works and Transport Departments, with work relating to the use of producer gas as a substitute for petrol for motor-vehicles. This has involved the thorough testing of producers already on the local market, and the design of one of simplified form, also the examination of various fuels available. The investigation has been greatly facilitated by the co-operation of the Director of the Wellington Technical College in granting the use of the College dynamometer, and providing facilities for its operation.

Coal Survey.

Details of the organization of the Physical and Chemical Survey of the coal resources of New Zealand were published in last year's annual report. The field staff has proceeded during the year with geological surveying and sampling programmes in the Greymouth coalfield covering the Liverpool, Strongman, Paparoa, Wallsend, Dobson, and a number of smaller co-operative mines. The Coal Survey Laboratory staff has been engaged on full analyses of the samples forwarded, and has at the same time conducted investigations into a number of survey and general problems.