

Some tests have been carried out with equipment working on 1.5 metre wave-length, to give range and bearing only up to 10,000 ft. altitude and 10,000 yards range. These tests were unsuccessful: further tests with Army searchlight control radar will be made before this wave-length is discarded. Possible alternatives would be based on surplus airborne radars using 10 cm. or 3 cm. wave-length.

Vehicle-speed Indicator.—An apparatus for observing the speed of road vehicles has been made at the request of the Transport Department. This employs the Doppler principle as affecting radio waves. A beamed aerial fed by a continuous-wave 3,000 mc/s. oscillator is directed along the road: the outgoing energy is reflected by a moving object and thus returns with a slightly different frequency. The difference between outgoing and incoming frequencies is a direct measure of the speed of the reflecting object, and is presented as a meter reading. The equipment has been handed over to the Transport Department and is giving satisfactory service.

Radar-type "Henry."—This is a high-discrimination 3 cm. radar with characteristics closely approximating the requirements laid down for merchant marine navigational radar. A number of equipments are on loan to the Department from the United States Navy.

In addition to that already fitted in the t.s.s. "Tamahine," a second set has been lent to the Anchor Shipping Co. and fitted in the t.s.s. "Matangi," and a third set has been installed on the top of Mount Victoria overlooking Auckland Harbour. The latter set will give useful information and experience of the utility of harbour radar in New Zealand.

METALLURGY

The major portion of the time of this section is spent on servicing work for industry and Government Departments. This covers advice on the heat treatment of ferrous and non-ferrous metals for machinability, the melting and refining of metals, physical and metallographic analyses of metals, including x-ray examination, and the suitability of metals for various engineering applications. Visits have been made to a number of foundries and workshops.

Ironsands.—One research officer has been engaged on full time in preparing for the large-scale trials that are shortly to be held at Onekaka by the Department of Industries and Commerce. The work has covered the preparation of 120 tons of ironsand from Patea and 6 tons from Gillespie's Beach, South Westland. A magnetic separator previously designed and built by the Laboratory for experimental work was used to prepare a portion of these trial samples of sand. The sand from Gillespie's Beach was suggested by the Laboratory as being worthy of trial, since it had been reported by C. O. Hutton some years ago that this particular sand had a low titanium content.

Lead Reclamation.—The present high price of lead has caused several battery-manufacturers to ask for the development of a furnace suitable for the reclamation of lead from used batteries. Initial trials with a preliminary design of furnace have given good results with a very high percentage recovery of lead. A final prototype furnace is under construction.

ENGINEERING RESEARCH

Hydraulic Model Investigations.—These investigations are being conducted for the Ministry of Works. Tests on the Maraetai spillway at 1/50 scale are completed and have been very worth while in assisting design. Tests on the Cobb River spillway at 1/48 scale are nearing completion, and here also the tests have led to a modification of design which gives improved flows.

Heat-pumps.—Investigations have been made into the possibility of using heat-pumps in a number of commercial and industrial applications, and the laboratory is urging the use of heat-pumps as compared with ordinary methods of heating in a number of civil and commercial undertakings with a view to conserving power. A small pilot plant has been constructed from which direct experience of the method can be gained.