

(2) *Canterbury Project*.—During the next twelve to fourteen months a joint team from New Zealand and the United Kingdom will conduct a long-term research experiment in radio meteorology in the South Island. Its aim is to—

- (a) Correlate the extent and properties of radio ducts formed with an off-shore wind, and when complicated by a sea breeze, with general meteorological data that is normally available and with low level soundings taken inland, in order that a forecasting technique for the formation and properties of radio ducts may be formulated.
- (b) Check current theories of ultra-high-frequency propagation in the troposphere under conditions of duct formation leading to the phenomenon of super-refraction.

The results of the project are of fundamental importance in radio meteorology and will have world-wide application.

The work is being carried out in the Mid-Canterbury Plains, where the prevailing warm dry north-west wind blowing out over the Canterbury Bight provides an ideal situation for the formation of radio ducts under stable meteorological conditions.

The British authorities are sending out six senior scientific and technical personnel to participate in the project, and are providing all the S and X band equipment for the radio measurements. The United States of America has supplied on loan a large portion of the low-level meteorological sounding gear. New Zealand is supplying the majority of the personnel, three metre radar and associated equipment for radio measurements, and all the remaining technical and general equipment. Wired sonde measurements of temperature, humidity, and wind velocity will be made from several points on land and from a ship at sea before, within, and above the radio duct. These will be supplemented by aircraft observations and will give in detail the gradients of these quantities throughout the lowest few thousand feet of the atmosphere. The ship and aircraft will be fitted with transponders on three metres, S and X bands which will be triggered by radars on these frequencies situated on the coast. The signal strength received at the radars from the transponders will be measured, and by discreet manipulation of the aircraft and ship it is hoped to be able to obtain a complete picture of the distribution of field strength, both within and above the radio duct.

(3) *Prototype Loran Air Navigational Aid*.—This equipment is being designed for the Navigational Aids Committee, Air Department. Its original purpose was to provide navigational fixes for the transport runs to the forward areas. Since the end of the war the project is being continued with the dual purpose of aiding the communications with the J Force and for assisting commercial air services.

(4) *Servicing of Radar on New Zealand Shipping*.—(a) A maintenance service is being provided for British shipping in New Zealand ports.

(b) Radar sets are being installed on the t.e.v. "Rangitira" and on other ships operating in New Zealand waters.

FINE-INSTRUMENT WORKSHOPS, INCLUDING GLASS-BLOWING, GLASS-GRINDING, AND ELECTRICAL INSTRUMENTS

At the conclusion of the war the larger type of instrument-construction work was transferred to the Tool-room. The Instruments Workshop now confines its attention to the finer type of construction and repair, involving, for example, pivots and jewels, hairsprings, fine suspensions, lenses, &c. This class of work requires specialists with considerable training.

The following is an analysis of the instruments work over the past twelve months, excluding those items mentioned in the Physical Laboratory list, which also received repair prior to calibration or testing: clocks, chronometers, stop-watches (61); miscellaneous measuring instruments (55); surgical instruments (22); navigational instruments (7); meteorological instruments (37); special drawing instruments (7); engraving measuring scales (13); seismographs repair (2); repairs to glass laboratory equipment (80); and electrical instruments (46).