

(9) *Strain-gauge Recorder*.—The Railways Department has requested the development and construction of strain-gauge equipment to record dynamic strains set up in railway-lines due to the passage of trains. This section of the Laboratory is investigating an A.C. resistance bridge circuit with oscillographic measurement of the change of resistance.

(10) *Conductivity of Railway Ballast*.—Difficulties encountered by the Railways Department with respect to conductivity of ballast near railway crossings with automatic warning signals have resulted in a request for electrical conductivity measurements of different types of ballast.

Tests and Calibrations

Some 600 separate instruments have been calibrated during the year covering electrical meters (87), thermometers (111), pressure-gauges (201), barometers (6), telescopes (10), binoculars (39), rangefinders (1), theodolites (19), sextants (9), laboratory balances (8), traffic loadometers (inspecting) (31), foot candle meters (4), tachometers (14), surveyors' levels (2), lenses (14), mirrors (40), and Aldis lamps (6).

Tests were made on the following materials and equipment: cow-covers, concrete blocks (16), leather belting (3), rot-proofing fabric (10), oilcloth, canvas (6), cotton duck (2), salvus valve, worsted cloth, paper, mould in State houses, hot-plate investigation, asbestos-cement sidings (6), fishing-lines, calico, thermal conductivity of wall sections (4), open hearth fires, resistance thermometers, rubber gloves (5), piston-rings, timber (4), elasticity of stone, pinex slabs, airfield lights, pressure tests on pipes, Pinex wallboard, Maraetai rock, welded cables, catgut, copper disks, electric lamps, casein glue (3), batteries, drum panel, linen thread (2), weld metal (2), copper tubing, bull-chains, insul wool, loud-speaker magnets, and margarine.

STANDARDS LABORATORY (including Metrology)

During the year the staff engaged on the measurement of limit gauges has been reduced to four. The work of packing away the many thousands of gauges has now commenced. Steps are now being taken to arrange for the taking-over of measuring-equipment in the Laboratory which is the property of the Munitions Controller. The following metrology equipment has been put into use during the year: optical dividing head—received from the National Physical Laboratory in November, 1945: inspection grade slip gauges; optical projection apparatus for one hundred times full size; a surface-finish recorder of the National Physical Laboratory type is now ready for calibration; and levelling-apparatus for major surfaces.

The following work has been completed during the year: investigation of gramophone needle and cutting stylus profiles for National Broadcasting Service; inspection of components for Karapiro hydro scheme; and inspection of a 35 ft. machine bed for Messrs. Andersons, Ltd.

The Laboratory has undertaken a considerable amount of gauge and measuring-instrument design, the gauges being mainly for threaded work. Some four thousand five hundred limit gauges of all types have been measured.

A start has been made to accommodate the electrical standards in the Metrology Laboratory. The galvanometer and potentiometer set-up is now in operation in the new situation. Further shifting is now awaiting the wiring of the Electrical Standards Laboratory by the Works Department. The wiring is also required for the photometric bench.

A special small room has been constructed to house an Oertling precision balance which is to be used for standards work.

Negotiations are proceeding with the various Government Departments concerned with standards of measurement and with the National Physical Laboratory in Great Britain regarding the setting-up in New Zealand of primary standards.