

Instrument Tests and Calibrations

Testing of materials was done over a wide field and included the following tests: casein glue (18), fabrics (46), thermal conductivity of building-materials on 12 in. guarding apparatus (10); thermal transmittance of walls, ceilings, and floors in houses (4); pumice and concrete blocks (24); catgut (29); wallboard materials (4); rubber hose (2); plywood (5); resistance to impact of wood (215); electrical conductivity of railway ballast (12); electrical insulating-boards (4); dielectric strength of varnishes (14); efficiencies of batteries (8); also on rubber adhesives, wool, paperboard, asbestos-cement, roofing-sheets, electric plugs and sockets, and field tests on a roofing-slab.

More than 700 different instruments were calibrated and/or adjusted, the main items being indicating thermometers (168), radiosondes (185), and vacuum gauges (104).

Development work was done on equipment designed and constructed for industrial use or by the Laboratory.

STANDARDS LABORATORY

With the co-operation of the Director, National Physical Laboratory, Great Britain, the officer responsible for the planning of the New Zealand Standards Laboratory was enabled to proceed to the National Physical Laboratory for training and discussions in July of this year.

No major work of setting up standards has proceeded since it was considered that waste of effort might ensue until the discussions with the National Physical Laboratory were completed. The standardizing-work this year has covered the calibration of analytical masses, hydrometers, platinum-platinum rhodium thermocouples, sub-standard lamps and photometers, various electrical meters (including sub-standards resistors and potentiometers), gauges, and tools for New Zealand metal industries. In addition, this Laboratory has conducted tests on accumulators, the performance of low-temperature resistors and electromotive cells for use with balloons, radiosondes, and measurements of the rollers and pathways associated with the spillway and intake gates of the Karapiro Dam. The routine intercomparison of the Laboratory sub-standards has been done, and special mention should be made of the kind collaboration of the National Standards Laboratory, Sydney.

DESIGN AND DRAUGHTING SECTION

The following are the major projects on which this Section has been engaged during the past year:—

In September, 1945, a high-vacuum, short-path, molecular still designed earlier was installed at the factory of an Auckland firm. Following this installation, a second still was requested which was to incorporate any improvements suggested from the operation of the first still. The design for the second still is now practically complete and includes many improvements which facilitate manufacture and operation.

A stirred-oil bath for standard pyrometry calibration was designed. New features are a proportional controller to maintain temperatures up to 300° c. constant to $\pm 0.05^\circ$ c., and improved oil-circulating system.

A simple pyrometer has been designed and manufactured to determine the surface temperature of hot bodies up to 500° c.

Considerable work is being done on vacuum equipment. Included in this work are high-vacuum oil-diffusion pumps of various sizes, equipment necessary to measure the speed of these pumps, leak-detection apparatus, and vacuum gauges.

At the request of the Air Department, designs have been prepared of equipment to demonstrate the functioning and inherent errors of the gyroscopic aircraft compass.

Thermocouple equipment has been designed to measure the temperature midway along the inside of a full-scale rotary cement-kiln.

The Soil Conservation Board have asked for a river-stage recorder which may be used on any river in New Zealand without requiring major adjustments. It was also desired that the high installation costs of conventional recorders be avoided. The design of the instrument is almost complete.