

(h) *Tire-retreading*.—Following on work that had been done for a local company on the retreading of motor car and truck tires, in which assistance was given with respect to curing-times for the vulcanizing of the retreads, further assistance has been given in overcoming lack of adhesion of rib-type retreads by vulcanizing for definite times with pressure applied and with controlled solutions of rubber adhesive. In addition, drawings of a new type of internal-heating retreading-mould were inspected and a report furnished as to its probable usefulness for the purpose intended.

(i) *Effect of Humidity and Temperature on Radio Components*.—The Army inspection department referred components from field radio equipment to the Laboratory for tests as to their probable behaviour under the high humidities and temperatures of tropical places. Tests were performed in a specially-constructed temperature- and humidity-controlled cabinet. In addition, advice was given as to the best method of servicing and maintaining the complete equipment in its most efficient condition.

(j) *The Application of Radio-active Luminous Paint for Luminizing Equipment*.—In co-operation with the luminizing section, the physical laboratory has designed and had constructed equipment for (i) comparing the luminous intensity of luminous paint on the dials of meters (to be incorporated in radio equipment) with green light of standardized intensity, and (ii) measuring the luminous intensity of radio-active materials used in luminous paint. The former is used as a check to maintain the luminosity of the dials between known safe limits of intensity and to observe the falling-off of the intensity with time, while the latter equipment measures the variation of intensity and the decay with time of the luminosity of the powders used.

(k) *Hard-rubber Coil-formers*.—The Radio Controller's office, Ministry of Supply, forwarded a number of hard-rubber coil-formers used in field radio equipment which tended to expand under working temperatures and overstretch the wire wound round them. Samples of various mixes of compounded rubber were obtained from the manufacturers, expansivity measurements made, and advice given as to the most suitable "mixes." The firm was thus able to produce a rubber compound which had a sufficiently low coefficient of expansion.

(l) *Soft Vulcanized-rubber Mountings for Whip-cord Aerials*.—Accelerated ageing tests were performed on soft vulcanized-rubber mountings used for the bases on which whipcord aerials are mounted on Army vehicles. Recommendations were made as to the comparative values of two types of mounting supplied.

(m) *Sound Measurement in Aeroplane Engine Test-houses*.—Measurements and recommendations were supplied to Air Department for reducing noise and vibration of test benches.

(n) *Repairs, Tests, Calibrations*.—Over nine hundred items have passed through the physical and electrical laboratories during the past twelve months in the nature of repairs, calibrations, tests, &c. Many of these, such as dial thermometer repairs, may take up to three or four days, cloth tests one day per sample, down to pressure-gauge calibrations, which may require fifteen minutes if no cleaning or overhaul is required. In the majority of calibrations, previous overhaul or repair was required.

(o) *General*:—

- (i) Sound measurements on wallboards for the Director of Scientific Developments:
- (ii) A portable experimental vulcanizer was developed, and six were constructed for the Linen Flax Section of the Department of Industries and Commerce for the repair of scutcher belts:
- (iii) A bomb-filler was designed for safe filling of practice bombs with chlor-sulphonic acid:
- (iv) Ground-vibration measurements were made for the Public Works Department in connection with a railway problem:
- (v) Comprehensive life tests made on accumulator boxes for M.G. carriers and tanks:
- (vi) Insulation measurements of plastics and wax-impregnated insulated wires for Radio Controller:
- (vii) Moisture-meter investigation for determination of moisture in seeds by electrical equipment:
- (viii) Investigational work performed on dark adaptometer for Air Department:
- (ix) Set of colour cards constructed and reflection factors measured for camouflage paints on ships:
- (x) Bimetallic thermometer being developed for Department of Island Territories for use with coconut-desiccator ovens.

METROLOGY LABORATORY

The metrology laboratory is now equipped to make linear measurements from less than 1 in. up to 3 ft. to an accuracy of 0.0001 standard inch. Throughout the year the routine checking of gauges for the Munitions Controller and the Chief Inspector of Munitions (Army) has proceeded satisfactorily. In this period over 12,500 gauges of all types have been certified. The work is performed entirely by a female staff under the supervision of two engineers. This laboratory is the central authority in New Zealand for the certification of munitions gauges made by all tool-rooms throughout the Dominion; it functions quite independently of the Dominion Physical Laboratory tool-room, which makes an inspection of its own work (just as the industrial tool-rooms do) before forwarding gauges to the metrology laboratory for certification. The decreasing number of rejected gauges during the past twelve months reflects partly the improving skill in New Zealand tool-rooms and partly their improved facilities and equipment. Opportunity is taken here to record the spirit of co-operation existing between the industrial tool-rooms, the Munitions Controller's Department, and the Dominion Physical Laboratory, which has enabled such rapid progress to be made in the field of precision tool and gauge manufacture.