

Multi-chamber Incubator.—The incubator consisted of ten insulated chambers which were maintained at evenly spaced temperatures between 0° c. and 50° c. It has been installed at the Entomology Division's substation at Ashburton.

Sun Camera.—A camera has been designed and built for the Carter Observatory for recording sun-spot activity.

High-speed Dental Drill.—The object has been to produce a dental handpiece running at a speed of 50,000–60,000 revolutions per minute, as such a handpiece would improve considerably present methods of drilling. Considerable mechanical difficulties have been overcome, and a demonstration unit is being prepared.

Vibration Activator.—This machine is for applying alternating loads of varying amplitude and frequency to the earth or to buildings. It will be used initially by the Geophysical Survey, but will have considerable application in research into the vibrations of structures.

STANDARDS LABORATORY

Instrument Calibrations.—During the year, sixty statements of examination were prepared on account of about one hundred instruments. The majority of these instruments are in use by Government Departments and public bodies. A few of them are high-grade substandard instruments.

Standard of Temperature Measurement.—Whilst waiting for the filling of the main overseas order for temperature apparatus, the various fixed-point equipments are being prepared. Provision is now being made for the following points: ice, steam, sulphur, silver, and gold, and also antimony, tin, carbon dioxide and mercury. A precision water bath is nearly ready for service. A large number of our present Standard thermometers are undergoing calibration in Australia.

General Metrology.—A large number of both internal and industrial measurements and calibrations has been dealt with. In addition, the section has designed and installed nine earth-pressure-measuring equipments for the State Hydro-electric Department's Lake Tekapo works, has made an extensive series of measurements on small racks and gears, and has made running deflection tests on a well shaft for a textile firm. The final checking and reduction of the pendulum gravity survey (1947) has been almost completed.

Electrical Standards.—The basis of electrical standardizations in New Zealand remains the same as previously—*i.e.*, on groups of Standard cells and resistances brought in from overseas. This foundation has been consolidated during the year by providing the addition of new individuals to the reference groups and by arranging the permanent housing of the Standard cells.

Various special power supplies for metre calibration have now been in operation for some months and have greatly increased the availability of the D.C. standards of measurement.

A.C. work is very difficult to do on account of the poor power supply available, and information is being sought on stabilized electronic equipment to replace the existing sine-wave alternator.

The Equipment Section, from which serviceable, calibrated electrical apparatus is loaned out to other laboratories, continues to perform a very useful function.

WORKSHOPS

The Laboratory Workshops consist of a tool-room, instrument workshop, sheet-metal workshop, electrical workshop, fine-instrument workshop, glass workshop, and cabinet shop. During the year, the tool-room has supplied a large number of special tools and gauges to New Zealand industry. Machines have been installed for the production of moulds for plastic and die-cast products, and this service is being fully used by manufacturers. The instrument workshop has been engaged in making up many