Electrical Conductivity Meter.—An experimental equipment is under test at Rotorua for measuring the electrical conductivities of thermal waters.

Schlumberger Well-logging Apparatus.—This enables electrical properties of rock strata to be determined by apparatus lowered down a borehole.

Calibration of Vibration Detectors.—A shaking-table for the testing and calibration of seismographs, geophones, and other vibration pickups has been designed. The table will be 2ft. square and will be capable of carrying instruments weighing up to 150 lb. The table can be given a horizontal or vertical motion of controllable amplitudes within the range 10^{-3} to 10^{-8} in. and of controllable frequency within the range 0·01 seconds to 10 seconds.

Embedded Strain-gauges.—Considerable importance is attached to the design of a new form of strain-gauge which can be embedded in a reinforced-concrete mass so that determinations of static or dynamic strain in large building structures, including dams, can be investigated. The Laboratory's attention has been directed towards the production of a unit of small size and high sensitivity, which would be sufficiently cheap to enable large numbers of gauges to be incorporated in a single structure. One promising type of gauge is at present under test; this gauge will detect a movement of approximately 1 millionth of an inch, corresponding to a strain of $2{\cdot}5\times10^{-6}$ approximately.

Geophysical Field Laboratory, Moore's Valley.—An urgent need existed for a non-magnetic building placed on a site free from electrical, magnetic, and vibratory disturbance. Such disturbances can arise from large trees, power electrification, strong tidal ocean currents on nearby coasts, &c. The greatest possible freedom from these disturbances is essential for the satisfactory testing of modern geophysical and seismic equipment. A site was selected at Moore's Valley, adjacent to Wainui-o-Mata, Wellington.

Oceanographic Research.—Opportunity exists in New Zealand for physical study of the surrounding ocean and sea coasts. Lines of investigations include measurements of the temperature and salinity distributions at and below the water surface, observations on tidal currents and their electrical and magnetic effects on coastal sites, measurements of the amplitudes and periods of waves arriving at the coast and their correlation with distant storm areas and movements. The latter study has immediate application to the tracking of storms and the forecasting of surf. Other problems concern wave action on harbour-works and coastal erosion and deposition. At the present time the serious study of physical oceanography is only just beginning in this country, and this year the Laboratory has made a start by constructing a simple form of wave-pressure element which may be immersed in the sea and connected to a recorder on shore.

ELECTRICAL, ELECTRONICS, AND ACOUSTICS LABORATORY

Portable Dynamic Strain-gauge Equipment.—The importance of strain measurements in building structures has already been mentioned. Resistance strain-gauges that may be readily attached to steel members are in common use, and work already conducted for the Ministry of Works indicated the need for equipment capable of recording simultaneously the dynamic strains indicated by a number of gauges. A multichannel cathode-ray oscillograph and camera with associated amplifier circuits, into which the output of six gauges can be fed, is being built for field use. Strain variations of frequencies up to 200 cycles can be recorded.

Wool Medullometer.—The hairiness of a wool staple is observed by immersing the staple in benzol, which is of such a refractive index that only the hairy fibres are visible. An estimation of the hairiness can be obtained from the light reflected by the hairs, and this light is measured by a photo-electric cell. The development of a meter working on this principle was completed this year, and equipment handed over to the Massey Agricultural College.