

Strain-gauging on Engineering Structures.—Dynamic strain-gauge tests were made for the Ministry of Works on a bridge near Napier. Continuous records were taken of bridge vibrations as a heavy load was driven across the bridge at various speeds. Experimental results showed evidence of resonance at truck speeds of 25 and 50 m.p.h. and gave a close correspondence between the observed and calculated natural frequency of the bridge. Similar tests were made on a reinforced-concrete girder bridge at Paremata.

DESIGN

River-stage Recorder.—A prototype recorder is under construction for the Rivers Control Council for providing a continuous record of river-levels in remote locations. The instrument will measure river-level changes of up to 60 ft. to an accuracy of 1 per cent. of recorded depth.

Hardboard Experimental Plant.—Satisfactory samples of hardboard have been produced from Southland beech and pinus. The latter wood appears surprisingly easy to manipulate.

Mobile Drilling-rig.—This equipment has been under test in Southland. Faults have been corrected and the drill is now operating successfully.

Sound-film Modulator.—The sound-film modulator was designed and built for the National Film Studios. It is essentially a light valve for recording sound on film by the variable area method.

Molecular Still.—In 1946 the Laboratory designed and built for an Auckland firm a high-vacuum short-path molecular still, which has since been successfully used for the commercial extraction of vitamin A from fish oils. A second still for the same firm to the same general design, but incorporating a number of improvements, was built during the year.

Fractionating Molecular Still.—This is a new type of molecular still, and uses a specially shaped condenser rotating in conjunction with and close to the inner surface of a cylindrical evaporator on the inner surface of which the distilland flows. This design should give a much greater fractionating efficiency than other types, and provisional patents have been taken out. An experimental model is being built.

Seismographs.—A number of seismographs of the Wood Anderson type were designed and built during the year for installation at the Seismological Observatory, Apia, and at stations in New Zealand.

Magnetic Tone Wheel.—This instrument, which is to be used for measuring speed fluctuations in sound-recording equipment, was completed for the New Zealand Broadcasting Service.

Pilot-balloon Timer.—The Meteorological Branch of the Air Department asked for a timer that would give an audible signal for five seconds every one or two minutes. This was designed and built, and is being used for timing observations by radar or visual methods on pilot balloons.

Vehicle Volume Counter.—A counter that records the number of vehicles passing along a road was designed and built for the Transport Department. The record consists of a paper tape on which is printed, at half-hourly intervals, the total number of vehicles that have passed over a rubber tube stretched across the road.

Ultracentrifuge.—This equipment will be used by the Plant Chemistry Laboratory of the Department for studying the molecular weights of proteins and other substances. It consists of an air-driven turbine with a maximum speed of 60,000 revolutions per minute. A rotor is attached to the turbine and holds samples of the substance to be studied. The optical system is of the "Schlieren" type and photographic records will be made. The equipment is now being built in the workshops.

Travelling Grid Intervalometer.—This instrument, for timing camera exposures in aerial mapping-work and at the same time compensating for varying terrain, has been delivered and tested, with very satisfactory results.