

These observations and the wave records are being examined by two methods: firstly, by that of frequency analysis by the Admiralty analyser; and secondly, by the development of correlograms and periodograms by treatment of the data in punched-card machines following a method devised by Mr. I. D. Dick of the Applied Mathematics Laboratory.

*Sea Temperatures.*—Two surface recording thermographs have arrived. Tests of these, attached to the sides of launches at anchor in Island Bay and Makara, showed a consistent difference of some 3° F. between the two localities. The thermographs will be installed as opportunity offers on naval or other vessels. An insulated water-sampler, with three protected thermometers, has also arrived; it is intended to use this on H.M.N.Z.S. "Lachlan" for deep-water temperature observations. Three bathythermographs are on order from the U.S.A., of which two are expected in May. A programme of surface observations by interested launch or fishing-boat operators, using bucket and thermometer, has been commenced in the Pelorus Sound, Queen Charlotte Sound, and Nugget Point areas. This is expected to give data on temperature variations and distribution which will help to define problems for more detailed study.

*Microseisms.*—Analysis of seismograph records of microseisms by the frequency analyser should greatly facilitate the study of the relations of microseisms to weather conditions and to waves. Methods of conversion of the records to the form required are being developed.

*Other Investigations.*—Using equipment of the Geological Survey, a few records have been obtained of the ground vibrations caused by surf; these offer, amongst other things, a convenient method of recording surf periods from a shore installation.

A series of observations, made recently at Tongue Point and Makara by Banwell and Olsson of the Dominion Physical Laboratory, showed the possibilities of obtaining information on tidal or other currents by the ground potential differences produced between pairs of electrodes on shore. It is intended to extend this work at other points where the disturbing effects of tram-line currents are less prominent, and sites for tests near Cape Campbell and Greymouth have been selected.

A library of books and periodicals relating to physical oceanography is being accumulated.

## GRASSLANDS DIVISION

Acting-Director: Mr. E. A. MADDEN

### STAFF

The Director was in Europe during the year under review attending the Fifth International Grassland Congress in Holland and delivering a series of lectures in the British Isles at the request of the United Kingdom authorities. One senior officer attended a Commonwealth Specialist Agricultural Conference in Australia.

Special research work at substations has not proceeded at the desired rate owing to shortage of professional staff. Technical staff recruitment has also been below requirements.

### PLANT-BREEDING

The standard of the pedigree strains of pasture plants already produced is being maintained and improved by further breeding. As improvements are made, nucleus seed stocks are handed over to the Department of Agriculture for further increase under the Government seed certification system. The stage