

at the end of that year. Since that date, however, most cities and towns have adopted daylight saving for varying periods in the summer months. Several provinces have recently placed legislation on their statute books making daylight saving time mandatory, either throughout the province or in certain areas. However, Saskatchewan operates on central standard time the year round and Alberta passed a Daylight Saving Time Act applying to the summer of 1964 (SA 1964, c. 18) prohibiting the use of daylight saving time in the province, except in certain cases.

PART IV.—GEOPHYSICS AND ASTRONOMY

Section 1.—Geophysics*

Geophysics is the study of the earth, including the oceans and atmosphere, by the methods of physics. Because it extends over such a very wide range of topics, it is generally divided into seven fields, each a well developed science in itself. Of these, one of the oldest is geodesy, the study of the earth's shape, and of variations in the gravitational attraction of the earth, which are related to the shape. Seismology originally was the study of earthquakes but it now includes investigations of the earth's interior by means of vibrational waves, which may be produced by explosions as well as by earthquakes. Meteorology deals with the atmosphere, and hydrology deals with the surface waters of the earth, excluding the oceans but including ice and snow. The study of the oceans, their currents and bottom profiles, forms a subject in itself—oceanography. Geomagnetism is involved with the earth's magnetic field and with many related phenomena, such as the ionosphere and the radiation belts that surround the earth. Finally, volcanology is the study not only of existing volcanoes but of volcanoes of the past and of the rocks they produced.

The seven fields all deal with the investigation of some major property of the earth. They may be considered as pure sciences but it is apparent that they all have applications that are vital to modern life. The findings of geodesy on the precise shape of the earth are needed for accurate maps. The search for minerals and oil by scientific methods makes use of the techniques of gravity measurements, seismology and geomagnetism. Meteorology obviously has great practical importance, and the contributions of hydrology to water supply problems and of oceanography to the fisheries are also very large. The following paragraphs cover 1963 activities in the different fields of geophysics.

The Geodetic Survey, Department of Mines and Technical Surveys, extended its network of triangulation, which provides, very accurately, the positions of points on the earth, to Coppermine on the Arctic coast, to Chesterfield Inlet on Hudson Bay, and to near Fort Chimo in northern Quebec. Precise levelling was continued in several provinces, and, in some areas, significant changes in level of the land surface from the time of previous surveys were indicated. The most important of these was in the Lake St. John area of Quebec, where an uplift of one foot in forty years has taken place. Measurements of gravity, which provide information on both the earth's shape and on geological structures, were made by the Dominion Observatory, Department of Mines and Technical Surveys, and by university and commercial groups. The Dominion Observatory work included a survey of a large area in northern Ontario, using helicopter transport, as well as measurements in the Gulf of St. Lawrence, using an instrument lowered to the bottom from ships. The Bedford Institute of Oceanography, Department of Mines and Technical Surveys, conducted extensive tests on gravity meters suitable for use on ships at sea.

The network of seismological stations in Canada, operated by the Dominion Observatory, was extended to include 19 stations, with four more under construction. Some of these stations are on or near university campuses, and are operated in co-operation with university departments. The network is sufficiently extensive and well equipped to

* This submission, prepared by Dr. G. D. Garland, Geophysics Laboratory, University of Toronto, Toronto, covers all Canadian activity in the field of geophysics. The surveying and mapping activities of the federal Department of Mines and Technical Surveys, of necessity included here, are also covered in different form in the article on pp. 17-24.