

the water, and plankton content. Cruises have been made in the North Pacific to longitude 165° W and along the inlets of the British Columbia coast. On the East Coast, observations have been made along the Scotian shelf and north to Davis Strait. In connection with the Polar Continental Shelf Project, oceanographic measurements are being extended throughout the Arctic islands wherever possible. Similar measurements have been extended in the waters of the Great Lakes by the Great Lakes Institute of the University of Toronto.

While there are no active volcanoes in Canada, many of the physical studies that can be made of rocks are grouped under volcanology. The dating of rocks by radioactive methods has been especially important in this country, because of the great area of the Canadian Shield in which there are no fossiliferous rocks which can be dated by palaeontological methods. Laboratories of the Geological Survey and the Universities of Toronto, British Columbia, Alberta and St. Francis Xavier have been active in this study, which is based on the slow accumulation in rocks of certain elements formed from the radioactive decay of others. Ages as great as 2,700,000,000 years have been determined for some of the rocks of the Canadian Shield.

Late in 1961 it was announced that Canada would participate in an international study of the earth's interior, particularly the solid mantle that lies below the outer crust at a depth of some 20 to 30 miles. The project, known as the Upper Mantle Project, is being organized by the International Union of Geodesy and Geophysics, to which this country adheres, and will extend from 1962 through 1964. Those fields that deal with the solid earth—such as geodesy, seismology and geomagnetism—will play an important role in the project, which is expected to yield valuable information on the earth's interior. One major result may be a better knowledge of how and where mineral deposits are produced and emplaced in the earth's crust.

Section 2.—Astronomy

The modern era of astronomy in Canada may be said to have begun in 1905 with the completion of the Dominion Observatory at Ottawa, the national observatory of Canada. Prior to that time, an astronomical observatory established in 1851 at Fredericton, N.B., was used for a short time to determine the longitude of that centre and for general astronomical purposes; it has been rehabilitated as a historic monument. Other small observatories were established, one at Quebec City in 1854 and one at Kingston in 1875. Astronomical instruments were to be associated with the Magnetic Observatory built by the British Government at Toronto in 1839 but there is no record of their being set up until 1881. A small observatory established at McGill University in 1879 was used for many years for time observations.

Today, an increasing number of universities and other scientific organizations are devoting a substantial part of their efforts to the study of astronomy and astrophysics. The Dominion Observatory at Ottawa, which with its sister institutions is administered by the Department of Mines and Technical Surveys, specializes in the astronomy of position, solar physics, meteoric astronomy and various branches of Geophysical work. This Observatory also maintains a subsidiary (the Dominion Radio Astrophysical Observatory) near Penticton, B.C., for the study of Radio Astronomy. Also associated in the same group is the Dominion Astrophysical Observatory at Victoria, B.C., which devotes its efforts to the motions and physical characteristics of the stars and of inter-stellar material. Other Federal Government institutions carrying out meteoric and radio astronomy, including a study of the upper atmosphere by essentially astronomical methods, are the National Research Council and the Defence Research Board. Solar observations at the Algonquin Radio Observatory of the National Research Council, located in Algonquin Park 150 miles west of Ottawa, are now under way. The program is being extended to