

In the field of geodesy, the work of precisely locating points upon the earth's surface is performed by the Geodetic Survey, Department of Mines and Technical Surveys. Nets of triangulation, the basis for the most accurate horizontal control, were extended toward the Arctic Coast in the Northwest Territories and in northern Quebec. Research was continued on the electronic measurement of distances, which has been widely used throughout the North for preliminary geodetic surveys and now promises to accelerate the precise location of points. The Geodetic Survey is also responsible for determining the height of the land surface above sea level and during the year it extended its network of level lines. Measurements of gravity are used to determine the shape of the sea level surface of the earth and a broad program of observations over the country is being conducted by the Dominion Observatory, Department of Mines and Technical Surveys. During 1961, measurements were made in Eastern Canada north to Ungava Bay, by a party using *Beaver* aircraft for transportation and landing on lakes to make the observations. Gravity readings provide information on the structure of the earth's crust as well as on the shape of the earth, and a large number of observations were made in the Arctic as part of the study of the polar continental shelf. Many of these were made on sea ice. Some measurements were made in Hudson Bay by lowering an instrument to the bottom. A number of universities, notably the University of Manitoba, include gravity measurements in the study of geological structures and the method is also used in the reconnaissance phase of oil exploration in Western Canada.

The recording of waves from earthquakes is an activity of the Dominion Observatory, which maintains seismograph stations at Halifax, Montreal, London, Alert, Resolute, Mould Bay, Pentteton, Victoria, Banff and Shawinigan, as well as at Ottawa. This represents a considerable expansion over previous years, and more stations will be established until they are located at intervals of 500 miles over the entire country. The detailed study of waves that have passed through the earth is one of the most powerful methods of studying the interior, and also provides an important method of detecting nuclear explosions. Theoretical investigations on the stress systems in the earth responsible for earthquakes are in progress at the Dominion Observatory and the University of Toronto. Seismological studies using explosions are useful in studying geological structures in the earth's crust, and measurements of this type were made by the Geological Survey, Department of Mines and Technical Surveys, in Sverdrup Basin, as part of the Polar Continental Shelf Project; in the vicinity of Vancouver Island by the University of British Columbia; and in northern Manitoba by the University of Saskatchewan. Seismic studies continue to be the chief geophysical method used in oil and gas exploration, with most of the operations being conducted in the winter because of muskeg conditions in northwestern Canada.

The Meteorological Branch of the Department of Transport is responsible not only for routine meteorological observations and forecasting but also for research into the physics of the earth's atmosphere. The other principal research centre in the field is the Department of Meteorology, McGill University. Canada offers a large scope for meteorological research because of the importance of the arctic air mass to the weather of a large portion of the world, and the existence of the jet stream of high wind velocity that crosses the country. Current interest includes the increased use of high-speed electronic computers to solve the complex problems encountered. Special programs involve the use of radar methods to study stormy weather conditions, in particular hail-producing storms in Alberta. A series of measurements on the speed of sound through the air from the explosion in August of 100 tons of TNT by the Defence Research Board at Suffield, Alta., is being analysed at the University of Alberta to provide information on upper air temperatures.

The importance of water as a national resource is being increasingly recognized and work in hydrology plays an important role in water conservation. Studies in surface waters, run-off, snowfall accumulation and underground water movements are included in the programs of the Water Resources Branch, Department of Northern Affairs and National Resources, and of several provincial groups and universities. Research in the field involves both field studies to provide the basic information and theoretical work on