

Surveys co-operates with the Division of Building Research, National Research Council, in defining regions of seismic activity throughout the country, in order that building specifications may be adapted to local conditions. As part of the International Upper Mantle Project, a number of studies of the crust and underlying mantle were carried on using seismic waves from large explosions. Groups from the Universities of British Columbia, Alberta, Manitoba and Toronto, and Dalhousie University, in addition to the Polar Continental Shelf Project, Dominion Observatory and Geological Survey, carried out investigations of this kind. Information on the thickness and composition of the crust is becoming available for many parts of Canada as a result of this work. Similar operations, conducted in more detail over limited regions, form the chief geophysical method used in the search for oil and natural gas. Laboratory measurements on the physical properties of rocks under high pressures are important for the understanding of the state of the earth's interior. Although this has been a neglected field in Canada, experimental work is now in progress at the Mines Branch, Department of Mines and Technical Surveys, and at the University of Western Ontario.

In meteorology, the routine operations of the Meteorological Branch, Department of Transport, were continued. The Branch also conducts research in meteorology and supports research projects at universities through a series of grants. The only department of meteorology in a Canadian university is at McGill University, Montreal, but an increase in meteorological research is notable at other universities, such as Toronto, where it is conducted within the Department of Physics. Canada co-operates with other nations in the exchange of weather information and in the standardization of weather reporting, by membership in the World Meteorological Organization.

Measurements and research in hydrology continue to expand, as the need to examine the extent of water resources becomes apparent in many parts of the country. The overall study of water resources is the responsibility of the Water Resources Branch, Department of Northern Affairs and National Resources, but studies in particular areas are conducted by provincial research councils, universities and groups, such as the Prairie Farm Rehabilitation Administration. Research was continued on such topics as estimating run-off from snow cover, evaporation from reservoirs, and the relation between meteorological conditions and floods. The problem of locating ground-water by surface exploration often brings other geophysical methods into play. The Geological Survey continued an investigation of local seismic measurements for the purpose of detecting water-bearing structures, and the Saskatchewan Research Council has had success using electrical measurements on the surface to locate buried river channels.

Perhaps no field of geophysics has grown more rapidly in Canada during recent years than glaciology. Glaciers in the western mountains are important as a source of water for many rivers, while those in the Arctic provide a record of climatic change. In 1962 field parties investigated glaciers in the Rocky, Selkirk, Monashee, Cariboo and Coast Mountains of Western Canada, and on Baffin, Devon, Melville, Axel Heiberg, Meighen and Ellesmere Islands of the Canadian Arctic. These groups represented the Defence Research Board, the Department of Mines and Technical Surveys, several universities, and other organizations such as the Arctic Institute of North America and the American Geographical Society. The work included accurate mapping of existing glaciers, determination of ice thickness, studies of glacial flow, and the breaking up of ice shelves to form ice islands.

Investigations of the earth's magnetism and its changes with time are important for a number of reasons. The use of the compass in navigation is an obvious one but magnetic measurements can also be used to study the earth's interior and to locate mineralized bodies in the earth's crust. Short-period disturbances in the earth's magnetism result from the bombardment of the earth by electrically charged particles from the sun. These disturbances can cause serious disruption of radio communication, particularly in northern regions. The strength of the magnetic field over Canada is determined by measurements, both airborne and ground, conducted by the Dominion Observatory, which also operates observatories to record the changes of the field with time, at Agincourt, Ont., Meanook, Alta., and Baker Lake, Resolute, Alert and Mould Bay, N.W.T. Airborne