

*The Mines and Geosciences Group.*—This Group contains four branches—the Mines Branch, the Geological Survey of Canada, the Observatories Branch and the Surveys and Mapping Branch.

The *Mines Branch* is a large laboratory and pilot-plant complex carrying out applied and basic research to discover new and better methods of ensuring mine safety, extracting and refining ores and other minerals, and using metals and minerals in industry and defence. Gratifying results have been achieved in the extraction of metals from ores and in the refining of low-grade crude oil, in the automation of grinding circuits and cyanide leaching processes in gold mills and in the leaching of ground or crushed uranium ores by bacteria. In pyrometallurgy—the extraction of metals by heat—applied research is concentrated principally on the combination of shaft and electric furnaces for smelting iron ore. In petroleum refining, research concerns hydrogenation, catalytic cracking, and catalyst development. This work is highly significant because of the opening-up of unconventional sources such as the Athabasca tar sands and the so-called Colorado oil shales, whose economic importance has been recognized by the Mines Branch for many years. A close tie-in with producers is maintained in mineral processing in which the emphasis is on the concentration of metallic ores and on the processing and improvement of industrial minerals. In the field of mineral sciences, the physical, chemical, crystallographic and magnetic studies being undertaken on sulphide minerals are of fundamental interest. In physical metallurgy, experiments on new alloy combinations continue to yield valuable practical benefits for Canadian industry.

The Mines Branch, on the advice of experts from industry and the universities, also awards an annual series of research grants in mining sciences to Canadian universities. In 1966, the total amount to be distributed annually was raised from \$50,000 to \$100,000.

The *Geological Survey of Canada* carries out geological investigations in Canada and compiles and publishes information in the form of reports, maps and other graphic representations. The scope of its activities extends into many aspects of the geological sciences, including geochemistry, geophysics, geomorphology, mineralogy, palaeontology, petrology, surficial and bedrock geology, and petroleum geology. The Survey's objectives are to systematically study, describe and explain the geology of Canada in order to find out more about the nation's potential mineral resources, and to provide this information to those engaged in discovering, exploring and developing these resources; to increase fundamental knowledge on the origin of rocks and minerals and to develop new theories, methods and instruments; and to help in the scientific training of young Canadians in these fields. Each year, the Geological Survey sends about 100 parties into many parts of Canada. They conduct broad regional investigations in the Canadian Shield, the Appalachian and the Cordilleran geosynclinal belts, the sedimentary basins of the mainland and the Arctic Archipelago, and unconsolidated sediments. As the first systematic reconnaissance of Canada is approaching completion, the country's major geological features are reasonably well known and attention is now given to more fundamental aspects of Canadian geology. An example is the recently concluded agreement with the Province of Quebec for a jointly financed aeromagnetic survey on both sides of the lower St. Lawrence River. The agreement is part of a 12-year \$18,000,000 federal-provincial program of aeromagnetic surveys.

The headquarters of the Geological Survey are at Ottawa but it has several regional offices and a recently opened Institute of Sedimentary and Petroleum Geology in Calgary, which will serve the special needs of the western provinces. The Survey each year awards a large number of grants in support of geological research in Canadian universities, at present totalling \$150,000.

A great deal of geophysical work of interest to prospectors is being carried on by several divisions of the *Observatories Branch*. Its airborne geomagnetic surveys, which have ranged all over Canada and across the Atlantic to Scandinavia, have become famous.