

detailed mapping by provincial and company geologists. In areas under development, the Survey does more detailed mapping to supply industry with the geological key to the structures of orebodies.

Each year more than 100 parties are placed in the field. Field officers send rock and mineral samples to the many laboratories at Survey headquarters for various tests and analyses and the information obtained from these investigations is published in the form of maps and reports. In 1963, requests were received for some 320,000 geological maps and reports.

The Survey continues to press forward with its first priority, the reconnaissance geological mapping of Canada, in the interests of national development. The introduction in 1952 of the use of the helicopter and fixed wing aircraft as operational support has resulted in the more efficient coverage of much larger areas and has brought much closer the completion of this project. At the end of 1963, the Survey had published maps covering about 65 p.c. of the country on a scale of one inch to eight miles or in more detail. And the new program is already paying dividends. For example, the reconnaissance mapping of the central and western Arctic islands has revealed the region's oil potential with the result that petroleum companies are now engaged in major exploration programs in the islands, which is undoubtedly the largest petroleum reservoir in Canada and perhaps in North America.

Although the Survey's principal effort, about half the cost of all field parties, is devoted to reconnaissance investigations, other parties continue to do four-mile bedrock mapping and to carry out a wide variety of investigations, including detailed studies of bedrock and surficial deposits, geophysics, groundwater, geochemistry and engineering geology. A recent major mapping project was an all-out effort involving bedrock geology, geochemistry, geophysics and the study of overburden in a 50,000-sq. mile area in the Patricia District of northwestern Ontario, in connection with the Federal Government's Roads-to-Resources Program. This project, begun in 1959 and completed in 1961, was a co-operative effort with the Ontario Provincial Government. The resultant geological, geophysical and geochemical maps enabled the respective departments to select the areas most likely to produce mineral wealth and to select the routes for the roads to these areas. The success of this venture prompted the Federal Government, through the Geological Survey, to begin in 1961 an \$18,000,000 federal-provincial program of aeromagnetic surveys of the Canadian Shield and bordering areas to be completed within 12 years. The surveys are being made, under contract, by various established survey companies and their cost is being shared equally by the province concerned and the Federal Government; surveys in the Yukon and Northwest Territories are financed by the Federal Government.

The Geological Survey has offices in three provinces and both territories—at Vancouver, B.C.; Calgary, Alta.; Whitehorse, Y.T.; Yellowknife, N.W.T.; and Dartmouth, N.S. These offices are staffed with resident geologists.

**Geophysical Surveys.**—Geophysicists of the Geological Survey of Canada and the Dominion Observatory conduct and interpret geophysical surveys as an aid to the understanding of the geology of Canada and the nature of the earth's interior. Their work also includes research on the development of new geophysical methods and instruments.

Recent projects include: continued investigation and evaluation of the extent to which aerial and colour photography and aeromagnetic data can be used to facilitate and expedite geological mapping; seismic surveys in various parts of Canada to establish the existence of buried channels and depths to Precambrian or other bedrock surfaces; a resistivity survey in southern Manitoba to delineate near-surface groundwater-bearing zones; a sea-magnetometer survey off Newfoundland and Nova Scotia in the study of the continental shelf; and a micromagnetic survey in northwestern Ontario to investigate known magnetic anomalies in some Precambrian iron-formations. Hammer seismic surveys were used successfully in the Moncton area of New Brunswick to outline bedrock surface and buried depressional features, which may be of assistance in groundwater