

provincial and private agencies and, to avoid duplication, the Department co-ordinates its work with these bodies. Other types—such as hydrographic and aeronautical charts—are produced exclusively by the Department.

The staff of the Department numbers about 4,000, of whom 1,000 are scientists and engineers and 1,300 are technicians. Each year, some 1,500 men are sent into the field to make surveys and to carry out research. Of the various Branches and Divisions, the following are particularly concerned with surveying and mapping: Surveys and Mapping Branch (geodetic and topographic surveys, electoral maps, aeronautical charts); Marine Sciences Branch (hydrographic charts of sea coasts and inland navigable waters); Geological Survey of Canada (geological features); and Observatories Branch (geophysical maps).

**Types of Surveys.**—In the field of geodesy, the Geodetic Survey maintains and extends a network of horizontal and vertical control points across Canada. At present, most of the extension work is in the northern parts of the country, whereas in the south greater density and the closing of gaps are the main tasks. The ultimate aim is to have horizontal and vertical control points no farther apart than 20 miles. During the summer of 1966, 20 geodetic parties were in the field extending or strengthening the horizontal and vertical network. In addition, the Geodetic Survey participated in the Satellite Triangulation program in co-operation with the United States Coast and Geodetic Survey. In this program, highly visible artificial satellites are photographed against a star background simultaneously at widely separated points, whose relative distances and positions can then be calculated.

The Topographical Survey is proceeding with the establishment of control points at smaller intervals and the mapping of the country at the most popular scales—1:25,000, 1:50,000 and 1:250,000. Complete map coverage of Canada at 1:250,000 is expected to be completed in 1967. This series will have approximately 925 maps which will be kept up to date by continuing revision. Of the 1:50,000 series, about 7,250 different maps are available, representing one third of Canada's land area. Another 500 maps at the 1:25,000 scale, or 2½ inches to one mile, cover the major cities. The Topographical Survey had 36 officers in the field in 1966, and collaborated with the Geodetic Survey in several municipal control surveys aimed at providing Canadian cities with a firm, permanent basis for planning public works, redevelopment, expansion and other projects.

The Department of Energy, Mines and Resources also carries out legal or property surveys on Crown lands, such as the two northern Territories, the National Parks and Indian reserves; it participates in the survey and demarcation of interprovincial and territorial boundaries; is responsible for the preparation of descriptions and diagrams of federal electoral districts; and is the sole agency in Canada for the preparation of aeronautical charts showing airports, airways, and radio and other aids necessary for air navigation. During 1966, 17 field parties carried out legal surveys in public lands; all work connected with the northern boundaries of Manitoba and Saskatchewan, and the northern part of the boundary between the two provinces, was completed; and five interprovincial and territorial boundary commissions were active. Two new series of aeronautical charts were produced, one to inform aviators of standard instrument departure and the other for the use of traffic controllers at busy airports.

As a service to map-makers and others interested in that field, the Department maintains the National Air Photo Library, a collection of all air photographs taken by or for the Federal Government. During 1966, the Library received 60,803 new photos, bringing the total collection to well over 3,000,000. The sixth edition of the *Air Photo Coverage Map of Canada* was made available to assist users with their orders.

Hydrographic and oceanic surveys in Canada's navigable waters and the adjacent oceans are conducted by the Department's Marine Sciences Branch. Operations are directed from Ottawa and carried out through three regional offices—the Bedford Institute of Oceanography on the Atlantic Coast, the Pacific Coast Regional Office at Victoria and the Central Regional Office at Ottawa. For its surveys and research work, the Branch