

Brant IV will be a combination of *II* and *III* and will go to a height of about 600 miles. *Black Brant V* is an optimum design of the *II*. Most of the flights have been made with the *II*'s but the *III*'s have been tested and these and the *IV*'s will be coming into use in 1964.

Along with the increased activity in Canadian space programs there has been a general broadening of interests. The Meteorological Branch of the Department of Transport (DOT) has formed a Meteorological Satellite Data Laboratory in order to promote applications of satellite observations to the problems of meteorology and ice reconnaissance. In the field of communications satellites, the DOT has reached an agreement with NASA whereby Canada will participate in the testing of such spacecraft as *Telstar*, *Relay* and *Syncom* and an experimental ground station is planned to obtain information for the development and use of communication satellite systems.

It would be quite misleading to suggest that space programs are limited to government departments. Canadian universities are now very active in this field. At present there are nine university groups preparing instruments for rockets, balloons or satellites for upper atmospheric studies. Canadian industry is also filling an important role in the space age. Civilian contractors are producing both instruments and space vehicles. Other firms have entered the field of system design and are providing high-level consulting service on problems pertaining to communications satellites. Important fundamental research on materials and in the field of plasma physics is also being carried on in industrial laboratories. This industrial contribution to the Canadian space effort is increasing and must now be counted as a very important part of its space programs.

Section 4.—Other Scientific and Industrial Research Facilities

This Section outlines research facilities and activities other than those covered in Sections 1, 2 and 3—various federal departments and agencies, provincial organizations, universities and industry. The first three types of institutions—federal, provincial and university—have, of course, an interest in problems of industrial significance. As already stated, though many Canadian industries now possess research facilities—some of them quite extensive—much of the industrial research to date has been done under government auspices.

Subsection 1.—Federal Organizations

Research activities in the various Federal Government departments and agencies have expanded rapidly, at first because of the need for speeding up the production of raw materials, which were for many years the basis of Canada's export trade, and later because of increasing interest in the processing of raw materials, the necessity of meeting the needs of national defence and the developing consideration for many human and resource requirements. In addition to the activities of the National Research Council and Atomic Energy of Canada Limited, dealt with in Sections 1, 2 and 3, federal agencies involved in research include the Departments of Agriculture, Forestry, Fisheries, Mines and Technical Surveys, National Defence, National Health and Welfare, and Northern Affairs and National Resources.

The scientific work of the Department of Agriculture is described in Chapter XI of this volume, the investigations conducted by the Board of Grain Commissioners in Chapter XXI, the specialized work in scientific forest research in Chapter XII, scientific services concerned with Canada's mineral resources conducted by the Department of Mines and Technical Surveys in Chapters I and XIII, investigational work of the Department of Fisheries in Chapter XV, research of the Canadian Wildlife Service of the Department of Northern Affairs and National Resources in Chapter I, medical and other research conducted by the Department of National Health and Welfare and other agencies in Chapter VI, and the work of the Defence Research Board in Chapter XXVII.