ganized three years ago by the National Research Council. It represents federal government departments and universities across Canada which have problems in geophysics. Chairman of the Canadian Committee is Dr. D.C. Rose, expert in cosmic rays at the NRC. Dr. Rose is also chairman of a small co-ordinating group which includes Dr. C.S. Beals (Dominion Astronomer), Mr. F.C. Davies (Assistant Chief Scientist of the Defence Research Board), and Dr. D.W.R. McKinley (Assistant Director of NRC's radio and electrical engineering division).

Highlights of the Canadian Programme

A chain of Canadian weather stations stretching from Alert, on northern Ellesmere Island, to Winnipeg, is part of a great band of meteorological observatories extending to the South Pole. The object of this pole-to-pole link-up is to learn exactly how heat and cold are exchanged between the tropics and the poles, and how events in the high levels of air affect weather factors at ground level.

Canada will play a big part in the world study of the aurora. Two lines of auroral stations are now spaced out under the zone of the Northern Lights, one line passing through Fort Churchill, the other still farther West. Here measurements will be made continuously by photography, radar, and other methods for recording light intensities and the gases present in the aurora. Across Canada thousands of visual studies of the Northern Lights will be made by trained amateur observers. By combining all the information complete records of the aurora in Canada will be obtained and then transferred to maps. A map will be made up for each 15 minutes of auroral occurrence. The field programme will be directed largely from the University of Saskatchewan; the compiling and mapping will be done in Ottawa at the National Research Council. During the IGY, when the sun will be near the peak of its sunspot cycle, Northern Lights will be more frequent and spectacular than at other times. Scientists want to know basic facts about the aurora, how it is formed and why it occurs as it does; but the study may also assist radio science, weather forecasting, and extend our knowledge of the sun and the earth's outer atmosphere.

For research in cosmic rays a mountain-top observatory has just been completed on Sulphur Mountain, near Banff, at an altitude of 7,500 feet. At this elevation the bombarding particles are less affected by collisions with air molecules than they are at sea level. On Sulphur Mountain the intensities of incoming cosmic rays, as they vary with the sun's activity will be recorded by "neutron counters", special Geiger tubes which are connected to automatic recording equipment. Cosmic ray "telescopes" will also be used to measure the angle at which the particles approach.

Cosmic rays appear to come from outer space though their intensity is sometimes influenced by storms in the sun's atmosphere. They enter the earth's atmosphere constantly and from all directions. They are changed particles, that is atoms or parts of atoms, some of which have extremely high energies and great penetrating power. Cosmic ray research over the past 50 years has helped to open up the world of the atom; their further study may reveal much about the nature of the universe.

Two glaciological expeditions in Canada are already at work, one on the Salmon River Glacier in British Columbia, the other on the icecap of Ellesmere Island, the most northern territory of Canada. The quantity of the world's water which is trapped on ice is important in determining weather conditions, sea levels and ocean currents. Only by measurements over many years can scientists discover whether the world's ice deposits are decreasing or whether we are on the verge of a new ice age. The deep layers of glaciers may reveal the age of the ice masses and how fast they have been accumulating; they may also give clues to meteorological conditions of previous centuries.

At many locations in Canada radio "sounding" will explore the ionosphere. This is a region of electrically charged gases extending from about 50 to 250 miles above the earth, and which is extremely useful to man because it reflects radio waves over long distances, linking stations all over the world. Unfortunately the ionosphere is unstable, and frequently long-range radio communications break down, especially at times when the sun is unusually active. The theory is that sun flares -- violent eruptions in the sun's atmosphere which occur with the sunspot cycle -- greatly alter the electrical properties of the ionosphere, and either break up or lower the reflecting layers. The choice of wavelengths used in broadcasting is critical during such disturbances. New techniques are being developed to extend the range of radio and television; but big improvements may require a better understanding of the ionosphere.

The meteor programme of the IGY is not designed to answer practical questions; but information about meteors is of increasing value to engineers who need to know more about the upper atmosphere, and even about space itself. The number of meteors arriving in the earth's atmosphere directly affects the electrical properties of the upper levels of air, as well as the dust content of the air in general. Radar echoes from meteor trails serve as a check on upper atmosphere conditions; photographic timing of the speed of meteors shows how fast the meteors are being slowed down, and this measure of air density is of interest both to weathermen and to ballistic experts working on problems of long-range missiles. Some investigators have related meteor showers

(Continued on P. 6)