special effort is made in the types of measurements that are difficult or too expensive to carry out continuously. The problem of communications and rapid exchange of information was one that arose particularly because a series of world days were planned that could not be selected in advance but were called often on short notice when solar, magnetic, ionosphere and aurora observations suggested unusually enhanced solar activity. A predicting centre for such days was set up at Fort Belvoir, Virginia, near Washington. Up to July 1, 1958, that is during the first year of the IGY, the number of alerts broadcast was 27 and 13 special world intervals were called. However, by far the largest part of the program was organized on a continuous basis and in such cases the calling of special world intervals makes very little difference to the measurements taken. Expensive experiments like the firing of rockets into the upper atmosphere might depend on the prediction of solar activity but usually these have to be carried out very close to a time planned in advance and often cannot be held to await some unusual activity on the sun. The world intervals that were planned in advance of the program, such as quarterly periods of ten days during which enhanced meteorological measurements are taken, do not involve any special problems in communications.

A very dominant part of the whole IGY program is a study of the effect of the sun on the geophysical phenomena that strongly influence man's environment on the surface of the earth. This applies to very practical problems like studies in meteorology and radio propagation as well as more academic research on the radiation from the sun that is completely absorbed by the atmosphere and, therefore, can be measured only indirectly or by penetrating the atmosphere with balloon-borne, rocket-borne or satellite-borne instruments. The disciplines concerned are meteorology, geomagnetism, aurora and airglow, ionosphere, solar activity, cosmic rays and rockets and satellites. Rockets and satellites are, of course, a means to the objective of taking measurements outside the atmosphere but the science of firing them when and where desired and of constructing useful measuring instruments in the space available and of light weight justifies treatment as a specialty.

Much of the upper atmosphere phenomena, such as the electric currents that are believed to cause magnetic storms, changes in the electron density in the ionosphere and the incidence of aurorae are caused in some way by streams of charged particles coming from the sun. These are influenced by the earth's magnetic field in a way that the resulting phenomena show most interesting variations in regions near the magnetic poles. For instance, aurorae are most frequent in a roughly circular band about 20° away from the geomagnetic poles. Churchill in northern Manitoba happens to be just about the centre of this band. In fact Canada has the only readily accessible territory in the world that adequately crosses the aurora band and where stations can be established not only on the band but well north of it. It is not unnatural therefore that in planning the Canadian program responsibilities in this regard were taken very seriously and as tight a chain of stations as was practical were planned. Every station planned in the national report of 1957* has been established in some form. In a few cases, instrumental difficulties or difficulties in getting staff or accommodation at remote points has been a limiting factor but it is no exaggeration to say that Canada's program has been carried out almost as planned, and it is anticipated that at least 90 p.c. of the data that was suggested in the Canadian program will be available when the IGY is over.

Perhaps the most spectacular results of the IGY that can be presented now (October 1958) are the results from measurements taken in rockets and satellites. The general objectives of these experiments are to study the physical and chemical properties of the atmosphere at heights that can be reached only by such techniques and to study radiation from the sun and sky at wave lengths that do not penetrate the atmosphere; the atmosphere is practically opaque to all light or electromagnetic radiation of shorter wave length than the violet end of the visible spectrum. This means that the radiation from the sun or skies cannot be observed in the ultra-violet, soft X-ray, or X-ray region. Even the very

* *The Canadian Program for the International Geophysical Year*, May 1957, published by the Associate Committee on Geodesy and Geophysics of the National Research Council.