GEOPHYSICS

Understanding the Earth

World-wide probe of "space ship" earth starting July 1 will be third such international program since 1882. At least 58 nations are participating officially in IGY; 12 unofficially.

By ANN EWING

➤ THE MOST FAR-FLUNG and intensive study ever undertaken of the earth as a planet starts officially on July 1.

The world-wide program, known as the International Geophysical Year, or IGY, actually lasts 18 months. June is a practice month for testing the organization and far-flung communications system of IGY.

Heading the international program is geophysicist Dr. Sydney Chapman of the University of Alaska's Geophysical Institute and of the High Altitude Observatory, Boulder, Colo. Directing all United States activities for IGY is Dr. Joseph Kaplan of the University of California.

Although the program is aimed at basic science—a better understanding of the earth, its seas and atmosphere—practical benefits are certain to be great. Improved forecasts of weather and radio communications are two outstanding examples.

Early Geophysical Expeditions

The new IGY is the third such international venture since 1882, when 11 nations sent expeditions to the Arctic for 13 months. The observations of weather, northern lights and sudden, strong changes in the earth's magnetic field taken then provided a treasure store of Arctic knowledge.

Like most scientific quests, the 1882-83 International Polar Year disclosed fascinating new problems for further study.

Exactly 50 years after the first polar quest, 20 nations joined in a new Polar Year, again with main emphasis on Arctic studies. This time there were more stations, more observations. One new departure was exploration of the Arctic ionosphere, the region in the upper atmosphere that is electrified, or ionized, and reflects radio waves, thus enabling man to communicate long distances.

First Plans for IGY

The 1957-58 program was born in April, 1950, when Dr. Lloyd Berkner, president of Associated Universities, Inc., New York, first suggested informally it was time for another international look at the earth as a planet. Later that year, Drs. Berkner and Chapman presented formal proposals for a third polar year, and plans were later extended to cover the physical study of the whole earth instead of only its polar regions.

By 1953, 23 nations had decided to join, and a year later, 36 were cooperating, including Russia, which also had taken part in the two previous Polar Years.

Now there are 58 nations officially cooperating in IGY, another 12 joining unofficially. Never before have so many countries joined freely together in so great an enterprise of peaceful scientific research.

Costs and Committees

Each nation bears the cost of its own program, with the world-wide total estimated at $500,000,000. Of this, the U. S. is spending $39,000,000, not including the logistic support by the Defense Department for launching satellites and for Antarctic expeditions.

Within this country, the organization required to coordinate the hundreds of plans is very complex, and an equally complex set-up is needed to guide the international program.

The National Academy of Sciences-National Research Council, top U. S. science organizations, set up the U. S. National Committee for the International Geophysical Year to handle our participation. This is the committee Dr. Kaplan heads. Under him, there is a permanent staff with Hugh Odishaw as executive secretary.

Dr. Kaplan's main committee consists of 20 oustanding scientists and five unofficial advisers, also scientists. This group is advised by three committees covering the three geographical areas of concentration, the rings of stations to be set up in the Antarctic, Arctic and near the equator.

It is also advised by 12 technical panels, one for each of the 12 main programs, plus a special panel on communications.

There is some overlap of committee membership, many scientists serving on more than one panel or committee. Except for a recording secretary, the advisory panels and committees are not paid members of the IGY staff.

International Committee

The international IGY set-up roughly parallels that of the U. S., with international organizations coordinating plans for each main field and region to be studied.

Dr. Chapman is in charge of the main committee, known in French as Comité Special de l'Année Geophysique Internationale, or CSAGI. This was set up by ICSU, the International Council of Scientific Unions, the highest world-wide science body.

ARCTIC EXPLORATION IN 1882—Early expeditions of such famed polar pioneers as Adolphus Washington Greely, shown in the center of the photograph, in 1882-83 during the first International Polar Year, yielded a treasure-house of Arctic knowledge. Starting July 1, the regions surrounding both poles and most of the rest of the earth will be under intensive surveillance as part of the International Geophysical Year.

The permanent international staff is located in Brussels, under the direction of Dr. M. Nicolet of Belgium. However, each country is responsible for the planning and execution of its own program, within the general outline suggested by CSAGI.

Data Centers

To be of value, the mountains of data collected during the IGY by the 60,000 participating scientists must be available to all, so storing information in world data centers has been agreed upon by all participating nations.

There will be three of these centers, one in this country, one in Western Europe and another in the U.S.S.R. All IGY nations will send copies of their measurements and source records to one of these centers. There the data will be duplicated and copies forwarded to the other two.

In this way, original IGY data from all over the globe will be available in each center to scientists for research and study.

The data center in the U. S. will actually consist of 12 archives located at institutions outstanding for their work in the particular field.

Essential to U. S. participation in IGY has been the appropriation of necessary funds by Congress. The U. S. National Committee for IGY made its fund requests through the National Science Foundation, and the money was appropriated upon recommendation of the House Subcommittee on Independent Offices, of which Rep. Albert Thomas (D.-Tex.), is chairman.

One important by-product of IGY has been a step-up in the international standardization of equipment and measurements. This standardization was essential in order to get an accurate picture of the earth as a planet.

When plans for the international program were being drawn, one criterion used to decide their inclusion or exclusion was whether the observations had to be made on a world-wide basis and simultaneously. For the unique aspect of geophysics is that nature herself is the laboratory.

Neither weather, nor auroras, nor sudden electrical storms pay any heed to national boundaries. They are world-wide and cosmic events.

IGY Symbol

The IGY symbol illustrates the planet-wide nature of IGY. It shows the earth, half sunlit, half dark, illustrating in the simplest way the sun's influence. The South Pole is shown sunlit to emphasize the great advances IGY will bring to Antarctic knowledge. The satellite is shown to illustrate the most novel and striking of the many new instruments to be used during the IGY.

One unexpected feature of the IGY program has been the resurgence of interest in science in smaller countries around the world.

The period from July 1, 1957, to Dec. 31, 1958, was chosen for this major international effort because the sun hits a peak in its 11-year cycle of activity during this time. (See SNL, June 1, p. 346.)

The IGY program includes studies of world weather, the earth's magnetism, the aurora, the ionosphere, the sun, cosmic rays, glaciers, the oceans, earthquakes and the pull of the earth on objects near its surface as well as the better determination of latitudes and longitudes to improve our knowledge of the form, size and geography of the earth.

The IGY has been called a "great symphony of science." Scientists and politicians alike have praised the international undertaking in which so many differing nations are willingly working together in a peaceful program so beneficial to mankind.

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PATHOLOGY

Some Skin Cancers Due To Unusual Hair Growth

➤ A COMMON type of skin cancer, called basal cell carcinoma, comes from the body's unsuccessful attempts to form hair follicles, Dr. Martin Swerdlow, Menorah Medical Center, Kansas City, Mo., reported to the International Academy of Pathology meeting in Washington.

These skin cancers have been a biological mystery because they are relatively harmless and rarely spread by metastasis even though they are closely related to other malignant cancers.

A four and one-half year study of 271 of these basal cell carcinomas has revealed the tumor nests contain skin substances and resemble all stages of hair development from embryonal germs to well-formed follicles.

Hair is an elaborately balanced structure that minor deviations can unbalance and it is vulnerable to easy derangement and possible tumor formation. The changes seen in the scalps of Hiroshima atom bomb victims support the theory that the basal cell tumors originate in hair follicles.

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