

radiation belt project down toward the earth, do not appear to coincide.

The long-standing question as to whether an appreciable abundance of the elements, lithium, beryllium and boron, is present in the primary cosmic radiation may be settled.

It will not be surprising if in 1961 Red China becomes the fifth atomic power by exploding its own fission atomic bomb, as France did in 1960. Probably this can be accomplished without necessarily the aid of Russia.

Russia may announce that it has atomic submarines. The atomic fleet of the United States will continue to grow and so will the production of atomic power in our nuclear plants.

The new look at the aspects of the planet on which we live, which began in the International Geophysical Year, will continue to sharpen with continued developments and more analysis of data.

### Automated Weather Forecasting

Automation in weather forecasting will increase at several centers, with the result that there will be an effect on predictions issued experimentally and for public use. Old and new satellites will continue to give meteorological information to be analyzed and fed into the forecasting computer machines. The record of Explorer VII when evaluated in the year will give a determination of the global heat balance, a new value for the solar constant, and the first direct heat calculations of individual storms. By use of radar, airplanes and ground observations, tornadoes, hail and other severe storms of spring will be observed more extensively and fully than ever before.

New observations in Antarctica may tell whether the lines of force of earth's magnetic field, near the poles, close from one hemisphere to the other or are lost in the interplanetary magnetic field.

We should know whether the "whistler" mode of radio propagation, previously a scientific curiosity, has a significant role to play in radio communication.

### Study IGY Data

Further study of International Geophysical Year data is likely to show that many distinctive ionospheric phenomena can be observed in the airglow as well as by radio. The differences among these phenomena will throw light on relative roles of excited atoms as contrasted to electrons.

The reduction of IGY data, their flow to World Data Centers and publication of summaries in the IGY Annals will be virtually complete. The international use of IGY data will reach its peak level.

Planning will begin for the little sister to the IGY, the Solar Activity Minimum Program of 1964-65. This will involve only the atmospheric sciences where the rhythm of solar changes is important. This will give the necessary amount of comparison data at minimum solar activity to interpret fully IGY observations in fields where there are marked changes with solar activity.

There will be further probing of the great unobserved universe revealed to us by radio

waves caught by the new giant radio telescopes, particularly the one in West Virginia. There will be concentration upon why different types of peculiar galaxies have similar radio spectra and magnitudes. Radio observations of the planets Venus and Jupiter will be resumed, and accurately determined radio sources will help to continue the exploration of the radio universe and its comparison with that shown by light.

For the growing complexity of computers being put into use in many varieties for a multiplicity of purposes, an attempt will be made to have them use the same mathematical "language" oriented to the problems they tackle. Each of the giant machines will need a translator or compiling mechanism to adapt descriptions of the problems fed it to the special way it handles the data.

In medical research, more adequately supported than ever before in the world's history, basic information, only available after continued work, is likely to begin to give clinically applicable results. Prediction of specific results is difficult.

Under the new Democratic administration of President John F. Kennedy a continued expansion of scientific research and application can be expected. There will probably be new emphasis upon the sociological and psychological angles of international relations, with attempts at practical application to a "warm" peace.

• Science News Letter, 78:440 December 31, 1960

### GENERAL SCIENCE

## Postmortem on 1960 Forecast in Science

► THE SCIENCE FORECAST for 1960 made by Watson Davis, director of Science Service, issued a year ago was fulfilled in many respects.

The drive to make the U. S. Navy nuclear powered continued with more nuclear submarines launched and put into service. The nuclear ship Savannah did progress as predicted.

The Dresden, Ill., atomic reactor and the Yankee atomic installation in Massachusetts both began preliminary production as foreseen. Two great atomic accelerators for research began work, that at Brookhaven on Long Island, New York, and CERN at Geneva, began operation during the year as predicted.

The Neanderthal discoveries in Iraq were new finds of anthropological significance which it was suggested in last year's predictions would be made.

The ban on atomic explosions did continue during the year, but international cooperation did not get to the point where

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tests of underground blasts to determine their detectability were made.

Satellites launched included one that was used as a relay point for radio transmissions. This was the satellite Echo I in the form of a 100-foot balloon which shone like a bright star and was seen by millions of people.

Satellite observations also showed that there are, as suggested in the prediction, other bands of radiation high above the earth additional to the original Van Allen belt discovered previously.

There was significant development in mechanization of weather mapping by means of computers and utilization of information gathered by satellites, as foreseen.

The hope expressed that man would make his first short hop into an orbit around the earth was not fulfilled, and remains to be accomplished some time in the future.

The hope, not listed as a definite prediction, that among the thousands of drugs being tested on animals a chemotherapeutic agent of promise in controlling cancer might be found was not fulfilled.

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## Questions

**AGRICULTURE**—How was the self-improving barley developed? p. 437.

**PHYSICS**—What kind of light waves were generated for the first time with the uranium maser? p. 434.

**TECHNOLOGY**—How many bits of information can the cryogenic thin film memory plane store? p. 438.

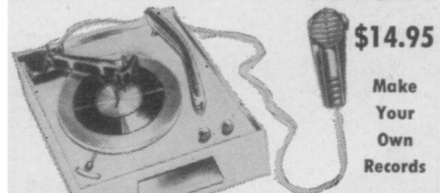
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