

operation may make it possible to achieve particles having 50,000,000 electron volts of energy.

The new cyclotron will be located next to the two giant electrostatic accelerators which already deliver 1,000,000 and 5,000,000 electron volt energy atomic "bullets" for experiments in nuclear physics.

With these instruments, plus a large cyclotron, the department will be one of the best rounded laboratories in America for investigations on atomic structure. Other institutions may have either electrostatic generators or cyclotrons but none, so far, has both.

Moreover, the presence of the newly founded National Cancer Institute of the U. S. Public Health Service in Bethesda, Md., with its large supplies of radium available, means that the nation's Capital area will eventually possess the best research facilities in the country for all types of investigations on radioactivity and atom smashing.

Plans for the new cyclotron call for elaborate facilities for its use in biological and medical investigations using radioactive "tracer" elements to study obscure physiological processes in living plants and animals.

The department also studied the huge and mysterious earth supply current of 1,800 amperes which must continually be supplied to the earth as negative electricity, so that it may balance the 1,800 amperes of positive electricity known to be flowing continually in the atmosphere of the earth.

A "powerhouse" for this supply current may be the regions where electrical storms are prevalent. Continuous observations are being taken to build up a mass of data which will show the changes in supply current of the earth from year to year.

### Study Plants

"Tagging" carbon atoms by making them radioactive, and then tracing them in their course through the food-making process of plants, physiologists and biochemists of the Carnegie's Division of Plant Biology are pushing forward into hitherto unexplored regions of plant science.

Radioactive carbon dioxide is manufactured and fed to the plants. Wherever the treated atoms of carbon go, they mark their course by the radioactive particles they throw off, just as a firefly, otherwise invisible in the dark, marks his course with his little lantern. Plant physiologists are thus learning many

things about the way plants make sugars, starches and proteins, which until now could only be guessed at.

Plants are studied while they are whole and alive. Much of the present knowledge of the food-making and food-using processes in plants has been gained by tearing them to pieces and extracting the enzymes with which they work. Now it is becoming evident that this method gets at only part of the facts: "It has been found that some of the components of the cell's photosynthetic apparatus had until recently escaped detection, because of their extreme sensitivity, particularly when in contact with the killed tissue of the plant. Similarly, many of the enzymatic reactions are drastically altered after the death of the cells."

The rotation of the sun about the center of the Milky Way has been explored

by the Mt. Wilson Observatory. The great galaxy system of stars to which our sun belongs is rotating. Latest figures show that the center of this circular movement is so distant that it takes 33,000 years for light (speeding 186,000 miles per second) to reach earth from there. The sun moves 180 miles per second in a circular orbit around this center, requiring 207,000,000 years for one revolution. Since the earth and all of us travel with the sun, we are moving at this rate also.

Discovery of some stars so extremely faint that they give out as little as one fifty-thousandth of the light of the sun emphasizes that our sun is a very average star, roughly midway between these faint bodies and the most luminous stars with 20,000 degrees Centigrade or about 30,000 times that of the sun.

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### PHYSIOLOGY

## Seeks Clue to Human Cancer In Induced Plant Tumors

### Tumors Now Induced by Chemicals Are Part of Healing And Unlike Animal Tumors But Cancers May Yet Be Made

**C**LUES to the mechanism of cancer production in humans and other animals are now being sought in the plant world. Latest efforts to produce cancers in plants by the chemicals in tar which produce cancer in animals or by other chemicals were described by Dr. Michael Levine, Montefiore Hospital Biological Laboratory for Cancer Research, at the meeting of the Torrey Botanical Club in New York. Montefiore Hospital is the only hospital in the world which has a garden devoted to plant cancer studies.

Crown gall, the form of cancer which plants are known to harbor, is not analogous to human or other animal cancer, Dr. Levine said.

Cancer-causing hydrocarbons, which produce cancer in animals, poison plants but fail to produce cancers in them. Certain other irritating chemicals, such as indole acetic acid, indole butyric acid, naphthalene acetic acid and a series of scarlet red dyes, when applied to the injured surface of a plant, produce roots together with small tumors. These tumors, however, are not, in Dr. Levine's opinion, analogous to human or other animal tumors, either. The plant tumor,

he believes, is a part of a reparative and protective mechanism of the plant, analogous to inflammation in animals.

Dr. Levine expressed the hope that plants ultimately will be made to form tumors as a response to chemical substances. He implies that the plant cells will be so modified as to proliferate without limit, endowing them with a property now possessed by animal cancer. The production of malignant plant growths will throw light on the mechanism of cancer production in animals. The absence of blood and lymph streams, and lack of diversity of tissue types make the plant a suitable subject for the study of this important problem.

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## ● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by U. S. Coast and Geodetic Survey and Jesuit Seismological Association of the following preliminary epicenter:

*Tuesday, December 5, 3:30.1 a.m., EST*  
On the ocean bottom off the coast of Guatemala.  
Latitude, 14.5 degrees north. Longitude, 92.5 degrees west. Depth 80 kilometers.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, Oct. 28.