

PHYSICS

X-Rays From Sun Found To Create Radio "Roofs"

Unlike Light and Heat, Roentgen Radiation Does Not Reach Earth's Crust But Is Absorbed in Upper Air

X-RAYS generated in the sun bombard the earth incessantly, Dr. Ernst A. W. Müller of the Siemens and Halske Company has discovered as the result of a study of the electrified radio "roofs" of the earth's atmosphere.

Unlike the sun's light and heat, the solar X-rays or Roentgen radiations do not reach the solid crust of the earth. They are absorbed by the upper atmosphere down to a height of about 65 miles where they electrify the air and create what is known as the Kennelly-Heaviside layer. This E layer, as it is also called, is the lowest of a number of the earth's electrified roofs which keep radio waves from being lost in interplanetary space. It reflects the longer radio waves. (*Nature*, Feb. 2)

The solar X-rays are thought by Dr. Müller to be more penetrating or softer than the ultraviolet radiations known also to come from the sun. They are "soft" X-rays, having a wavelength around one hundred millionth or one billionth of an inch.

Based on Many Experiments

Dr. Müller's discovery is based on deductions from many experimental results from England, America and elsewhere. Radio observations during the 1932 solar eclipse and at other times indicated that the agent causing the electrification of radio roof E comes from the sun. At first it was thought that the radiation responsible might be great streams of sun-born neutrons or electrically neutral particles, and later ultraviolet sun light was blamed. Dr. Müller's calculations show that ultraviolet radiation is easily absorbed by the air and that an amount sufficient to create the radio layer would not plumb the depths of the earth's enveloping ocean of air.

How the sun acts as an immense X-ray generator is explained by Dr. Müller. Following the suggestion of Dr. W. F. G. Swann of the Franklin Institute, Philadelphia, that fast electrons are produced in sunspots, most of them, Dr.

Müller holds, must lose their energy in the outer layers of the sun and in so doing generate X-rays. This generation also takes place in the unspotted part of the sun, in Dr. Müller's opinion.

Science News Letter, February 23, 1935

PHYSICS

Million Volt Generator For Atom Research

See Front Cover

A NEW type of atom "gun," hurling electrified particle "bullets" at atoms, which should speed vital research on how matter is put together has just been completed, it has been announced by the department of physics of Ohio State University.

Creation of Dr. Willard H. Bennett, the new atom gun is a compact doughnut-shaped edition of the high-voltage generator first proposed by Prof. Robert T. Van de Graaff of Massachusetts Institute of Technology.

So huge is the M. I. T. generator that it is housed in an airplane hangar in

Massachusetts. The Ohio State device, capable of reaching voltages of a million volts, is small enough to go into a normal science laboratory. The trick is to mount the apparatus horizontally, on its side, instead of having it towering high in the air.

The million and more volts created with the device are being used to drive electric particles against matter and break it apart. In the debris of destruction science learns how the basic units of all matter—the atoms and electrons—are joined and studies the forces which hold them together.

The photograph on the front cover of this week's SCIENCE NEWS LETTER shows the flashing sparks from the generator. The picture is a double exposure; the man moved from beside the device before the "lightning" flashed.

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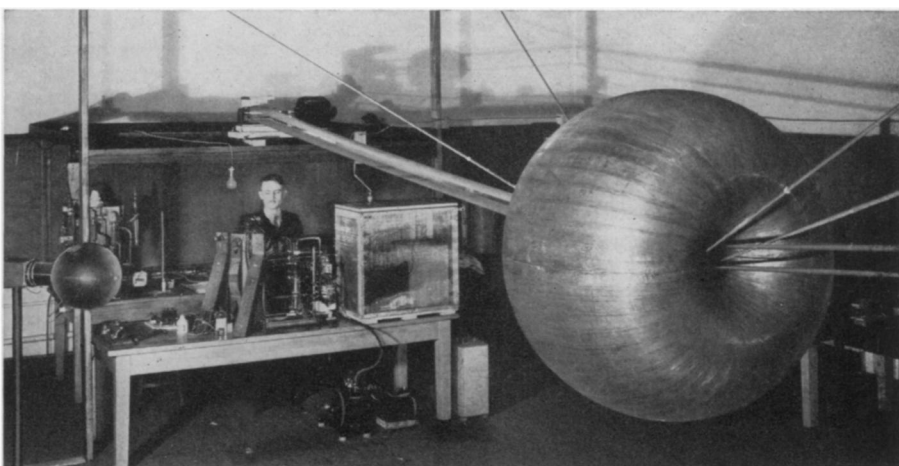
PHYSICS—ASTRONOMY

Electronic Tides In Air Also Caused by Moon

MYSTERIOUS electronic tides high in the upper atmosphere, 200 miles above the earth, are being investigated by Dr. Harlan T. Stetson, visiting research associate in astronomy at Harvard University.

Discovered by Dr. Stetson through their effects on radio transmission, the tides are believed to be caused by the moon.

Using the same data with which he found a marked correlation between



ELECTRICAL DOUGHNUT

Like a giant doughnut cooked to a golden copper hue is the new high voltage generator of Ohio State University. It is capable of creating a million volts to be used in experiments on bombarding the atom. Dr. Willard H. Bennett, professor of physics, designed the device.