

BIOPHYSICS

Cast of Virus Studied

Evaporated gold is deposited on particles of tobacco mosaic disease virus in film only eight Angstroms thick for study under electron microscope.

► GOLD films of ultramicroscopic thinness, "cast" over solidified protein particles that are the essence of a virus disease of plants, are helping scientists using the electron microscope to get a better idea of the size and shape of these particles, forever beyond the direct reach of the human eye even when looking through the most powerful of lens combinations.

The new method was worked out in laboratories at the University of Michigan by two physicists, Dr. Robley C. Williams and Dr. Ralph W. G. Wyckoff, who describe it in some detail in *Science*, (June 8).

Objects less than one light wavelength in diameter cannot be made visible in the ordinary-type microscope because they are unable to stop or turn aside light waves. But they can still be photographed when streams of magnetically focussed electrons are substituted for beams of light.

However, the streams of electrons are very apt to destroy the organic particles, or at least radically change them, before suitable photographs can be made. It is

therefore often advantageous to study, not the objects themselves but "casts" formed by depositing some more durable material over them, very much as you can examine last December's snowflakes in June if you caught them on drops of plastic as they fell and kept the molds thus formed.

To get their ultramicroscopic "castings" of tobacco mosaic disease virus particles, Drs. Williams and Wyckoff place a drop of a watery suspension known to contain the virus on a chemically clean glass slide. After the water has evaporated, nothing can be seen on the slide; nevertheless the invisibly tiny bits of solidified virus protein are still there.

They next place their slide in a vacuum chamber, in which a small bit of gold is electrically heated until it goes past its melting-point and becomes a vapor. Some of this evaporated gold falls on the glass and solidifies into a very thin film, just as a sheet of ice would form if water vapor were introduced and the chamber temperature held below freezing-point. Where the gold falls on the virus protein particles, minute hollows are formed,

with every detail of the particle structure faithfully reproduced in negative.

The gold film is only about eight Angstrom units thick. An Angstrom unit is the light-measurer's "inch"; how short it is can be realized from the fact that light at the limit of high-violet visibility has a wavelength of about 4000 Angstroms. A gold film only eight Angstroms thick, therefore, cannot be seen at all, and so cannot be directly picked up.

To get around this difficulty, the two physicists coat the slide with collodion, to which the thin gold will firmly adhere. This collodion film they strip off and place on the stage of the electron microscope. By such roundabout methods they are finally able to get a likeness of the invisible virus particles, faithful in its details as a sculptor's life-mask, into position where the searching beams of the electron microscope can make shadow photographs.

Science News Letter, June 16, 1945

ASTRONOMY

Fire Lookouts to Help Make Eclipse Observations

► FIRE LOOKOUTS of the U. S. Forest Service will help astronomers by observing the July 9 eclipse. Accustomed to thinking fast and acting quickly when a fire is discovered, these foresters are ideal persons to carry out a rapid-fire series of observations.

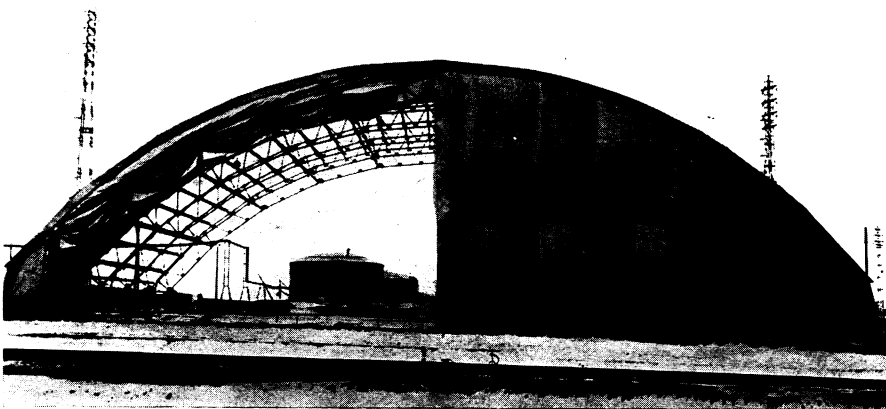
About 60 foresters in lookout towers on mountain peaks in Montana and Idaho, some of the peaks 10,000 to 12,000 feet above sea level, will study the advancing shadow of the moon. For them the shadow will sweep down for a minute or less at about 6:14 a.m., Mountain War Time.

A questionnaire sent by Dr. John Q. Stewart of Princeton University Observatory suggests that three kinds of observations relating to the shadow would be helpful. Its motion in the sky can be reported in detail; the degrees of darkness on the ground estimated; and stars identified during totality, particularly the faintest stars.

The total eclipse is over so quickly (30 seconds) that no single inexperienced observer will have time to carry out more than one observation.

Although Dr. Stewart suggests that everyone spare a few seconds for a glance at the beautiful corona, he points out that observations of the corona by amateurs are not likely to be of scientific value, whereas adequate observations of the shadow are very desirable.

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GLASS CLOTH HANGAR—Glass cloth, woven of glass fiber yarns and coated with either synthetic rubber or resin, is being used for curtains, side walls and ends in newly developed airplane hangars. Use of coated glass fabric for sections of hangars saves a great amount of shipping weight and speeds assembly of the hangars.