

PHYSICS—OPTICS

New Electric Eye Has Persistence of Vision

A NON-LIVING "electrical eye" apparatus that has persistence of vision similar to that of the human eye was described by Dr. V. K. Zworykin, the RCA Victor Co. television inventor, to the American Physical Society meeting in New York. It promises aid to astronomy, biology, and other sciences as well as television.

It is an electrical latent image mechanism that stores electrically the information from an optical image projected on a mosaic of tiny cells that convert light into electricity. It can reproduce its electrically stored information when it is desired.

Persistence of vision in human seeing is important in viewing movies, for instance. It results from the ability of the eye's retina to continue to register for a fraction of a second after light has ceased to fall upon it. Dr. Zworykin has made an apparatus that improves upon the eye in several respects.

The original Zworykin device was developed as a pickup camera for television. It is part of the very promising television method that has encouraged scientists and engineers to believe that practical development of television may be "just around the corner" if people are willing to pay for it.

The new form of electrical eye is sensitive to ultraviolet rays and infrared rays or heat that are invisible to the human eye. It can allow the amplification of light intensity of the image so as to increase its intensity many times. And electrical magnification of the scene being viewed is easily accomplished.

Dr. Zworykin explained that the broad idea behind his electrical latent image apparatus is not new, but he has developed several different methods of applying the idea.

A simple electrical experiment illustrates the principle behind the Zworykin apparatus. A condenser is connected in series with a photocell. The photocell is illuminated. The light on the photocell is converted into electricity which flows and charges the condenser. The condenser is made to discharge by flashing upon it a beam of electrons shot from a cathode tube.

The simplest form of the Zworykin

latent image apparatus consists of a screen placed in a vacuum bulb. The screen is a thin sheet of mica coated on the back side with a continuous metal layer. On its front there is a mosaic of small isolated photo-sensitive globules, each a miniature mechanism for changing light into electricity.

Dr. Zworykin makes this mosaic very simply by evaporating a thin film of silver upon the mica, then breaking it into separate particles by heat and sensitizing the silver with the element caesium. The globules "soak up" the light converted into electricity when an image is projected by lenses upon the screen. Each photo-sensitive globule gets a positive electrical charge in proportion to the amount of light that falls upon it.

The screen is scanned regularly by the electron beam that releases these charges and this produces changes in the electrical capacity of the metal layer on the other side of the mica. By attaching an amplifying system to that metal layer, there can be drawn off from the system a fluctuating current that is an electrical representation of the light picture on the screen.

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PALEONTOLOGY

15-Foot Herring Swam In Dinosaurian Seas

LENTEN regulations would have presented no difficulties to the swimming dinosaurs that ruled the seas ninety million years ago—had there been any Lent in those days. For the fish they fed on—or some of them at least—were commensurate with their own huge bulk and appetites.

Forcible demonstration of the gigantic scale on which the seas were run in those remote times is given by a fifteen-foot fossilized herring which has just been placed on display in the Peabody Museum of Yale University. It was found near Russell Springs, Kansas, in a rock deposit that was soft seabottom mud when this great fish laid him down to die nearly a million centuries ago.

Prof. Malcolm Thorpe, of the department of geology, says that this is the most complete and probably the finest extant skeleton of an ancient fish. It has 87 articulated backbone segments, and the head retains an impression of the actual skin. The great fish bears the scientific name *Portheus molossus*.

The giant fish is not lonely in his museum hall; he has been given the company of his own contemporaries. Some members of that company, indeed, might not have been very welcome to him while he was alive, for they include some of the very dinosaurs that lusted after his flesh, as well as a huge flying reptile, *Pteranodon*, with a 25-foot wingspread.

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METEOROLOGY

Cold Waves Follow Unusual Route

SHAKESPEARE might be appropriately invoked, in the case of the series of cold waves that have successively gripped the eastern United States during the past few weeks.

"One woe doth tread upon another's heel," recites the Bard, somewhere in Hamlet.

For the cold waves have followed a regular track, one right after the other, like the elephants holding one another's tails in a circus parade. Each successive mass of freezing air has originated somewhere in the unpeopled wastes of northern Siberia. It has moved across Alaska and northern Canada to the Hudson Bay region. Then it has swung southward, to vent its fury on New England and the Atlantic States.

This cold-wave track is quite abnormal, says J. B. Kincer of the U. S. Weather Bureau. In ordinary winters, cold waves start their southward swing much farther to the west, moving down the Great Plains area and slanting eastwardly across the country. But this winter the West has been almost basking, under relatively balmy skies. For example, the state of Montana, which ordinarily is anything but a Riviera in winter, has during recent weeks averaged eighteen degrees a day above normal winter temperatures.

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The Phoenicians have partly lost their reputation as pioneer sea lords since it has been found that the people of Crete spread settlements from the Aegean to Spain.