

## ENGINEERING

# Spherical Aerial Photos

Spherical lens for projecting negatives on a shell is now being tested. Rotary shutters for eyes and machine aid map plotting.

## See Front Cover

► PHOTOGRAPHS AT least twice as good as those now being taken from airplanes can be made with a spherical lens and a negative on a spherical shell. The spherical projection lens, only one of its kind, is new and was shown for the first time to the meeting of the American Society of Photogrammetry in Washington.

The device looks like the top one-third of a globe set on top of and about six inches from the top one-third of another globe. One of the cut-off shells is the negative, the other the lens projector. In the photograph on the cover of this week's SCIENCE NEWS LETTER, the spherical shell with the negative has been replaced, in order to show the projection lens to better advantage, with a plain white shell.

Photographs of aerial views have been made on spherical shells before, but previously all methods of projecting such a curved negative have given distortion. Putting the negative on a properly curved surface give a photograph free from distortion at any point, but without an accurate projection method, the spherical negatives were of little use.

The camera can now take a picture on the spherical shell at one time of all that a person could see if he looked around in a complete circle from an airplane. When the spherical lens is used to project such a negative, there is no change in the proportions. At four to six feet, it gives an absolutely accurate, flat projection of the negative taken on the one-third of a shell.

Credit for originating the spherical lens idea goes to Dr. James Baker of Harvard Observatory. The projection unit was perfected by Drs. Claus Aschenbrenner, Duncan Macdonald and Ray Dussalt of Boston University's Optical Research Laboratory. Their work was done under contract with the U. S. Air Force's Wright Air Development Center, Wright Field, Dayton, Ohio.

Only about 30 spherical negatives have been taken so far in this program to find out how effective such a shell lens projection would be in operational work.

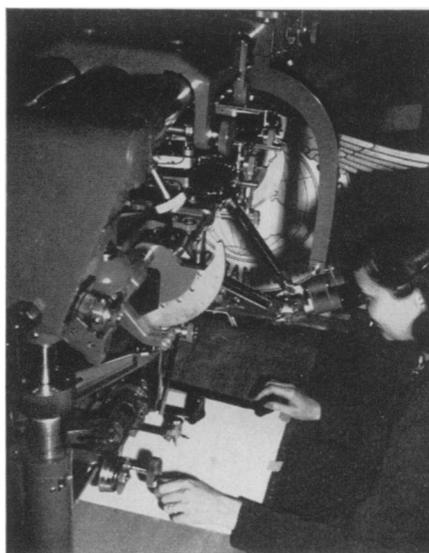
## Rotary Shutters for Eyes

► GREAT IMPROVEMENT in getting information from aerial maps is foreseen through use of a rotating shutter device shown for the first time at the Society's meeting.

The shutters are worn by the operator who is interpreting the photographs, making him look like a man of the future. Each shutter revolves 1,800 times per minute, but the one for the left eye is 90 degrees out of phase with that for the right. The Kelsh-plotting instrument on which the aerial maps are scanned is also equipped with two of the fast rotating shutters, one for each of its two photographic projectors. These shutters also rotate 1,800 times per minute and the left one is 90 degrees out of phase with the right one.

Thus a series of pictures, alternating so fast they appear as one, are thrown by the projector, but because of the timing the right eye sees only the picture shown by the right hand side of the instrument and the left eye sees only that from the left.

With each eye seeing only one picture, but both of them seeing two, each set of images fuses to give a three-dimensional picture.



**PRECISION PLOTTER** — *The Stereosimplex, an Italian-made instrument for plotting maps from aerial photographs, is the only one of its kind in the United States. Using it, an operator can plot from photographs taken by cameras having different focal lengths, not possible with U. S. instruments.*

The instrument was developed by the Engineer Research and Development Laboratories at Fort Belvoir, Va. One of its advantages is that it can be used with color pictures. It also eliminates the need for color filters, now used to get the three-dimensional effect, thus considerably increasing the amount of light thrown by the projectors and making the photograph look more natural to the operator.

## Better Plotting Instrument

► PHOTOGRAPHS TAKEN by fast flying jet planes will reveal more vital information through use of a brand new instrument.

The Stereosimplex, as the machine is called, is made in Italy and is the only one of its kind in the U. S. It arrived just in time to be put on exhibit in Washington at the meeting of the American Society of Photogrammetry by the U. S. Naval Photographic Interpretation Center at Anacostia.

They imported the instrument, since nothing like it is made in this country, in order to test a new system of mapping from aerial photographs. The instrument is for plotting the information contained on aerial photographs. Its great advantage is that an operator can work on photographs taken by cameras with different focal lengths. U. S. plotting machines are set up to be used with photographs taken at a fixed focal length, usually six inches.

Photographs by cameras having much shorter focal lengths can thus be plotted with this new instrument. The shorter the focal length of a camera, the clearer is the picture that it will take of a wider area at one time. Short focal length cameras have just gone into operational use on a test basis.

With present equipment, in order to get contour maps that are correct to within one foot, the photographing plane must fly at 2,500 feet. Using the new instrument, aerial photographs can be taken at 10,000 feet that will give contour maps correct to within nearly half a foot.

"This instrument is the newest and one of the most outstanding pieces of equipment at the meeting," Talbert Abrams of Lansing, Mich., president of the Society, declared.

It is Model 2 of the Stereosimplex and was made by Santoni in Italy.

## Map Ground Heights

► A SIMPLER instrument for mapping heights of ground terrain using only two aerial photographs was shown to the American Society of Photogrammetry meeting in Washington. Completed just in time to be put on exhibition, it is the first device of its type to be made.

Known as the Hypsometer, the instrument makes use of parallax—the apparent

change in the way objects look when viewed from different positions. It has been adapted for use with the oblique photographs taken by aerial cameras. Only the horizon line is needed as a reference mark, the horizons on the two photographs being lined up with an etched line on the flat surface of the instrument.

Corresponding points on the photos are projected to a fixed base line by means of two arms. There the parallax is measured, and using the parallax formula, the elevation differences are computed.

The Hypsometer is made by the Union Instrument Corp. of New Jersey for the U. S. Army's Engineer Research and Development Laboratories at Fort Belvoir, Va.

## Speedy Camera Shutter

➤ A NEW shutter for aerial cameras, designed for use in photo reconnaissance, gives more accurate pictures at higher flying speeds than with previous shutters. The clearer the photographs, the easier it is for U. S. Air Force photo-interpreters to spot camouflaged guns and troop concentrations.

The shutter, built into a drawer so that it can be repaired easily, has two sets of blades. One opens and the other closes, almost at the same instant. The lightning-like movements are what increase the efficiency of the shutter, giving clearer pictures for the same time exposure.

For inventing this device, known as the Fairchild Rapidyne, Frederick P. Willcox of Fairchild Camera and Instrument Corporation was awarded the 1952 Photogrammetric Award of the American Society of Photogrammetry.

Science News Letter, January 19, 1952

Grass *silage*, now popular on American farms, is made from any of the green crops that might otherwise be dried and made into hay.

## BIOPHYSICS

# Ward Off Atomic Radiation

➤ TO INCREASE your chances of surviving radiation death when the A-bombs fall, take a cocktail or other alcoholic drink and eat a steak when you hear the warning siren.

This action seems to be justified by a discovery of Drs. Edith Paterson and Joyce J. Matthews at Christie Hospital and Holt Radium Institute, Manchester, England.

Alcohol drunk 80 and 20 minutes before irradiation saved more than a fourth of a group of mice exposed to killing doses of radiation, these scientists discovered.

When they gave mice salt water before irradiation, all the mice died. Of the group that got the alcohol, only 63% died.

Alcohol taken immediately after irradiation and again one hour later was not effective in saving the mice.

Cysteine, one of the protein building blocks found in meats, had a greater protective effect when injected into the veins of the mice than the drinks of alcohol, which suggests eating steak or other protein food along with the alcohol for possible protection against irradiation.

The alcohol given the mice was diluted with salt solution to a concentration of 10% by volume. The mice got about a fourth of a teaspoon (one milliliter) of this 80 minutes and again 20 minutes before the irradiation.

Alcohol at a concentration of 5% was about equally as effective as the 10% concentration.

The protective effect of the alcohol was apparently not related to its anesthetic effect, since nembutal and ethyl carbamate, given in anesthetic doses, were not effective.

Discovery of alcohol's protective action for mice exposed to killing doses of radiation is announced in the journal *NATURE* (Dec. 29, 1951). Because this is a report

to fellow scientists, it does not point out the fact, obvious to scientists, that since men are not mice they may not get the same protective effect from alcohol taken before irradiation.

Science News Letter, January 19, 1952

## SCIENCE NEWS LETTER

VOL. 61 JANUARY 19, 1952 No. 3

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc. 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STAt 2-4822.

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The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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## SEISMOLOGY

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