offices, using the ER-55 projector reported a mean square error of 2.36 feet for the Cronar and 3.63 feet for the Topographic base.

As might be expected, the results of the tests in the various offices did not completely agree. Also, there was some variation in the manner of reporting and presentation.

Resolution of Stereo Models

One interesting development was that some of the fine detail on the Topographic base, and the even finer detail on the Cronar, did not print on the diapositives and consequently was lost in the model. Here again, there is resurrected the question of whether the photography or the instrumentation is at fault when fine detail is lost in the model. The advent and continuing use of the automatic dodging techniques may solve part of the problem of lost imagery. The printing of diapositives through the film base support may also be a contributory factor.

Conclusions

The conclusions of all four Area offices were in remarkably close agreement. Since all tests were conducted under actual working conditions, random and systematic errors caused by equipment, personal error, and misidentification of points have contributed to the variations.

The author has found it impossible to state the conclusions better than one Area office did, in reporting their results. "The following conclusions mark the Cronar base film as definitely superior to the Topographic base film, and they enumerate the operational benefits that would result from its adoption:

"1. Cronar film has approximately one-fifth the differential distortion of the Topographic base film. This characteristic would strengthen both analytical and instrumental aerotriangulation. Convergent oblique models are especially sensitive to nonhomogeneity of the film base.

"2. Cronar film base has a humidity coefficient of linear expansion approximately one-fourth that of the Topographic base. Its use would eliminate the need for special air-conditioning systems and film seasoning equipment in the photo laboratory.

"3. The stability of the Cronar film was further evidenced by its ability to recover after extreme variations in temperature and relative humidity. The Topographic base film, however, developed a permanent curl after being subjected to extreme conditions. Cronar, therefore, is less susceptible to permanent deformation should it be abused in processing.

"4. The chemical stability of polyester film is well known. Cronar, therefore, would be inert to organic solvents such as acetone which have been known to deform the base of Topographic film."

"5. Based on visual inspection of fine ground patterns, both the resolution and acutance of the Cronar emulsion are superior to the emulsion of the Topographic base."

*Aerial Photographic Investigation of Leaching and Sapping as an Erosion Process**

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STANDARDS of map accuracy stipulate that ninety per cent of contours are to be within one-half contour-interval of the ground elevations through which they pass. Although contour accuracy compared with terrain elevation is governed by this consideration, there is another factor in topographic accuracy which cannot be so simply stated and is dependent upon the stereo-topographer to a larger extent than the instrumental accuracy of his readings. A map may comply with topographic standards while the slope portrayal may be in error by a complete contour interval in the space of three contours. With an interval of 10 units a correct slope of 20 may be shown as either 10 or 30. Not only is the amount of error in excess of the inferred accuracy, but the slope characteristic may be destroyed.

Weathered slope characteristic is a function

* The opinions or assertions contained herein are not to be construed as being officially endorsed by the U. S. Navy Hydrographic Office or the Navy Department.

of climate, and characteristic slopes occur throughout climatic zones (or broad climatic regions). The observation of these slopes has been more definite than an accounting for their occurrence, especially in the tropical areas similar to those considered in the present study.

The study is of a subtropical region with 88 inches of annual rainfall, distributed without pronounced seasonal variations. The writer considers these conditions as analogous to tropical humid regions. Among illustrated topographic features are those which occur in tropical semiarid regions.

A second area consists of a tropical semiarid (seasonal rainfall) region. Many of the observed topographic details are common between the two areas investigated, but among the semiarid features, soil flowage at "depths below that anchored by roots" (a tropical humit phenonenon) is shown.

The writer suggests, as a primary hypothesis, that all tropical slopes (except arid and karst regions and those of sufficient elevation to remove them from tropical considerations) may result from the same erosion agency as is mentioned in the title.

*Measurement of Contrast in the Aerial Image**

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ABSTRACT: *The quality of a lens is evaluated by examining the image it produces and comparing it with the object or target of which the image is made. An instrument has been developed which scans the aerial image directly with a slit and photomultiplier tube. The resultant variations in luminosity in the image are recorded on a moving chart paper. This process substitutes a linear receiver or phototube for a non-linear receiver such as an emulsion. Results are shown in which contrast is plotted against image frequency for several f/values of a lens. A comparison is also made between image contrast and star images at several focal positions. A second comparison is made between measured contrast and best definition at several focal positions.*

ANALYZING the image of a lens as a means of judging its quality or capabilities might be compared to determining the response of an electronic amplifier. In each case, a known quantity is presented as input and the resultant output is analyzed and compared with the input. Both amplifier and lens are limited in response to the input signal. Beyond this limit in each case is only noise, either electrical from the amplifier, or light in the optical image.

In setting up a lens for test, an illuminated target is placed in front of the lens, within limits of distance and field angle, to produce an image.[1] This image exists only in space, to be seen and examined, it is usually registered by one of the following methods:

1. A diffuser is employed such as a ground glass which allows immediate examination of the image at the expense of considerable degradation of quality;
2. A photographic emulsion such as a film or plate is used in which a secondary chemical process is necessary to bring out the latent image for further examination;
3. The primary image is used as the object of a projection lens system such as a microscope objective. This approach, or the one permitting the image to fall directly on a slit, is referred to as the "aerial image."

To make the third method as objective as possible and to reduce the subjective or human element, a procedure for instantaneous read-out must be established to minimize the use of the eye. The phototube is an excellent tool and is used in this method since it responds to the amount of luminous energy falling on it. The response is the product of the area, the energy density, and the spectral response of the tube. This response varies as

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