



FIG. 1. The combination instrument, the Multiscope plotter *A*, the inverted Focalmatic projector *B*, and the Multiscope tracing table *C*. By means of the tracing table, reference features, such as streams, peaks, roads, etc., are transferred from the stereoscopic model and plotted at approximate model scale on a compilation sheet. These reference features are used for control in scaling the projected image of the topographic base map to the compilation sheet. (Since the projection is viewed from a direction opposite that for which the projector was originally designed, a mirror image copy of the topographic base is required for proper projection. This is commonly accomplished by having the map printed on a transparent medium such as Mylar which can be reversed in the projector for proper read-out.)

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## Combination Instrument for Geologic Compilation

A modified Multiscope, Multiplex tracing table, and Focalmatic Projector aid in transfer of photo data to topo base.

*(Abstract on page 382)*

\* Submitted under the title "Modified Multiscope Combined with Multiplex Tracing Table and Focalmatic Projector Provides Instrument for Geologic Compilation."

THE MODIFIED Multiscope combined with a Multiplex tracing table and a Focalmatic projector (Figure 1) provides a method for viewing and compiling data from vertical

aerial photographs with direct reference to the projected image of a topographic base map. Detail from the stereoscopic image is transferred to a compilation sheet by means of the Spurr and Brown, 1945 and 1946; Iwema, 1946; Johnson, 1946; and Spurr, 1949 and 1954, for operation capabilities, and use with a Multiplex tracing table.)

*ABSTRACT: A combination of a modified Multiscope, a Multiplex tracing table, and an Inverted Focalmatic projector provides a useful instrument for compilation of geologic information on a topographic base map, and is especially useful in small-scale compilation. Reference points are orthographically transferred from the stereoscopic model of the Multiscope by means of a Multiplex tracing table to a compilation sheet. The base map is projected and scaled to the plotted points on the compilation sheet. Photointerpreted data, geologic or otherwise, is then plotted on the compilation sheet. Using reference points for control the compilation sheet can later be projected to the base map for final compilation. Advantages of this projection method are: the photointerpreted data can be rapidly and reliably fitted to the projected base map, and the relationship of the geology to topography can be checked at all times during the stereoscopic transfer.*

tracing table which is visible through the half silvered mirrors in the Multiscope eyepiece. The scale of the transferred data is restricted to the approximate scale of the stereoscopic model and is essentially orthographic. (See

The topographic map is enlarged (or reduced) to the scale of the stereoscopic model. This is done by means of a Focalmatic projector which projects the map to the underside of the transparent compilation sheet.



FIG. 2. A close-up view of the Multiscope with recommended modifications. New holders for the diopter viewing lenses at A provide for a greater field of view than is possible with original instrument design. Spring-loaded adjustable mounts were added to each of the half-silvered mirrors (one is shown at B) to facilitate optical calibration of the instrument. A thread, aligned over the center of each wing mirror and in the X-direction of the instrument, has been added (see C) to provide a reference line for rapidly aligning the centers and conjugate centers of each photograph. This thread also reduces errors resulting from parallax displacement, as these lines are vertically above the photo plates and any movement of the head in a backward or forward direction is readily apparent in the stereoscopic model. Because it is necessary to see only the illuminated dot of the Multiplex tracing table in the stereoscopic model, and because the white surface of the tracing table (platen) causes a diffusion of the stereoscopic imagery, the table is painted black (see D).

The projector has an enlargement/reduction factor of 2.0 to 0.33. As the transferred models will vary in scale, control for later reprojecting the compiled data to the base map is gained by sketching some contours or other reference points from the projected image on the compilation sheet.

Minor modifications (Figure 2) improve the utility of the Multiscope and Multiplex tracing table when employed in this combination instrument.

This system provides a rapid method for scaling the topographic base map to the orthographic plot of the stereoscopic model. Furthermore, the relationship of the stereoscopic model, geology, topography, planimetry, etc., to the topographic base can be verified at all times during the transfer.

The instrument has been found especially useful in transferring geology data stereoscopically from aerial photographs to a topographic base map of much smaller scale,

where control detail for scale is limited in the area covered by the photograph. The ability to see a three-dimensional model in relation to such limited control helps to scale the projected base map to the model more accurately.

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