and the Stereo-Plotter A-6. Test plottings on 50 A-5's and 70 A-6's have been carried out and analyzed.

2. Tests on the *performance of lenses* and methods to test such lenses were performed. The results are contained in the article, "Standardization of Tests Methods for Photogrammetric Objectives," by Professor H. Kasper (see page 633).

3. The mechanical parts of the WILD *aerial cameras* have been *revised and redesigned.*

4. *Series production of the RC-7 Automatic Plate Camera was started.*

5. *A new RC-6 Aerial Series Film Camera for reconnaissance purposes was submitted to tests.* This camera has a picture size of 13×13 cm. and a focal length of 165 mm.

DISCUSSION OF "APLICACIONES PRACTICAS DEL METODO AEROFOTOGRAMETRICO" BY ALFREDO WEIL

Bernard J. Colner, U. S. Coast and Geodetic Survey, Washington, D.C.

MR. WEIL, in his book "*Aplicaciones Practicas del Metodo Aerofotogrametrico*" assumes an error of ±20 meters for astronomic position determinations. This writer agrees with this statement. However, when these fixes are to be used for a network of control instead of first-order triangulation, the error as to their geodetic positions for mapping control will probably be much greater, because of the variations of the deflection of the vertical from place to place. The following paragraphs will demonstrate the possibilities of errors of great magnitude where astronomic position determinations have been used for mapping control.

The following is a translation by this writer from the "*Annuaria Pour L'An 1949*".[1]

"Maps established on an astronomic network—The existence of the deflection of the vertical and the matter of the reference ellipsoid and geoid, prove the impossibility of establishing an accurate large-scale map based solely on a network of astronomic positions. On maps thus established, distances between Voirol and la Bouzareah (7 Km. or 4.3 miles) and on the island of Hawaii (120 Km. or 74.6 miles), errors of 360 meters (1,181 feet) and 3,000 meters (9,842.5 feet), respectively, were found.

It can readily be discerned that only small-scale maps of little precision can be established with networks of control based on astronomic determinations. L'Institut Geographique National constructed maps of the Sahara region at a scale of 1:500,000."

The following are quoted from Mme. E. Chandon's and A. Gougenheim's article,[2] "Instruments for Observing Equal-Altitudes in Astronomy," and are inserted because of the importance of the astrolabe in establishing control.

"Gauss's equal-altitude method, which enables the latitude and longitude of a place to be determined simultaneously and by observations of the same nature, was hardly used during the XIX century. But during the past fifty odd years, astronomers and geodesists, anxious to render measurements of geographical positions easier and, incidentally, more accurate, have designed instruments more appropriate than the sextant for use with this method. . . .

"Accuracy of results—The results given by the prism astrolabe have quickly proved themselves to be most satisfactory, and account for the success which this instrument has met with among French and foreign geodesists since its appearance in 1903.

[1] "*Annuaire Pour L'An 1949,*" Le Bureau des Longitudes, Gauthier-Villars, Paris, p. 157.

[2] Chandon, Mme. E. and Gougenheim, A., "Instruments for Observing Equal-Altitudes in Astronomy," "*Hydrographic Review,*" International Hydrographic Bureau, Monaco, May 1935, pp. 45 and 54.

"It has been adopted by the Geographical Services of numerous countries—France, Egypt, British India, Spain, U.S.A., Belgium, Brazil, etc.

"It owes this popularity to the fact that while providing extremely accurate results, its bulk remains small, its setting up and adjustment are easy, and observation with it is very simple and does not require long training.

"Among the various equal-altitude instruments, the prismatic astrolabe is by far the most generally used, and this long experience is a protection against unforeseen errors which might become apparent in other instruments, the use of which is much more restricted. . . .

"To summarize, one cannot count on an accuracy of nearer than one or two seconds of arc in latitude determination, and one or two tenths of seconds of time in time determination (obviously without taking the personal equation into account)."

The Coast & Geodetic Survey undertook to obtain comparisons between position determination by standard methods of this Bureau and that obtained by the pendulum astrolabe[3] (Figure 1), an instrument developed for the U. S. Armed Services during World War II. The conclusion was "that the astrolabe is an instrument well adapted to rapid astronomical determinations when the highest attainable accuracy is not required." The latitude determination was considered comparatively precise, but "longitude is subject to a systematic error probably due to personal equation."

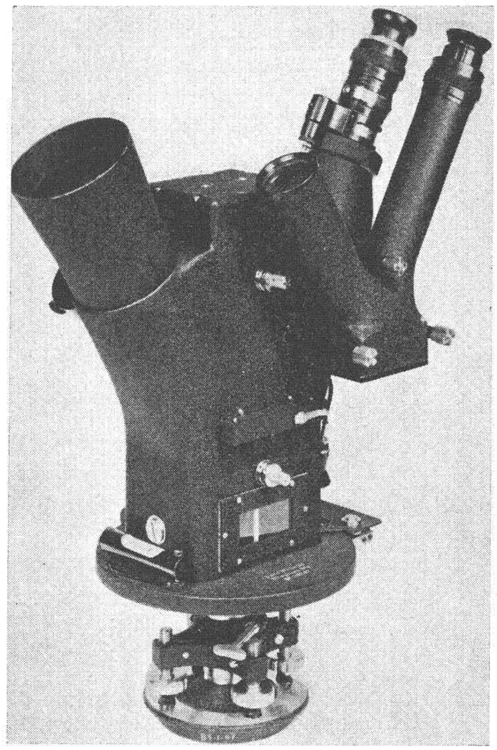

FIG. 1. 60° Pendulum Astrolabe, pilot production model, made by David White Co., Inc Milwaukee, Wisconsin.

In order to locate photogrammetric horizontal control points between the comparatively widely-spaced astronomic positions, this writer recommends the slotted-templet method. This method would give ample accuracy for small-scale mapping, and it would leave the multiplex free for planimetric and topographic work. It would be preferable to utilize the reconnaissance photography for the slotted-templet solution if the astronomic control could be identified on it, otherwise the larger scale photography must be utilized. Diapositives reduced from the reconnaissance photography should be used in the multiplex projectors for locating additional vertical control, by setting up models on widely spaced vertical control, established by barometric levels for greater economy.

[3] Gossett, F. R. and Sollins, A. D., "Experimental Position Determination by Pendulum Astrolabe," "*Transaction American Geophysical Union,*" Vol. 27, No. V, Oct. 1946.