

## THE ACCURACY OF POIVILLIER PLOTTERS

A Letter to the Secretary of the Society From

*E. Torquebiau*

**I**N THE June 1951 issue of PHOTOGRAMMETRIC ENGINEERING covering the 1951 Annual Meeting, you have published the paper by Mr. John V. Sharp, entitled "United States and International Methods of Comparing Accuracy of Photogrammetric Instruments."

We are in agreement with Mr. Sharp on the absence of a common definition of error for the purpose of determining the accuracy of a stereoplottting instrument. This lack of a common definition has led to confusion and to those erroneous interpretations of error statistics which appear in the photogrammetric journals of the various countries and in the publications of government and private cartographic organizations.

Therefore, in answer to the expressed wish of Mr. Sharp to dissipate misunderstanding among photogrammetrists, we deem it proper to re-emphasize what has already been published on the matter of the altimetric accuracy of the Poivillier-SOM stereotopographs Types *B* and *C*. The calculation of the *C* factor for each of these apparatus was based on statistical studies made at the National Geographic Institute. We know that this factor, which expresses the relation between map altimetric accuracy and flight height of the aerial photography, does not completely characterize the accuracy of the plotting instrument whose operation constitutes but one step among the several involved in passing from an aerial negative to plotted map; therefore, it is in the abstract sense that we here utilize this factor based on the law of error distribution.

We have calculated the *C* factors for the Poivillier-SOM stereotopographs Types *B* and *C* from stereoscopic measurements made under normal operating conditions at the French National Geographic Institute.

The strips of negatives tested were those exposed in a Poivillier-SOM plate camera having a 70° field angle. An average of 10 spot heights were read in each model and errors were determined by comparison with elevations obtained on the ground.

Negative Scale	Plotting Scale	C factor $\frac{H}{3,33 \times \text{mean square error}}$	
		Stereo-Type <i>B</i>	Stereo-Type <i>C</i>
1/15,000	1/10,000	3.750	2.400
1/25,000	1/20,000	3.200	
1/35,000	1/40,000		

These values of the *C* factor can be compared strictly to those published in the American literature concerning the Multiplex and Kelsh plotters and stated as being in the neighborhood of 1,000. Such a comparison is valid even though the *C* factor is influenced by such data as the metric qualities of the survey camera and the characteristics of the film base, which are extraneous to the stereoplottting apparatus. The values in this tabulation correspond to the *C* factor as defined in the paper of Mr. Sharp.

It would be desirable to study the different types of plotting instruments from the standpoints of accuracy and efficiency under identical operating conditions. In lieu of such a study, each instrument manufacturer should inform the

user as to the conditions under which the stated accuracy can be obtained. A statement of *C* factor gives but one aspect of the accuracy characteristics of the plotter.

It is a simple matter to state the accuracy of a plotting apparatus in terms of the mean square error of stereoscopic parallax measurements in the plane of the original negative. This value is practically independent of the scale of the negatives and of the *B/H* ratios (cf. statistical study of altimetric accuracy, communication of the French Geographic Institute to The Hague 1948 International Congress). If the instrument accuracy is so stated with reference to the photographic material to be used, be it glass plates or film, it is easy for the user to determine the minimum negative scale required to achieve the specified map altimetric accuracy. In the case of the Type *B* and *C* stereotopographs using plate negatives, the mean square error of stereoscopic parallax measurements in the plane of the negative are from 3 to  $4\mu$  and  $5\mu$ , respectively.

Yours truly,

E. TORQUEBIAU  
*Ste. d'Optique & de Mecanique de Haute Precision.*  
*Le Directeur General*  
*125, Boulevard Davont, Paris*

NOTE by Publications Committee: The Poivillier plotter *C* factors are based on the mean square error of spot heights read in the instrument, whereas the American practice is to compute the indicated *C* factor from the errors of spot heights interpolated from stereoscopically drawn contours. There is an appreciable disparity between the two types of *C* factors.

## SELLING PHOTOGRAMMETRY\*

*Fowler W. Barker, Secretary, Association of Professional Photogrammetrists*

I FEEL humble in talking on this subject when so many men in Government and out have been selling photogrammetry for twice as many years as the months I have been connected with it. In fact, ten months ago I didn't know what the word meant. A group of men in this profession asked me to meet with them. I asked their spokesman what business they were in. When he told me, I didn't know what it was. A few weeks later I attended a meeting in Chicago; none there knew what photogrammetry is. They were men who have influence in setting the budgets of some important industries, which gives a chance to tell a story.

During World War II, there was a manual for new officers. It quoted a German staff officer as saying that there are four kinds of people in the world:—the brilliant and industrious makes the best staff of-

ficer; the brilliant and lazy follows instructions brilliantly and makes a good line officer; the stupid and lazy follows instructions well and makes a fairly good tactician; but the kind to look out for is the stupid and industrious. Since I read that, I have hesitated and tried to think things through before doing anything. I now wish that I had thought and acted to get out of making this speech before so many brilliant and industrious men who know more of the subject than I.

The profession of photogrammetry in my opinion has received more recognition in the past several years than in any period preceding, regardless of duration. But, as the saying goes, we have merely scratched the surface for there are still millions of people who should know about its value and who do not even know what the word means.

\* Paper read at the Eighteenth Annual Meeting of the Society, Hotel Shoreham, Washington, D. C., January 9 to 11, 1952.