satisfactory, but their accuracy, which was about 10 nautical miles, was then considered too low to justify their general adoption.

If, as Mr. Parker writes, an accuracy of 10 miles is all that is required in celestial navigation in modern aircraft, this navigation device would seem to fill the present needs by giving that degree of accuracy and at the same time radically simplifying sight reduction.

Mr. Sadler comments:

I am glad that Mr. Byerly has called the attention of readers of the *Journal* to his method of sight reduction using C. & G. S. Charts Nos. 3062 and 3063. This ingenious method possesses the great merit of simplicity of principle; it uses directly the fact that the position line is part of the small circle of position centred at the sub-stellar point and radius equal to the (corrected) zenith distance. The direct measurement on the chart of distances of up to, say, 80° naturally involves large size and small scale; if these are acceptable, then the method offers an exceedingly fast means of sight reduction marred only by the necessity of transferring the position lines, or fix, to the navigating chart.

Mr. W. A. Scott points out that this method can be used on any axial projection on to a tangent plane to the Earth's surface, including both the orthographic and the stereographic. The meridians will of course no longer be straight lines, but this is no great disadvantage compared to the possible advantages of a conformal projection.

Mr. Byerly writes:

Like Mr. Scott, I thought that it might be better to use a conformal projection in which the line of position could be drawn perpendicular to the azimuth. After using a gnomonic projection for some time, I secured a stereographic projection from the C. & G. S. and tried it. My personal experience was that the facility and accuracy with which two points can be set on a straight line in the gnomonic chart considerably outweighed the advantage of conformality. Furthermore, the wide variation in the gnomonic scale to some extent meets Mr. Sadler's criticism of the smallness of the scale, for it is usually possible to number the meridians so as to place the plotted points in the outer part of the chart where the scale is quite large.

Plotting Sights with the Douglas Protractor

from F. K. Humphreys

THE 10-in. Douglas protractor can be modified to reduce the time taken to plot astronomical sights in the following manner. Two narrow slots are cut parallel to the central E.–W. line, and $\frac{3}{4}$ in. each side of it, from the central N.–S. line to the western margin of the graticule.

To plot the sight, the intercept is marked on the centre line, measuring from the centre to the west, by comparison with the scale of the chart. The centre of the protractor is placed on the assumed position and the required azimuth (read on the inner reciprocal scale) aligned with the parallel of latitude—to the eastern side for intercepts towards and to the western side for away. Marks are then made on the chart through each of the slots, opposite the pencilled intercept distance, and joined to give the position line.

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