PRACTICAL HINTS TO HYDROGRAPHIC SURVEYORS.

TO PLOT A STATION POINTER FIX GRAPHICALLY

by

J. TH. VERSTELLE, 1ST OFFICER N.E.I. SURVEYING VESSEL *"Orion"*

In the *Hydrographic Review*, Vol. X, No. 2, J.D.N. describes a method for plotting a station pointer fix graphically. This method is more accurate than plotting by means of a station pointer and has the advantage that it may always be used. The inconvenience of the station pointer is that it provides for the use of two angles between three *successive* points only and that it is impossible to check the accuracy of plotting, because the angle at which the circumscribing circles cross each other is not visible.

The easiest way of plotting is by the well known method of placing a transparent protractor divided in degrees and half degrees with its centre at A and the division of 90° on the line AB and to draw the perpendicular PQ on the middle of AB (Fig. 1).

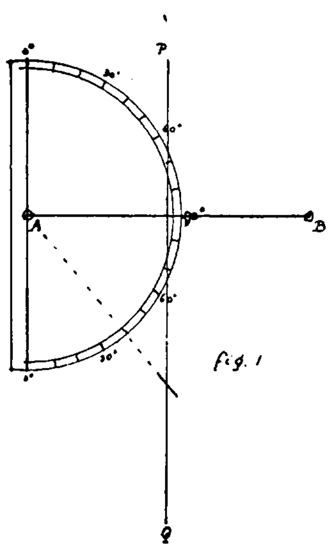

fig. 1

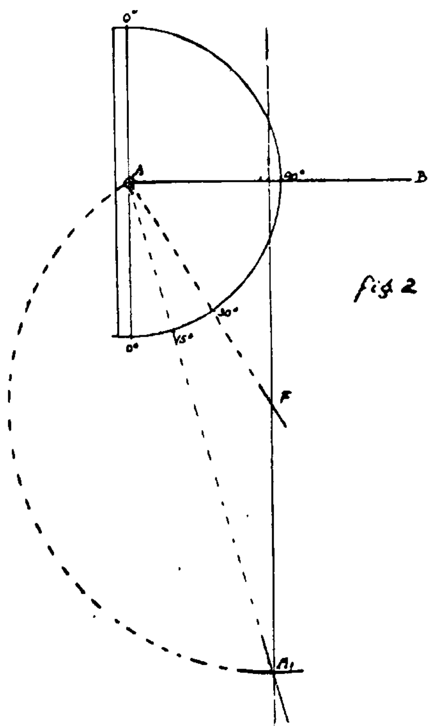

fig 2

There are some special cases which are worth mentioning:

1. Where α, the angle between A and B as seen by the observer, is smaller than 30° (Fig. 2). In this case it is difficult to determine the point M_1 (the centre of the circumscribing circle) accurately, because the angle at which the line AM_1 intersects the perpendicular is very small, so that a small error in placing the protractor will introduce an important error in M_1. Let us suppose $\alpha = 15°$. By plotting the angle $2\alpha = 30°$ the point F is found. Describing a circle with the radius AF, the intersection with the perpendicular is the centre M_1 of the circumscribing circle.

2. Suppose the observer is at S (Fig. $3a$). The angle between the circumscribing circles on AB and BC is very small (Fig. 3). A good check would be obtained by the

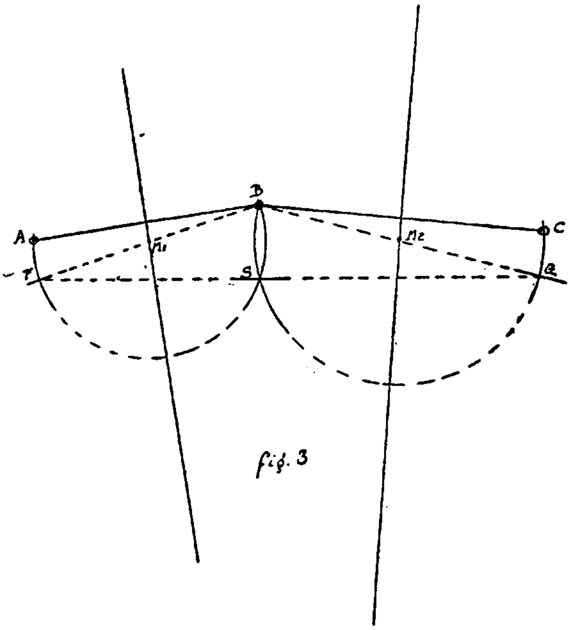

fig. 3

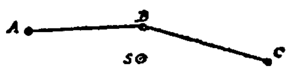

fig. 3a

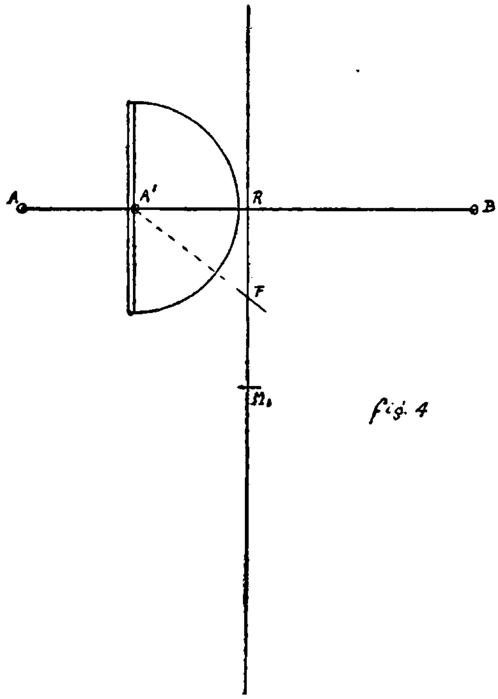

fig. 4

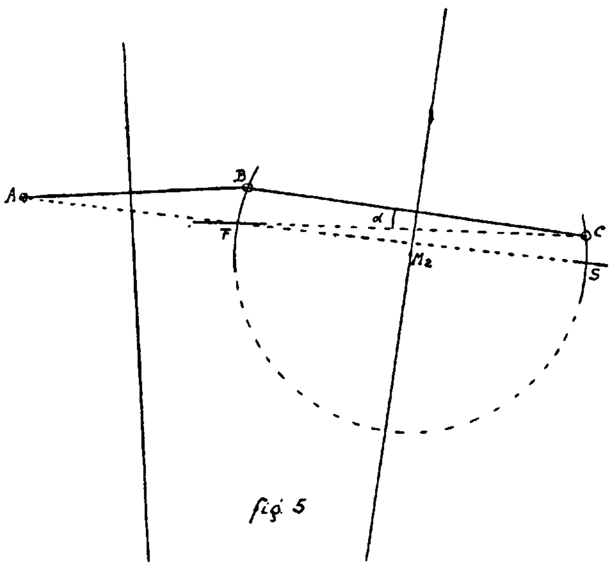

fig. 5

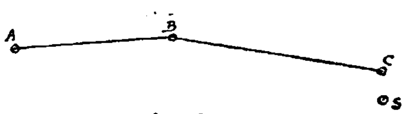

fig. 5a

circumscribing circle on AC. But when the angle AC is nearly 180° the centre of this circle would be too far away.

Draw the circumscribing circles in the usual way and join B with $M1$ and $M2$. By joining the intersections F and G the observer's position S is found (Fig. 3).

3. Where the distance AR is much greater than the radius of the protractor.
Divide AR into halves, AA' and $A'R$, and place the centre of the protractor at A'. To find $M1$, take twice the distance of RF (Fig. 4).

4. When the position of the observer is at S (Fig. 5*a*). The angle between A and B is only 1 or 2 degrees. Drawing the circumscribing circle in the usual way is not possible, nevertheless the intersection of the two circumscribing circles would be nearly perpendicular.

Draw the circumscribing circle on BC. Plot the angle α (the angle between A and B seen by the observer) as in Fig. 5. Join the intersection F with A, thus S is the position of the observer. (The manual on Hydrography written by the Hydrographer of the Netherlands, Captain LUYMES, gives a solution that differs slightly from the above).

A GRAPHICAL METHOD OF ADJUSTING PLANE TABLE TRAVERSES.

(Extracted from *The Canadian Surveyor*, Ottawa, July 1933).

(The United States Geological Survey recommend the following method of similar triangles for adjusting cumulative errors in a plane table traverse).

***

Through the end points of the traverse (see Fig.) draw a straight line AB. Measuring from one end, lay off on this line the distance which should be the end to end distance of the traverse. Call the end which does not coincide with the end of the traverse b or b' according to whether the distance laid off is respectively shorter or longer than the traverse. Take any convenient point O at one side of the traverse and at a sufficient distance away to avoid sharp angles of intersection with the line AB, and draw lines OA and OB. If the traverse is too long, draw a line from b parallel with the line OA and intersecting the line OB at point B'. Through point B' draw the line $B'A'$ parallel to the line AB.