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 $90^\circ$ on the line $AB$ and to draw the perpendicular $PQ$ on the middle of $AB$ (Fig. 1).

There are some special cases which are worth mentioning:

1. Where $\alpha$, the angle between $A$ and $B$ as seen by the observer, is smaller than $30^\circ$ (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 $\alpha = 15^\circ$. By plotting the angle $2 \alpha = 30^\circ$ 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
circumscribing circle on $AC$. But when the angle $AC$ is nearly $180^\circ$ the centre of this circle would be too far away.

Draw the circumscribing circles in the usual way and join $B$ with $M_1$ and $M_2$. 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 $M_1$, take twice the distance of $RF$ (Fig. 4).

4. When the position of the observer is at $S$ (Fig. 5a). 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 $\alpha$ (the angle between $A$ and $B$ viewed 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 Luybes, gives a solution that differs slightly from the above).

---

A GRAPHICAL METHOD OF ADJUSTING PLANE TABLE TRAVERSSES.

(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 $AB$. 