

RESTRICTED

OPERATIONAL PROCEDURE

situation was such that further relaxation of vigilance was permissible. In this case the state of "Released" would be authorized, to be understood as follows:—

Released. All observers can be released from duty, provided arrangements are made to reach the state of "Readiness" within two hours of the receipt by the head observer of a message requiring "Readiness".

Post Instrument—How to Use

8. The post instrument is so designed that it may be used for both visual and sound plotting. The operations called for are:—

- (a) *Visual Plotting.* Immediately an aircraft is seen, No. 2 observer will estimate the height at which it is flying, and set that height on the height column of the post instrument by means of the small milled edge ratchet wheel. He will then align the aircraft in the sights of the sighting arm using the large milled edge wheel to elevate or depress the sighting arm. The base line carriage will be in sympathy and will move away from or towards the observer until the aircraft has been correctly sighted. At this point No. 2 observer will then note the gridded map reference position indicated by the pointer and proceed to report.
- (b) *Visual Plotting at Ultra Low Heights.* The greatest care must be exercised when aircraft are flying very low. It is not practicable to use the instrument to the best advantage at heights below 1,000 feet. In these circumstances No. 2 observer will estimate the distance of the aircraft from the post site and place his finger on the chart table top at the spot equal to the distance he has estimated on a bearing line indicated by the instrument which has been aligned on the aircraft. He will then note the gridded map reference position indicated by the finger, and proceed to report. In this connexion, it must be remembered that the scale of the post chart map is to the order of 1 inch to 1 mile.
- (c) *Plotting Aircraft by "Sound".* Immediately an aircraft is heard, no matter whether in conditions of good or bad visibility, by day or night, No. 2 observer must move his instrument round until it is pointing in the direction from which he estimates the sound is coming. This action will give the clock minute bearing. Before taking a "Sound Angle" No. 2 observer must ensure that both plotting pointers are over the sound circle line. He will elevate or depress the sighting arm by means of the milled edge wheel on the height bar until he determines the point from which the greatest volume of sound is coming to him.

Reporting from R.O.C. Posts

9. In order to achieve speed and efficiency of post reporting and operations room plotting there must be an accepted sequence of information. The sequence is designed to give all the essential information in the most concise form and in the order required by the operations room plotter.

10. In the following paragraphs methods of reporting, with examples, are described. Observers must learn each method and sequence so that no

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SECTION 5

CORRECTION OF HEIGHTS— MICKLETHWAITE HEIGHT CORRECTOR

1. The accuracy of plots obtained from the post instrument is directly proportional to the accuracy of the setting placed on the height column. Provided the correct height setting is used, the position revealed by the pointer on the map chart beneath will be correct.
2. Conversely, provided the ground plan position of the aircraft is known accurately at any moment, its actual height can be obtained. This can be done by two or more posts working in conjunction, and taking simultaneous observations on the same aircraft.

Correction of Height when Aircraft is Over a Known Post

3. When an aircraft passes directly over any named post, its position at that moment is known. This information must be reported, but in order to give warning to other posts before they take action to obtain a corrected height, warning reports must be given. Examples of both reports are:—

(a) "Baker Wun"—(plotter repeats "Baker Wun"); Plane (type to be named) about to pass overhead.

Pause—to be followed by:—

(b) "Baker Wun"—(plotter repeats "Baker Wun"); Plane (type to be named) overhead.

4. Posts (on the same cluster) which can see the aircraft, on overhearing such a report (or posts on an adjacent cluster, also seeing the aircraft, on receipt of information from the plotter) are to take the following action:—

(a) On hearing the warning report, the post which will correct Baker 1's height must keep the aircraft trained in the sights of the post instrument, making no alteration to the estimated height they have set on their height column, and immediately the "overhead" report is heard from B.1 post (see Fig. 1) move the Micklethwaite Height Corrector pointer (see Fig. 2) to the spot which appears as "B.1" post on the chart.

(b) Report, immediately, to the plotter the height shown on the scale of the Micklethwaite Height Corrector. This height reading is taken from the scale at a point where it is intersected by the upper edge of the Micklethwaite arm (see Fig. 2). This height is termed the "corrected height". The report is given in the sequence shown in sub-para. (c).

(c) "Baker Too"—(plotter repeats "Baker Too"); Plane (type overhead Baker Wun; corrected height ate.

5. When the corrected height has been reported by B.2, the observer at B.1. must reset his height column with the correct height, realign the aircraft in the sighting arm and continue plotting in the normal manner.

NOTE. After correcting a height both pointers of the instrument are to be brought together before plotting is continued.

Correction of Height when Aircraft is Flying Between Posts and is Visible to Each Post

6. When an aircraft's track is between posts and each post can see it, the correct ground plan position and actual height can be obtained by the method detailed below. This method is based on simultaneous observations of the aircraft by posts on the same cluster, or by co-operation with posts on an adjacent cluster through the plotter in the operations room.

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7. The actual position of an aircraft which is visible to two posts simultaneously is the point at which the line of sight from the first post intersects the line of sight from the second post.

NOTE. The line of sight is the direction of the sighting arm when it is aligned on the aircraft.

8. In Fig. 1 of this section two posts, B.1 and B.2, are shown. The position of B.2 is marked on B.1's chart and vice versa. B.1 can overhear B.2 giving plots on an aircraft, and they should have also sighted the same aircraft in their instrument. The direction of the sighting arm is the line of sight of the aircraft from B.1 post, and similarly, the line joining the position of B.2 post to the two-minute area which B.2 was heard to

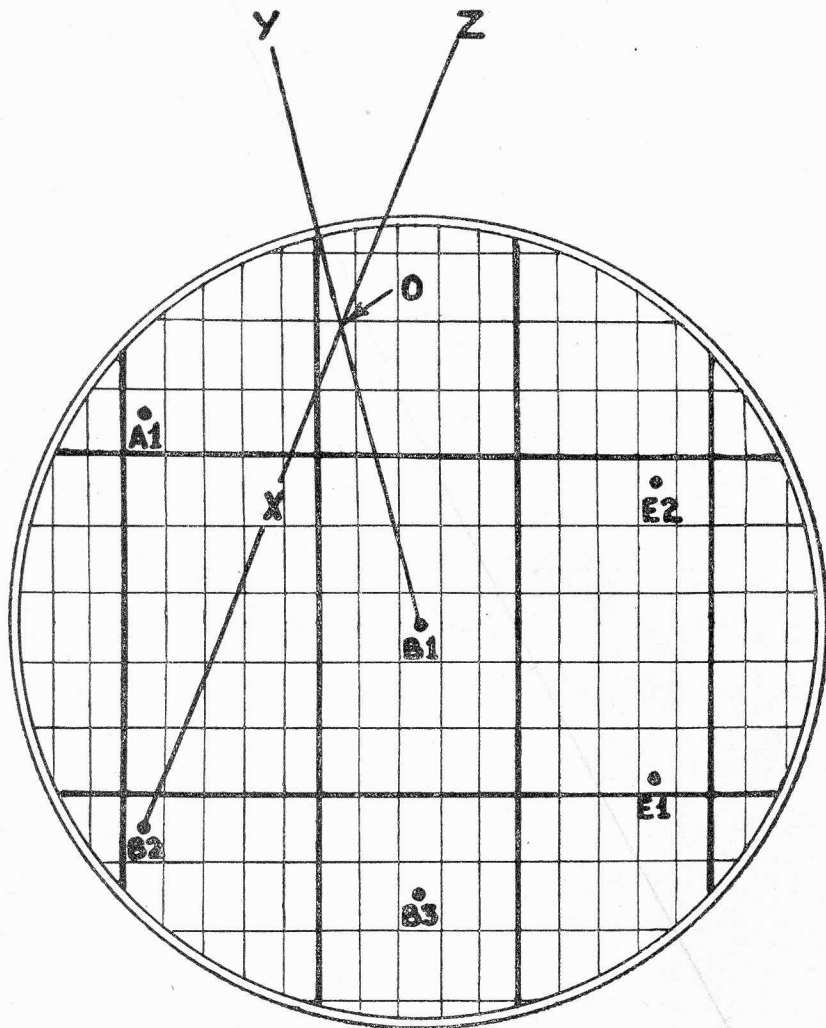


FIGURE 1. Diagram of Height Correction.

Line B1-Y = Line of sight from B1 Post.
Line B2-Z = Line of sight from B2 Post.
Point X on Line B2-Z = Grid reference given by B2 Plot.
Point O at intersection of lines = Actual position of aircraft.
Line B2-Z represents ruler placed on chart table top to join position of B2 Post to the plot they were heard to give.

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CORRECTION OF HEIGHTS

give is the line of sight of the aircraft from B.2. Where these lines of sight cross at point "O" is the actual plan position of the aircraft at that moment.

9. When a post is sighting an aircraft which is being plotted at that moment by a post on the same cluster, the opportunity must be taken to correct the height overheard from the reporting post. The method to be used is as follows: The No. 2 observer at B.1 post (see Fig. 1), on over-hearing B.2's plot will hold the instrument steady and then proceed as follows:—

- (a) Place a ruler on the chart table top so as to join the position of B.2 with the two-minute area they have given.
- (b) Move the pointer of the Micklethwaite Height Corrector attachment (see Fig. 2), forward or backward, as appropriate, so that it touches the ruler edge.
- (c) Report, immediately, to the plotter the height shown on the scale of the Micklethwaite Height Corrector. This height reading is taken from the scale at a point where it is intersected by the upper edge of the Micklethwaite arm. This reading is termed the "corrected height". The report will include the latest plan position of the aircraft and is to be given in the sequence shown in the example at sub-para. (d).
- (d) *Example of Corrected Height on Plot between Posts.*
"Baker Wun"—(plotter repeats "Baker Wun"); Plane (type) given by Baker Too—now 3939; corrected height seven.

10. When the corrected height has been reported by B.1, the No. 2 observer at B.2 must then reset his height column with the corrected height, realign the sighting arm on to the aircraft and continue plotting in the normal manner.

11. After correcting a height, both pointers of the instrument are to be brought together before plotting is continued.

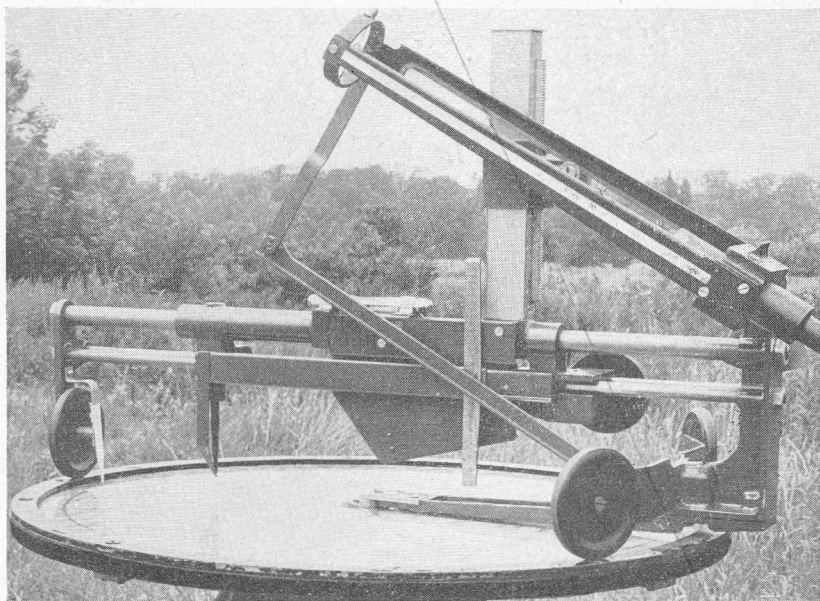


FIGURE 2. Micklethwaite Height Corrector Attachment.

SECTION 6

METHOD OF HEIGHT FINDING BY "SOUND"

1. Part Two, Section 3, sub-paras. 8 (d) and (e) describe plotting aircraft by "Sound", whilst paras. 11 to 16 give the method of reporting. To obtain a height from this system it is essential that the actions called for are carried out with speed and accuracy.
2. In instances where a complete sound report is to be given, No. 2 observer moves the instrument into the direction from which the sound is coming, ensures that both indicator pointers are over the sound circle, elevates or depresses the sighting arm so that it is aligned on the spot from which the sound is reaching the post, and reads the height on the height column of the post instrument.
3. Reading on the height column is taken as the "Sound Angle Reading". For this purpose the noughts are omitted, the thousands of feet, spoken as a whole number, now becoming the "Angle". For example, a reading of 10,000 feet would become "Angle 10", 18,000 feet would become "Angle 18", and so on.

Sound Angle Heights

4. The sound angle readings given in the post report are converted into actual heights by the operations room plotter. The basis for calculating these heights is that the sound angle reading would be the actual height of the aircraft if the track were exactly five miles from the post reporting it (the pointers having been set on the five-mile sound circle when the angle was taken).
5. Since this combination happens infrequently, it is necessary to use a formula by which the plotter converts the sound angle into an actual height in thousands of feet. This simple formula is:—

$$\frac{\text{SOUND ANGLE} \times \text{DISTANCE}}{5}$$

6. Thus, if the track counter is on a position (as determined by the intersection of the various posts' bearing reports) showing the aircraft to be 8 miles from the post reporting, it will be seen that the sound angle reported must be multiplied by the distance figure of 8 miles and the result divided by 5.
7. For example, the latest plan position of a track on the main plotting table shows that the aircraft is 4 miles distant from the post ; from the post report the sound angle is 14, the actual height, therefore, is:—

$$\frac{14 \times 4}{5} = \frac{56}{5} = 11 \text{ and } 1/5\text{th, which is approximately 11,000 feet.}$$

In actual practice, a plotter usually refers to a prepared calculator, which sets out the conversion tables for angles to heights in thousands of feet.