Letters to the Editor

ASTRO-FIX BY COMPUTATION

SIR,

Professor O. C. Collins's ingenious contribution (Vol. 3, No. 2, p. 107) to an old question assumes that the computed astro-fix is, *per se*, desirable in air navigation. However, some inherent disadvantages are:

(a) There is no 'cocked hat' or 'box' to indicate if one of the sights is a 'rogue'—occasionally encountered by all bubble sextant users.

(b) The procedure is too rigid: a spoiled sight ruins the whole series and the method cannot be used on a 'catch-as-catch-can' basis through, for instance, altostratus, or when course must be altered.

(c) An elliptical area of probable position is produced if the sighting technique suggested is used.

I also find that if the 'simultaneous' technique is used, H.O. 249 is quicker.

If, despite these factors, instrumental advances find a use for the computed astro-fix in air navigation, there is an obvious method (not original) which seems better.

For the same list of stars compute only c and the angle PX_1X_2, where X_1, X_2 are respectively the first and second star. Then,

$$\text{hav } ZX_1X_2 = \sin\left(\frac{z_2+z_1}{2}-c\right)\sin\left(\frac{z_2-z_1}{2}+c\right)\operatorname{cosec} z_1 \operatorname{cosec} 2c$$

The parallactic angle is $PX_1X_2 \pm ZX_1X_2$, the sign being determined by a simple rule. Since PX_1 and ZX_1 are also known, the triangle PZX_1 can be solved by a variety of methods. The advantages are:

1. Only two elements are pre-computed instead of five.

2. The working is shorter. After obtaining the parallactic angle, if Ageton is used, the working is of the same extent (or slightly less) than formulae 4–9 of Professor Collins's paper. Hence we have the one formula given above to compare with formulae 1–3 of the paper mentioned.

3. The theory is elementary and involves only well-known formulae and principles.

4. Since in the triangle PZX_1 one element (the co-declination) is predetermined, the procedure lends itself to a further degree of pre-computation if that should become justified.

With reference to the equal altitude method, it is difficult to see how the air navigator determines the moment of equal altitude, and the common altitude, 'by direct intercomparison', and works the fix, all in five minutes. Unless a special instrument is used, one would surmise that:

(a) The time of equal altitude had already been calculated.

(b) The position is already known (to find a).

(c) Instantaneous observations are used.

With reference to the latter, I have taken, and used, thousands of sights in the air with an ordinary bubble sextant, and it is my experience that fixes obtained from single shots taken with this instrument should be regarded with grave

https://doi.org/10.1017/S037346330003513X Published online by Cambridge University Press

suspicion. Surely any scheme involving the simultaneous observation of two stars at equal altitude from an aircraft must await the arrival of a gyro-stabilized two-star tracker?

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Yours faithfully,
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SAIL TRAINING FOR NAVIGATION

SIR,

I have read with interest Captain C. A. G. Nichols's paper on Collisions and Groundings (Vol. 3 No. 2) and I feel some comment of a general nature may apply.

For some years I have inclined to the view that the ancient caution, wariness and sea-sense of navigators has deteriorated with the advancement of scientific aids and that officers tend to rely on instrumental information to an extent perhaps unwarranted, to the exclusion of experience, skill and senses; i.e. if the scientific answer is 'x' but experience says 'y', the former is accepted without demur and the latter dismissed without investigation.

Recent correspondence in a certain periodical questions the preservation of a sailing ship for training purposes and whilst remaining aloof from this subject, I feel that sail-taught navigation, as distinct from seamanship, has considerable merit in that its first essential is caution, its second foresight and its third wisdom: qualities manifestly absent in the navigators mentioned by Captain Nichols. Had it been otherwise, they might not have walked into traps so obviously baited.

In the case of the two motorships, captain 'A' had a great asset which, coupled with the above qualities, ought to have made collision well-nigh impossible. But his justifiable confidence in radar obscured his judgement and he appears to have mistaken knowledge for wisdom. In the absence of radar I am sure he would have acted with the utmost circumspection; and had he exercised the same with his scientific aid, short of Act of God, he was safe. Knowing merely the presence and whereabouts of a ship calls, I think, for prudence as hitherto adopted rather than for reliance upon the instrument which itself does not pretend to be collision proof.

The *Queen Mary* case appears to me to be one due to lack of foresight on both sides. Perhaps her officers, being over-familiar, did not fully appreciate her weight and speed of about 50 feet per second on an erratic course or that she was, in fact, a most undesirable companion. Certainly her responsible officer had never taken a brisk walk with a free puppy in front of his feet else he would have expected the inevitable, and it may be callous to regret that in his youth the cruiser's captain had never apparently run a tight race with a bull. *Queen Mary* appeared determined to complete her leg to the last yard notwithstanding the jeopardy, and she seems to have lost sight of the salient point—that the zig-zag was designed for safety and when no longer safe its function had passed for the moment.

As regards the vessel in-bound to the Clyde; making a landfall in blowing weather carrying a dead reckoning two days old and with a lee shore most uninviting demands, I think, methods a little less happy-go-lucky than those adopted by this ship.

https://doi.org/10.1017/S037346330003513X Published online by Cambridge University Press