THE ACCURACY OF BUBBLE SEXTANT OBSERVATIONS

SIR,—I have read Mr. Hagger's paper (this *Journal*, Vol. V, p. 380) with keen interest, but I feel driven to protest against his 'Historical Summary', which does less than justice to the state of the art, before 1940. For example, the Mark IX sextant was not 'being developed' but was in full production, having had extensive trials a year or more earlier. Neither is it fair to imply that the selection of the arithmetic-mean system was made with a pin. Actually plenty of experience had been gained with both systems, since median-marking was a feature of the Favé-Lepetit sextant, purchased in 1936, and mechanical averaging was first introduced on the Husun Mark XII in February 1938.

The main problem of astro-navigation before the war was that of survival in face of electronic competition, and the fact that it did survive, and even developed somewhat, was almost solely due to the pressure of a few enthusiasts at Air Ministry, notably the late Wing Commander F. M. V. May. Is there no one left to lift the veil on those critical years?

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Yours faithfully,

F. DORMAN BYERS

A. J. HAGGER writes: In trying to sketch, in a few words, the state of knowledge at the beginning of the work of A. & A.E.E. it was not possible to give a full account, and if less than justice has been done to the work of the pioneers of the aircraft sextant I hope that they will accept my apologies. May I thank Mr. Byers for his correction, that the R.A.F. Mark IX sextant was being introduced, and not as stated, developed. Both median-marking and averaging sextants had been used, and each had its active supporters, to whom great credit is due for the introduction of the sextant in air navigation. Each had evidence of successful use, but the arguments brought in their favour were conclusive on neither side, as judged from minutes of meetings at which their merits were compared. The fundamental work of Professor Plaskett on the nature and magnitude of sextant errors resolved the uncertainty of these earlier discussions.

NAVIGATION AT SEA WITH A STAR LATTICE

SIR,—I have read the very interesting and practical paper of Lieutenant-Commander R. B. Michell (this *Journal*, Vol. VI, p. 63). He states in his paper that 'star lattice charts are not yet available . . .' It occurs to me that the projection of the proposed plotting charts might be worth study with a view to the standardization of the chart length of one degree of latitude throughout the useful range of latitudes. This would permit the use of a standard ruler for marking off the minutes of sextant altitude along the star intercepts.

For example, if the chart length of 1° of latitude is fixed at 3 inches, then 1′ represents 1/20 inch, which is about the smallest division for practical chart draughtsmanship; it could with advantage be 1/10. A thin opaque perspex ruler slotted longitudinally would provide eight working edges which could be marked with one scale of sextant altitude and a choice of seven time scales. A transparent ruler would provide one altitude scale and three time scales.

The question amounts to this: would the conical orthomorphic projection provide a better plotting chart than the mercator? Over the small area covered by each chart, and particularly over the small local triangle formed by the D.R. position, the fix and the meridian of the D.R., the distortion should be negligible over the latitudes normally covered by surface navigation. The facility gained by the regular use of an unchanging scale of minutes of sextant altitude might be considerable. Faulty draughtsmanship in transferring minutes from a normal latitude scale at the side of a mercator chart might spoil much accurate work with almanac, tables and sextant.

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Yours faithfully,
F. W. WRIGHT

THE VALUE OF MOON SIGHTS

SIR,—The contention in Mr. Burton's article (this *Journal*, Vol. V, p. 139) appears to be that because Moon sights are fairly frequently available at sea it follows that the Moon must be of great value as a position finding agent to those concerned with the navigation of merchant ships. This is not confirmed in practice for it is found that the weather conditions which favour an observation of the Moon will, almost certainly, ensure that the ship's position has been, or will shortly be, satisfactorily established by the normal observations of the Sun and stars which are matters of routine in a well-conducted merchant ship. The information supplied by the Moon is therefore merely redundant, unless of course, the normal routine is allowed to lapse.

In the higher latitudes in winter the longitude of the noon position as derived from the morning sight is often not very satisfactory on account of the small change of bearing, and it would seem that the noon position could with advantage be obtained by simultaneous sights of the Sun and Moon. Unfortunately, however, in high latitudes in winter the Moon is rarely high enough in the sky to be observed when on a suitable bearing at apparent noon. At other seasons of the year, and in low latitudes at all seasons, the Moon is astronomically available for the purpose for several days each half month; but then the longitude can be derived from the morning sight with all the accuracy required and the use of the Moon only delays the determination of the position.

Frequently enough at sea cloudy weather causes a failure, or partial failure, of our routine observations and then help from the Moon would be very welcome. Experience, however, tells us that help from that quarter is not at all likely to be forthcoming and that, when a break in the sky occurs, a sight of the Sun is the only thing worth hoping for.

To the seamen, then, the Moon sight is something which, very generally, can be obtained when it is not needed. Consequently he cannot use it very much and his valuation of the Moon as a position-finding agent is correspondingly low. The Moon is, however, found to be very useful for finding the error of the compass.

S.S. Ranchi,
At sea.

Yours faithfully,
C. F. HALLIDAY