FORUM

The Place of Navigation in Modern Air Transport

from Captain V. A. M. Hunt

In his Presidential Address at the Annual General Meeting of the Institute, Captain Majendie spent some time on demonstrating the restrictions imposed on free navigation by air traffic control. Whilst there is much truth in his statement the matter does not end there and I believe that those who study his address in retrospect should remember that the marked inflexibility of economic operation in the vertical plane of the modern jet aircraft and, to a lesser extent, the turbo-propeller driven aircraft, imposes considerable restrictions on air traffic control! In fact, the designers of modern aircraft and engines seem to be doing their best to deprive air traffic of its unique asset—the third dimension.

The President seemed to be resigned to a situation in which pilots, navigators and controllers alike are all slaves to the idiosyncrasies of an extremely temperamental vehicle. Surely this should not be permitted. The designers of aircraft and their engines must play their part and aim at producing a vehicle which can economically maintain a regular and accurately timed passenger and goods service in all weathers; this they will never do so long as maximum cruising speed in still air remains the criterion of virtue and all else is made subservient to its achievement. Could it be that we have completed the full circle and that those who complain loudest at the deficiencies of air traffic control have, in fact, created the situation themselves when they laid down the aircraft specifications?

The President writes:

Captain Hunt implies that a major part of the blame for our present difficulties in providing safe separation economically between aircraft must be attributed to the designers of aircraft and their engines, and those responsible for laying down the basic specifications from which they have to work. In particular he emphasizes the lack of vertical flexibility in the new turbine-powered generation of aircraft.

At the end of the war it was usual for most transport aircraft to operate in the height band extending from ground level to about 10,000 feet. Between the end of the war and about 1950 a large number of new transport aircraft powered by piston engines, and with pressurized passenger cabins, entered service capable of operating reasonably economically between 10,000 and 20,000 feet of height. Since then the turbo-propeller aircraft have entered service, and, in broad terms, these use the height band from 15,000 feet to a maximum of about 30,000 feet. The next generation of pure jet aircraft will operate economically in the height band between about 30,000 feet and 40,000 feet. Concurrently with these developments we have the helicopter entering service at the bottom end of the range, and desirous of utilizing the airspace below 10,000 feet, which is now becoming vacant.

Although any particular aircraft of a given class may be somewhat restricted in its vertical flexibility of operation, the aircraft industry has, in fact, spread its

utilization of the airspace widely between different classes of aircraft, and, by so doing, has eased tremendously the air traffic control problem.

When one considers the vast research effort that has to go into the design and manufacture of only a single type of transport aircraft, in order to produce it at all, it does seem that the lack of major research effort, expressed either in terms of skilled man hours or of expenditure, on the air traffic control side presents a most unbalanced situation. It must also be remembered that the real commodity that the transport industry has to sell is speed, and it is hardly fair, therefore, to attack operators and constructors from being preoccupied with it.

If extra effort is to be devoted to solving our present air traffic control problems, I feel sure that real results will come more quickly and economically by directing this effort directly on to the problem of safe separation, rather than into the multifarious fields of aircraft design.

The 'Box' or Pocket Sextant

from Frances W. Wright

(*Harvard College Observatory*)

LAST summer I sailed in R.M.S. *Newfoundland* from Boston to Liverpool and took the opportunity of keeping up a navigational plot using a minimum of charts and instruments. The sextant I used was a box sextant and it occurs to me that some description of this instrument may be of interest to navigators. Box sextants are lightweight and usually have a sling case which enables them to be carried or packed away easily. They are much less expensive than the standard sextant, and since they are precision-made instruments will last just as long. Good results can be obtained with them both in coastal navigation and offshore.

The instrument is made entirely of metal; it is only three inches in diameter and 1½ inches thick. It is shown, closed, in Fig. 1. The small opening (o) is

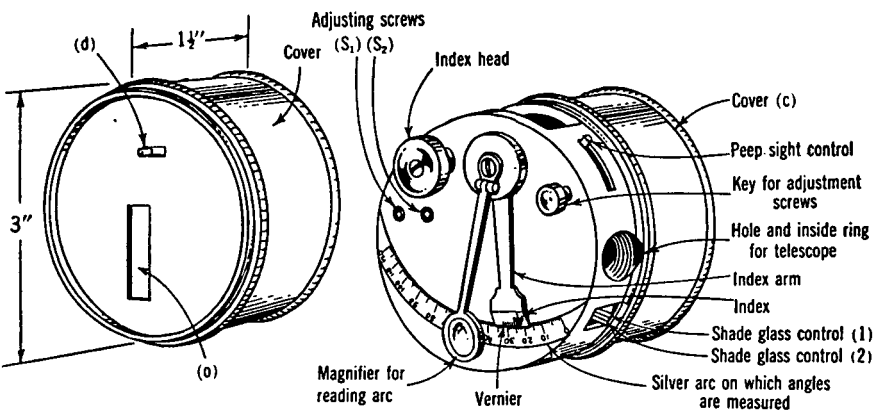

Fig. 1. The box sextant closed (a)*; opened* (b).

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