

FORUM

THE AVOIDANCE OF COLLISION BY AIRBORNE AND SHIPBORNE MEANS

THE papers presented at the three-day conference on collision-avoidance held in London last June by this Institute, the French Institute of Navigation and the Ausschuss für Funkortung, have been published in the last two numbers of the *Journal*. It has not been possible to publish the fairly lengthy discussion that took place on these papers but a summary of some of the contributions follows. Some contributions printed here do not relate to the conference itself.

One subject which aroused a great deal of interest at the conference was the impact of radar on the International Regulations for Preventing Collisions at Sea, and as a result of the conference a Working Group has been set up by the three sponsoring bodies to consider the problem and if possible formulate positive recommendations. A great deal of the discussion at the conference (on the marine side) was on this subject and a brief summary of the various suggestions put forward has been made available to the Working Group.

Numbers printed thus (10, 230) in the Forum, refer to the volume and first page number of a paper in this *Journal*.

The Use of Infra-red as a Warning Device

from Professor F. Schroeter

My comments refer to those papers dealing with the use of certain parts of the electromagnetic wave spectrum as a means of overcoming bad visibility, and especially those concerned with the prevention of collisions at sea. Here, fog is the source of danger in almost all cases, whereas in aviation fog and clouds cause only a minority of accidents. In the case of aviation, moreover, height above the ground plays a decisive part; the atmosphere becomes more and more transparent to infra-red rays with increasing height. In these zones, therefore, and in all zones without rainfall and with a very rarefied atmosphere, the prospects for systems using infra-red rays are far better than at sea-level.

To start with, I should like to remind you of very early measurements of atmospheric transparency carried out by Coblentz, of the Bureau of Standards, at the beginning of this century and apparently forgotten by the present generation. It is again and again assumed that fog and mist are far more transparent for the infra-red zone than for light waves and ultra-violet. On the basis of measurements by Granath and Hulburt, also of the Bureau of Standards, and by myself, I can say that this assumption is wrong. I will not mention uses where the required range is very small. There of course infra-red—or for that matter light—can be used. The results of Coblentz and of Granath and Hulburt show what may be expected. Coblentz found that between 4μ and 7.5μ , almost all wavelengths are heavily absorbed in the infra-red zone. This leads one to a division of the infra-red spectrum which fits in well with the various methods