know how many of the parties concerned were misled by this. In the writer's submission, really competent use of the stabilized or north-upward display and of the north-upward plot should increase safety. The dangers mentioned, of course, are themselves strong reasons in favour of plotting and against crystal-gazing.

If the plot is taken seriously, it can, as already remarked, be drawn to a compass datum, e.g. north upwards, even if the display cannot be stabilized. There is also one kind of mechanical computer which can achieve the desired result despite a ship's-head-upward PPI and a prejudice against converting bearings from relative to compass. This computer (Fig. 1) provides for a relative plot in which two bearing scales are used. The compass scale 0–359° is fixed to the plotting surface and the relative scale is fixed to a rotatable ring beneath and visible through the plotting surface. The scales are, of course, concentric and can be locked in any desired relationship to one another. Provided that this relationship is always such that the ship's head point on one scale is opposite the compass course being steered on the other, it is immaterial whether bearings are plotted as relative or compass, as long as the appropriate scale is used. The plotted track will in either case appear as if plotted to a compass datum and the compass bearing of the plotted echo will always be in plain sight. This kind of computer can be a separate unit for transferred plotting or be in the form of a reflection plotter over the PPI. In the latter, as the compass bearing scale has to be in fixed relation to the plotting surface, it follows that if the PPI display is always ship's head upward with the relative bearing scale fixed to it, the plotting surface with the compass scale must be made rotatable, so that the two scales may be correctly aligned. If and when the PPI display is stabilized north upwards, the plotting surface would be turned so that its scale is also north upwards. This facility is not yet possible on all existing reflection plotters, but it is thought worthy of incorporation.

Radar and Collision at Sea

IN the July number of the *Journal* (Vol. VI, p. 313) Captain F. J. Wylie suggested that members and other readers of the *Journal* should contribute their suggestions as to rules of conduct to be observed by ships using radar in fog. It is possible to print only a selection of the comment received, but all the contributions sent in have been made available to the Technical Committee.

from Captain H. C. Fellingham

(*Esso Transportation Co., Ltd.*)

I THINK that, before attempting to frame a code of conduct in fog with radar, the feasibility of applying a code in many circumstances should be considered. I cannot see, for example, how a code of behaviour can possibly emerge to deal with situations such as that of making a navigational focal point, as Finisterre or Ushant, with many ships converging on different courses and with the inevitable fisherman to complicate matters. The radar cannot distinguish between ordinary vessels and fishermen, and the average fisherman is not likely to be equipped with radar. Thus the situation will have to be dealt with as it was before radar was invented, except that radar will give advance warning of the existence of such a

situation and a little timely alteration of course may enable a vessel to avoid the greatest concentration of shipping.

In my opinion the main application of radar to the *Regulations for Preventing Collisions at Sea* is to 'the existing circumstances and conditions' clause of Article 16. This phrase, although coined before the advent of radar, to my way of thinking includes the use of radar. Provided that I have a clear radar screen I feel justified, if the area in which I am navigating is not usually used by small craft which are poor radar targets, and if all tests indicate that the radar set is operating correctly, in considering a moderate speed in fog as almost full speed (the qualifying word 'almost' being due to the technical reason that most modern ships' engines cannot be run on 'stand by' conditions without some reduction of speed). On the appearance of a target on the screen I ease down to a speed consistent with the visibility and distance of target, plot and avoid the close-quarter situation if possible. This is the only situation which I can envisage for which it would be an advantage to have a code of behaviour, but I would first like some device to be invented which would tell me if that other vessel had radar and was using it.

from Captain G. C. Forrest

(T.S.S. Arcadia)

THE following subjects might be worth considering for discussion and possible exploration:

(1) That radar-using ships, taking broad evasive action, shall alter course to starboard only, and not at all once they are within five miles of the other vessel, though they may reduce speed or stop. (Open waters.)

(2) That the international code signal 'C' (Yes) in morse on the whistle should signify in fog 'I am using radar', and should be used in place of every third blast required by Article 15.

(3) The establishment on charts of a traffic dividing mark at a suitable distance off headlands or other turning points: ships with land on their starboard hand to keep inside of it and those with the land on their port hand to keep outside of it.

(4) Fact collecting, by the theorists who are interested in this subject, on recent collisions of vessels with radar with a view to discovering whether locality has much to do with it, and if so to suggest remedies.

(5) The feasibility of traffic control in rivers and estuaries.

from Captain A. H. Hutton

(General Steam Navigation Co., Ltd.)

IN regard to plotting, I think the question of plotting is primarily one which depends on the type of vessel and the trade in which she is employed. In one of H.M. ships, or in one of the large liners, where there is plenty of help on the bridge, plotting has no doubt many advantages, but in the company to which I have the honour to belong, in the short-sea trades (with the possible exception of the Mediterranean), I do not think plotting would be of much help. During fog the master and one officer, and perhaps a lookout, would be on the bridge fully occupied watching the Decca Navigator and the PPI, and possibly the echo-sounding machine.

from F. W. Morgan

CAPTAIN WYLIE points out that the ordinary steering rules cannot properly apply until visual contact has been established. Surely, however, when an echo appears in the starboard fore quadrant no watchkeeper can ever be at fault if he so manœuvres the vessel as to ensure that the bearing of the echo does not remain constant. Presumably in most cases the object should be to bring the echo abaft the beam and then to ensure that its bearing continues to change, at least until it is abundantly clear that the range is increasing. If this fundamental rule were always followed, it would appear on the face of it that a collision could not possibly result.

The suggestion that radio identification and intercommunication should be made a requirement, might, if adopted, leave the position of the small yacht or fishing-vessel worse off than before.

George Margetts

from D. H. Sadler

I AM much indebted to Commander W. E. May for calling my attention to the numerous references to George Margetts (see this *Journal*, **6**, 403) in *The Marine Chronometer* by R. T. Gould (J. D. Potter, 1923). The following extracts from this book will provide some of the biographical information which I was unable to give previously.

'George Margetts (1748–1804), already referred to as the inventor of a form of lever escapement, produced several machines of this kind.' (Namely chronometers showing sidereal and mean time.)

'Margetts also made several very complicated watches designed to give a certain amount of the information which was normally afforded by astronomical and tidal tables. They showed the tide at various ports, the age and place of the moon, the place and declination of the sun, and the stars visible at any time above an observer's horizon. Also the time in hours and minutes.'

'One of these watches, and the movement of another, is preserved in the British Museum, and there are also several examples in private collections. . . . The decoration of the dial, exhibiting the figures of the constellations, is very fine, but the workmanship and engraving of the movement is far from first class —a feature which is characteristic of all Margetts' work. Were it not for this lack of finish, he might have a claim to be regarded as the English Breguet.'

The footnote to this last extract gives most of the information of interest.

'He was, in many ways, a remarkably gifted man. He detected and corrected a large number of errors in the tables of refraction and parallax published by the Board of Longitude, and also produced a large volume of "Horary Tables", a work of enormous labour, designed to provide a graphical method of clearing the lunar distance by inspection. He received from the Board a gratuity of £100 as a reward for this work.

'He was for some time chronometer maker to the East India Company, but his circumstances declined, and he died in a lunatic asylum.'