within the permissible range for Permo-Trias as the refraction profiles of Browitt[6] show velocities of 4.6–4.8 km s^{-1} at a level in the West Shetland Basin where Cashion's sections[7] reveal thick sediments of this age. Thus, pre-Jurassic deposits cannot be dismissed at the depths I have indicated. They correctly note that magnetic anomalies occur over the 4.0–4.4 km s^{-1} layer but, rather than arising from Tertiary lavas, these can be interpreted as reflecting small basic intrusions within a thick Mesozoic section and magnetisation contrasts in the Precambrian basement.

In denying that my results are relevant to the early evolution of the Rockall Trough, Smythe *et al.* have ignored my demonstration of major faulting and crustal subsidence. As they accept a Mesozoic age for the Flannan Trough they must also accept the existence on the continental margin of NNE-trending faults which were active during Mesozoic time. As these run approximately parallel to the continental slope north of St Kilda and have increasingly larger displacements northwestwards[1], it is difficult to resist the conclusion that the faulting is directly associated with the major phase of downwarping in the Rockall Trough. My section showing thick pre-Jurassic sediments north-west of the fault-bounded Flannan Ridge is compatible with the Permian opening first suggested by Heirtzler and Hayes[8] but it does not establish that seafloor spreading took place at this time.

Commenting on petroleum prospects off northern Britain, Smythe *et al.* offer a comparison with other parts of the Rockall Trough that hinges on unpublished data and a geometrical argument which is questionable because the extent of oceanic crust in the region is unknown. Several parts of the Rockall Trough clearly deserve detailed commercial exploration, although my appraisal of prospects would be less sweeping than that given by Smythe *et al.* Moreover, in view of the geophysical indications of thick sediments and major Mesozoic faulting west of Hebrides, it seems premature for them to take a firm, pessimistic stand on a large section of the Scottish margin, especially since drilling investigations are at such an early stage.

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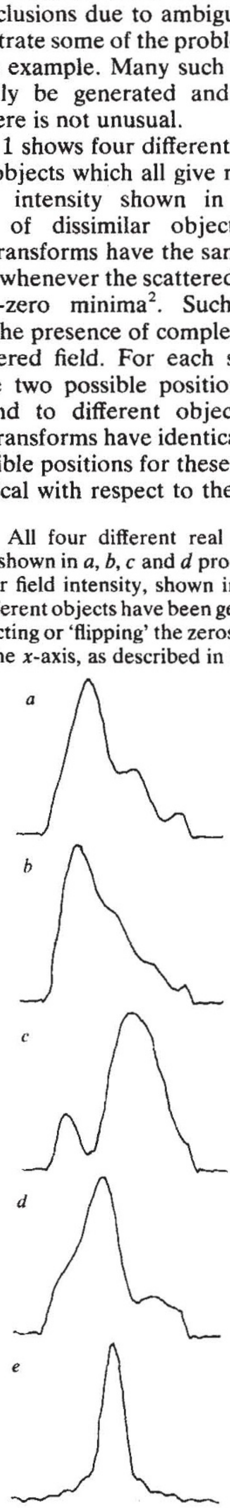
Object reconstruction from intensity data

GULL AND DANIELL[1] have recently proposed a new maximum entropy algorithm for the reconstruction of an object field from incomplete and noisy measurements of its Fourier transform. This new algorithm may encourage other workers to apply maximum entropy techniques to their own problems. For this reason we point out here that the application of maximum entropy techniques for object reconstruction in the absence of phase information could lead to wholly false conclusions due to ambiguities. We shall illustrate some of the problems using a specific example. Many such examples may easily be generated and the one chosen here is not unusual.

Figure 1 shows four different, real and positive objects which all give rise to the scattered intensity shown in Fig. 1*e*. Families of dissimilar objects whose Fourier transforms have the same modulus occur whenever the scattered intensity has non-zero minima[2]. Such minima indicate the presence of complex zeros in the scattered field. For each such zero there are two possible positions, which correspond to different objects whose Fourier transforms have identical moduli. The possible positions for these zeros are symmetrical with respect to the real axis and thus one speaks of 'flipping' zeros about this axis in order to generate different objects. The example in Fig. 1 was produced by 'flipping' such zeros. Clearly the four objects thus created are very different, for example, in the number and position of their peaks.

Fig. 1 All four different real positive objects shown in *a*, *b*, *c* and *d* produce the same far field intensity, shown in *e*. The four different objects have been generated by reflecting or 'flipping' the zeros of $F(z)$ about the x-axis, as described in the text.



The maximum entropy algorithm should converge to one of these possible solutions but the only criterion it has as a basis for the selection of that solution is that of smoothness, as all the possibilities are real and positive. However, inspection of the four possible solutions shows that none may be disregarded as unphysical—they are all 'smooth'. It would only be possible to identify one of these possibilities as the solution if one has some extra information, such as approximate phase values which may provide a basis for such discrimination. On the basis of the intensity alone there can be no unique solution, unless all minima are zero. The selection of one solution using an entropy criterion is dangerous. For example, if the algorithm chose the third solution one might conclude that the object consisted of two distinct peaks, whereas the other possible solutions show that such a conclusion is unfounded.

The example given here is simpler than may be expected in general—there are few complex zeros—and thus 'real' data may be expected to result in even greater ambiguity. In these conditions it is vital that some measure of the ambiguity is established. The maximum entropy algorithm does not give such a measure[3].

For convenience the analysis used to produce the example in Fig. 1 is one-dimensional but similar ambiguities will exist in two-dimensional systems.

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Human reproduction reconsidered

MAY'S article in News and Views, '*Human Reproduction Reconsidered*'[1], fails to mention that the research on the demography of the !Kung hunter-gatherers, reviewed by Short and by

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