Comments on the Evolution of the North-East Atlantic

It has been proposed[1-3] that the opening of the Bay of Biscay occurred by rotation about a pole situated near Paris (50.0° N, 3.3° E) and not about the pole proposed by Bullard *et al.*[4] (43.6° N, 1.0° E). The rotation about the first pole results in strike-slip motion along the North Pyrenean Fault during the pre-Upper-Cretaceous opening, while the rotation about the second pole results in compression there. The second rotation is not compatible with geological data[5] which indicates extension prior to Upper Cretaceous in the Pyrenean region.

We wish to show how these two hypothetical rotations agree with the magnetic data of Williams and McKenzie[6].

Fig. 1 shows a rotation of the Iberian peninsula (contour at the 1,000 fathom isobath) by 23° about the first pole. Intermediary rotated positions every 5° are also shown. Similarly, Fig. 2 shows a rotation of the Iberian peninsula by 27.8° about the Bullard *et al.* pole. If the 1,000 fathom contour represents the limit of the continent, most of the area between anomaly 32 and the western limit of Portugal (except for the southernmost part presumably related to movement of Africa) would have been created by the relative rotation of the Iberian peninsula in Fig. 1, but not in Fig. 2. The first rotation would thus seem to be in better agreement with Williams and McKenzie's data. In addition, this first rotation explains the shape of anomaly 32 as reflecting the pre-drift position of the Iberian peninsula.

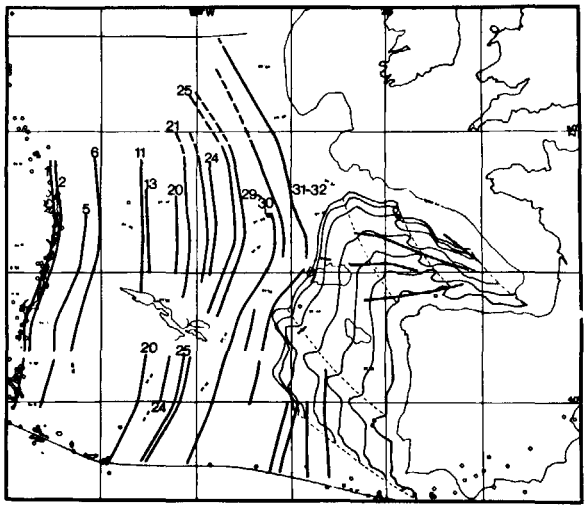

Fig. 1 Magnetic anomalies after Williams and McKenzie[6]. The Iberian Peninsula has been rotated about a pole at 50.0° N, 3.3° E. Several flow-lines are shown in dashed lines.

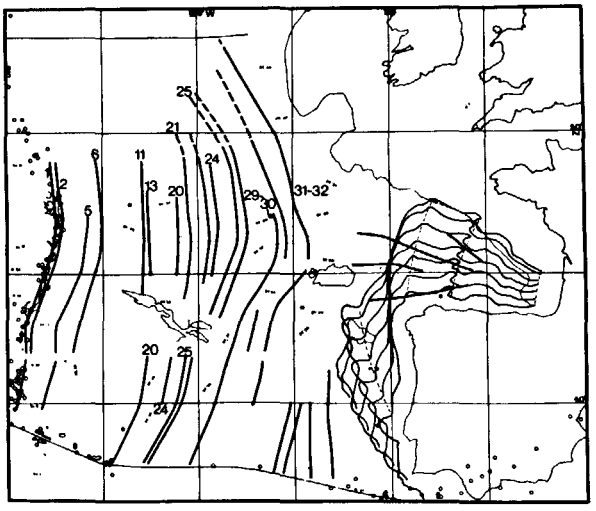

Fig. 2 Magnetic anomalies after Williams and McKenzie[6]. The Iberian Peninsula has been rotated about the Bullard *et al.* pole at 43.6° N, 1.0° E. Several flow-lines are shown in dashed lines.

But even in Fig. 1 the detailed agreement between measured and predicted magnetic anomalies is not good. This may result from inaccurate identification of the anomalies east of 32 by Williams and McKenzie, as a detailed 10 km spaced systematic aeromagnetic survey of the Bay of Biscay (ref. 7 and unpublished work of E. Le Borgue, J. Le Mouël and X. Le P.) has shown the anomalies there to be less fan-shaped than indicated by their map. In any case, an extension toward the west of the systematic detailed survey would enable a definite choice to be made between these two possible rotations.

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