GEOPHYSICS

Magnetic Anomalies over the Mid-Labrador Sea Ridge

On February 16, 1963, an R.C.A.F. *Argus* aircraft flew a sortie from the Labrador coast to the southern tip of Greenland and back to the Strait of Belle Isle at an altitude of 200 ft. Total intensity values of the Earth's magnetic field were obtained at one-thirtieth nautical mile intervals along the track of the aircraft. These are shown in Fig. 1 using a scale of 20γ to a nautical mile. The regional gradient of the Earth's magnetic field has been removed. The track of the aircraft is shown in the inset and the letters refer to the points labelled on the profiles. It is readily apparent from the profiles that some distinctive magnetic anomalies occur in the area traversed. The largest anomaly recorded off the continental shelf was greater than 700γ in amplitude, where the depth of water, as indicated by Canadian Hydrographic Chart 7011, was more than 11,000 ft.

An interesting feature of the profiles is the apparent correlation (as indicated by the dashed lines) between the two profiles near the coast of Greenland. It appears that the empirical correlation can be carried to the point where the tracks are about 150 miles apart. This apparent correlation brings to mind the occurrence of the elongated anomalies off the west coast of North America[1-4], which also occur in the deep ocean, and on the western side of a large land mass. The trends of the Pacific anomalies are aligned approximately north–south, whereas the Labrador Sea anomalies appear to trend about north-west–south-east.

There has been some speculation recently on the possible existence of a mid-Labrador Sea ridge[5], and Drake *et al.*[6] have presented records from the seismic profiler which indicate that a Labrador Sea ridge probably does exist. However, no distinctive, associated magnetic anomaly was observed. The profiles of Drake *et al.* are located reasonably close to the profiles presented in this report. The feature on their profile *AB* which outcrops above the ocean floor lies to the south-east of the 550γ anomaly labelled *R* on the profile *DE* in this communication. From the previous discussion this direction seems to be the dominant geological trend in the area. A smaller amplitude (200γ) anomaly appears on our profile *AB* and is also labelled *R*. It is approximately north-west of the previously discussed anomaly. There would thus seem a reasonable chance that the anomalies labelled *R* are, in fact, the magnetic expression of the mid-Labrador Sea ridge. Both anomalies gave depth determinations around 12,500 ft., which would indicate that the causative body is just below the ocean floor.

The lack of a magnetic anomaly on some traverses over the mid-Labrador Sea ridge is puzzling, but similar inconsistencies have occurred in the case of the mid-Atlantic ridge[7].

The large (1,550γ) anomaly immediately to the north of *E* occurs on the Labrador continental shelf in about 500 ft. of water and may be associated with the edge of the continental shelf.

Two sea magnetometer traverses were made by Lamont across the Labrador Sea in 1960. Between miles 900 and 950 on Fig. 84 of the published report[8] may be seen a series of four anomalies each having an amplitude about 400γ. These stand well above the background and are located in the vicinity of the anomaly labelled *R* on profile *DE*. The anomalies which occur between miles 990 and 1,120 of the aforementioned report correlate well with the anomalies shown on profile *CD* on a peak-to-peak basis. On their return profile the ridge anomaly is not so definite although the associated magnetic anomaly could be that located at mile 455 on their Fig. 86.

The preliminary interpretation presented here is admittedly speculative. However, it is hoped that additional magnetic traverses will be carried out between Greenland and Canada to establish the distances over which the anomalies in the Labrador Sea have continuity and to throw additional light on the possible existence of a Labrador Sea ridge.

We thank the crew of *Argus* 722 who actually flew the sortie. This work was supported by the Royal Canadian Air Force. This communication is Canadian contribution No. 46 to the International Upper Mantle Project.

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GEOLOGY

Origin of Ice Ages: an Ice Shelf Theory for Pleistocene Glaciation

A recent paper by Wilson[1] suggests that 'thermal' surges of the Antarctic ice sheet led to the growth of large ice shelves in the Southern Ocean, and that these shelves cooled the Earth sufficiently to cause glaciations in the northern hemisphere. That the southern hemisphere may

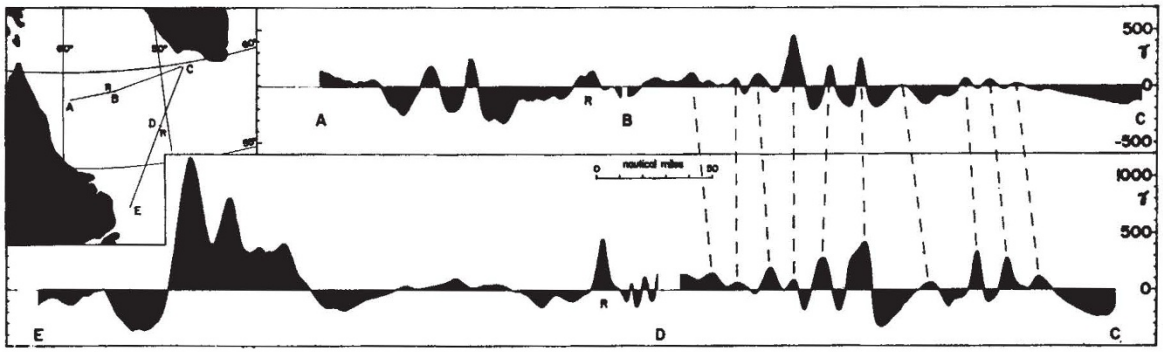

Fig. 1