NOTE ON THE REMANENT MAGNETISM OF SOME UPPER JURASSIC LAVAS FROM THE ARGENTINE ISLANDS

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Previous studies of intrusive rocks from eastern Antarctica have yielded a reliable position for the geomagnetic pole during the Jurassic (Blundell and Stephenson, 1959; Turnbull, 1959; Bull and Irving, 1960). However, a similar study of the Upper Jurassic Volcanic Group from the Antarctic Peninsula (Argentine Islands; lat. 65°15′S., long. 64°17′W.) failed to produce any useful information (Blundell, 1962). This is believed to be due to hydrothermal alteration of the lavas by the later Andean Intrusive Suite, or to the inherent magnetic instability of the Upper Jurassic lavas themselves. Evidence of varying amounts of alteration is afforded by thin sections (Blundell, 1962; Elliot, 1964), whilst magnetic instability is indicated both by storage tests and by a.c. demagnetization experiments (Blundell, 1962).

Continued interest in the relative geographical positions of the eastern and western parts of Antarctica in the past suggested that a second attempt to obtain Jurassic palaeomagnetic data from the Antarctic Peninsula might be of value. The work described here was carried out on twelve of the specimens collected by Blundell (as yet unmeasured), and the aim was to remove any effect of the Andean batholiths, such as a secondary magnetization, by heating specimens to a temperature just above that to which they had been raised during the period of intrusion. The apparatus used in the thermal demagnetization experiments was a simple non-magnetic furnace in which the specimens were heated to the desired temperature and then cooled in a field-free space. All measurements of remanence were made with an astatic magnetometer.

In a preliminary experiment three specimens were heated in successive 50° C steps up to 550° C, and some improvement in the scatter of the remanence directions was observed after heating to 250° C. Although the actual improvement in scatter was only slight, this temperature was chosen for the thermal demagnetization of a further nine specimens. Petrological studies suggest that this is not an unreasonable maximum temperature for the lavas to have attained at this distance, i.e. approximately 1 mile (1·6 km.), from the observed junction with the Andean intrusions.

The remanence directions of all twelve specimens before and after heating to 250° C are summarized in Table I.

Table I

Temperature	N	α	P	k	$\bar{\phi}$	$\bar{I}$
Room temperature	12	54°	0·05	1·62	116°	51°
250° C	12	35°	0·05	2·50	120·5°	54·5°

It is apparent that initially the scatter of remanence directions was large and that, although some slight improvement was produced by the demagnetization, this is not significant. Because of this large scatter, it is thought that the calculation of a virtual geomagnetic pole position would be of little value.

The N.R.M./T.R.M. ratios of the three specimens used in the preliminary experiment are all less than 0·1, and such low values support the suggestion that the lavas are magnetically unstable.

One factor not considered so far is the geological dip of the lavas, which is reported to be variable and often difficult to determine (Blundell, 1962). Since it is not known whether the dip is depositional or tectonic, a dip correction would in any case be of no scientific value.

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It should be noted, however, that, in cases where the dip is known, restoring the lavas to the horizontal did not appreciably improve the scatter of remanence directions.

The failure of these and previous experiments to obtain reliable palaeomagnetic data from the Upper Jurassic rocks of the Argentine Islands is considered to be due to the partial or total destruction of their original magnetism by the Andean Intrusive Suite.

The collection of orientated samples of Jurassic rocks from areas in the Antarctic Peninsula remote from outcrops of Andean batholiths would therefore be of great value to palaeomagnetic research.

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