Some Palæomagnetic Investigations on Chinese Rocks

Previous palæomagnetic investigations[1] on European and North American rocks agree in suggesting that those areas were in such a position that the pole appeared to lie on or near the Chinese mainland from Upper Palæozoic to Mesozoic times. If the geology of China is examined for those same periods, the climate indicated is more equatorial than polar[2]. These two apparently contradictory facts make the palæomagnetic study of Chinese rocks particularly interesting, and account for the publication of the results of the first collection from China despite the small number of samples.

The collection was comprised of some eleven samples, of which eight were of the Tertiary Kansu Series collected at three sites in Kansu, while the remaining three were of red Middle Silurian siltstones from the southern part of Yumen, Kansu province. The Tertiary rocks unfortunately were magnetically unstable, being characterized by low intensities of magnetization and scattered results. The measurements on the Silurian rocks yielded a more consistent pattern (Fig. 1). The mean declination was N. 66·4° W., mean inclination + 55·3°, with a circle of confidence of 8·5° calculated from 17 measured disks. The mean intensity of magnetization was $8{\cdot}8 \pm 3{\cdot}8 \times 10^{-6}$ e.m.u./cm.^{3}.

The position of the ancient pole was 168° W. 49° S. or 12° E. 49° N., which compares with the Silurian pole from North America of 138° E. 19° N. and by extrapolation an estimated position of a European pole in 165° E. 22° N. If this Chinese result is confirmed by further collections, the following implication, first suggested by Nairn[3] as a result of comparing Permian palæoclimatic and palæomagnetic data, would seem to be valid, namely, that differential movement occurred between Europe and North America and Eastern Asia. This is a significant addition to the Continental Drift theory, for it implies that at the time when Gondwanaland was a single unit, China at least was not part of the Laurasian continent. Further investigation of this possibility is at present in progress.

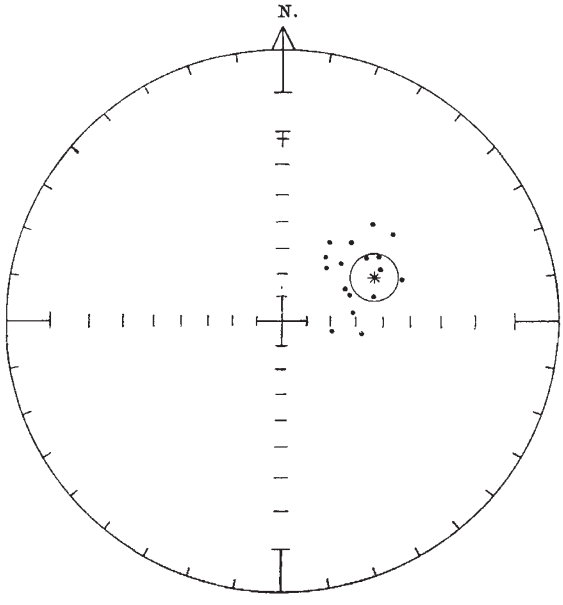

Fig. 1. Stereographic plot of palæomagnetic measurements on middle Silurian rocks from Kansu province. ●, N. pole pointing down; +, theoretical dipole field at the site; *, mean direction of magnetization enclosed within the circle of confidence

Chang Wen-you

Institute of Geology,
Academia Sinica,
Peking.

A. E. M. Nairn

Department of Physics,
King's College,
Newcastle upon Tyne 1.
Nov. 29.

[1] Creer, K. M., Irving, E., and Runcorn, S. K., *Phil. Trans. Roy. Soc.*, A, **250**, 144 (1957).
[2] Lee, J. S., "The Geology of China" (Murby, London, 1939).
[3] Nairn, A. E. M., *Bull. Soc. Géol. France*, **7**, 721 (1957).

Chemical Composition of Tektites

In a recent communication[1], Prof. H. Urey makes the following statement: "Tektites have chemical compositions remarkably similar to those of the more acid sedimentary rocks. This is true for the major and minor constituents. (I have been privileged to see analyses as yet unpublished on these minor constituents.) Such a chemical composition is not produced by any other naturally occurring chemical processes that we know of, except perhaps in very rare and special circumstances". Similar statements have appeared in other papers dealing with tektites, and give the impression that their compositions can be explained only by the fusion of sedimentary rocks.

One may reasonably ask which are these "more acid sedimentary rocks" to which Prof. Urey refers. I do not know any publication in which analyses of tektites are directly compared with those of sedimentary rocks. The most comprehensive compilation of tektite analyses is that of Barnes[2]. In discussing these analyses Barnes applies certain criteria for suspecting a sedimentary origin from the chemical composition (excess of aluminium oxide, potassium oxide > sodium oxide combined with magnesium oxide > calcium oxide and very great excess of silicon dioxide). On the basis of these criteria he concluded that: "There is a strong suggestion that Darwin glass, bediasites, and possibly the moldavites and Ivory Coast tektites are fused sediments. The indochinites, billitonites, and australites on this basis are most closely allied to the igneous rocks".

Nevertheless, a rapid survey of published analyses shows the existence of igneous rocks of comparable composition to each of the principal tektite types (Table 1). The igneous rock analyses were selected from Washington's compilation[3], the tektite analyses from Barnes's monograph[2]. An analysis of each tektite type is paired with the analysis of an igneous rock; the correlation within each pair is on the whole very close.

It is incumbent on those claiming near identity of composition between tektites and sedimentary rocks to show that an equally close correlation is possible between these tektite analyses and analyses of individual sedimentary rocks. Even if such a correlation can be established, it should be clear from Table 1 that material with the chemical composition of tektites can be produced by more than one naturally occurring chemical process. To argue that the chemical composition of tektites indicates that they