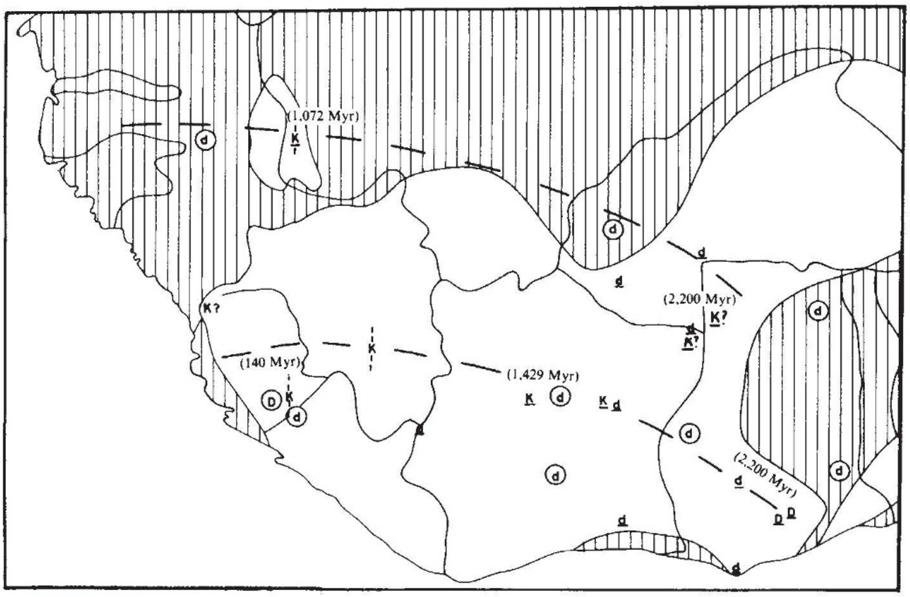

Fig. 1 Diamond and kimberlite occurrences in West Africa. K designates kimberlites (kimberlite belts are denoted with vertical caps and bases), D denotes major secondary diamond deposits, d marks minor secondary diamond occurrences. Underlined symbols are Precambrian in age, other deposits are younger. Circled symbols are alluvial deposits without age determinations; vertically shaded areas are covered with platform or basin sediments. Dates are given for diamond districts in which determinations have been made.

plume[12] producing a kimberlitic magma[13–15]. Then the alluvial deposits and kimberlites of the primary arc could be explained by the slow migration of such a plume from Ghana across the Ivory Coast to Sierra Leone with a long-term relative rate of motion of $0.8\ \mathrm{mm\ yr^{-1}}$. The deposits on the secondary arc could be explained and would be consistent with a second but possibly weaker plume located north-west from the first plume, roughly in line with the Atlantic continental marginal intersections of the two arcs.

Such a hypothesis is consistent with the longevity, movement, and episodic nature of other hot spots such as the Hawaiian Chain[16]. The intrusion through the continents may be more episodic in nature, being shut off during periods of continental compression and opening up during periods of continental tension. Following the splitting of Africa from South America the rate of relative movement of the plume should have increased greatly. This would place the present position of the hypothetical plume, by extrapolation of the primary arc, at St Paul's Rocks on the Mid-Atlantic Ridge. This is known to be an active hot spot[17] and includes rocks with close affinities to kimberlites and carbonatites[18] as well as uplifted mantle material[19].

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H. R. AND R. A. WILLIAMS REPLY—Hastings and Sharp[1] have attempted to explain the distribution of Precambrian to Mesozoic kimberlites in West Africa by means of two long-lived mantle plumes, the major one tracking from Ivory Coast to Sierra Leone with time. Their criticism of our hypothesis[2] that kimberlites occur along fundamental crustal fractures affected by oceanic lineaments, is unacceptable, especially as our hypothesis has been confirmed by Stracke[3] in south-east Australia, following his visit to Sierra Leone.

Hastings and Sharp have criticised our choice of data, particularly the ages of kimberlites, their location, and that of transform fracture zones. With regard to the first, the reliability of much radiometric dating of kimberlites and other lithologies is fraught with problems[4–7] as shown by kimberlites in Mali, Liberia and Ivory Coast. Argument over the locations of kimberlites and fracture zones probably stems from the small-scale of our Fig. 1. However, some loci of our hypothetical continental continuations of transform fracture zones are ill-defined, but this is due to the scarcity of readily accessible, reliable Geological Survey data in West Africa. We did not include the diamond fields of southern Ghana in our Fig. 1 because we were discussing only the distribution of Mesozoic kimberlites. We are fascinated by the Nigerian kimberlite which has allegedly become a lamprophyre, but this does not subdue our hypothesis, as Scott[8] relates lamprophyres to kimberlites by a simple crystal fractionation process.

With regard to movement of mantle plumes over a period of nearly two billion years, we suspect that an arcuate locus is facile. The movement of the African plate since the Palaeozoic has been roughly northwards, as shown by the building of the Alps, the age succession of the Nigerian Younger Granites, and by palaeomagnetism. If Hastings and Sharp seriously consider that since the mid-Proterozoic plate movement relative to an assumed hot spot may be described as an arc, then we refer them to refs 9 and 10 for illumination.

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The problem of thrown string

BASS AND BRACKEN[1] have proposed a probabilistic model to explain existing experimental results on the average length between the ends of a string when thrown onto a table. The theoretical values obtained from their model are not consistent with the available experimental evidence. However, the model presented seems to be a plausible description of the physical situation. We suggest here a

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