

# PALEOCONTINENTS

## *j1* Before Pangea < paleolatitudes, orientaton, paleoclimates >

Although plate tectonics offers a great clarifying principle, in some ways it increases the difficulty of finding a unique solution to any geotectonic problem because it adds a new dimension—in fact a fourth dimension. Formerly, fixistic geology was concerned with up, down and time, but now we must add sideways!

—Dietz (1977) quoted by Lester C. King in *Wandering Continents*, 1983.<sup>1</sup>

We are like a judge confronted by a defendant who declines to answer, and we must determine the truth from the circumstantial evidence. All the proofs we can muster have the deceptive character of this type of evidence. How would we assess a judge who based his decision on part of the available data only?

—Alfred Wegener.<sup>2</sup>

*Historical note:* Apparent polar wandering, recorded of Earth's magnetic (geomagnetic) field in excess of its secular variation, was discovered in 1954 (*see* Topic *j3*). By 1957, the apparent polar wandering recorded in the rocks of *each* continent was known to be different. This first geophysical proof of continental drift was independent of the later proof which followed from the discovery of geomagnetic field reversals, and that the chronology of these accounts for the map zebra pattern of magnetic anomalies in oceanic crust formed by seafloor spreading.

Reversing the motion of the continents recorded by the geomagnetic reversal history in the oceanic crust, easily reassembles Pangea.

However, to know of the wandering of continents *before* Pangea, evidence of apparent polar wandering is required.

Pangea had brief existence during the Triassic. What joined to form Pangea were a scattering of paleocontinents.<sup>3</sup> How can we know of their existence and of the different histories of their joinings? To answer, mutually corroborating geological and geophysical lines of enquiry are:

Lithological and paleontological evidence is that deep oceans used to exist between parts of continents that are now one.<sup>4</sup> Paleoclimate indicators in sedimentary rocks record that continents, and parts of these, were at different latitudes formerly.<sup>5</sup>

Apparent paleomagnetic polar wanderings (*see* Topic *j3*) evidence that continents, and parts of these, were at different latitudes and were with different geographic orientations formerly (having wandered and having rotated since with respect to true north) .

What is knowable of paleocontinents are their latitudes and their past orientations with respect to north.

What is not knowable of paleocontinents are their longitudes. However, their longitudes relative to each other can be assigned tentatively by disallowing extraordinary drift motions. But only for the Paleozoic. Before then (which is before the existence of Rodinia, *see* Topic *k35*), the longitudes of protocontinents are not knowable. □