

## i6 Mountain belts and cratons of Pangea that cut off at the coast of the present Atlantic < fold trend lines, São Luis >

The story of geology has been the letting go of permanence. —Richard Fortey.<sup>2</sup>

Fold trends (the general bearing of fold-axial plane strikes) in an orogen (mountain belt) develop at right angles to the direction of crustal shortening (due to compression). The fold trends can terminate abruptly only where cut off by a fault. Then their continuation is found offset across the fault or, if a rift has opened, on the far side of that. Marcel-Alexandre Bertrand (1847-1907) in 1887 (correctly) joined Caledonides to Green Mountains of Vermont and Hercynides to Alleghenies (but in armchair speculations<sup>3</sup> of geometrical patterns that, to his embarrassment, he could not find in the field).<sup>4</sup>

Converging trends of two orogens that begin their crossing on one side of the Atlantic are found to complete it on the other side in a reconstructed Pangea in which the width of the Atlantic is eliminated. This is powerful geometric evidence that the simple foundering of the Atlantic cannot better. *Two* such instance (**Figure i6.1**) described by Wegener could not be ignored.<sup>5</sup>

In South America, Triassic trends and Pre-Devonian trends are cut off at the coast north and south of the River Plate. Currently their trends converge to a point in the Atlantic. In Pangea that convergence would be where fold trends of these ages do cross in Cape Province, South Africa.

In North America, in the Northern Appalachians, Late Paleozoic fold trends cross Early Paleozoic fold trends. These would line up remarkably well with the westward convergence of the Caledonian and Hercynian fronts in Wegener's reconstructed Pangea.

In his favorable review of this argument for the once existence of Pangea, Arthur Holmes in 1944 agreed that the fold trends that are joined by the reconstruction of Pangea between South America and the Cape of South Africa are excellent evidence.<sup>6</sup> However, he had several reservations as to the



reasonableness of the claims made for the mountain belts that would cross in central Pangea. He had been informed that the Late Paleozoic Appalachian folding climax was not synchronous with that known for the Hercynian. Nor was he convinced that Early Paleozoic trends in Newfoundland are better linked to a trend-segment of the Caledonian front in Scotland rather than those currently on line with them in Greenland. If the latter be true, the British Caledonian belt joins to a Caledonian belt that traverses the Sahara.

With the advantage of our hindsight, we know that Pangea did exist. We also know that Caledonian and Hercynian fronts did link in Pangea as Wegener proposed.<sup>7</sup> Tuzo Wilson was right to see Newfoundland's Cabot and Scotland's Great Glen faults as one.<sup>8</sup> In vicinity of Ghana, West Africa, gneissic rocks radiometrically date more than 600 My (million years old) east of a line **Patrick Mason Hurley** (1912-2000)<sup>9</sup> could draw on a map, whereas, west of this line, gneisses date more than 2000 My. If South America and Africa are

fragments of Pangea, his test was that correspondence of rock ages and fold trends should occur on strike near São Luis, northern Brazil. This he found to be so (**Figure i6.2**) and in 1968 Hurley published a popularized version of his findings in *Scientific American* entitled: *The Confirmation of Continental Drift*. □

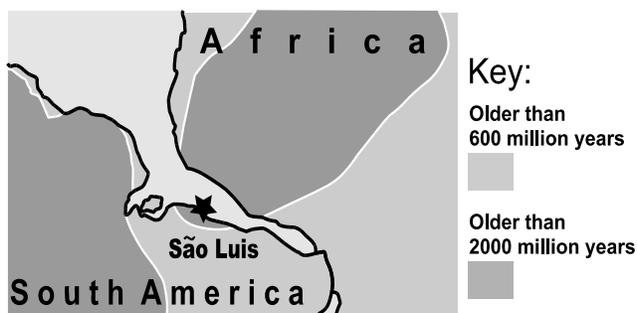


Figure i6.2 Craton correspondences<sup>10</sup>