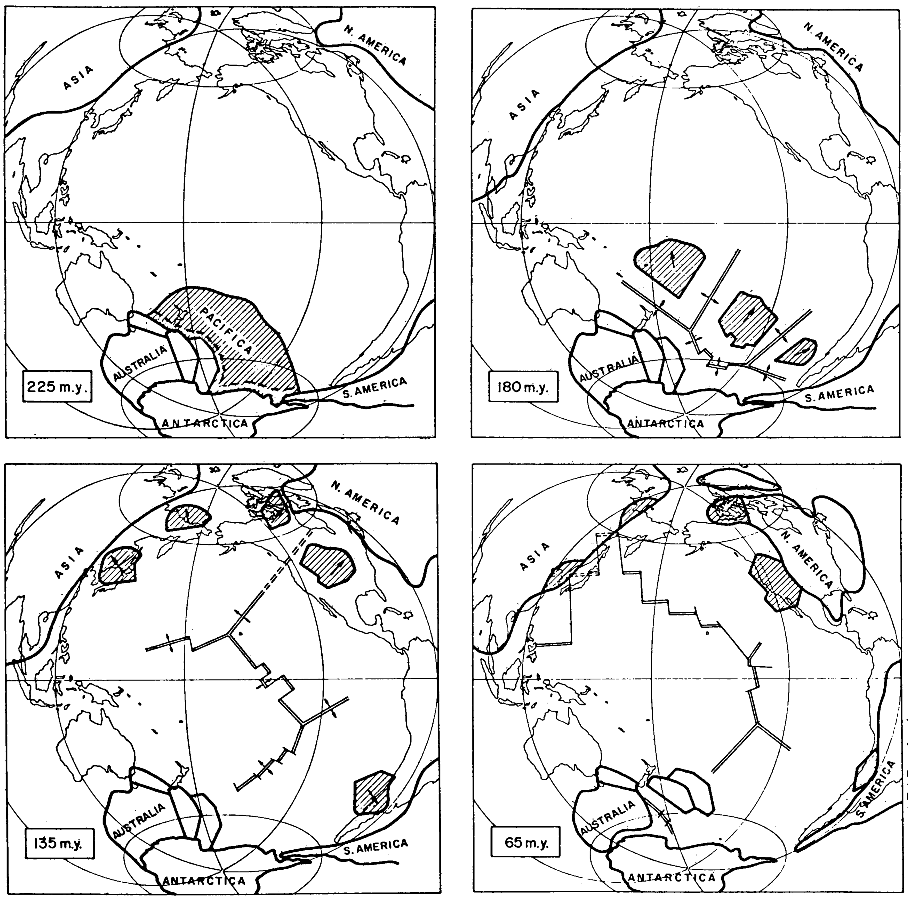
Extra continent may have existed



Amos Nur and Zvi Ben Avraham

Pacifica's hypothetical life history shows collisions 65 million years ago.

According to two geologists, the seven known continents may have been accompanied by an eighth, Pacifica, as recently as 65 million years ago. They suggest that Pacifica's existence was a transient one because it wasted itself away by colliding with other, larger continents, in the process of which it also created some of the world's major mountain ranges.

Amos Nur of Stanford University and Zvi Ben Avraham of the Weizmann Institute in Israel hypothesize that Pacifica, like the other continents, was, about 300 million years ago, part of the single primordial land mass called Pangaea. Geologists currently believe that this mammoth continental progenitor began fracturing about 200 million years ago, whereupon the continents slowly dispersed to their present locations like an adjourned huddle of sluggish seafaring rafts.

Until now, the formation of wide mountain ranges upon these initially planar fragments has been explained using collisions among the known seven continents. The explanation, however, generally requires that the continental pieces followed some rather bizarre and, opponents argue, implausible trajectories in the process of finally arriving where they are now.

Nur and Avraham, reporting to the meeting of the American Geophysical Union in Washington, believe they might have discovered a more likely scenario. It entails the one-time, but as yet unconfirmed, existence of an eighth piece to the continental jigsaw puzzle. Their hypothetical continent, 200 million years ago detaching itself from and being about the size of Australia, supposedly inched its way through the Pacific. In the process it was pulled apart by contesting internal stresses and the clastic remains headed on collision courses toward various other continents.

One fragment alledgedly collided with and rumpled the western coastline of North America, creating among other things the Sierra and Rocky Mountain ranges. Other fragments, in the meantime, were bumping into South America, Alaska, Kamchatka, Japan and east Asia, also creating wide mountain ranges there.

The two researchers first struck upon this idea when they extrapolated millions of years backwards the presumed motions of the continental plates. They noticed that if one supposed these various wide mountain ranges were indeed caused by collisions with Pacifica's land fragments, all those fragments reassembled themselves quite neatly at a single location off the coast of proto-Australia (see diagram). This was like running backwards a film that depicts an explosion and observing that all the shrapnel improbably reunite to a common origin.

Besides the mountain ranges, Pacifica might have left behind little remnants of itself, which partly sunk for unknown reasons, into the Pacific Ocean (see diagram). The scientists observe that the Ontong Java area, the Shatsky Rise and Minihiki Plateau all have continental-like crust thicknesses (up to 40 kilometers)—greater than that of the surrounding seafloor, suggesting they may once have been parts of Pacifica.

Finally, geophysicists believe that all seafloor spreading originally began, with one exception, beneath continental masses. The sole exception, in the Pacific, would be accounted for with Pacifica. □

Solar flares: Link to thunderstorms

It is well known that the sun constantly showers the earth with a wind of high-energy particles, mainly electrons and protons, and that there is some intriguing time variation to this solar activity (SN: 3/6/76, p. 154). Thus far, however, all known effects of the solar wind on the earth have been confined to the ionosphere, the outermost, electrically charged layer of the atmosphere.

Now there is direct evidence that indicates sunspot activity affects terrestrial weather, which occurs far beneath the ionosphere in the troposphere. Two physicists from the University of California at Berkeley reported at the American Geophysical Union meeting in Washington that solar flares caused a dramatic increase in worldwide thunderstorm activity.

During August 1972, Robert Holzworth and Forrest Mozer collected data from satellite, balloon and ground-based observations of solar flares and found that the ambient electric field in the earth's atmosphere increased concurrently. The increase amounted to about 5 to 10 percent at sea level, and Holzworth speculates that it was greater around mountainous regions.

Many atmospheric scientists believe that the earth's ambient field, usually about 100 to 200 volts per meter, plays a key role in creating more intense electric fields, which can build up to such proportions that huge discharges of electricity, lightning, are provoked. The researchers inferred the solar flare-related increase in thunderstorm activity from a threefold increase in recorded numbers of very low frequency "whistlers" during that time. Whistlers are an electromagnetic phenomenon, whose sole source are lightning discharges, and which can propagate halfway around the world, carried along be earth's magnetic field.

Solar flare activity is currently emerging from a minimum in its 11-year cycle. The next maximum, somewhat belated, is expected around 1978. □