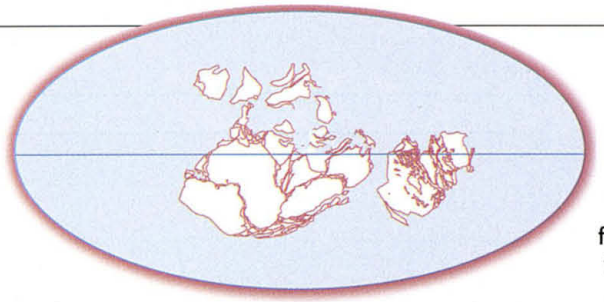

According to area cladistics, Laurentia (at right in map) should be moved 8000 km west to be near eastern Australia.

Move Over, Laurentia

Two researchers at the Natural History Museum in London have come up with a new tool for analyzing fossils, which they say could help researchers redraw maps of ancient land masses.

Paleontologist Malte Ebach and botanist Christopher Humphries call their technique "area cladistics." It uses an algorithm that, by combining geographical and morphological information, suggests the ancient locations of continents on which the fossils were found.

Ebach—who was invited to present the theory at a meeting on "Fresh Science" in Melbourne, Australia, last month—points to his study of trilobites, small marine invertebrates that lived about 590 million to 250 million years ago. He created a cladogram—a kind of family tree—after measuring features on 100 individuals from around the world. Then, assuming that similar animals lived closer together, he superimposed data on where they were found to estimate the position of the continents some 400 million years ago.

Ebach and Humphries, whose theory was published in the April *Journal of Biogeography*, say that trilobites living in what is now the southern and central United States were more like ones from eastern Australia than those in Africa or South America. This suggests that accepted maps of the ancient landmasses of Gondwana (covering South America, Africa, and Australia) and Laurentia (which included North America) are way off. "They moved right around the world 8000 kilometers west of where scientists originally placed them," Ebach says.

Paleontologist Bruce Lieberman of the University of Kansas, Lawrence, says the work reflects the increasingly quantitative direction of biogeography, which studies how evolution is related to changes in the face of Earth. But he's not planning to redraw any maps, saying there's "very good evidence"—both from paleomagnetic and fossil sources—that Australia was nowhere near North America at the time of trilobites.

China Gets Old Aerial Shots

Copies of 11,000 aerial photos of pre-Mao China arrived in Beijing from the United States this summer. They're part of a cache of 37,000 photos taken by the Japanese of China's cities, military targets, and major cultural monuments between 1926 and 1945. Seized by the U.S. Army in 1945, they were declassified in 1995.

The newly acquired collection will be housed at Beijing's National Museum of Chinese History. Yang Lin, director of the museum's Remote Sensing and Aerial Archaeology Center, says China has almost no aerial photos taken prior to the 1960s. Now, he says, scholars can use the collection to gain a much better idea of how the landscape changed after the founding of "new" China by Mao in 1949. For example, pictures of Beijing in 1944 show the ancient walls and gates of the city, which were almost totally destroyed in the 1960s to make way for a subway.

Prewar photo of Beijing, showing Forbidden City (rectangle on right); below it is Tiananmen Square.

Montagnier's Miracle Cure?

Did Pope John Paul II seem a little perkier than usual during his trips this summer to Poland and the Americas? The French daily *Le Monde* thinks so, and it thinks it might know why: During an audience with the pontiff last June, the paper reported in its 1 September edition, HIV co-discoverer Luc Montagnier gave him some antioxidants. Antioxidants, some researchers say, can protect against cancer, aging, and degenerative diseases such as Parkinson's, which afflicts the 82-year-old pope.

Montagnier confirms that he did indeed meet with the ailing pontiff and that following a discussion of the AIDS epidemic, he gave him two types of pills that 70-year-old Montagnier himself takes regularly. One was glutathione, an over-the-counter tripeptide; the other, a fermented extract of papaya. "I take these, and I am in pretty good shape," Montagnier says. "The pope said, 'If you take these, then I will take them too.' "

But if the Holy Father is indeed feeling peppier, antioxidants won't get the credit. According to Vatican sources, the pope has not been taking the pills.

More Theories on Tunguska

Tunguska epicenter today.

On 30 June 1908, in the remote Tunguska forest of Siberia, a vast explosion charred and flattened trees across an area nearly as large as Rhode Island. Scientists have long been mystified as to the cause, although prevailing wisdom has it that it was an extraterrestrial chunk of ice or rock (*Science*, 20 August 1999, p. 1205).

But two scientists last week rejected the "E.T. hypothesis" at a conference on environmental catastrophes in London. Andrei Ol'khovatov, formerly of the Soviet Radio Instrument Industry Research Institute, noted that no one has ever found definitive traces of extraterrestrial material. There's no impact crater, and some trees near the epicenter were left untouched.

Wolfgang Kundt, an astrophysicist at Bonn University, Germany, proposed an alternative scenario: a massive gas explosion. A large natural gas deposit lies below the site, a well-known fact unconnected to the event until now, he said. Kundt has modeled a Tunguska "outgassing" and says it would fit with eyewitness accounts.

"The geophysical hypothesis could be the answer," says Jesús Martínez-Frías of the Institute of Astrobiology in Madrid, Spain. But Ol'khovatov believes the explosion was caused by a "strong coupling between subterranean and meteorological phenomena" that science is not yet ready to understand.

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