New Explanations of Cracks In Santa Cruz Mountains

SF Chron. 10/23/89 EQ '89-Geological

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Scientists began coming up with explanations yesterday for the bizarre patterns of huge cracks left in the Santa Cruz Mountains by Tuesday's earthquake.

One leading hypothesis is that the quake, striking along a bend in the San Andreas Fault near its junction with other faults in the Santa Cruz Mountains, twisted mountain-sized chunks of the Earth's crust in an unexpected direction.

The ragged fissures wind and twist through the redwood-covered slopes, particularly near the junction of state Highway 17 and Summit Road. Geologists who have inspected them initially found no way to connect them to deeper forces that caused the powerful temblor.

"The present thought is that there was rotation of fairly large blocks in the Santa Cruz Mountains," disguising the actual motion deep below the surface along the San Andreas, said Peter Ward, a geologist at the U.S. Geological Survey in Menlo Park.

Many of the cracks in the mountains, some of them hundreds of yards long and two or three feet wide, show "left lateral slip" movement. This means that to a person on one side of the cracks, the other side has moved left.

However, analysis of the main earthquake shock shows that 12 miles down, where the earthquake started, the main motion was just the opposite direction, a right lateral slip. Data also show that the western side of the fault lurched upward, perhaps half as much as it moved north.

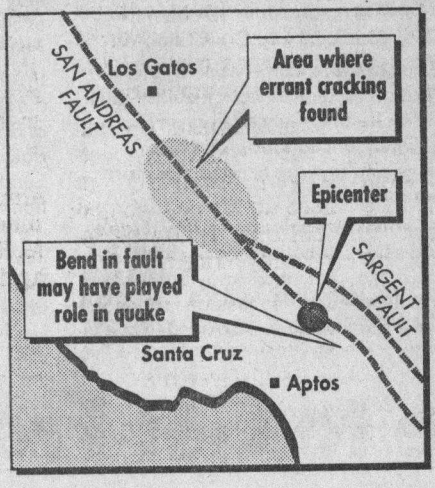
The Earth's surface, divided into plates up to 60 miles thick, could turn entire mountains as though they were sand grains caught between boulders sliding against each other, the researchers say. The northward sliding portion, called the Pacific Plate, would twist such bits clockwise. Relative motions at the boundaries of the rotating blocks would appear to be the opposite of major motions deep below.

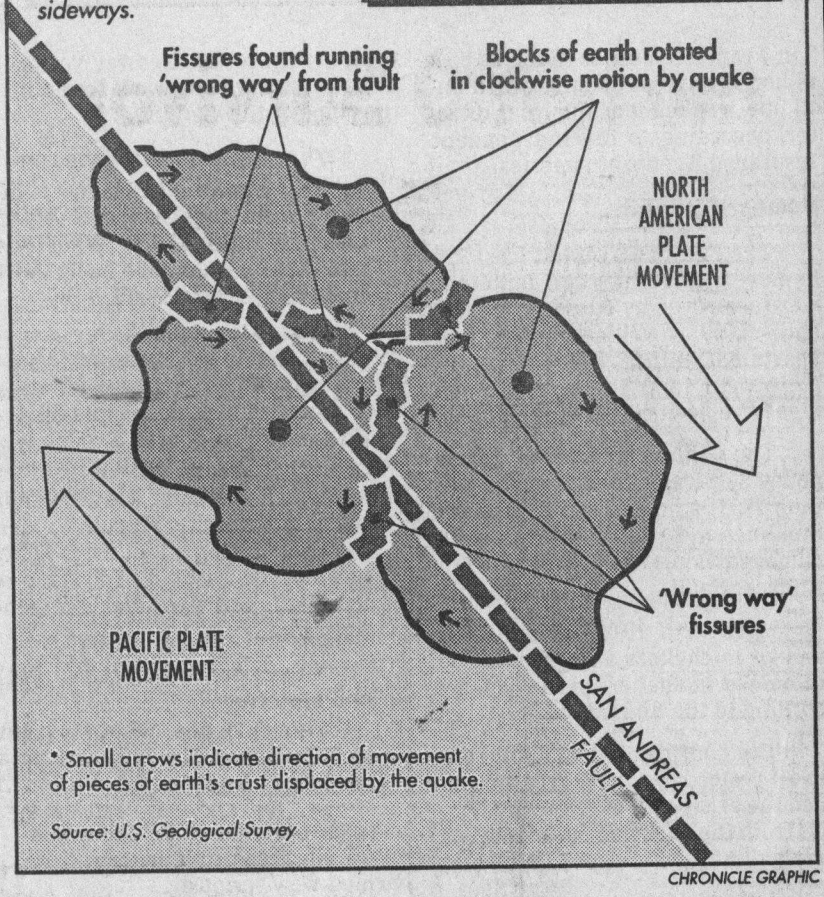
"I don't think the pattern should be a surprise," said Robert Uhrhammer, research seismologist at the University of California Seismographic Station in Berkeley. Using 20-20 hindsight, he said, "When you get a bend in the fault, you can get rotations at the surface with all kinds of slip, shearing in various directions, compression, and extension of the ground," all depending on where you are.

The director of the Berkeley station, Lane Johnson, reviewed reports of geologists who tracked the 1906 quake. That great quake, far larger than Tuesday's, broke the San Andreas for nearly 300 miles including the section that gave way last week. During that quake, too, the pattern of faulting in the Santa Cruz Mountains often seemed to have gone the wrong way.

A 'BACKWARD' QUAKE

Scientists have found numerous cracks in the earth north of the quake's epicenter that appear to go the 'wrong way.' It is hypothesized that the forces twisted mountain-sized chunks of the Earth's outer crust in a clockwise direction, and the resulting cracks did not follow the normal north-south movement of the San Andreas Fault. Miles below the surface, the fault moved as expected. The Pacific Plate also moved up in relation to the North American Plate, as well as sideways.





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The fissures wind through the redwood-covered slopes, particularly near Highway 17 and Summit Road