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[Home](#) [Index](#) [By Subject](#) [By Year](#) [Biographies](#) [The Gift Shop](#)

The California Earthquake: Movements Along the Santa Cruz Fault Line.

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To those acquainted with the geology of the region affected by the late earthquake, it is evident that the disturbance is directly related to the geologic structure. Through the region affected there are several profound fractures that pass downward from the surface of the ground to an old depth in the crust of the earth. One of the most important of these fractures, or faults as the geologists call them, runs through the Santa Cruz range of mountains. Starting on the coast near Mussel Rock, a few miles south of Lake Merced, it passes through San Andreas and Crystal Springs lakes, just west of Searsville lake, through Portola Valley, over the top of Black Mountain down Stevens Creek canyon, over the water-shed at Sycamore farm, crosses Campbell Creek, two miles southwest of Saratoga, and follows the same southeastern direction past the reservoir and so on in the direction of Chittenden on the Pajaro river.

Shortly after the earthquake I went to examine the ground in the vicinity of this old earth fracture, and found that there had been a new displacement along this line. These facts suggest that there was a readjustment of the strains and pressures that affect the rocks of the earth's crust, and that this readjustment caused the rocks to slip upon and against each other along this old line of fracture. Such a slipping would necessarily cause a jarring of the entire region along and near the fault line, and this jarring we call an earthquake. It seems somewhat remarkable at first that the area affected should extend so far up and down the coast, while it is comparatively narrow. This is because the faults through this part of the State are all approximately parallel with the Santa Clara Valley, and when one of these readjustments takes place it is likely to follow these old lines of weakness in the earth's crust. The area affected is not confined to the fault line itself, but the vibration jars all the region along and near the line of fracture.

It may be of interest to know where some of the evidences of this earth movement may be seen. In the Portola valley, six miles southwest of Palo Alto, the earthquake cracks along the old fault line may be seen at many places. Following the public road up Los Francos Creek past Burke's place and the Blue Goose saloon, about a mile southwest of the last named place, the Portola road turns square to the right. Instead of going on toward Portola one should go straight ahead and follow the road about half a mile further, where the earthquake cracks will be found crossing the road. There will be no difficulty in recognizing the place for unless it has been repaired lately one cannot ride or drive over broken roadbed. Just north of the road where these cracks occur an oak tree was broken by the violence of the shock. In the fields to the northwest and to the southeast one can see an irregular ridge of earth thrown up along the line of the fracture.

From this place one should go back a half a mile and take the road to Portola. There were at first some small cracks just where the road turns to the northwest toward Portola, but these have probably now been obscured by rains. After passing the Portola school-house, which was thrown off its foundation, the road bends to the left. Just here in front of a small house there are several cracks across the road and extending through the fields up and down the valley. The next place where the cracks show in the road is between the Preston house and the upper end of the Searsville lake. Here a fence was torn in two, and a gap nearly 4 ft. wide was made.

Further along to the northwest fences are displaced, and the water-pipe of the Bear Gulch Company was broken and displaced 73 ins. At one place a fence crossing the fault line has been displaced as much as 8 ft. This 8-ft. break in a fence shows approximately the amount of the earth movement that produced the earthquake. Besides this lateral thrust of 8 ft. there is a vertical displacement amounting in some localities to 2 ft. or more. On

top of Black Mountain, on the Page Mill road, this fracture shows about a quarter of a mile south of the Mountain House. At this place it is plain that there was a lateral thrust of 3 or 4 ft., and a vertical movement also of about 2 ft.

Black Mountain has therefore risen about 2 ft., and it has moved 3 or 4 ft. toward the southeast; or it may be instead that the opposite side, or Castle Rock Ridge, has sunk about 2 ft. and moved 3 or 4 ft. toward the northwest. When one considers the enormous mass of rocks involved in these movements—a height of 2,700 ft.—the violence of the earthquake shock is not to be wondered at.

The geology of this entire region shows distinctly that it has always been and that it always will be one of earthquakes. I hasten to say, however, that it is absolutely impossible for any one to predict earthquakes, and it is equally impossible to prevent them. But there is no reason for alarm. The shocks here in California are generally too slight to have any importance. The earth fractures rebreak easily and the readjustments are easy. The earthquake of April 18th is probably as heavy as has ever been known here. The plain practical lesson of it is that buildings should be so constructed that they will not be injured.

Some anxiety has been expressed regarding the possibility of an enormous wave from the ocean breaking on the shores of the Bay of San Francisco and overwhelming the cities around it. Such a thing is quite impossible. The narrowness of the Golden Gate makes it impossible for a tidal wave to get into the bay fast enough to overwhelm the towns.

Palo Altan

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[Return to top of page](#)