

The Jolting Truth About Santa Cruz And Earthquakes

By Alan Pugh
Sentinel Staff Writer

Situated between two major lateral faults and with a unique vertical fault almost in its backyard, Santa Cruz finds itself definitely in California earthquake country. To add to the city's statistical tribulations, a major portion of it is on river bed alluvium which, in turn, sits atop miocene shale.

All of this should see the surf city shaking and shivering and sliding into Monterey bay.

But, through a strange quirk of nature, it is relatively "quiet" in an otherwise shivering, jumping and jolting state.

Statistics also pinpoint Santa Cruz in the center of the Tsunami warning area, that strip of Pacific coast where, according to scientific calculations, earthquake-created tidal waves are to be expected.

As yet, however, Santa Cruz has noted nothing greater than a one- or two-foot lift in any of the recent tidal wave warnings.

To the east of Santa Cruz—about 10 miles—lies the famous San Andreas fault. It's a 600-mile long giant fissure in the earth that extends, geologists believe, anywhere from 10 to 100 miles deep. It is constantly on the move.

To the west of Santa Cruz—also about 10 miles—lies the famous submarine San Gregorio fault. It starts, it is believed, at about Ano Nuevo and dips down the ocean bed to terminate just a little below Santa Cruz.

On top of all of this, just north of the city is the Ben Lomond mountain. This once was a flat affair, but a massive

vertical fault shoved the mountain up to its present elevation some eons ago.

"The combination of the three put Santa Cruz in a 'not enviable' situation," George Schlocker, research geologist with the U.S. Geological survey in Menlo Park, declared.

"The San Andreas is constantly moving — about two inches a year," he said. "As for the San Gregorio, we haven't any definite measurements on it. The navy has a research program under way now and although its movements are, of course, not as noticeable as on the San Andreas, it nonetheless is moving, too."

Schlocker said the Ben Lomond fault has been called an "inactive" fault.

"But what does 'inactive' mean?" he countered. It was thought the Taal volcano in the Philippines was inactive — that is, until it blew its top last week.

Strangely enough, though, Santa Cruz has spanned the decades with only minor damage — and most of that damage, it is believed, has come from the San Andreas movement.

Historically, the first definitely-identified Santa Cruz mountain shake came at 12:46 p.m. October 8, 1865. It was between 8 and 9 on the modified Mercalli intensity scale which calls for slight to considerable damage, falling chimneys, heavy furniture overturned, changes in waterwells and persons in automobiles being disturbed.

(Editor's Note: All of California, including the Santa Cruz area, lies in earthquake country. This is the first report of a series of four articles telling what has happened in the past and what might happen in the future when 'quakes strike here or nearby).

There is nothing in the records about motorists on Santa Cruz streets and their reactions to that quake. But the U.S. Coast and Geodetic survey said on the "Santa Cruz Gap road chimneys fell; at Mountain Charley's the earth opened and boulders obstructed the road."

There was an earlier quake—the one in June, 1836, situated in San Francisco—that did damage in Santa Cruz. It is described by the Coast and Geodetic survey as "comparable to the 1906 San Francisco quake."

Numerous smaller quakes — but ones causing damage—were felt in Santa Cruz through the years before the 1906 "big one."

In 1882 and again in 1883, quakes, centered in Hollister, did damage here. In 1890 there was another and, in 1891, the Mount Hamilton shake was felt strongly here, but with no damage.

Watsonville was the epicenter of the July 6, 1899, quake that saw two separate shocks. They were felt over a distance of 40,000 square miles.

Came April 18, 1906, and San

Francisco, the peninsula, and all of the central coast area jumped, jolted and rattled to the intensity 11 temblor.

Intensity 11 is described as destroying bridges, toppling masonry buildings, creating broad fissures, earth slumps and land slips.

Records show there was a land slippage of 180 miles along the San Andreas, with the greatest slip—21 feet—being in Marin county.

The 1910 quake in March may be remembered by some Santa Cruz residents. It was a "freak" one with the motion being slow rocking of alarming energy from Aptos to Monterey. The epicenter is not definitely known.

It is possible, geologists said, the 1910 quake may have an association with the one in 1927. It is described as a "submarine shock, just off Santa Cruz where damage was slight."

The "submarine" would indicate the San Gregorio was on the move. And it is possible, geologists related, that the 1910 quake was a combination of both the San Gregorio and the San Andreas.

In later years, Santa Cruz has felt quakes ranging from "little ones," to "gosh, wasn't that something!"

Don Tocher, formerly the seismologist at the University of California, said, "Numerous small shocks in a known earthquake region could be a good thing. They indicate continued relieving of stresses."

He also declared the numerous small quakes could be "fore-

shocks of a larger one to come or could be aftershocks of a large one in the past."

The "foreshock" and "after-shock" question is one that has puzzled both geologists and seismologists ever since "earthquakeology" got off the ground.

It is easier to identify "after-shocks," perhaps because they are what they are.

John Kepper, geologist at Cabrillo college, quotes earthquake reports showing the 1927 and 1932 minor quakes in southern California have been recognized now as foreshocks for the 1933 temblor that did such great damage in Long Beach.

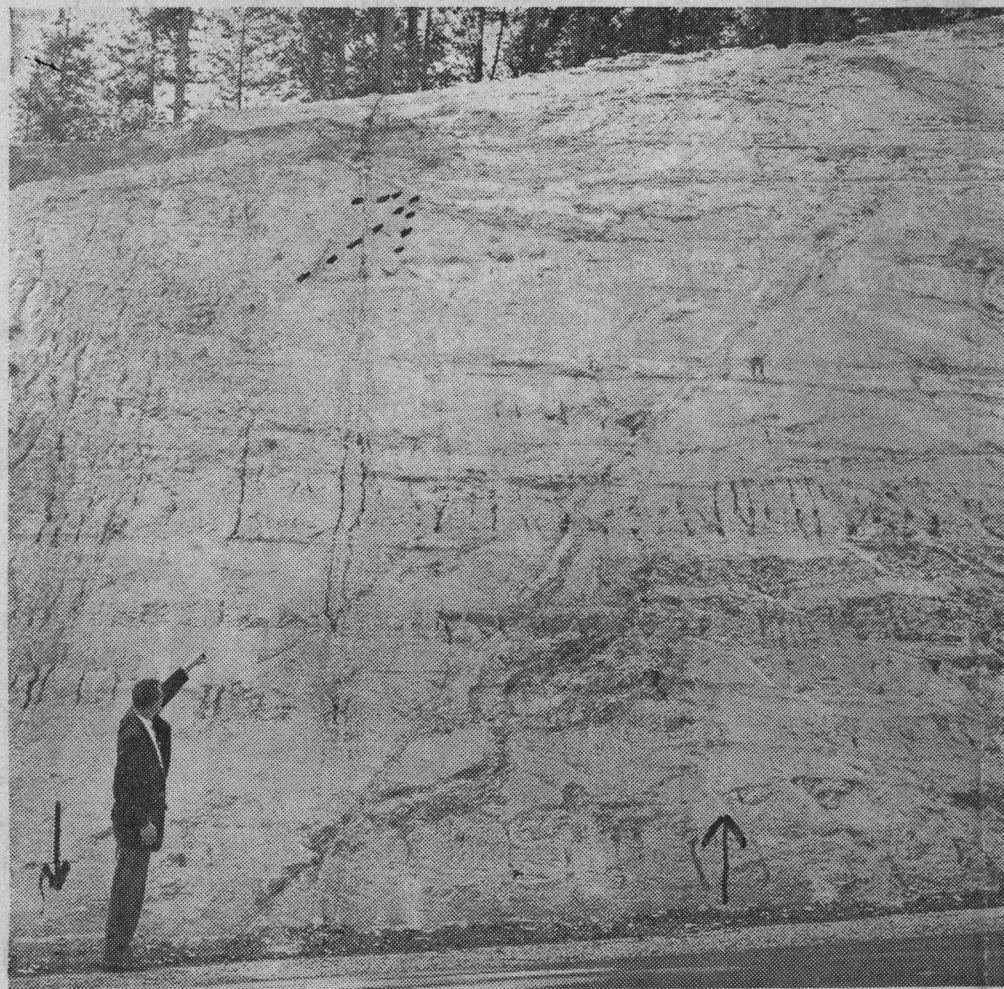
That quake was not of major magnitude from the seismological point of view. But it was in a thickly settled district with poorly constructed buildings and therefore rates as the second most destructive shock in the United States.

While residents of the area were warned by the so-called foreshocks, strangely enough, there were no harbingers of the 1906 shock in San Francisco. It just hit—Boom—without a foreshock at all.

There have been forecasts galore of earthquake activity in California. Authorities, however, say there is no sure method.

But if a person must be a prophet, he could truthfully forecast there will be an earthquake somewhere in California of destructive potential within the next two weeks. That's a certainty.

Next: the coming "big one" and how Santa Cruz stands).



The Ben Lomond fault line is clearly seen on Empire Grade just beyond the Smith Grade intersection. Cabrillo college geologist John Kepper points to the layer of Monterey mudstone that was shoved upward in a giant seismic upheaval eons ago. Arrows at the bottom indicate direction of force and the dotted arrow at top points to a swirl created when the fault

was activated. Such a clearly defined and extensive fault line would indicate it could be on the main slippage that saw Ben Lomond mountain created.

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