THE 1862 EARTHQUAKE IN SAN DIEGO

by

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The earthquake of May 27, 1862, is of special importance in making seismic risk estimates for San Diego. Most earthquakes that have caused damage in San Diego have been located in the Imperial Valley or northern Baja California. Although its location is not completely determinable, the 1862 earthquake seems to have been closer to the San Diego metropolitan area. This earthquake serves as a good example of the fragmentary nature of the historical record of California earthquakes: despite its size, it has received almost no mention in earthquake catalogs. The purpose of this paper is to give a brief description of the earthquake, based on contemporary documents. A list of these is given at the end of the paper; the numbering of that list will be used in the citations.

The main shock occurred at about noon on May 27, 1862. Two accounts (1,2) say that there were two shocks separated by some minutes, the second being the stronger. In San Diego (the present Old Town) this shock stopped clocks and upset bottles and tumblers (1,2,4,6) so that "many sets of crockery were demolished" (2). The bell at the Army depot was set ringing (2). Understandably enough, all the people ran outside in fright (1,2,4), and many slept outside because they feared further earthquakes (1,7). There apparently were no injuries, and no buildings were destroyed. However, many of the accounts (1,2,4) mention damage to buildings, primarily cracking; it should be remembered that in 1862 most buildings in San Diego were either adobe or poor masonry. The newspaper reports say that "various adobe houses" (4) were "cracked through and through". Some specific examples were the Pico adobe, which sustained several cracks, one passing through the wall; the Bandini adobe; and the 2-story Fitch adobe, which was "much sprung on its side wall" (1). Of masonry buildings, the Whaley house cracked in several places, and the lighthouse tower suffered several cracks, one going through the wall (1,4). However, the light was not thrown out of adjustment, nor was any glass broken (1). Some frame buildings were racked so that windows and doors were

loosened in their frames (1), and windows and door hinges were broken. Several accounts (1,2,4) mention cracks in low ground near the San Diego River, which washed over its banks (1,4). At La Playa (on Point Loma), cracks formed on the beach, water came out of the sand on the tidal flats, and a piling that had just been driven into the mud was shaken loose. Some bluff banks on the east side of Point Loma collapsed (1, p. 711, 4).

This shock was felt in Los Angeles, where it was termed "light" (5) and in Anaheim (1). At Temecula and Aguanga it rattled plates on the shelves; at Aguanga it also caused a pile of sacks to fall over (1). At Mesa Grande it seemed to last about 10 seconds, and caused the building roof to creak (1). It was also felt at Lake Henshaw, El Cajon, Carlsbad, Rincon del Diablo, Vallecito, San Luis Rey, San Dieguito, San Felipe, and the Cuyamacas (1,4). It was not felt at Fort Yuma (4).

There are two lists of aftershocks (1,6). These show that earthquakes were felt every day at San Diego up to June 8, 12 days after the first shock, and relatively frequently for the rest of June (see Agnew et al., this volume). An aftershock at 10 a.m. on May 29 was described as "violent" at San Diego (6), and was felt at San Ysidro and Anaheim (1). One in the afternoon of May 31 was felt at San Diego (6) and Temecula (1). A relatively large aftershock occurred at 10:30 a.m. on June 13; it was strong at San Diego (1,6) and also felt at Penasquitos (1), but was not generally felt in Los Angeles or San Bernardino (1).

Based on the descriptions given here, we estimate that this earthquake caused shaking in San Diego of about intensity VI to VII on the Modified Mercalli scale. The upsetting of small objects and the extent of building damage (cracking but no serious damage) both suggest intensity VI, although the damage seems to have been greater than that associated with intensity VI shaking from more recent earthquakes, such as the 1968 Borrego Mountain event. Ground cracking is usually associated with intensity VIII, but this is certainly too high, judging by the effects on buildings. It is possible that this reflects higher intensity on marshy ground. There is not enough information to estimate intensities elsewhere, except that they were lower, possibly IV-V, in the Temecula-Aguanga area, and lower still in Los Angeles.

The distribution of intensities suggests that San Diego was closer to the epicenter than any other place for which we have reports. This seems

to be confirmed by the aftershock records, though there is an obvious bias because San Diego is the only place for which there is a continuous record. That the earthquake was not felt at Fort Yuma would seem to rule out a source in the Imperial Valley. On the whole, a location south or west of San Diego seems most likely; in the absence of more information we can say little else.

SOURCES

(1) Benjamin Hayes, "Emigrant Notes", MS CE-62, Bancroft Library, Berkeley. (In the Bancroft Library pagination, pp. 690-697 are transcripts of a diary for May-June 1862; pp. 709-710 is an account of the 1862 earthquake; p. 711 is a memorandum from Andrew Cassidy describing the effects of the earthquake at La Playa).

(2) San Francisco Daily Alta California, June 17, 1862, p. 2.

(3) San Francisco Daily Alta California, June 18, 1862, p. 1, col. 3.

(4) Los Angeles Star, June 21, 1862, p. 2, col. 2.

(5) Los Angeles Semi-Weekly Southern News, May 28, 1862, p. 2, col. 2.

(6) Weather Records, New San Diego. (In the Climatological Records of the Weather Bureau, Record Group 27, U. S. National Archives).

(7) Letter of Augustus Ensworth to Cave Couts, May 28, 1862, San Diego. (Couts Collection, Huntington Library, San Marino).