

PSEUDOSEISMS CAUSED BY ABNORMAL AUDIBILITY OF GUNFIRE IN CALIFORNIA.

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Zusammenfassung: In der Nacht vom 27./28. Januar 1930 wurde an vielen Punkten Südkaliforniens Klirren von Fenstern, in einem Falle Springen von solchen, Rütteln von Türen, Geräusche und ähnliche Erscheinungen wahrgenommen, die meist als Erdbebenwirkungen gedeutet wurden, aber offenbar von Schießübungen eines Kriegsschiffes in etwa 110 km Entfernung von der Küste herrührten. Weder in Pasadena noch an den übrigen Erdbebenstationen in Südkalifornien wurden Erdbebenwellen zu der in Frage kommenden Zeit registriert. Auch zu anderen Zeiten sind während der letzten zehn Jahre mehrfach die Schallwellen von Geschützfeuer der Flotte gehört worden, und zwar ähnlich wie im kontinentalen Europa vorwiegend im Winter. Da die Entfernung Schallquelle—Beobachtungsort zwischen 150 und 300 km betrug, handelt es sich offenbar um anormale Schallwellen, zumal keine Berichte von den küstennahen Orten vorliegen. Die Laufzeit betrug $12\frac{1}{2}$ —13 Minuten für rund 260 km Entfernung.

During the last ten years the Pacific fleet of the United States Navy has occasionally engaged in target practice off the coast of southern California. The sound of this gunfire has often been heard far inland, especially at night and in the winter season as in Europe on the continent. The distance between the source and the points of observation was often so great that abnormal audibility is clearly indicated.

An unusually large number of reports are available for effects during the night of January 27/28, 1930, as the disturbance commonly was taken for an earthquake and reported to the U. S. Coast and Geodetic Survey as such. Consequently the reports were made available to us as usual. The following is a summary of the data:

Big Bear City, Jan 27, 7^h p. m. Shock about one minute, felt by many, beginning gradual, creaking of walls and frame.

Pasadena (press report). Series of shakes (rumbling) before 8^h p. m.

Bakersfield (press report). One shock a few minutes before 8^h p. m.

Los Angeles, windows rattled repeatedly about 8^h p. m.

Lang, Vincent, Palmdale, Muroc several light shocks (rattling of windows) at 8^h 40^m p. m.

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Big Bear City three shocks during the night 27/28. Sleepers wakened by one. Doors rattled, house seemed to rock back and forth. Mohave 12 (midnight) felt by few, slow motion, creaking of walls. Pasadena 0^h 21^m a. m. doors and windows shaken. Los Angeles after midnight succession of sounds, no rattling. Visalia, Ducor nothing felt. Lindsay, Porterville, shock felt at 0^h 23^m.

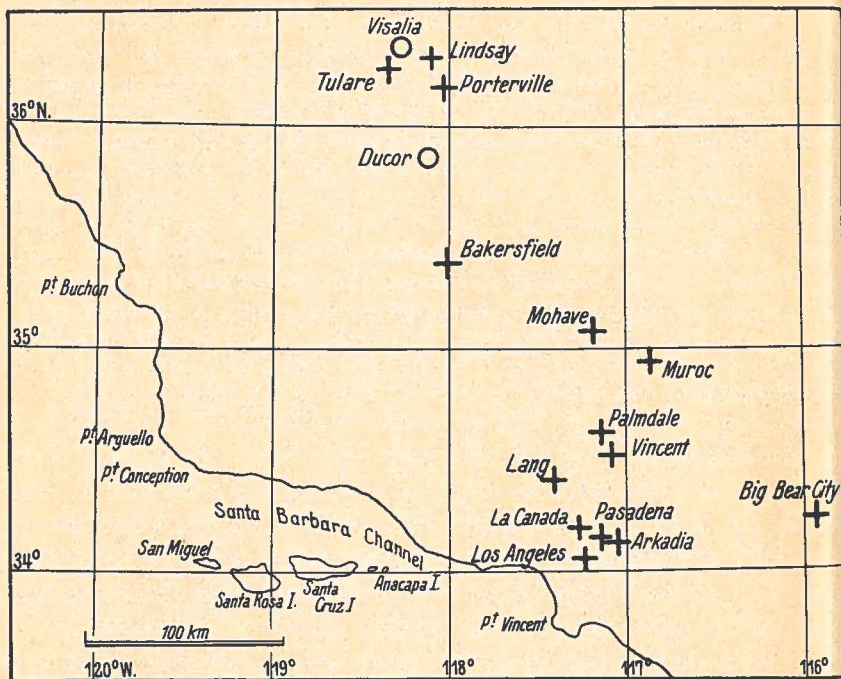


Fig. 1.

5 miles east of Bakersfield 9 quakes at intervals of $\frac{1}{2}^m$, each 20^s long, felt by few, slow motion, beginning gradual, rattling of windows and doors, doors swung, windows cracked, at 0^h 23 $\frac{1}{2}^m$ a. m.

Bakersfield at 0^h 23 $\frac{1}{2}^m$ a. m. (press report) police receives 12 calls for help against supposed burglars. Doors and windows shaken, dull roar resembling a distant blast; not felt; lasting over about 3 minutes; observed east, south and west of Bakersfield. At Stockdale windows and doors shaken, curtains moved outward, hanging lights swung, no movements of buildings.

Pasadena, 0^h 25^m (press report) 30 calls to police, believed to be an earthquake; rattling of doors and windows, lasting more than 30 seconds.

Arcadia, 0^h 26^m, 4 shocks, motion same as heavy swell, shock plainly heard as it approached and before it was felt, lasting $\frac{1}{2}$ minute, felt by many, slow, beginning gradual, rattling of windows, creaking of walls, frame, cracked plaster, awakened many, frightened few.

Tulare, 0^h 30^m, rattling of windows, felt by few, awakened few.

La Canada, 1^h 32 $\frac{1}{2}$ /₂—37 $\frac{1}{2}$ /₂^m a. m. Rumbling and shaking every 30 seconds; quiet in between, felt by few, rattling of windows. "May have been fleet target practice."

No earthquakes were recorded at these hours at Pasadena nor at its auxiliary stations, so there can be no doubt that all these effects were caused by sound waves from gunfire. Nevertheless as the effects after midnight were very remarkable (windows broken etc.) an inquiry was addressed to the naval authorities. In reply it was stated that a battleship commenced firing target practice at 0^h 10^m 53^s and ceased at 0^h 15^m 0^s on this date, the vessel being 70 miles off the coast.

The figure 1 shows the places where the gunfire was observed. The region of maximum intensity surrounding Bakerfield is distant at least 125 km from the coast, so the distance from the source of the sound must have been at least 240 km. The travel time was of the order of 12 $\frac{1}{2}$ —13 $\frac{1}{2}$ minutes in good agreement with the travel time of abnormal waves in Europe.