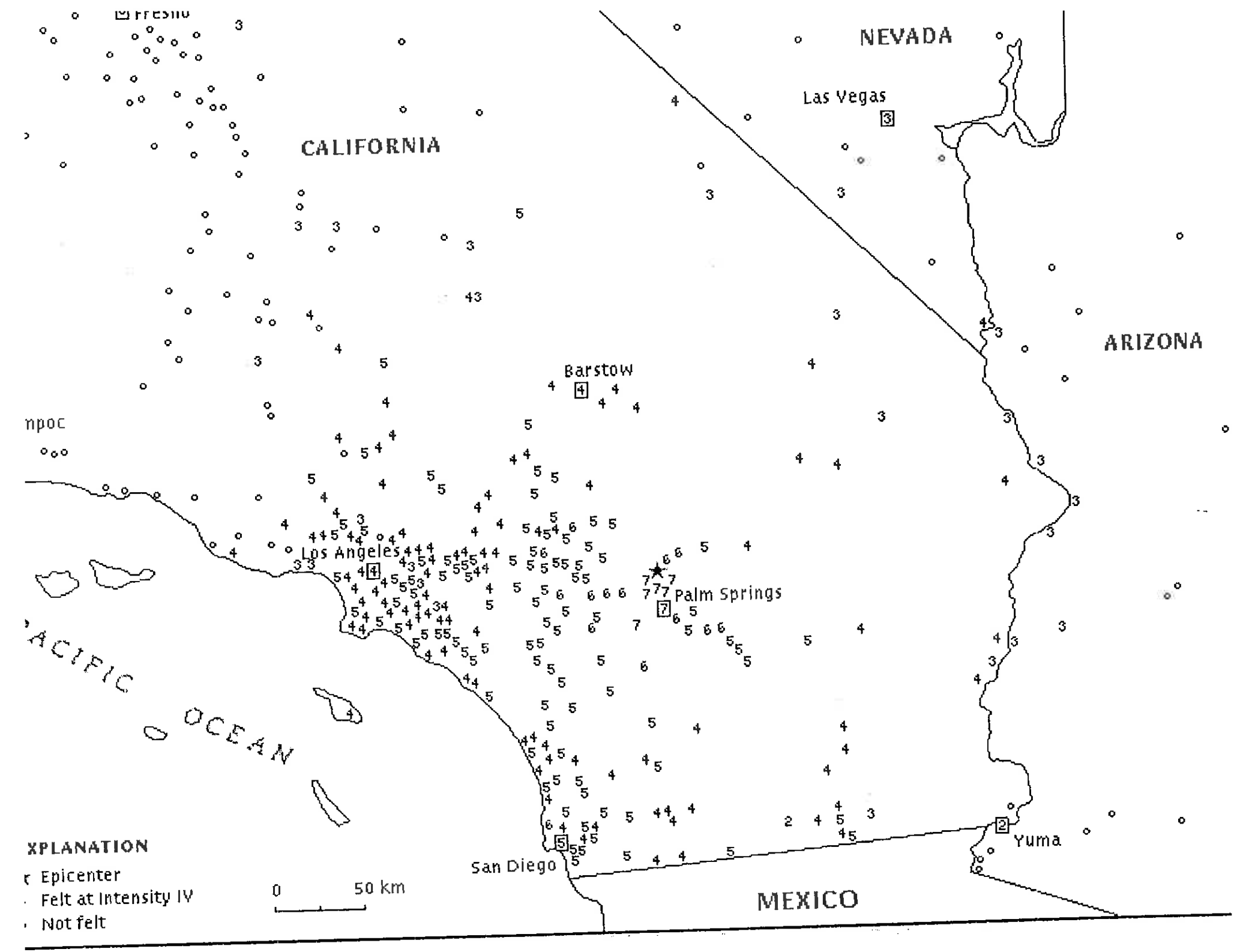
NEVADA
Las Vegas
CALIFORNIA
ARIZONA
Barstow
Los Angeles
Palm Springs
San Diego
Yuma
MEXICO
PACIFIC OCEAN
EXPLANATION
Epicenter
Felt at Intensity IV
Not felt
0
50 km

Table 1 — Combined Richter and Modified Mercalli Intensity Scales

(Approximate intensity values are in **bold type** followed by description)

Descriptor	Richter Magnitudes	MMIS Values	Earthquake Effects	Summary Damage Description	Frequency of Occurrence
Micro	Less than 2.0	**I**	Not felt. Recorded on seismographs only.		About 8,000 per day
		II	Felt only by persons at rest, on upper floors of buildings, or favorably placed (near epicenter).		
Very minor	2.0–2.9	**I**	Not felt. Recorded on seismographs only.		About 1,000 per day
		II	Felt only by persons at rest, on upper floors of buildings, or favorably placed (near epicenter).		
Minor	3.0–3.9	**III**	Felt indoors. Hanging objects swing. Vibration like passing of light truck. May not be recognized as an earthquake.		49,000 (estimated) per year
		IV	Hanging objects swing. Vibration like passing of heavy trucks or the sensation of a jolt like a heavy ball striking the walls. Standing cars rock. Windows, dishes, doors rattle. Glasses clink. In the upper range of IV, wooden walls and frame creak.		
Light	4.0–4.9	**V**	Felt outdoors; direction estimated. Sleepers awakened. Liquids disturbed, some spill. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.	Pictures Move	6,200 (estimated) per year
		VI	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., fall off shelves and pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees and bushes visibly shaken, or heard to rustle.	Objects Fall	
Moderate	5.0–5.9	**VII**	Difficult to stand. Noticed by drivers. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices, also unbraced parapets and architectural ornaments. Some cracks in masonry C. Waves on ponds, water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.	Nonstructural Damage	800 per year
Strong	6.0–6.9	**VIII**	Steering of cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved off foundations if not bolted down; loose panel walls thrown out. Decayed pilings broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.	Moderate Damage	120 per year
Major	7.0–7.9	**IX**	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. General damage to foundations. Frame structures, if not bolted, shifted off foundations. Frames bent. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In flood plains, sand and mud ejected creating earthquake fountains, sand craters.	Heavy Damage	18 per year
Great	8.0–8.9	**X**	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown onto banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Railroad rails bent slightly.	Extreme Damage	1 per year
Rare Great	9.0 or greater	**XI**	Rails bent greatly. Underground pipelines completely out of service		1 per 20 years
		XII	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air. Fault lines appear, course of rivers are changed and new lakes formed.		

(Adapted from U.S. Geological Survey documents.)

Masonry A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.

Masonry B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces.

Masonry C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces.

Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.