

The after shocks continued for many days. Ship reports indicate that during the next 36 hr. several strong underwater disturbances were experienced in the area. The MV SILVERWILLOW at 18°45'N., 104°34'W. began to vibrate dangerously in every part and at the same time began an uneven short pitching motion followed by heavy rolling. The disturbances commenced at 0530 GMT on June 4, and the rolling continued for 15 min. Seven hours later at 1245 GMT in 19°31'N., 105°45'W. the crew aboard the SS TALAMANCA heard a loud noise like distant gunfire, then experienced severe vibrations, and at 1337 GMT two similar reports were heard about 10 sec. apart but there were no apparent vibrations. However, 20 min. later the sea surface was littered for 5 or 6 mi. with small white oval objects, presumably dead fish. Several hours later near 19°28'N., 106°06'W., the SS HANOVER reported at 1205 ship's time (probably 1905 GMT) violent shocks that rocked the ship as a nearby explosion might. Fifteen minutes later 2 more shocks were experienced with only slight vibrations.

The main quake caused considerable damage throughout the countryside inland of Manzanillo and inundated the immediate coastal area with a minor tsunami. Tide gages in Hawaii recorded a 2 1/2-ft. wave and 12 hr. after the earthquake the boxlike harbor of Pago Pago, over 4,400 mi. southwest of the epicenter, experienced a series of sea level fluctuations on the order of 8 ft. for over an hour.

It is a quite general but not universal observation that the surface of the sea shows no indication of the seismic disturbance. Though the sea may have been without a ripple and as smooth as a surface of glass, a shock severe enough to startle the crew from deep sleep and bring them rushing to the deck often will not ruffle the surface of the water.

Three-quarters of the world's earthquakes occur under the ocean floors, with the Northern Hemisphere more susceptible to seismic activity than the Southern Hemisphere. The area below 30°S. latitude represents one-fourth of the earth's surface, yet less than 10 percent of our earthquakes occur in this area.

Earthquakes are unknown on the continent of Antarctica.

At present over 1 million detectable earthquakes occur each year, of which at least 700 are strong enough to cause damage. Fortunately, as the magnitude of earthquakes increases the relative frequency with which they occur decreases.

A chart showing the world distribution of seismic activity reveals that the earthquake epicenters occur in narrow belts and zones easily correlated with certain geological features such as high mountain chains, oceanic trenches, ridges, and rises. Normally, where there is high relief there is increased seismic activity.

The Pacific Ocean is ringed by a system of active volcanic and seismic belts and a branch extends into the East Indies. Another branch extends eastward across Central America into the West Indies. This system accounts for four-fifths of the world's earthquakes. Another belt extends from the Mediterranean region of southern Europe across southern Asia. Active belts are also found in the oceans along the Tonga Trench, down the Mid-Atlantic Ridge, and southward from the central Indian Ocean, with a branch swinging westward across the South Atlantic towards the Sandwich Trench and another branch swinging eastward south of Australia.

As illustrated by the comments of the BELMONT's captain, vibrations from seaquakes frequently produce a sensation similar to that caused by grounding. This has led to numerous reports of uncharted shoals that later cannot be located. A similar relationship seems to exist between ship reports of distant reefs and rocks awash and those concerning early stages of submarine volcanic activity. A comparison of charts showing the earthquake belts of the world and the concentrated areas of unconfirmed observations reveal a remarkable correlation.

Observers should always include the precise time (GMT) of observation when reporting a suspected obstruction so that in its evaluation, the possibility of a seismic disturbance can be explored.