

Mallet, the center of disturbance of the Calabrian earthquake of 1857 was seven to eight miles below sea-level. From this point, the waves traveled in every direction, assuming positions like the concentric shells of successively larger spheres. Dr. Oldham found the focus of the great Cachar earthquake of 1869 in India, to be considerably deeper.

It has been a common opinion, from ancient times, that earthquakes are sometimes characterized by vortical or twisting motions. The latest investigations, however, do not sustain this view. Every position assumed by objects moved can be explained by motions of a rectilinear, vibratory character.

Sounds often accompany earthquakes, even when not coincident with volcanic eruptions. Sometimes they resemble explosions as of distant artillery; more frequently it is a rumbling sound as of heavy vehicles moving over a city pavement. I have myself experienced but one noteworthy earthquake; and that happened in Michigan and neighboring regions on the 19th of September, 1884. It lasted about ten seconds. The floor on which I rested was very perceptibly vibrated, and a rumbling sound was extremely audible, like that of a train of cars, with the beats quite rhythmical.

Among the effects of earthquakes, though of a secondary character, are the drying up of springs, the sudden increase of their volume, the augmentation or diminution of their temperature and the production of muddiness in the water. Artesian wells are similarly affected. Sometimes the occasion is signalized by the escape of mud, water, gas, or flames. Occasionally, as in the Andalusian earthquakes of 1884, the ground is rent open for considerable distances. During the frightful disturbances of Calabria in 1783, the phenomena of ground-ruptures ranked among the grandest and most fearful effects of the catastrophe. Whole mountain sides, undermined by water, slid down in mass, and tumbled into the plains below, covering all the cultivated ground. Cliffs fell down in a body, and rocks opened, swallowing the houses which stood upon them. At the western base of the granitic chain of the peninsula, the ground affected by the shock was