of short, sudden vibrations which travel through the earth at the rate of one or two thousand feet a second. The rate of transmission varies with the intensity of the shock and the nature of the rock materials. When mines of powder were exploded near Holyhead, in Wales, the waves of disturbance were propagated through wet sand at the rate of 951 feet a second; through friable granite 1,283 feet, and through compact granite 1,640 feet a second. Mr. Mallet calculated that during the earthquake of Calabria in 1857, the waves traveled through the earth at the rate of 820 feet a second.

It appears thus, that the transmission of the waves of disturbance is favored by the solidity of the medium. Hence we discover the explanation of a fact observed two thousand years ago by the Greeks and Romans, that caverns, wells, and quarries retard the progress of the disturbance and thus protect edifices built in their vicinity.

The surface movement of earthquake waves is radially from a center. The cause of the disturbance must be regarded as acting with greatest violence at the center, while the effects gradually die out, as the distance from the center increases. But the distances to which the effects are transmitted are not equal in different directions; and this fact is, undoubtedly, attributable to the unequal distribution of the rocks. Generally, the disturbance should be farther felt in the direction of the strike of strata, than in a direction, across the strata; since in the latter direction, the waves have to cross all the interruptions which characterize the stratified condition. So, if on one side of an earthquake center, the country is granitic, and in the opposite, is underlaid by Tertiary clays and sands, the granitic region will be most widely and most severely shaken. It is not supposable that the actual center of an earthquake disturbance is at the surface. It must exist at some considerable depth beneath the surface. Careful study of the directions indicated by the effects produced, have led not only to the determination of a radial progress over the surface, but to a center of disturbance, in each case, some miles beneath the surface. According to