

believes that each of these motions arises from a different cause. Thus the trembling or vibratory phase, like that produced by the passage of a heavily-laden wagon, or like that arising from a landslip, may be due to the collapse of the sides of subterranean cavities, when the rocks fall with great weight and noise into the recesses below. These catastrophes may sometimes be aided by the abrading power of the overlying rivers, and the constant action of water in widening and weakening the fissures of rocks. When the concussion is so great as to shake down the walls by which the roof of one of these underground empty spaces is supported, the whole ground will give way and sink into the abyss, carrying down large tracts of the surface and even entire cities.

This philosopher recognized the local character of earthquakes, and connected the limitation of their extent with the restricted dimensions of the subterranean caverns where the wind is developed. If it were not so, he remarks, wide tracts of country would be agitated and many places would totter at the same time. But the movement never extends beyond a distance of two hundred Roman miles, and he points once again to the recent example that had filled the Roman world with its renown, yet did not itself travel outward beyond the bounds of Campania.

Volcanoes form the subject of some interesting remarks in Seneca's treatise. He refers to various eruptions in the Italian and Greek centres of volcanic activity. In speaking of two outbreaks at Santorin he remarks that an island rose out of the sea by protracted eruptions from below, and he notes that