

earthquakes according to their field of action as *successive* or vertical, *undulatory* or wave-like, and *rotatory* or whirled. At the present day, earthquakes are usually classified as central and linear; in the case of "central" earthquakes the undulatory movements radiate from a seismic focus towards all directions; in the case of "linear" earthquakes, the movements are limited to long strips of the crust. Von Seebach termed the subterranean origin of an earthquake the "seismic centre"; the median point at the surface within a region of earthquake shock he termed the "epicentrum"—at this point the shock manifesting itself chiefly by up and down motion; and to the imaginary lines drawn through all points simultaneously affected by the shock, he gave the name of "homoseisms" or "isoseisms." But it has to be remembered that a definite central point of origin has only been determined in a few cases. Generally the seismic centre or focus has been ascertained to be in point of fact an underground area from which concussions are propagated vertically along a large number of parallel lines, which Mallet has called "Seismic Verticals." Undulatory impulses are also transmitted obliquely through the surface, the intensity of the shock at the surface diminishing in proportion as the angle of emergence increases. In the case of the Agram earthquake in 1880, a large surface area was affected by vertical movements of almost equal intensity, showing that the underground focal area was of considerable extent.

The leading geological authorities now associate earthquake shocks with manifestations of volcanism, crust collapse, or tectonic crust-movement. Earthquakes as a rule precede or accompany the eruptions of active volcanoes, but they often occur in volcanic districts when there is no actual discharge from volcanic vents. The earthquakes which have been directly traced to crust subsidences were of small extent and intensity. And it is now widely accepted that most earthquakes which occur in non-volcanic districts are originated by dislocations and movements in the earth's crust.

In two suggestive papers (1873-74) on the Earthquakes of Lower Austria and Southern Italy, Professor Suess showed conclusively that earthquakes occur along the lines of tectonic movement in a mountain-system, and quite irrespective of any volcanic phenomena. Hoernes contributed several interesting papers on tectonic tremors, demonstrating by