

tion ; and fields covered with different kinds of plants found to be displaced in the great earthquake of Riobamba, in the province of Quito, on the 4th of February, 1797, and in that of Calabria, between the 5th of February and the 28th of March, 1783. The phenomenon of the inversion or displacement of fields and pieces of land, by which one is made to occupy the place of another, is connected with a translatory motion or penetration of separate terrestrial strata. When I made the plan of the ruined town of Riobamba, one particular spot was pointed out to me, where all the furniture of one house had been found under the ruins of another. The loose earth had evidently moved like a fluid in currents, which must be assumed to have been directed first downward, then horizontally, and lastly upward. It was found necessary to appeal to the *Audiencia*, or Council of Justice, to decide upon the contentions that arose regarding the proprietorship of objects that had been removed to a distance of many hundred toises.

In countries where earthquakes are comparatively of much less frequent occurrence (as, for instance, in Southern Europe), a very general belief prevails, although unsupported by the authority of inductive reasoning,* that a calm, an oppressive

* Even in Italy they have begun to observe that earthquakes are unconnected with the state of the weather, that is to say, with the appearance of the heavens immediately before the shock. The numerical results of Friedrich Hoffmann (*Hinterlassene Werke*, bd. ii., 366-375) exactly correspond with the experience of the Abbate Scina of Palermo. I have myself several times observed reddish clouds on the day of an earthquake, and shortly before it; on the 4th of November, 1799, I experienced two sharp shocks at the moment of a loud clap of thunder. (*Relat. Hist.*, liv. iv., chap. 10.) The Turin physicist, Vassalli Eandi, observed Volta's electrometer to be strongly agitated during the protracted earthquake of Pignerol, which lasted from the 2d of April to the 17th of May, 1808; *Journal de Physique*, t. lxxvii., p. 291. But these indications presented by clouds, by modifications of atmospheric electricity, or by calms, can not be regarded as *generally* or *necessarily* connected with earthquakes, since in Quito, Peru, and Chili, as well as in Canada and Italy, many earthquakes are observed along with the purest and clearest skies, and with the freshest land and sea breezes. But if no meteorological phenomenon indicates the coming earthquake either on the morning of the shock or a few days previously, the influence of certain periods of the year (the vernal and autumnal equinoxes), the commencement of the rainy season in the tropics after long drought, and the change of the monsoons (according to general belief), can not be overlooked, even though the genetic connection of meteorological processes with those going on in the interior of our globe is still enveloped in obscurity. Numerical inquiries on the distribution of earthquakes throughout the course of the year, such as those of Von Hoff, Peter Merian, and Friedrich Hoffmann, bear testimony to their frequency