

cleft open for a length of more than eighteen miles, and in some places, the fissure was several yards in width. In another place, a cleft occurred 131 feet deep, over a mile long and 32 feet wide. Sometimes the disturbances of an earthquake leave the surface permanently elevated or permanently depressed. In one remarkable instance in the country of Cutch, the Great Runn sank down over an extent of some thousands of square miles, so that, during a part of the year, it remained inundated by the sea, and during another part was a desert without water.

A few other facts connected with earthquakes must be mentioned, and then we will endeavor to ascertain how they are caused. Through the monumental patience and industry of M. Perrey, we have been placed in possession of thousands of statistics of earthquakes between 1842 and 1850. Through the similar labors of Mr. Robert Mallet and his son John W. Mallet, we have been placed in possession of the facts respecting other earthquakes between 1606 B. C. and 1842. From both sources we have a record of six or seven thousand separate earthquakes. The laborious discussion of this immense catalogue shows very important results respecting the distribution of earthquake occurrences through the year. Earthquakes are found to occur most frequently at new and full moon; also, more frequently at perigee than at apogee; also, more frequently when the moon is on the meridian than when in the horizon; also, more frequently in winter than in summer; and finally, more frequently at night than during the day. The results of this interesting analysis we will presently apply to earthquake theory.

It requires but little acquaintance with the phenomena usually ascribed to earthquakes, to discern that they do not all belong to one class. Most widely destructive earthquakes are characterized by vibrations of the earth, and these alone are admitted by Mallet as true earthquakes. These may be denominated *earthquakes of vibration*. Other movements of the earth are translatory. The surface is bodily uplifted or depressed, or both alternately. This may be denominated an