

Whitney's observations in California, by Wynne's in the Punjab, and by Heim's in Switzerland.

Perrey's long historical catalogue of earthquakes was intended in the first instance to determine how far earth-tremors had been encouraged by the particular times of the day, or seasons of the year, or by the disposition of the earth with reference to other heavenly bodies. The results are not altogether satisfactory, for although they prove greater frequency of earth-tremors in winter and autumn than in other seasons, no definite law can be induced. Neither do the statistics give any confirmation of the idea that the occurrence of earthquakes may have some connection with meteorological conditions. On the other hand, they led Professor Perrey to conclude that an explanation of earthquakes might be found in the varying attraction of the moon at its different phases.

He supposes the earth's crust to be as uneven on its inner concave surface towards the nucleus as upon its outer surface; that under the attraction of the moon the hot nucleus swells upward in wave-like form and presses against the weakest parts of the crust, with the result that the terrene impulse is transmitted through the crust as an earthquake.

Dr. Rudolf Falb in 1869 independently formulated a theory of earthquakes similar in character, but more fully elaborated than that of Professor Perrey. Dr. Falb connects high tidal waves of the earth's magma with the attractions exerted upon the earth by the sun, the moon, and other heavenly bodies, and he therefore thinks it possible to foretell from astronomical calculations "critical" days or periods on which violent seismic disturbances will take place. A general connection between solar and lunar attraction and the occurrence of earthquakes is accepted by a considerable number of astronomers and geologists, amongst others, by J. Schmidt, C. F. Naumann, Von Lasaulx, Pilar, and others. But several authors have disputed Dr. Falb's theory. One main contention is the uncertainty regarding the actual condition of the earth's nucleus; many physicists and geologists now believe that the nucleus is practically solid, and that molten rock-magma can only be present under certain definite conditions of depth and pressure, and is necessarily of limited distribution in the earth's mass.

Friedrich Hoffmann had distinguished different kinds of