

few sun-spots and diminished magnetic disturbance.³⁸ Such a connection cannot be regarded as having yet been satisfactorily established. Again, the same author has called attention to the frequency and vigor of volcanic explosions at or near the time of the August meteoric shower. But in this case, likewise, the cited examples can hardly yet be looked upon as more than coincidences.

Periodicity of Eruptions.—At many volcanic vents the eruptive energy manifests itself with more or less regularity. At Stromboli, which is constantly in an active state, the explosions occur at intervals varying from three or four to ten minutes and upward. A similar rhythmical movement has been often observed during the eruptions at other vents which are not constantly active. Volcano, for example, during its eruption of September, 1873, displayed a succession of explosions which followed each other at intervals of from twenty to thirty minutes. At Etna and Vesuvius a similar rhythmical series of convulsive efforts has often been observed during the course of an eruption.³⁹ Among the volcanoes of the Andes a periodic discharge of steam has been observed; Mr. Whymper noticed outrushes of steam to proceed at intervals of from twenty to thirty minutes from the summit of Sangai, while during his inspection of the great crater of Cotopaxi, this volcano was seen to blow off steam at intervals of about half an hour.⁴⁰ At the eruption of the Japanese volcano, Oshima, in 1877, Mr. Milne observed that the explosions occurred nearly every two seconds, with occa-

³⁸ "Ueber Synchronismus und Antagonismus," Svo, Leipzig, 1863, p. 72. A. Poëy (Comptes Rend. lxxviii. (1874), p. 51) believes that among the 786 eruptions recorded by Kluge, between 1749 and 1861, the maxima correspond to periods of minimum in solar spots. See, however, postea, p. 477.

³⁹ G. Mercalli, Atti. Soc. Ital. Sci. Nat. xxiv. (1881).

⁴⁰ "Travels amongst the Great Andes of the Equator," 1892, pp. 74, 153.