

gion is one of great interest, which cannot, for want of time, be considered here. It appears probable that the great manifestations of volcanic force belong to the period of depression of the area of sedimentation, if we may judge from the energy and copiousness of the eruptions of island volcanoes, although the activity is still prolonged after the period of elevation.

As regards the geological importance of volcanic and earthquake phenomena, their significance is but local and accidental. Volcanoes and earthquakes are and always have been confined to limited areas of the earth's surface, and the products of volcanic action make up but a small portion of the solid crust of the globe. Great mountains and mountain chains are not volcanic in their nature or their origin, though sometimes crowned by volcanic cones; nor are earthquakes and volcanoes to be looked upon as anything more than incidental attendants upon the great agencies which are slowly but constantly raising and depressing continents.

The theory of volcanic phenomena here set forth was first partially indicated by Keferstein in 1834, and subsequently and apparently independently by Sir John Herschel in 1837. It, however, attracted little or no attention until, in 1858 and 1859, I again brought it forward, and endeavored to show its conformity with the facts of chemistry, physics, and geognosy. In the hasty sketch of it here given, the chemist, the geologist, and the geographer will alike discover points which require elucidation or provoke criticism, but will, I hope, find, nevertheless, a concise and intelligible statement of a theory of earthquakes and volcanoes which appears to me more in harmony with the known facts of science than any other hitherto advanced.

P. S.—In justice to myself, it should be said that at the time this lecture was delivered I had no knowledge of Prof. J. D. Whitney's excellent and suggestive paper on earthquakes, which appears in *The North American Review* for April, 1869. The relation of modern volcanic phenomena to great accumulations of newer secondary and tertiary rocks, and the connection of the foldings and contortions of sedimentary strata with great thicknesses of the same, are set forth by me in several papers, the chief of which may be found in the *Canadian Journal* for May, 1858, the *Geological Journal* for November, 1859, and the *American Journal of Science* for July, 1860 (vol. xxx., p. 133), and also for May, 1861 (vol. xxxi., pages 406-414), where the important contributions of Professor James Hall, bearing upon this question, are noticed at length.

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