

together all the fine plants they have met with during a long journey, and thus produce the effect of a gay and flower-painted landscape. They have rarely studied and described individual scenes where vegetation was most luxuriant and beautiful, and fairly stated what effect was produced in them by flowers. I have done so frequently, and the result of these examinations has convinced me that the bright colours of flowers have a much greater influence on the general aspect of nature in temperate than in tropical climates. During twelve years spent amid the grandest tropical vegetation, I have seen nothing comparable to the effect produced on our landscapes by gorse, broom, heather, wild hyacinths, hawthorns, purple orchises, and buttercups."—Wallace, "*The Malay Archipelago*," i. 371–373.

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Page 346.—EARTHQUAKES.

On the vast and important subject of earthquake phenomena, the reader may consult the valuable works of Mallet, Daubeny, and Scrope. The bases on which the former proposes to construct his new science of Seismology require to be carefully examined. In the July number (1869) of *Blackwood's Magazine* a "New Theory of Earthquakes and Volcanoes" is propounded, and supported by some very ingenious reasons. The author denies the existence of the "central sea of fire or molten matter," which most physicists admit, and replaces it by a zone of electric action, close to the surface, and wholly independent of the internal condition of our planet, whatever that may be. The disturbances in this zone he considers to be the immediate causes of earthquakes, which he calls "the thunderstorms of earth;" and he also connects volcanoes with them as "the vents which the subterranean electric action makes for itself, or for its effects, in those regions or localities where it is strongest or most permanent."

He repeats, "the cause of earthquakes and volcanoes is the same; and the subterranean action which produces an earthquake will, if of greater intensity, produce a volcano over the centre of disturbance. The difference in the effects at the surface produced by subterranean convulsions depends upon three things—namely, (1.) the intensity of the convulsion; (2.) its depth or distance from the surface; and (3.) the greater or less resistance which the overlying strata present to the upward explosive movement. The nearer to the surface the focus of convulsion is, the more easily will a convulsion be formed."

Our author concludes:—"Our special object in this paper has been to show that such convulsions—typified by volcanic action and earthquakes—are not attributable to tidal or other commotions in a central molten mass, of which our planet is supposed to consist up to within a few miles of the surface, but to disturbances in the outer rim of earth's solid crust, occasioned by electric action and phenomena analogous to those which have their seat in the atmosphere, in the gaseous zone which surrounds earth's solid surface. But one word in conclusion. Whence come those disturbances? They cannot be produced by the Earth *per se*. Whatever be the condition of our globe, whether slowly cooling in space or not, such *changes* in its condition, frequently sudden and always *local*, must of necessity be ascribed to *extra-terrestrial influences*—to the cosmical action of the surrounding bodies in space. Ordinarily they are produced by the varying action of the sun, moon, and planets; but in their grander forms, as exemplified in the records of geology, these convulsions are doubtless due to the changing position of our whole solar system in space. Who can tell how far the grand geological changes may have been owing to the varying position of the sun and planets in regard to the world of the fixed stars, and the central sun around