

CHAPTER XXIII.

IGNEOUS CAUSES.

Changes of the inorganic world, *continued* — Igneous causes — Division of the subject — Distinct volcanic regions — Region of the Andes — System of volcanos extending from the Aleutian isles to the Molucca and Sunda islands — Polynesian archipelago — Volcanic region extending from Central Asia to the Azores — Tradition of deluges on the shores of the Bosphorus, Hellespont, and Grecian isles — Periodical alternation of earthquakes in Syria and Southern Italy — Western limits of the European region — Earthquakes rarer and more feeble as we recede from the centres of volcanic action — Extinct volcanos not to be included in lines of active vents.

WE have hitherto considered the changes wrought, since the times of history and tradition, by the continued action of aqueous causes on the earth's surface; and we have next to examine those resulting from igneous agency. As the rivers and springs on the land, and the tides and currents in the sea, have, with some slight modifications, been fixed and constant to certain localities from the earliest periods of which we have any records, so the volcano and the earthquake have, with few exceptions, continued, during the same lapse of time, to disturb the same regions. But as there are signs, on almost every part of our continent, of great power having been exerted by running water on the surface of the land, and by waves, tides, and currents on cliffs bordering the sea, where, in modern times, no rivers, have excavated, and no waves or tidal currents undermined—so we find signs of volcanic vents and violent subterranean movements in places where the action of fire or internal heat has long been dormant. We can explain why the intensity of the force of aqueous causes should be developed in succession in different districts. Currents, for example, tides, and the waves of the sea, cannot destroy coasts, shape out or silt up estuaries, break through isthmuses, and annihilate islands, form shoals in one place, and remove them from another, without the direction and position of their destroying and transporting power becoming transferred to new localities. Neither can the relative levels of the earth's crust, above and beneath the waters, vary from time to time, as they are admitted to have varied at former periods, and as it will be demonstrated that they still do, without the continents being, in the course of ages, modified, and even entirely altered, in their external configuration. Such events must clearly be accompanied by a complete change in the volume, velocity, and direction of the streams and land floods to which certain regions give passage. That we should find, therefore, cliffs where the sea once committed ravages, and from which it has now retired—estuaries where high tides once rose, but which are now dried up—valleys