

opinion, namely, that each large mass of granite was generated in a brief period of time.

The doctrine of some modern writers of authority that crystalline rocks, such as granite, gneiss, mica-schist, quartzite, and others, were produced in the greatest abundance in the earlier ages of the planet, and that their formation has ceased altogether in our own times, will be controverted in the next chapter.

*Gradual development of subterranean movements.* — The extreme violence of the subterranean forces in remote ages has been often inferred from the facts that the older rocks are more fractured and dislocated than the newer. But what other result could we have anticipated if the quantity of movement had been always equal in equal periods of time? Time must, in that case, multiply the derangement of strata in the ratio of their antiquity. Indeed the numerous exceptions to the above rule which we find in nature, present at first sight the only objection to the hypothesis of uniformity. For the more ancient formations remain in many places horizontal, while in others much newer strata are curved and vertical. This apparent anomaly, however, will be seen in the next chapter to depend on the irregular manner in which the volcanic and subterranean agency affect different parts of the earth in succession, being often renewed again and again in certain areas, while others remain during the whole time at rest.

That the more impressive effects of subterranean power, such as the upheaval of mountain-chains, may have been due to multiplied convulsions of moderate intensity rather than to a few paroxysmal explosions, will appear the less improbable when the gradual and intermittent development of volcanic eruptions in times past is once established. It is now very generally conceded that these eruptions have their source in the same causes as those which give rise to the permanent elevation and sinking of land; the admission, therefore, that one of the two volcanic or subterranean processes has gone on gradually draws with it the conclusion that the effects of the other have been elaborated by successive and gradual efforts.

*Faults.* — The same reasoning is applicable to great *faults*, or those striking instances of the upthrow or downthrow of large masses of rock, which have been thought by some to imply tremendous catastrophes wholly foreign to the ordinary course of nature. Thus we have in England faults, in which the vertical displacement is between 600 and 3000 feet, and the horizontal extent thirty miles or more, the width of the fissures since filled up with rubbish varying from ten to fifty feet. But when we inquire into the proofs of the mass having risen or fallen suddenly on the one side of these great rents, several hundreds or thousands of feet above or below the rock with which it was once continuous on the other side, we find the evidence defective. There are grooves, it is said, and scratches on the rubbed and polished walls, which have often one common direction, favouring the theory that the movement was accomplished by a single stroke, and not by a series of interrupted movements. But, in fact, the *striæ* are not