

this last phenomenon should also be established as a fact on farther inquiry.

It is also possible that as the clay in Wedgwood's pyrometer contracts, by giving off its water, and then, by incipient vitrification; so, large masses of argillaceous strata in the earth's interior may shrink, when subjected to heat and chemical changes, and allow the incumbent rocks to subside gradually.

Moreover, if we suppose that lava cooling slowly at great depths may be converted into various granitic rocks, we obtain another source of depression; for, according to the experiments of Deville and the calculations of Bischoff, the contraction of granite when passing from a melted or plastic to a solid and crystalline state must be more than ten per cent.* The sudden subsidence of land may also be occasioned by subterranean caverns giving way, when gases are condensed, or when they escape through newly-formed crevices. The subtraction, moreover, of matter from certain parts of the interior, by the flowing of lava, and of mineral springs, must, in the course of ages, cause vacuities below, so that the undermined surface may at length fall in.

The balance of dry land, how preserved. — In the present state of our knowledge, we cannot pretend to estimate the average number of earthquakes which may happen in the course of a single year. As the area of the ocean is nearly three times that of the land, it is probable that about three submarine earthquakes may occur for one exclusively continental; and when we consider the great frequency of slight movements in certain districts, we can hardly suppose that a day, if, indeed, an hour, ever passes without one or more shocks being experienced in some part of the globe. We have also seen that in Sweden, and other countries, changes in the relative level of sea and land may take place without commotion, and these perhaps produce the most important geographical and geological changes; for the position of land may be altered to a greater amount by an elevation or depression of one inch over a vast area, than by the sinking of a more limited tract, such as the forest of Aripao, to the depth of many fathoms at once.†

It must be evident, from the historical details above given, that the force of subterranean movement, whether intermittent or continuous, whether with or without disturbance, does not operate at random, but is developed in certain regions only; and although the alterations produced during the time required for the occurrence of a few volcanic eruptions may be inconsiderable, we can hardly doubt that, during the ages necessary for the formation of large volcanic cones, composed of thousands of lava currents, shoals might be converted into lofty mountains, and low lands into deep seas.

In a former chapter, I have stated that aqueous and igneous agents may be regarded as antagonist forces; the aqueous labouring incessantly to reduce the inequalities of the earth's surface to a level,

* Bulletin de la Soc. Géol. 2nd series, vol. iv. p. 1312.

† See p. 451.