

last 400 years.* But, granting that in these and some exceptional cases (none of them as yet very well established) the rising or sinking has, for a time, been accelerated, I do not believe the average rate of motion to exceed that above proposed. Mr. Darwin, I find, considers that such a mean rate of upheaval would be as high as we could assume for the west coast of South America, where we have more evidence of sudden changes of level than anywhere else. He has not, however, attempted to estimate the probable rate of secular elevation in that or any other region.

Little progress has yet been made in divining the most probable causes of these great movements of the earth's crust; yet what little we know of the state of the interior leads us to expect that the gradual expansion or contraction of large portions of the solid crust may be the result of fluctuations in temperature, with which the existence of hundreds of active and thousands of extinct volcanoes is probably connected.

It is ascertained that solid rocks, such as granite and sandstone, expand and contract annually, even under such a moderate range of temperature as that of a Canadian winter and summer. If the heat should go on increasing through a thickness, say only of ten miles of the earth's crust, the gradual upheaval of the incumbent mass may amount to many hundreds of feet; and the elevation may be carried still farther, by the complete fusion of part of the inferior rocks.

According to the experiments of Deville, the contraction of granite, in passing from a melted, or as some would say its plastic condition, to a solid state, must be more than ten per cent.† So that we have at our command a source of depression on a grand scale, at every period when granitic

* Seasons with the Sea-Horses, p. 202.

† Bulletin de la Société Géologique, 2nd series, vol. iv. p. 1312.