

some faults, on sound mechanical principles, by a succession of movements, is far preferable to any theory which assumes each fault to have been accomplished by a single upcast or downthrow of several thousand feet. For we know that there are operations now in progress, at great depths in the interior of the earth, by which both large and small tracts of ground are made to rise above and sink below their former level, some slowly and insensibly, others suddenly and by starts, a few feet or yards at a time; whereas there are no grounds for believing that, during the last 3000 years at least, any regions have been either upheaved or depressed, at a single stroke, to the amount of several hundred, much less several thousand feet. When some of the ancient marine formations are described in the sequel, it will appear that their structure and organic contents point to the conclusion, that the floor of the ocean was slowly sinking at the time of their origin. The downward movement was very gradual, and in Wales and the contiguous parts of England a maximum thickness of 32,000 feet (more than six miles) of Carboniferous, Devonian, and Silurian rock was formed, whilst the bed of the sea was all the time continuously and tranquilly subsiding.* Whatever may have been the changes which the solid foundation underwent, whether accompanied by the melting, consolidation, crystallization, or desiccation of subjacent mineral matter, it is clear from the fact of the sea having remained shallow all the while that the bottom never sank down suddenly to the depth of many hundred feet at once.

It is by assuming such reiterated variations of level, each separately of small vertical amount, but multiplied by time till they acquire importance in the aggregate, that we are able to explain the phenomena of denudation, which will be treated of in the next chapter. By such movements every portion of the surface of the land becomes in its turn a line of coast, and is exposed to the action of the waves and tides. A country which is undergoing such movement is never allowed to settle into a state of equilibrium, therefore the force of rivers and torrents to remove or excavate soil and rocky masses is sustained in undiminished energy.

* See the results of the "Geological Survey of Great Britain;" Memoirs, vols. i. and ii. by Sir H. de la Beche, Mr. A. C. Ramsay, and Mr. John Phillips.