

always parallel in such cases, but often irregular, and sometimes the stones and earth which are in the middle of the fault, or fissure, have been polished and striated by friction in different directions, showing that there have been slidings subsequent to the first introduction of the fragmentary matter. Nor should we forget that the last movement must always tend to obliterate the signs of previous trituration, so that neither its instantaneousness nor the uniformity of its direction can be inferred from the parallelism of the striæ that have been last produced.

When rocks have been once fractured, and freedom of motion communicated to detached portions of them, these will naturally continue to yield in the same direction, if the process of upheaval or of undermining be repeated again and again. The incumbent mass will always give way along the lines of least resistance, or where it was formerly rent asunder. Probably, the effects of reiterated movement, whether upward or downward, in a fault, may be undistinguishable from those of a single and instantaneous rise or subsidence, and the same may be said of the rising or falling of continental masses, such as Sweden or Greenland, which we know to take place slowly and insensibly.

*Doctrine of the Sudden Upheaval of parallel Mountain-chains.*—The doctrine of the suddenness of many former revolutions in the physical geography of the globe has been thought by some to derive additional confirmation from a theory respecting the origin of mountain-chains, advanced in 1833 by a distinguished geologist, M. Elie de Beaumont. In an essay on this subject he has attempted to establish two points; first, that a variety of independent chains of mountains have been thrown up suddenly at particular periods; and, secondly, that all the contemporaneous chains thus thrown up, preserve a parallelism the one to the other, even in the most distant regions.

These opinions, and others by which they are accompanied, are so adverse to the method of interpreting the history of geological changes which I have recommended in this work, that I am desirous of explaining the grounds of my dissent, a course which I feel myself the more called upon to adopt, as the generalizations alluded to are those not only of a skilful writer, but an original observer of great talent and experience. I shall begin, therefore, by giving a brief summary of the principal propositions laid down in the work above referred to.

1st. M. de Beaumont supposes “that in the history of the earth there have been long periods of comparative repose, during which the deposition of sedimentary matter has gone on in regular continuity; and there have also been short periods of paroxysmal violence, during which that continuity was broken.

“2dly. At each of these periods of violence or ‘revolution,’ in the state of the earth’s surface, a great number of mountain-chains have been formed suddenly.

“3dly. All the chains thrown up by a particular revolution have