

parallel zone of younger tertiary deposits? Here (and the case is by no means a solitary one) we are embarrassed by discovering at least two parallel lines of elevation of different dates, in one and the same chain. *

Moreover, in considering these questions, we are bound to bear in mind that trains of active volcanos, although linear, have not all of them one uniform direction, but are sometimes at right angles the one to the other; so is it probable that we shall find in the lines of subterranean convulsion, whether of upheaval or subsidence, a wide deviation from parallelism.

Among other propositions laid down in the essay of M. de Beaumont above cited, he alludes to the sudden upheaval of the Andes as a very modern event (see above, p. 161.). This opinion he would doubtless modify or retract on fully considering the result of the investigations of Mr. Darwin, recently published. Never, perhaps, in regard to any other mountainous region have more ample data been brought together, in proof of the local persistency of volcanic action throughout a long succession of geological periods, beginning with times antecedent to the deposition of the oolitic and cretaceous formations of Chili, and continuing to the historical epoch. It appears that some of the parallel ridges which compose the Cordilleras, instead of being contemporaneous, were successively and slowly upheaved at widely different epochs. The whole range, after twice subsiding some thousands of feet, was brought up again by a slow movement in mass, during the era of the eocene tertiary formations, after which the whole sank down once more several hundred feet, to be again uplifted to its present level by a slow and often interrupted movement. †

Slow upheaval and subsidence.—Recent observations have disclosed to us the wonderful fact, that not only the west coast of South America, but also other large areas, some of them several thousand miles in circumference, such as Scandinavia, and certain archipelagos in the Pacific, are slowly and insensibly rising; while other regions, such as Greenland, and parts of the Pacific and Indian Oceans, in which atolls or circular coral islands abound, are as gradually sinking. That all the existing continents and submarine abysses may have originated in movements of this kind, continued throughout incalculable periods of time, is undeniable, and the denudation which the dry land appears every where to have suffered, favours the idea that it was raised from the deep by a succession of upward movements, prolonged throughout indefinite periods. For the action of waves and currents on land slowly emerging from the deep, affords the only power by which we can conceive so many deep valleys and wide spaces to have been denuded as those which are unquestionably the effects of running water. One of the soundest objections indeed to the theory of the sudden upthrow of continental masses is, that it deprives

* Sir R. Murchison, *Quart. Geol.*, Jan. 5., pp. 219. 228. 308.

† Darwin's *Geology of South America*, p. 248. London, 1846.