

depends on the accuracy of the data by which the contemporaneous or non-contemporaneous data of the elevation of two independent chains can be demonstrated. In every case, this evidence, as stated by M. de Beaumont, is equivocal, because he has not included in the possible interval of time between the deposition of the deranged and the horizontal formations, part of the periods to which each of those classes of formations are referable. Even if all the geological facts, therefore, adduced by the author were true and unquestionable, yet the conclusion that certain chains were or were not simultaneously upraised is by no means a legitimate consequence.

In the third volume of my first edition of the Principles, which appeared in April, 1833, I controverted the views of my friend M. de Beaumont, then just published, in the same terms as I have now restated them. At that time I took for granted that the chronological date of the newest rocks entering into the disturbed series of the Pyrenees had been correctly ascertained. It now appears, however, that some of the most modern of those rocks contain eocene fossils in great abundance, as at Biarritz, and other places at the western extremity of the Pyrenees.* The discovery of this fact would, according to the terms of M. de Beaumont's own theory, make it necessary to assign a different geological epoch to the period of the upheaval of the Pyrenees. When an error of this kind is detected in the assumed age of one of the best known of European chains, it is clear that no confidence can be felt respecting the assigned date of the Ghauts of Malabar, and certain chains in Syria, Egypt, and Northern Africa, presumed to have been thrown up simultaneously from their mere conformity in geographical direction to the Pyrenees. It should at the same time be observed that geologists are by no means agreed in regard to the parallelism of the *strike* of the strata in all the chains said to be contemporaneous, and many of those referred to in Africa, Asia, India, and South America, are too slightly known, even geographically, to afford data for secure generalization.

The elevation of the Alps was first assumed by M. de Beaumont, in common with other geologists, to have occurred before the beginning of the Eocene period, whereas, now it is ascertained that *eocene* strata of great thickness, comprising among other rocks the nummulitic limestone, enter largely into the structure of the higher and more disturbed parts of the chain.† Must we, then, at once change our views in regard to the age of all the mountain ranges in the world, which happen to run parallel to the Alps? If so, by what principle are we to be governed when we find on the southern flanks of the Alps themselves, in the Venetian territory, the nummulitic or eocene group, which was first upraised, followed by an outer and

* Mr. S. P. Pratt, F. G. S., first called the attention of the Geol. Soc. of London to the subject in 1844. See also Bulletin de la Soc. Géol. de France, vol. i., Seconde Ser. p. 407., Mai, 1844. Other papers have since appeared confirmatory

of the same views, and are referred to in my Anniversary Address to the Geological Society for 1850.

† See Sir R. Murchison, Quart. Journ. Geol. Soc. London, and my Anniversary Address to the Geol. Soc. 1850.