

terms of each proposition are equivocal; and the possible length of some of the intervals is so vast, that to affirm that all the chains raised in such intervals were *contemporaneous* is an abuse of language.

In order to illustrate this argument, I shall select the Pyrenees as an example. Originally M. E. de Beaumont spoke of this range of mountains as having been uplifted suddenly (*à un seul jet*), but he has since frankly conceded that in this chain, in spite of the general unity and simplicity of its structure, six, if not seven, systems of dislocation of different dates can be recognized.\* In reference, however, to the latest of these convulsions, which is described as having been extremely violent, the chain is said to have attained its present elevation at a certain epoch in the earth's history, namely, between the deposition of the chalk and that of tertiary formations; for the chalk is seen in vertical, curved, and distorted beds on the flanks of the chain, as the beds *b*, Fig. 7., while the tertiary formations rest upon them in horizontal strata at its base, as *c*, *ibid*.

The proof, then, of the extreme suddenness of the convulsion is supposed to be the shortness of the time which intervened between the formation of the chalk and the origin of certain tertiary strata.† Even if the interval were reducible within these limits, it might comprise an indefinite lapse of time. In strictness of reasoning, however, the author cannot exclude the whole either of the Cretaceous or Tertiary periods from the possible duration of the interval during all or any part of which the elevation may have taken place. For, in the first place, it cannot be assumed that the movement of upheaval took place after the close of the Cretaceous period; we can merely say, that it occurred after the deposition of certain strata of that period; secondly, although it were true that the event happened before the formation of all the tertiary strata now at the base of the Pyrenees, it would by no means follow that it preceded the whole Tertiary epoch.

Admitting, then, the age of the strata, both of the inclined and horizontal series, to have been accurately determined by M. de Beaumont, still the upheaving of the Pyrenees may have been going on before the animals of the Chalk period ceased to exist, or when the Maestricht beds were in progress, or during the indefinite ages which may have elapsed between the extinction of the Maestricht animals and the introduction of the Eocene tribes, or during the Eocene epoch, or the rise may have been going on throughout one, or several, or all of these periods.

It would be a purely gratuitous assumption to say that the inclined cretaceous strata (*b*, Fig. 7.) on the flanks of the Pyrenees, were the very last which were deposited during the Cretaceous period, or that, as soon as they were upheaved, all or nearly all the species of animals and plants now found fossil in them were suddenly exterminated; yet, unless this can be affirmed, we cannot say that the Pyrenees

\* Bulletin, 2d Series, vol. iv. p. 1368.

† Phil. Mag. and Annals, No. 58., New Series, p. 243.