

so near, the white chalk would not have remained unsoiled, or without intermixture of mud and sand; nor would organic remains of terrestrial, fluviatile, or littoral origin have been so entirely wanting in the strata of the North and South Downs, where the chalk terminates abruptly in the escarpments. It is admitted that the fossils now found there belong exclusively to classes which inhabit a deep sea. Moreover, the uppermost beds of the Wealden group, as Mr. Prestwich has remarked, would not have been so strictly conformable with the lowest beds of the Lower Greensand had the strata of the Wealden undergone upheaval before the deposition of the incumbent cretaceous series.

But, although we must assume that the white chalk was once continuous, over what is now the Weald, it by no means follows that the first denudation was subsequent to the entire Cretaceous era. Most probably it commenced before a large portion of the Maestricht beds were formed, or while they were in progress. I have already stated (p. 238, above), that in parts of Belgium I observed rolled pebbles of chalk-flints very abundant in the lowest Maestricht beds, where these last overlie the white chalk, showing at how early a date the chalk was upraised from deep water and exposed to aqueous abrasion.

Guided by the amount of change in organic life, we may estimate the interval between the Maestricht beds and the Thanet Sands to have been nearly equal in duration to the time which elapsed between the deposition of those same Thanet Sands and the Glacial period. If so, it would be idle to expect to be able to make ideal restorations of the innumerable phases in physical geography through which the southeast of England must have passed since the Weald began to be denuded. In less than half the same lapse of time the aspect of the whole European area has been more than once entirely changed. Nevertheless, it may be useful to enumerate some of the known fluctuations in the physical conformation of the Weald and the regions immediately adjacent during the period alluded to.

First, we have to carry back our thoughts to those very remote movements which first brought up the white chalk from a deep sea into exposed situations where the waves could plane off certain portions, as expressed in diagram (fig. 329), before the British Lower Eocene beds originated.

Secondly, we have to take into account the gradual wear and tear of the chalk and its flints, to which the Thanet sands bear witness, as well as the subsequent Woolwich and Blackheath shingle-beds, occasionally 50 feet thick, and composed of rolled flint-pebbles.

Thirdly, at a later period a great subsidence took place, by which the shallow-water and freshwater beds of Woolwich and other Lower Eocene deposits were depressed (see above, p. 221) so as to allow the London Clay and Bagshot series, of deep-sea origin, to accumulate over them. The amount of this subsidence, according to Mr. Prestwich, exceeded 800 feet in the London, and 1800 feet in the Hampshire or Isle of Wight basin; and if so, the intervening area of the Weald could scarcely fail to