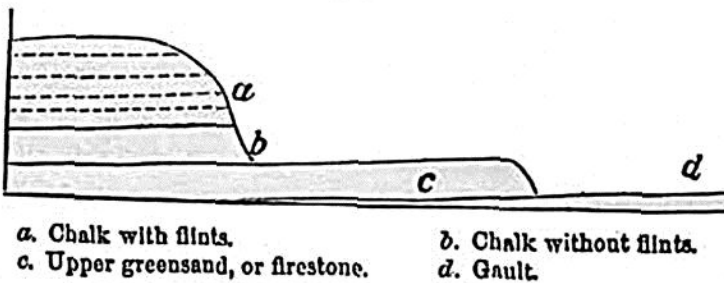


The quantity of denudation, or removal by water, of stratified masses assumed to have once reached continuously from the North to the South Downs is so enormous, that the reader may at first be startled by the boldness of the hypothesis. But the difficulty will disappear when once sufficient time is allowed for the gradual rising and sinking of the strata at many successive geological periods, during which the waves and currents of the ocean, and the power of rain, rivers, and land-floods, might slowly accomplish operations which no sudden diluvial rush of waters could possibly effect.

Among other proofs of the action of water, it may be stated that the great longitudinal valleys follow the outcrop of the softer and more incoherent beds, while ridges or lines of cliff usually occur at those points where the strata are composed of harder stone. Thus, for example, the chalk with flints, together with the subjacent upper greensand, which is often used for building, under the provincial name of "firestone," have been cut into a steep cliff on that side on which the sea encroached. This escarpment bounds a deep valley, excavated chiefly out of the soft argillaceous bed, termed gault (No. 3. map, p. 272). In some places the upper greensand is in a loose and incoherent state, and there it has been as much denuded as the gault; as, for example, near Beachy Head; but farther to the westward it is of great thickness, and contains hard beds of blue chert and calcareous sandstone or firestone. Here, accordingly, we find that it produces a corresponding influence on the scenery of the country; for it runs out like a step beyond the foot of the chalk hills, and constitutes a lower terrace, varying in breadth from a quarter of a mile to three miles, and following the sinuosities of the chalk escarpment.*

Fig. 828.



a. Chalk with flints.

c. Upper greensand, or firestone.

b. Chalk without flints.

d. Gault.

It is impossible to desire a more satisfactory proof that the escarpment is due to the excavating power of water during the rise of the strata, or during their rising and sinking at successive periods; for I have shown, in my account of the coast of Sicily (p. 76), in what manner the encroachments of the sea tend to efface that succession of terraces which must otherwise result from the intermittent upheaval of a coast preyed upon by the waves. During the inter-

* Sir R. Murchison, Geol. Sketch of Sussex, &c, Geol. Trans., Second Series, vol. ii. p. 99.