the line of fracture.* We should doubtless err in assigning all these mutations to one and the same period; the phenomena are extremely complicated, and an appearance which may seem to have been produced at the same time, and by a single operation, may have been the result of many and varied changes. There is, however, one fact respecting which there can be no hesitation, namely, that the disturbing forces which have broken up the tertiary deposits came into action *after the elephant epoch.* These elevatory movements and convulsions were manifestly of great intensity, and materially changed the physical geography of the south-east of England, and the contiguous parts of the continent, and occasioned the vertical position of the strata in the Isle of Wight and Hampshire. These alterations in the surface of the country, must, too, have been attended with great changes in the hydrography of Hampshire, Surrey, Kent, and Sussex; the waters resulting from the drainage of the land, and which, before the existence of the transverse fractures, probably flowed through the longitudinal valleys towards the east, would be thrown into different channels, and find their way to the ocean by the existing river courses. Traces of these revolutions remain in the boulders and superficial loam and gravel, which occupy the valleys and low elevations of the south-east of England.

Subsequently to these last mentioned changes, the surface of the country appears to have undergone no material alteration; the ordinary effects of the atmosphere, the degradation of the shores by the action of the sea, the erosion by river currents of the strata over which they flow, and the formation of deltas, and the silting up of valleys, being the only physical changes that have taken place in the south-east of England during the modern epoch, and which are still in active operation.

The existing rivers in this district are producing on a small scale the same effects as the mighty river of the Iguanodon period; bringing down from the interior the debris of the strata over which they flow, mixed with the bones of animals, and the trunks, branches, and leaves of vegetables, and imbedding a portion in the chalk valleys, in a deposit of mud or silt, and transporting the remainder to form deltas at their entrance into the ocean.

The levels near Lewes, described in a former part of this volume, afford so interesting an illustration of the silting up of the disrupted valleys of the chalk, during a comparatively very recent period, that we subjoin the following summary of the sequence of events which they record.† First, there was a salt-water estuary peopled for many years by marine testacea identical with existing species, and into which some of the large cetacea, as the sea-unicorn and porpoise, occasionally entered. Secondly, the inlet grew more shallow, and the water

---

* Mr. Woodward arrives at the same conclusion from an examination of the chalk valleys of Norfolk. "These," he observes, "are *valleys of disruption*; that is, they were formed by the elevation of the chalk and its consequent fracture, as is evident from the strata of chalk and flints on each side of the valley being now found to decline from the line of elevation."—*Correspondence with the Author.*

† Principles of Geology, vol. ii. p. 276.