

boulder-clay, indicated less violence and less extent of agitation and movement in the waters.

(4.) The deposits of clay prove that general tranquillity or calmness succeeded the above periods. From the discovery of terrestrial remains, both animal and vegetable, in this deposit, it is obvious that land had not been far distant; and, accordingly, the nature of the shells found in it, partakes somewhat of an estuary character.

(5.) The banks of sand which lie over the clay, shew that the supply of albuminous sediment which, during the former period, was poured into the ancient sea, at or near this district, had altogether ceased. The fact of these sand-banks running nearly east and west, in all parts of the district, coupled with the discovery in them of stones which must have come from the west, prove the general direction of the current to have been from the west. The sea at this period must have been still *at least* 300 feet above the present level of it.

(6.) The next epoch is characterized by a very remarkable change of the relative levels of sea and land. The old bank which runs nearly parallel with the shores of the Firth of Forth, has been formed sometimes out of the fine brick-clay, and sometimes out of the sand last described. The base of this bank on the east shore of Haddingtonshire is about thirty feet above high-water mark; whilst towards the west it gradually increases to forty feet, which is its height in Linlithgowshire. A bed of shells and sand generally intervenes between said old bank and the present shore.

(7.) The next period is characterized by a still more remarkable change in the relative levels of sea and land. The upper covering of gravel and boulders has been spread over and above all the deposits previously described, and it reaches even to the height of 900 feet above the sea. This would indicate a sinking of the land or elevation of the waters, to that extent, and a subsequent reversal of the operation, whereby at length the land again emerged from the waters, and attained the elevation which it now possesses. These boulders are not very much rounded in shape, and do not seem to have been transported from very distant parts. They are frequently angular in shape.

### 3. Investigation of a New Series for the Rectification of the Circle. By J. Thomson, LL.D. Glasgow.