

clusions, the premises of which they were incompetent to comprehend.\*

§ 6. Another class of substances imbedded in the secondary strata, and throwing light on the convulsions amidst which they have been formed, are the pebbles or rolled fragments of rocks, older than themselves, which they are often found to contain; thus the lower beds of the supermedial order (namely, the conglomerate rocks of the new red sandstone) contain in great abundance rolled fragments of the carboniferous limestone belonging to the class next below it (the medial order), as well as of many still older rocks; being in fact only a consolidated mass of gravel, composed of debris of these rocks.†

The necessary inferences from this fact are, first, the rock whence the fragments were derived must have been consolidated, and subsequently to that consolidation have been exposed to the mechanical violence (probably the action of agitated waters), which tore from it these masses and rounded them by attrition, before the rock in which these fragments are now imbedded was formed; and secondly, since loose gravel beds (and such must have been the original form of these, though now consolidated into conglomerate rocks) cannot be accumulated to any extent (from the action of gravity) on an highly inclined plane. We are sure when we find such beds, as we often do, in nearly vertical strata, that this cannot have been their original position, but is one into which they have been forced by convulsions which have dislocated them subsequently to their consolidation.

\* The present writer regrets that he is obliged to mention the hasty speculations contained in a Geological Survey of the Yorkshire coast as in some degree liable to this censure. The descriptive part of that work merits considerable praise as a valuable and interesting contribution to the geological branch of local history; but it will at once be evident to those who read the catalogue of fossil shells there given, that a knowledge of conchology is not the author's strongest point, and equally so that his ideas of geology are formed only from the inspection of a very limited district. The imperfect acquaintance with his subject displayed in his concluding part may readily be accounted for; its flippancy (see particularly page 302) is less easily to be excused: had the whole of the third part of this work been suppressed, the remainder, like the books of the Sibyl, would have acquired a much higher value.

† This example has been selected because it is not open to any doubt, for it has been sometimes said that the supposed derivative pebbles were in fact original concretions mistaken for such; but no suspicion of this kind can be brought against the alleged instance, since the pebbles of the carboniferous limestone are marked by the characteristic organic remains of that rock, and the angles of these remains, where they approach the surface of these pebbles, are broken down and rounded off, so that the proof of their origin is complete.