

the waste of those districts, and forced down to the great hollow uniting the vales of the Dee and the Severn, were transported, according to the descent of the country, previous to the dispersion of the erratic blocks from Cumberland ; and he supposes that, between the mountains of Wales and the oolitic ranges, the vale of the Severn was submerged, and constituted part of a long strait uniting the Irish and Bristol Channels, since the northern zones were inhabited by quadrupeds. The abundance of shelly deposits mixed with and lying under the detrital accumulation of Cheshire, Worcestershire, &c. appears to justify this view.

It is, therefore, by no means a simple problem which the superficial gravel deposits of even a limited district offer to the reasoning geologist. Gravel is not necessarily of diluvial origin ; does not necessarily imply the action of violent forces, or currents moving in directions which could only be rendered possible by a great change of the relative level of land and water. We must, in all cases, distinguish between the local and general agencies which, separately or in combination, effected the transfer of the gravel. The pebbles on the plain of Crau at the mouth of the Rhone, and those vast heaps brought from the Alps of Dauphiné by the Isère and the Durance, have one local origin ; almost every valley of the Alps and the Grampians has served for the passage of a peculiar suite of broken rocks ; only at one point of the Penine chain of England have the Cumbrian rocks been drifted to the drainage of the Humber. Geographical circumstances appear to have been more important in determining the *distribution* of gravel, than of erratic blocks, even though we assume the effects in all cases to have been produced by the same agencies. Before any particular masses of sand, gravel, or pebbly clays can be pronounced to be of diluvial origin, and adduced in evidence on the question as to the origin and operation of violent waters, it is indispensably necessary to show that, under the present configuration of the surface, with ordinary measures of local watery forces, the accumu-