

their fragments here deposited. Portions of the same gravel have been swept onwards through transverse vallies affording openings across the chains of oolite and chalk hills, as far as the plains surrounding the metropolis; but the principal mass of the diluvial gravel in this latter quarter, is derived from the partial destruction of the neighbouring chalk hills, consisting of flints washed out from thence, and subsequently rounded by attrition.\*

On a general investigation of these and similar phænomena, it does not seem possible to assign any single and uniform direction to the currents which have driven this debris before them; but they appear in every instance to have flowed (which indeed must of necessity be the case with the currents of subsiding waters) as they were determined by the configuration of the adjoining country; from the mountains, that is, towards the lower hills and plains. As far as England is concerned, this principle will produce a general tendency to a direction from north and west towards south and east, greatly modified however by obvious local circumstances.

Another circumstance connected with the distribution of these travelled fragments is, that we often find them in masses of considerable size, accumulated in situations now separated by the intervention of deep vallies from the parent hills (if we may so speak) whence we know them to have been torn. This appears to be a demonstrative proof that these intervening vallies must have been excavated subsequently to the transportation of these blocks; for though we can readily conceive how the agency of violent currents may have driven these blocks down an inclined plane, or, if the vis a tergo were sufficient, along a level surface, or even up a very slight and gradual acclivity, it is impossible to ascribe to them the Sisyphean labour of rolling rocky masses, sometimes of many tons in weight, up the face of abrupt and high escarpments. The attention of geologists was first directed to this phænomenon by the discoveries of Saussure, who noticed one of its most striking cases—the occurrence of massive fragments torn from the primitive chains of the Alps, scattered at high levels on the escarpment of the opposite calcareous and secondary chains of the Jura, although between the two points the deep valley containing the lake of Geneva is interposed.

The occurrence of colossal blocks of granite scattered over the plains of northern Germany, which may be traced up to the

\* See some excellent observations on diluvial gravel appended by Professor Buckland to his memoir on the Lickey quartz rock, whence much of the gravel of the midland counties seems to have been derived. (*G. T.* vol. 5.)