

In the boulder-clay, on the contrary, most of the pebbles that bear the mark of their transport at all were not *rolled*, but *slidden* forward in the line of their longer axis. They were launched, as ships are launched, in the line of least resistance, or as an arrow or javelin is sent on its course through the air. Water could not have been the agent here, nor yet an eruption of mud propelled along the surface by some wave of translation produced by the sudden upheaval of the bottom of the sea, or by some great wave raised by an earthquake.

But if water or an eruption of mud could not have produced such effects as the longitudinal scratching, let us ask what could have produced them? There are various processes going on around us, by which the scratchings on the solid rocks beneath are occasionally simulated with a less or greater degree of exactness. In some of our shallow Highland fields, for instance, I have seen the rock beneath, or the stones buried at the depth of but a few inches from the surface, scarred by the plough with ruts not very unlike the larger ones on the stones and rocks of the boulder-clay; but in these plough-scarred surfaces the polish is wanting. Again, in some of our steeper lanes, if a fine-grained trap has been used in the pavement, we find that it soon polishes and wears down under the iron-armed feet of the passengers, and becomes scratched in the line of their tread, in a style not very distinguishable, save for the absence of the deeper furrows, from that of the scratched and polished rock-pavements of the boulder-clay. But I know of only one process by which, on a small scale, *all* the phenomena of the boulder-clay could be produced,—more especially, however, the phenomena of its oblong pebbles scratched in the lines of their longer axis; and my recollection of that one dates a good many years back. When, more than a quarter of a century ago, the herring fishing began to be prosecuted with vigour in the north of Scotland, many of the Highland