

consider to belong to the same period; namely, a continuous zone of boulder clay, forming ridges and mounds from fifty to seventy feet high (the upper part of the mounds usually stratified), enclosing numerous lakes, some of them several miles long, and many ponds and swamps filled with shell-marl and peat. This band of till, with Grampian boulders and associated river-gravel, may be traced continuously for a distance of thirty-four miles, with a width of three and a half miles, from near Dunkeld, by Coupar, to the south of Blairgowrie, then through the lowest part of Strathmore, and afterwards in a straight line through the greatest depression in the Sidlaw Hills, from Forfar to Lunan Bay.

Although no great river now takes its course through this line of ancient lakes, moraines, and river gravel, yet it evidently marks an ancient line by which, first, a great glacier descended from the mountains to the sea, and by which, secondly, at a later period, the principal water drainage of this country was effected. The subsequent modification in geography is comparable in amount to that which has taken place since the higher level gravels of the Valley of the Somme were formed, or since the Belgian caves were filled with mud and bone-breccia.

Mr. Jamieson has remarked, in reference to this and some other extinct river-channels of corresponding date, that we have the means of ascertaining the direction in which the waters flowed by observing the arrangement of the oval and flattish pebbles in their deserted channels; for in the bed of a fast-flowing river such pebbles are seen to dip towards the current, as represented in fig. 35, such being the position of greatest resistance to the stream.\* If this be admitted, it follows that the higher or mountainous country bore the same relation to the lower lands, at the time when a great river passed through this chain of lakes, as it does at present.

\* Jamieson, Quarterly Geological Journal, vol. xvi. p. 349.