

blage of shells implying a colder climate than that of the twenty-five foot terrace, or that of the present sea; just as, in the Valley of the Somme, the higher level gravels are supposed to belong to a colder period than the lower ones, and still more decidedly than that of the present era (see p. 142). At still greater elevations, older beds containing a still more arctic group of shells have been observed at Airdrie, fourteen miles south-east of Glasgow, 524 feet above the level of the sea. They were embedded in stratified clays, with the unstratified boulder till both above and below them, and in the overlying unstratified drift were some boulders of granite which must have come from distances of sixty miles at the least.* The presence of *Tellina calcarea*, and several other northern shells, implies a climate colder than that of the present Scottish seas. In the north of Scotland, marine shells have been found in deposits of the same age in Caithness and in Aberdeenshire at heights of two hundred and fifty feet, and on the shores of the Moray Frith, as at Gamrie in Banff, at an elevation of three hundred and fifty feet; and the stratified sands and beds of pebbles which belong to the same formation ascend still higher — to heights of five hundred feet at least.†

At much greater heights, stratified masses of drift occur in which hitherto no organic remains, whether of marine or freshwater animals, have ever been found. It is still an undecided question whether the origin of all such deposits in the Grampians can be explained without the intervention of the sea. One of the most conspicuous examples has been described by Mr. Jamieson as resting on the flank of a hill called Meal Uaine, in Perthshire, on the east side of the valley of the Tummel, just below Killiecrankie. It consists of per-

* Smith of Jordanhill, Quarterly Geological Journal, vol. vi. p. 387, 1850.

† See papers by Prestwich, Pro-

ceedings of the Geological Society, vol. ii. p. 545; and T. F. Jamieson, Geological Quarterly Journal, vol. xvi.