downward movement and pressure of the frozen mass had not only smoothed, polished, and scratched the rocks, but had, in the course of ages, deepened and widened the valleys, and produced much of that denudation which has commonly been ascribed exclusively to aqueous action. The glaciation of the Scotch mountains was traced by him to the height of at least three thousand feet.*

Mr. T. F. Jamieson, of Ellon, in Aberdeenshire, has recently brought forward an additional body of facts in support of this theory. According to him the Grampians were at the period of extreme cold enveloped 'in one great winding sheet of snow and ice,' which reached everywhere to the coast-line, the land being then more elevated than it is now. He describes the glacial furrows sculptured on the solid rocks as pointing in Aberdeenshire to the south-east, those of the valley of the Forth at Edinburgh, from west to east, and higher up the same valley at Stirling, from north-west to south-east, as they should do if the ice had followed the lines of what is now the principal drainage. The observations of Sir James Hall, Mr. Maclaren, Mr. Chambers, and Dr. Fleming, are cited by him in confirmation of this arrangement of the glacial markings, while in Sutherland and Rossshire he shows that the glacial furrows along the north coast point northwards, and in Argyleshire westwards, always in accordance with the direction of the principal glens and fiords.

Another argument is also adduced by him in proof of the ice having exerted its mechanical force in a direction from the higher and more inland country to the lower region and sea coast. Isolated hills and minor prominences of rock are often polished and striated on the land side, while they remain rough and jagged on the side fronting the sea. This may be seen both on the east and west coast. Mention is also made

* Ancient Sea Margins, Edinburgh, 1848. Glacial Phenomena, Edinburgh New Philosophical Journal, April 1853, and January 1855.