

power of moving ice. Suddenly strip Greenland of its ice-sheet, and it will present a picture, something like the greater part of Britain immediately after the close of this Glacial period.

During the time that these results were being produced by glacial action, there were occasional important oscillations in temperature, so that the ice sometimes increased and sometimes diminished, and land animals that lived habitually outside the great glacier limits, at intervals advanced north or retreated south with the retreating or advancing ice.

Evidence of the same kind is not wanting in England, for erratic stones and large blocks of granite, gneiss, felspathic traps, Carboniferous Limestone, &c. are scattered over the west and east coasts and the central counties of England. Boulders of Shap granite of Cumberland are common in Staffordshire, and even in the valley of the Severn, about twelve miles north of Cheltenham, and they have also been borne across the central watershed of the north into the plains of Yorkshire, near Darlington, and further south on the banks of the Humber. This distribution of erratic stones, on the east of England, throws much light on the subject of the motion of large sheets of glacier-ice, and therefore it is worth while to give a few details, some of which are probably not generally known.¹

At and a little south of Berwick-upon-Tweed, where the sea-cliffs are clear, or, when the Till has been removed, the surfaces of quarries of Carboniferous Limestone are found to be ice-polished and grooved, the striations point from 10° to 12° south of east, in the

¹ The observations were made in 1863 during an examination of the glacial accumulations on the coast-cliffs by Professor J. Geikie, Mr. Aveline, and myself, and are extracted from my note-book.