

of blocks of granite which have travelled from south to north in Aberdeenshire, of which there would have been no examples had the erratics been all brought by floating ice from the arctic regions when Scotland was submerged. It is also urged against the doctrine of attributing the general glaciation to submergence, that the glacial grooves, instead of radiating as they do from a centre, would, if they had been due to ice coming from the north, have been parallel to the coast-line, to which they are now often almost at right angles. The argument, moreover, which formerly had most weight in favour of floating ice, namely, that it explained why so many of the stones did not conform to the contour and direction of the minor hills and valleys, is now brought forward, and with no small effect, in favour of the doctrine of continental ice on the Greenlandic scale, which, after levelling up the lesser inequalities, would occasionally flow in mighty ice-currents, in directions often at a high angle to the smaller ridges and glens.

The application to Scandinavia and Scotland of this theory makes it necessary to reconsider the validity of the proofs formerly relied on as establishing the submergence of a great part of Scotland beneath the sea, at some period subsequent to the commencement of the glacial period. In all cases where marine shells overlie till, or rest on polished and striated surfaces of rock, the evidence of the land having been under water, and having been since upheaved, remains unshaken; but this special proof rarely extends to heights exceeding five hundred feet. In the basin of the Clyde we have already seen that recent strata occur twenty-five feet above the sea-level, with existing species of marine testacea, and with buried canoes, and other works of art. At the higher level of forty feet occurs the well-known raised beach of the western coast, which, according to Mr. Jamieson, contains, near Fort William and on Loch Fyne and elsewhere, an assem-