

M. Kjerulf, of Christiania, in a paper lately communicated to the Geological Society of Berlin,\* has objected, and perhaps with reason, to what he considers the undue extent to which I have, in some of my writings, supposed the mountains of northern Europe to have been submerged during the glacial period. He remarks that the signs of glacial action on the Scandinavian mountains ascend as high as 6,000 feet, whereas fossil marine shells of the same period never reach elevations exceeding 600 feet. The land he says may have been much higher than it now is, but it has evidently not been much lower since the commencement of the glacial period, or marine shells would be traceable to more elevated points. In regard to the absence of marine shells, I shall point out in the sequel how small is the dependence we can place on this kind of negative evidence, if we desire to test by it the extent to which the land has been submerged. I cannot therefore consent to limit the probable depression and re-elevation of Scandinavia to 600 feet. But that the larger part of the glaciation of that country has been supramarine, I am willing to concede. In support of this view M. Kjerulf observes that the direction of the furrows and striæ, produced by glacial abrasion, neither conforms to a general movement of floating ice from the Polar regions, nor to the shape of the existing valleys, as it would do if it had been caused by independent glaciers generated in the higher valleys after the land had acquired its actual shape. Their general arrangement and apparent irregularities are, he contends, much more in accordance with the hypothesis of there having been at one time a universal covering of ice over the whole of Norway and Sweden, like that now existing in Greenland, which, being annually recruited by fresh falls of snow, was continually pressing outwards and downwards to the coast and lower regions, after crossing many of the lower ridges, and having

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