

there is no evidence, and it would give to the latest glacial age an antiquity which seems at variance with all other facts; (4) In those more northern regions where glacial phenomena are most pronounced, the theory of floating sheets of ice, with local glaciers descending to the sea, seems to meet all the conditions of the case, and these would be obtained, in the North Atlantic at least, by very moderate changes of level, causing, for example, the equatorial current to flow into the Pacific, instead of running northward as a gulf stream; (5) The geographical theory allows the supposition not merely of vicissitudes of climate quickly following each other in unison with the movements of the surface, but allows also of that near local approximation of regions wholly covered with ice and snow and others comparatively temperate which we see at present in the north.

If, however, we are to adopt the geographical theory, we must avoid extreme views, and this leads to the inquiry as to the evidence to be found for any such universal or extreme glaciation as is demanded by some geologists.

The only large continental area in the northern hemisphere supposed to be entirely ice- and snow-clad is Greenland, and this so far as it goes is certainly a local case, for the ice and snow of Greenland extend to the south as far as 60° N. latitude, while both in Norway and in the interior of North America the climate in that latitude permits the growth of cereals. Further, Grinnel Land, which is separated from North Greenland only by a narrow sound, has a comparatively mild climate, and as Nares has shown is covered with verdure in summer. Still further, Nordenskiöld, one of the most experienced arctic explorers, holds that it is probable that the interior of Greenland is itself verdant in summer, and is at this moment preparing to attempt to reach this interior oasis. Nor is it difficult with the aid of the facts cited by Wæickoff and Whitney,¹¹ to perceive the cause of the exceptional condition of Greenland. To give ice and snow in large quantities, two conditions are required: first, atmospheric humidity, and, secondly, cold precipitating regions. Both of these conditions meet in Greenland. Its high coast ranges receive and condense the humidity from the sea on both sides of it and to the south. Hence the vast accumulation of its coast snow-fields, and the intense discharge of the glaciers emptying out of its valleys.

¹¹ Memoir on Glaciers, Geol. Soc'y, Berlin, 1881. Climatic Changes, Boston, 1883.

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