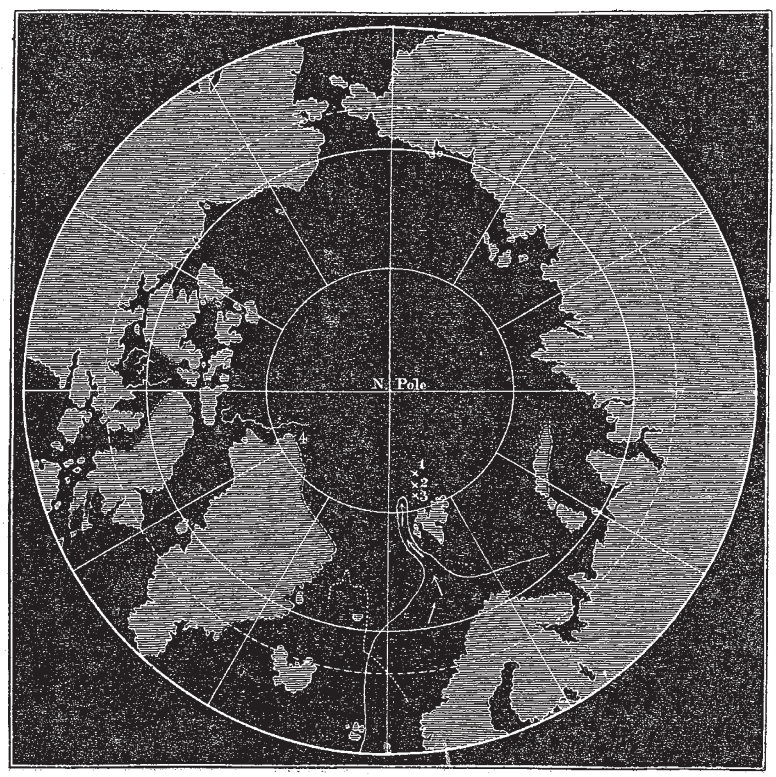
## THE GERMAN AND SWEDISH EXPEDITIONS TO THE ARCTIC REGIONS

ENGLAND seems ready to resign the position she once held as chief of all the competitors in Arctic exploration. Our flag has been carried within 7½ degrees of the North Pole; our seamen have forced from the ice-bound straits which lie to the north of America the secret of the North-Western Passage; and from the days of Scoresby until those of Franklin we have been foremost in scientific researches within the dreary Arctic wastes. But now the answer to all who would emulate the deeds of a Parry or a Ross, a Beecher or a Franklin, is the stereotyped *cui bono*. A business account of the probable gains of an Arctic journey must be rendered before England will send men or ships to the Polar seas.

In the meantime, Swedish and German explorers are pushing their way boldly into the regions where England won her Arctic laurels—perhaps we ought rather to say, ice-wreaths. Already the most northerly spot reached by our seamen has been all but attained, and there is yet room for supposing that this very year the second German expedition may push its way to the Pole itself. Scientific results of extreme value have also been attained. The course of the Gulf Stream (if Mr. Findlay will permit the name) has been tracked into very high latitudes, its depth has been gauged, and the nature of the currents which run beside it, or beneath it, has been carefully inquired into. The various forms of life which people those Arctic seas have been examined with loving care (extending even to a judicious use of powder and shot, or nets and fish-hooks, as the case might be) by the naturalists who have accompanied the expedition. And lastly, a very important addition, about which I hope to make some remarks on a future occasion, has been made to our knowledge of the variations of the magnetic needle in Arctic regions.




MAP OF THE NORTH POLAR REGIONS

The primary object of all three expeditions has been to attain, if possible, the North Pole of the earth. Dr. Petermann, who had the principal part in planning the German expeditions, has a theory about Greenland, which was associated, perhaps not very fortunately, with the other objects of the German voyagers. But undoubtedly the attainment of the highest possible northerly latitude was their principal aim.

A glance at the accompanying map will show the nature of the Arctic regions, so far as they have yet been explored. The circle 10 degrees from the North Pole has hitherto been crossed in only two neighbourhoods. The figure shows (1) where Parry made his most northerly point in 1827. The Swedish and German expeditions of last year pushed their way towards the same region, and the crosses numbered (2) and (3) indicate the spots they respectively reached. In 1854 Dr. Kane crossed the circle of 10 degrees near (4), having pushed his way along the inlet above the north-western point of Greenland. And in 1865 Dr. Hayes reached the same point, after traversing a large part of Greenland in sledges drawn by Esquimaux dogs.

Notwithstanding the hopes which M. Lambert has formed of attaining the North Pole by passing through the Straits between Asia and North America (shown near the top of the map), there seems every reason for believing that if the North Pole is ever reached by man it must be either along the course pursued by Kane and Hayes, or by the path which Parry followed. In fact, it is reasonable to confine our attention wholly to the latter course, since Dr. Hayes' journey sufficed to show that without the means of crossing the sea, further passage northwards from (4) is impossible, and it is inconceivable that any suitable sea-boat could be carried to (4) either by Kane's or Hayes' route.

The Swedish expedition to (2) is perhaps the most hopeful sea-journey that has yet been made towards the North Pole. They had been engaged until late in the Arctic season in scientific researches on the coast of Norway; yet they succeeded in pushing their way within a few miles of the most northerly point yet reached, and were even then only impeded by the dangers due to the approach of winter. There seems every reason to believe, that had they started a few months earlier they might have pushed their way much further north.

The German expeditions, undertaken in the two years, seem to have followed a course less likely to be successful. Dr. Petermann holds that Greenland extends much further towards the north-west than its shores have yet been traced—nay, even past the Pole, perhaps, to the neighbourhood of Behring's Straits, between Asia and America. Both expeditions sought to reach the north-eastern shores of Greenland with the object of ascertaining whether this theory, or General Sabine's view that Greenland has some such figure as is indicated by the dotted line in the map, is the more correct.

Twice in 1868 Captain Köldewey was forced to abandon this attempt, and each time after his defeat he made for the shores of Spitzbergen. Thus, on July 18, he had

already crossed the 80th parallel, and was close to the station marked (3); but thence he again made, by a long *détour*, for the shores of Greenland. It was after his second repulse that he reached his most northerly point (3), close to the most northerly limit of the Swedish expedition.

This year, Captain Köldewey, now in a steamship, has pursued the same tactics, except that he has been less ready to accept defeat, and has persistently sought to penetrate the ice-laden seas which surround the Greenland coast. The dotted line shows the general course of the second expedition; and it will be seen that when last heard of they were close by Greenland, and far south of the 75th parallel. Captain Gray, who brought the latest intelligence of their doings in this neighbourhood, states that on August 1, although the sea was still much encumbered with ice, it was becoming rapidly clearer, so that the *Germania* was likely to have little difficulty in reaching the Greenland coast. I confess, however, that I do not share the hopes which have been expressed of the successful progress of the expedition this year. The result of the expeditions of 1868 seems to point very clearly to another course than that which the *Germania* is now seeking to pursue: and there is nothing in the whole history of Arctic expedition to encourage a hope that a way can be found so far to the west (at least in latitudes below 80°), to the neighbourhood of the North Pole.

The figure indicates the course of the mean summer and autumn isotherm of 3° Reaumer (about 39° Fahr.), in the North Atlantic. Along the course marked by arrows a branch of the Gulf Stream has been traced (in summer) as far north as latitude 81½°; the main stream making its way towards Novaia Zemlia.* Does not Nature herself seem to point out this track past Spitzbergen as the proper course for North Polar explorers? Here, in the first place, the mildest temperature is found; and in Arctic voyaging this is a matter of no small importance. Here also is an assisting current—*valeat quantum valere debet.* But the chief circumstance to be noticed is, that the course followed by the Gulf Stream shows that there is open water—ice-encumbered, no doubt, but still not ice-bound—in this direction. It is well worthy of notice, too, how deep the sea is along this part of the Atlantic. Herr von Freeden remarks, that the whole of the Bernese Oberland might be hidden, "its presence unbetrayed even by an eddy," under the ocean to the north-west of Spitzbergen. Long ago, indeed, Scoresby found no bottom with a two-mile line. Here, then, if anywhere, a ship might expect to find her way, though experience has shown again and again that that way is full of dangers.

Either along this course or along the track suggested by Herr von Freeden, the Pole, I doubt not, will yet be reached. It will be remembered that Sir Edward Parry, setting forth from Spitzbergen on his famous "boat and sledge" expedition, was foiled by an unforeseen difficulty. The whole mass of ice over which he had tracked his way for more than a hundred miles began to drift southward, so that, as fast as Parry and his party travelled northwards, they were set back by the relentless sea and wind. Now, Parry's defeat shows at once the hopefulness of the course suggested above, and of Von Freeden's proposition that an expedition like Parry's should be commenced earlier in the season, when the ice is as yet unbroken. The very fact that Parry's great ice-ship floated freely shows how wide and deep the seas must be even far to the north of the spot he reached. For not only could he see no sign of water in front—and the Arctic voyager can recognise a "water-sky" at a great distance—*but the point where he turned must have been a few days before some hundred miles at least further north*, for he and his party had been floated back more than a hundred miles. There must then have been, that year at least, a course round the floating ice-fields which would have carried a daring seaman to an open sea between the North Pole and station 1, and far to the north of the latter point. On the other hand, the ease with which Parry's party pursued their way northwards shows, as Herr von Freeden justly remarks, that it would be no very difficult matter to attain the Pole itself over the ice, if the journey were made in early summer.

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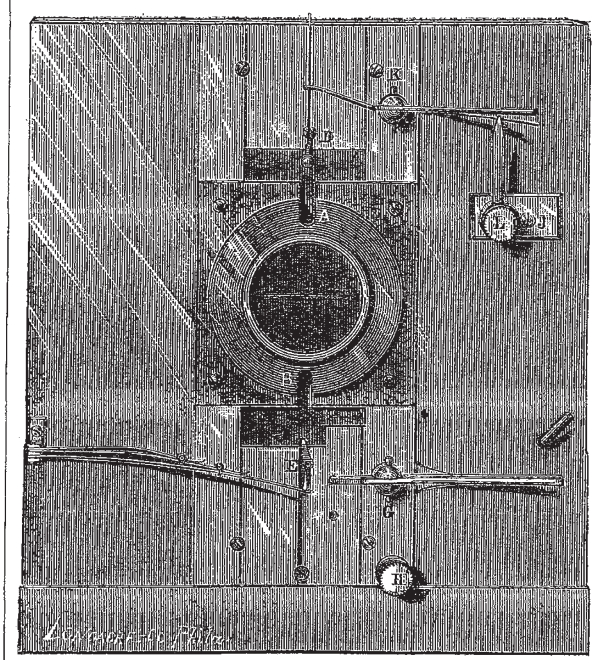
* Petermann's Geog. Mittheilungen, Part VI. The paper on "the scientific results of the first German North-polar Expedition," by Herr W. von Freeden, in this number of the Mittheilungen, will well repay careful study. In Part IX. the progress and results of this year's expedition, so far as they are yet known, are detailed in a series of letters from the people on board the *Germania*.

## *IMPROVED ECLIPSE CAMERA*

IT is to be hoped that shortly, in view of the approaching total eclipse in December next—to observe which we trust a Government expedition will be organised—English astronomers will be making arrangements for obtaining as valuable a series of photographs as the one which rewarded the efforts of the American astronomers last year.

We therefore append a description of the important modifications successfully introduced by Professor Morton, of Philadelphia.

A B represents the face plate of the camera, to which the eye-piece tube was attached, its other end being screwed to the telescope. The diaphragm plate, D E, moved across the axis of the instrument, being drawn downwards by the combined spring, C F. The strength



of this spring could be reduced by raising the outer end of one or both the upper strips so as to disengage the forks at their end from the lower spring, and then turning them forward in a direction normal to the front of the box, out of the way.

The spring was attached to the diaphragm plate by a swivel hook.

A number of diaphragm plates were provided, with slits respectively of $\frac{1}{40}$, $\frac{1}{30}$, $\frac{1}{20}$ and $\frac{1}{10}$ of an inch in width. These plates could be readily interchanged, and, in combination with the springs, gave a very wide and yet delicate series of fixed adjustments for the times of exposure.