

THE EXPLORATION OF THE ARCTIC
REGIONS*

TEN years ago, when arctic exploration was sought to be revived by the Royal Geographical Society, all, I think, were agreed as to the main points of the subject, while a diversity of opinion arose regarding one point, which appears to me only of secondary importance now—namely, the route to be chosen. There was a great deal of discussion upon this point, and whether it would be more advisable for a new English expedition to proceed west of Greenland up Smith Sound, or east of it, anywhere in the wide sea between Greenland and Novaya Zemlya.

From the results arrived at by actual exploration since 1865, and the light shed by it upon the subject, it appears to me that a real ground for any such diversity of opinion no more exists, as the most noteworthy fact brought out by the various recent polar expeditions is a greater navigability in all parts of the arctic seas than was formerly supposed to exist.

For my part, I readily admit that the Smith Sound route has turned out to be a great deal more practicable and navigable than could formerly be surmised from the experience of Kane and Hayes. Certainly both these attempts were made with insufficient means, Kane's *Advance* being only a sailing brig, heavily laden and blown about by unusually strong gales, and Hayes' schooner, the *United States*, a mere sailing vessel of 133 tons, not fit for navigation in the arctic seas. When, therefore, Hall in 1871 tried this route with the *Polaris*, he achieved most astounding results, for he sailed and steamed from Tessiusak without interruption in one stretch through the ill-famed Melville Bay, Smith Sound, Kennedy Channel, and into new seas as far as 82° N. lat., a distance of 700 miles, with the greatest ease in seven days, and even reached beyond the 82nd parallel. Yet his vessel, the *Polaris*, was only a small, weak-powered steamer, by no means well fitted for the work, and manned by a motley crew, hampered by Eskimo families and little children.

While I thus readily admit my expectations to have been far exceeded by recent experience, similar progress has also been made on all the other routes into the central area of the arctic regions, and a great deal has been achieved, even with small means. From the results already arrived at, it is evident that with appropriate steam-vessels, making use of the experience gained, that central area will be penetrated as far as the North Pole, or any other point.

As I cannot but think that an English exploring expedition will soon leave for the arctic regions, I take this opportunity to state to you explicitly that I withdraw everything I formerly said that might be construed into a diversity of opinion on the main points at issue, and that I now distinctly approve beforehand of any route or direction that may be decided on for a new expedition by British geographers.

For those expeditions which I myself have been able to set on foot since 1865, the most direct and shortest routes and the nearest goals seemed the most advisable, as only very small means could be raised, and these chiefly by promising to break new ground and open new lines of research never before attempted. With the same small means at our command, we could not have done as much as we did elsewhere. At my instance, more or less, seven very modest expeditions and summer cruises went forth. The first one, a reconnoitring tour in 1868 under Captain Koldeway, consisted of a little Norwegian sloop of only about sixty tons, no bigger than an ordinary trawling smack; she was purchased at Bergen, received the name of *Germania*, and went towards East Greenland, then to the east of Bear Island, on to the north of Spitzbergen beyond the 81st parallel, and surveyed portions of East Spitzbergen not before reached by English or Swedish expeditions. Next year, 1869, started the so-called second German expedition, consisting of two vessels, a screw steamer of 143 tons, called the *Germania*, and a sailing brig of 242 tons, called the *Hansa*, as a tender; they went again to East Greenland, explored this coast as far as 77° N. lat., and discovered a magnificent inlet, Franz-Joseph Fjord, extending far into the interior of Greenland, navigable, and the shores of it enlivened by herds of reindeer and musk oxen. It was also shown that the interior of Greenland in this region consists not of a slightly elevated table-land, as formerly supposed, but of splendid mountain masses of Alpine character. The account of this expedition, which also wintered on the coast of East Greenland in 72½° N. lat., is before you in an English dress.

* A letter addressed to the President of the Royal Geographical Society, a copy of which has been forwarded to us by Dr. Petermann.

Besides this, I got my friend Mr. Rosenthal, a shipowner, to allow two scientific men, Dr. Dorst and Dr. Bessels, to accompany two of his whaling steamers, one to explore the seas east of Spitzbergen, the other those east of Greenland; both made highly interesting and valuable scientific observations, which have not yet been published. In 1870 my friends Baron Heuglin and Count Zeil went from Tromsø in a small schooner of thirty tons to East Spitzbergen, and collected most interesting information on a region never before visited by scientific men; and when Baron Heuglin had been out a second time, the next following year (1871), again with one of Rosenthal's expeditions, he published a valuable work in three volumes. In the same year Payer and Weyprecht went in the *Isbjörn*, a sailing vessel of forty tons, from Tromsø, to explore still further northward than Bessels the sea east of Spitzbergen, which was done with great success as high up as 78° 43' N. lat. (in 42½ E. long. Gr.) and as far east as 59° E. long. The scientific results of this cruise have also not yet been fully worked out.

Thus from the interior of Greenland, in 30° W. long. to 59° E. long. east of Spitzbergen, a width of about ninety degrees of longitude has been explored, and highly interesting results obtained. The cost of these seven expeditions and cruises was about 140,000 thalers, or altogether 20,000*l.*, of which 5,000 thalers, or 750*l.*, were contributed by the Government of Germany; all the rest by private individuals, my friend Rosenthal spending upwards of 30,000 thalers. Half of the results of these expeditions have not yet been published, but the work of the second German expedition in four volumes, and that by Baron Heuglin in three volumes, are finished, and are, I think, a credit to the explorers.

I have mentioned these details in order to show that such endeavours to extend human knowledge, improve the spirit of the navy, and foster a taste for the progress of science, are not necessarily expensive. A really effective expedition will cost more, but also accomplish more; in this respect a reviewer in the *Athenaeum*, in reviewing our second expedition, says that "to start on expeditions such as these in vessels ill-adapted, ill-strengthened, ill-found, and ill-provisioned, is but to court failure;" to which I say Amen.

One well-appointed English expedition of one or two strong steamers may well be able to penetrate to the furthest points of our globe. Even the whaling ships, now furnished as they are with steam, penetrate as a rule to where it was thought impossible for such a fleet to pursue their valuable fisheries; the ill-famed middle ice of Baffin's Bay is to them no more impenetrable, and extreme points reached by former discovery expeditions in the course of a long series of years are now visited and passed by one whaling vessel in the course of a few summer months.

Up to 1869 the general opinion was that from Bear Island in 74½° N. lat. there extended the line of heavy impenetrable pack-ice eastward as far as Novaya Zemlya; that, working along this coast, the furthest limit of navigation was at Cape Nassau; and that the Kara Sea was entirely and always filled with masses of ice, totally impracticable for any navigation. But the Norwegians, with their frail fishing-smacks of only thirty tons at an average, have for five consecutive years every year navigated all those seas hitherto considered as totally impenetrable; they have repeatedly circumnavigated the whole of Novaya Zemlya, crossed the Kara Sea in every direction, penetrated to the Obi and Yenisei, and shown beyond the shadow of a doubt that navigation can generally be pursued there during five months of the year, from June to October, and moreover, that the whole of the Kara Sea and the Siberian Sea far to the north are every year more or less cleared of their ice, both by its melting and drifting away to the north. I have had the journals of many of these cruises sent to me from Norway, containing a mass of good observations made at the instance of the Government Meteorological Office under the superintendence of Prof. Mohn, at Christiania. If another proof of confirmation were wanting, it has been furnished by Mr. Wiggins, of Sunderland, who this summer also navigated through the Kara Sea as far as the mouth of Obi.

As to the sea between Novaya Zemlya and Spitzbergen, the very first time in our days its navigation was attempted, namely, by Weyprecht and Payer in 1871, it was found navigable even in a small sailing vessel of forty tons up to 79° N. lat., and in the eastern half of it no ice whatever was met with. The experience of their last expedition in 1872 certainly has been the reverse, as they encountered much and dense ice, at least in the direction of Cape Nassau; but it would lead to erroneous conclusions, if it were not taken into account that the Norwegians at

the same time found the western half of that sea quite free of ice.

I am not going to make any remark upon the late Austrian expedition, as its results and observations are not sufficiently before us, but I am authorised by a letter of Lieut. Weyprecht, the nautical commander, dated the 1st November, to state that, before he has published his extensive observations, he warns against all premature conclusions, and concludes the letter which I shall publish in the next part of the *Mittheilungen*, and in which he expresses his own views on the arctic question for the first time, with the sentence "that he considers the route through the Siberian Sea as far as Behring Strait as practicable as before, and would readily take the command of another expedition in the same direction."

I believe myself that the navigability of the seas to the north of Novaya Zemlya can as little be called in question by this one drift of the Austrian expedition, as the navigability of Baffin's Bay by the drifts of De Haven, M'Clintock, and the crew of the *Polaris*. These drifts by no means prevent others from penetrating the same seas.

And here I may be allowed to refer in a few words to the other end of this route, the seas north of Behring Strait. Capt. Cook in 1778, and his second in command, Capt. Clerke, in 1779, believed to have reached the extreme limit of navigation by attaining Icy Cape (in $70\frac{1}{2}^{\circ}$ N. lat.) on the American, and North Cape (in 69° N. lat.) on the Asiatic side, and they considered further attempts there as madness as well as to any practical purpose useless. Capt. Beechey, however, with his lieutenant, the present Admiral Sir Edward Belcher, penetrated already in 1826 as far as Point Barrow, and expressed the result of his experience in the weighty sentence: "I have always been of opinion that a navigation may be performed along any coast of the Polar Sea that is continuous."* And, true enough, many a follower has sailed along the whole of the northernmost coast of America, though exposed to the pressure of the immense pack-ice masses from the north impinging upon these coasts. Capt. Kellett, with the *Herald*, a vessel not intended for ice navigation, penetrated in 1849 with ease to $72^{\circ} 51'$ N. lat. into the Polar Sea so much dreaded by Cook and Clerke, discovered Herald Island, and what is now called by some Wrangel Land, and found the ice not at all so formidable as supposed previously. Going over the similar experience of Collinson, Maclure, Rodgers, and others, we come to the time when the Americans established a highly profitable whale fishery in seas considered entirely useless by Cook and Clerke, gaining as much as \$8,000,000 in two years. It was in one of these years that a shipmaster went as far as 74° N. lat., nearly due north of Herald Island, and saw peaks and mountain ranges far to the northward of his position. Another, Capt. Long, went a considerable distance along the Siberian coast to the west, and did more in a few days with a sailing vessel than Admiral Wrangel had been able to accomplish with sledges in winter in the course of four years, in the same region. In a letter dated Honolulu, 15th January, 1868, he says:—"That the passage from the Pacific to the Atlantic Ocean will be accomplished by one of the routes I have indicated I have as much faith in as I have in any uncertain event of the future, and much more than I had fifteen years ago in the success of the Atlantic Telegraph. Although this route will be of no great importance to commerce as a transit from one ocean to the other, yet could the passage along the coast as far as the mouth of the Lena be successfully made every year (which I think probable) it would be of great benefit in developing the resources of Northern Siberia." †

To the north-east of Spitzbergen, also, an interesting cruise was recently made by Mr. Leigh Smith, who in 1871, with only a sailing schooner of 85 tons, reached as far as $27^{\circ} 25'$ E. of Greenwich in $80^{\circ} 27'$ N. lat., 4° of longitude further than any authenticated and observing navigator before him. At this point he had before him to the east—consequently in the direction of the newly-discovered Franz-Joseph Land—nothing but open water on the 6th of September, 1871, as far as the eye could reach.

That land would be found in the locality where the Austrian Expedition actually found it, I have long predicted. Gillis Land, after Keulen's map generally considered to be situated in 80° N. lat., 30° E. long., by the Swedish explorers erroneously put down in 79° N. lat., I have from the original text concluded to be in $81\frac{1}{2}^{\circ}$ N. lat. and 37° E. long. Greenwich. This approaches

to within eighty nautical miles of Franz-Joseph Land, which was sighted westward as far as 46° E. long.; but in this longitude there was not as yet any limit of the land. The flight of immense numbers of brent-geese and other birds in the same direction has long been observed by various voyagers, and it has also been noticed that not only migrations of birds but also of mammals take the same direction; the Norwegian fishermen on the north of Spitzbergen have repeatedly caught immense numbers of walrus and ice-bears at the Seven Islands, and especially on their north-eastern side, whereas at Spitzbergen the walrus is now very scarce and the ice-bear almost extinct.

I consider it also highly probable that that great arctic pioneer and navigator William Baffin may have seen the western shores of Franz-Joseph Land as long ago as 1614, for in that year he proceeded to 81° N. lat., and thought he saw land as far as 82° to the north-east of Spitzbergen (which is accordingly marked in one of Purchas's maps.* It is true the account of this voyage is very meagre, but so is the account of his voyage and still greater discovery of Baffin's Bay two years after, which Sir John Barrow calls "the most vague, indefinite, and unsatisfactory," and on his map leaves out Baffin's Bay altogether, and this, be it observed, in the year 1818! † Barrington and Beaufoy, though inserting Baffin's discoveries in their map dated March 1, 1818, describe them in the following words:—"Baffin's Bay, according to the relation of Mr. Baffin in 1616, but not now believed!" With Barents's important voyages and discoveries it is exactly the same. The Russians, who only navigated as far as Cape Nassau, also tried to erase Barents's discoveries from the map and cut off the north-eastern part of Novaya Zemlya altogether. ‡ But old Barents has been found more trustworthy and correct than all the Russian maps and pilots put together. Even the identical winter hut of that great Dutch navigator, nearly 300 years old, has been found by the Norwegian Capt. Carlsen on Sept. 9, 1871, and many interesting relics brought home by him; so that the truth and correctness of those famous old Dutch voyages has been proved beyond all doubt. In like manner, Baffin's voyage to within sight of the western shores of Franz-Joseph Land may be considered trustworthy until some substantial proof of the contrary is brought forward. Nay, it even appears to me that the report given of another remarkable voyage of a Dutch navigator, Cornelis Roule, merits attention and is to be considered in the same way as Baffin and Barents; so that if it be as true as the voyages of these navigators, it may yet be found that Franz-Joseph Land was already discovered and sailed through up to $74\frac{1}{2}^{\circ}$ or 75° N. lat. nearly 300 years ago. This report runs thus:—"I am informed with certainty that Capt. Cornelis Roule has been in $84\frac{1}{2}^{\circ}$ or 85° N. lat. in the longitude of Novaya Zemlya, and has sailed about forty miles between broken land, seeing large open water behind it. He went on shore with his boat, and from a hill it appeared to him that he could go three days more to the north. He found lots of birds there and very tame." § Now, the main longitude of Novaya Zemlya is 60° E. Greenwich, and passes right through Austria Sound and Franz-Joseph Land; the latter is a "broken land" also, behind which Lieut. Payer saw "large open water," and found "lots of birds!"

Be this as it may, we now come to Sir Edward Parry's voyage north of Spitzbergen, regarding which it is an undoubted fact that he reached $82^{\circ} 45'$ N. lat., the furthest well authenticated point yet reached by any navigator, and a feat unsurpassed to this day.

There is, however, no doubt that the northern coast of Spitzbergen lies just in the teeth of one of the most formidable ice-currents, and one that summer and winter is sweeping its ice masses just towards these coasts. If, therefore, an English expedition should take Spitzbergen as a basis to start from, it would require two vessels, one of which ought to go up the west coast, the other up the east coast; for when northerly and westerly winds prevail, the first vessel would probably be hampered by ice, and the second vessel find it navigable up the east coast, and if easterly and southerly winds prevailed, the reverse would be the case.

* Barrington and Beaufoy, pp. 40 and 41.

† Barrow, "Chronological History," p. 216 and map.

‡ This was actually attempted by a pilot of the "Russian Imperial Marine," and found its way also into vol. viii. of the Journal of the R. G. S., p. 411, where the map is spoken of as "showing the actual outline of its works, as traced by the pilot Ziwalka, from the latest examinations, by which it will be seen that more than the eastern half represented on our maps has no existence in reality!"

§ Wilsen, N. and O. Tartarye, folio 1707, 2 decl., p. 920. See also Proc. R. G. S. ix. p. 178.

* Beechey: Voyage, vol. ii. p. 297.

† Nautical Magazine, 1868, p. 242.

It is by way of Smith Sound, however, that navigation has hitherto been pushed furthest, and here an English expedition, so long projected, may well operate. At the same time the east coast of Greenland seems still worthy of attention. The second German expedition did not proceed far to the north, it is true, but it was easy enough to reach the coast, and Lieut. Payer told me this was merely something like a "cab drive." Capt. Gray, of Peterhead, a most experienced arctic navigator, wrote already in 1868 thus:—"Having for many years pursued the whale fishery on the east coast of Greenland, and observed the sides, the set of currents, and the state of the ice in that locality at various seasons of the year, I think that little if any difficulty would be experienced in carrying a vessel in a single season to a very high latitude, if not to the pole itself, by taking the ice at about the latitude of 75°, where generally exists a deep bight, sometimes running in a north-west direction upwards of 100 miles towards Shannon Island, from thence following the continent of Greenland as long as it was found to sound in the desired direction, and afterwards pushing northwards through the loose fields of ice which I shall show may be expected to be found in that locality. The following are the reasons on which that opinion is founded:—In prosecuting the whale fishery in the vicinity of Shannon Island there are generally found loose fields of ice, with a considerable amount of open water, and a dark water sky along the land to the northward; the land water sometimes extending for at least fifty miles to the eastward; and, in seasons when south-west winds prevail, the ice opens up very fast from the land in that latitude. The ice on the east coast of Greenland is what is termed field or floe ice, the extent of which varies with the nature of the season; but it is always in motion, even in winter, as is proved by the fact that ships beset as far north as 78° have driven down during the autumn and winter as far south as Cape Farewell. Thus there is always the means of pushing to the northward by keeping to the land ice, and watching favourable openings."

And quite recently, in communicating the result of his experience the present year, he writes:—"During the past season I had too many opportunities of observing the drift of the ice. In May, June, July, and August, its average drift was fully fourteen miles a day; in March and April it must have been driving double that rate. I calculate that nearly the whole of the ice was driven out of the arctic basin last summer. I went north to 79° 45' in August, and found the ice all broken up, whereas down in 77° the floes were lying whole in the sea, clearly showing that the ice in 80° must have been broken up by a swell from the north, beyond the pack to the north, which I could see over; there was a dark water sky reaching north until lost in the distance, without a particle of ice to be seen in it. I was convinced at the time, and so was my brother, that we could have gone up the pole, or at any rate far beyond where anyone had ever been before. I bitterly repeat that I did not sacrifice my chance of finding whale and make the attempt, although my coals and provisions were wearing down. Although I have never advocated an attempt being made to reach the pole by Spitzbergen, knowing well the difficulties that would have to be encountered, my ideas are now changed from what I saw last voyage. I am now convinced that a great advance towards the pole could occasionally be made without much trouble or risk by Spitzbergen, and some of our amateur navigators will be sure to do it and pluck the honour from the Royal Navy. I do not know if the *Eclipse* will be sent to the Greenland whale fishery next year; if I go I shall be able to satisfy myself more thoroughly as to the clearing out of the ice this year, because it will necessarily be of a much lighter character than usual."

If this important information should be considered worthy the attention of the British geographers and the Admiralty, there would, perhaps, be two steamers sent out to make success doubly certain, one to proceed up the west coast of Greenland by way of Smith Sound, the other up the east coast of Greenland.

But whatever may be decided on, I trust that the British Government will no longer hold back to grant what all geographers and all scientific corporations of England have been begging for these ten long years, and afford the means for a new effective expedition to crown these, our modest endeavours, of which I have given an outline. We in Germany and Austria have done our duty, and I am happy to have lived to see that our humble endeavours, the work of our arctic explorers, have

gained your approbation—that of the Royal Geographical Society of Great Britain. We have done all we could in the private manner we had to do it; for, as a nation, we Germans are only now beginning to turn our attention to nautical matters. We have had no vessels, no means, and our Government has had to fight three great wars these ten years. But, nevertheless, we have had in this interval German, Austrian, American, Swedish, Norwegian, Russian polar expeditions, of which even an Italian officer took part at the instance of the Italian Government. And England, formerly always taking the lead in these matters, is almost the only maritime power that has kept aloof. When, nearly thirty years ago, one man of science proposed that magnetical observations should be extended, it was at once answered by the Government then by sending out to the antarctic regions an expedition of two vessels, the *Erebus* and *Terror* , under that great navigator, Sir James Clarke Ross, which has never yet been eclipsed as to the importance of its results and the lustre it shed on the British Navy. I do not know the views held in England now, but I know that to us outsiders the achievements and work of a man like Sir James Clarke Ross or Livingstone has done more for the prestige of Great Britain than a march to Coomassie, that cost nine millions of pounds sterling. That great explorer, Livingstone, is no more; his work is going to be continued and finished by German and American explorers; we shall also certainly not let the arctic work rest till it is fully accomplished, but it surely behoves Great Britain now to step in and once more to take the lead.

AUGUSTUS PETERMANN,
Hon. Cor. Member and Gold Medallist,

Gotha, Nov. 7, 1874

Royal Geographical Society.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, Nov. 4.—Dr. Odling, president, in the chair.—The following papers were read:—On methyl-hexyl-carbinol, by Dr. C. Schorlemmer; On the action of organic acids and their anhydrides on the natural alkaloids, Part I, by Dr. C. R. A. Wright; On the action of bromine in the presence of water on bromopyrogallol and on bromopyrocatechin, by Dr. J. Stenhouse; The action of baryta on oil of cloves, by Prof. A. H. Church; Observations on the use of permanganate of potash in volumetric analysis, and on the estimation of iron in iron ores, by Mr. E. A. Parnell; Further researches on bilirubin and its compounds, by Dr. J. L. W. Thudichum.

Zoological Society, Nov. 3.—Dr. A. Günther, F.R.S., vice-president, in the chair.—The secretary read a report on the additions that had been made in the Society's menagerie during the months of June, July, August, and September, 1874.—Mr. Slater gave an account of some visits he had recently made to several zoological gardens and museums in France and Italy, and made remarks upon some of the principal objects noticed therein.—Mr. G. Dawson Rowley exhibited and made remarks upon some rare birds from New Zealand, amongst which were fine examples of *Apteryx haastii*, and a living pair of *Sceloglaux albifacies*.—Mr. A. R. Wallace exhibited some rhinoceros horns obtained in Borneo by Mr. Everett, proving that this animal was still found living in that island.—Mr. J. Gould exhibited a new parrot, of the genus *Aprosmictus*, recently obtained on the Darling Downs, in Queensland. Mr. Gould proposed to call this bird *Aprosmictus insignissimus*.—A letter from Mr. Swinhoe was read respecting some bats obtained by him at Ningpo.—A communication was read from M. L. Taczanowski, conservator of the museum at Warsaw, in which he gave a list of the birds collected by M. Constantine Jelski in the central part of Western Peru. Amongst these were eighteen species described as new to science.—A communication was read from Mr. Frederick Moore, giving descriptions of some new Asiatic Lepidoptera.—A communication was read from Mr. George Gulliver, containing measurements of the red corpuscles of the blood of *Hippopotamus amphibius*, *Olaria jubata*, and *Tricheus rosmarus*.—Mr. R. Bowdler Sharpe read a paper entitled "Contributions to a history of the Accipitres, or birds of prey." The first of this series contained notes on the females of the common and South African kestrels.—A communication was read from Mr. Henry Adams, giving the descriptions of some new species of shells from various localities, also of a new genus of Bivalves from Mauritius.—Mr. A. H. Garrod read a paper on points in the anatomy of the parrots which bear on the classification of the sub-order. This

* Proc. R. G. S., vol. xii. p. 197

† Letter of Capt. David Gray to Mr. Leigh Smith, dated Peterhead, Sept. 27, 1874.