

Thos. Pecker

American Geographical and Statistical Society.

ACCESS AB 8371

TO AN

OPEN POLAR SEA

IN CONNECTION WITH

THE SEARCH AFTER SIR JOHN FRANKLIN AND
HIS COMPANIONS,

BY

E. K. KANE, M. D.,

PAST ASSISTANT SURGEON IN THE U. S. NAVY.

READ BEFORE THE AMERICAN GEOGRAPHICAL AND STATISTICAL SOCIETY
AT ITS REGULAR MONTHLY MEETING, DEC. 14, 1852.

[Reprinted from the Second Bulletin of the Society.]

NEW YORK:
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1853.

CIRCUMPOLAR CHART

illustrating

KANE'S PAPER

ON
ACCESS TO AN OPEN
POLAR SEA.

Projected from
PETERMANN, BERGHAUS

AND MATERIALS

in the

BRITISH

HYDROGRAPHIC OFFICE.

E. K. K.



NOTE.

- Limit of Forests.....
- Forests.....
- Destitute of Trees.....
- Approximate Area of Ice.....

NOTE.

- Simple numerals denote Temperatur of Air..... 25
- Emphatised " " " " Surface Water..... 25
- Fathoms..... f.
- Stations..... s.

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THE OPEN POLAR SEA.

THE north pole, the remote northern extremity of our earth's axis of rotation, is regarded, even by geographers, with that mysterious awe which envelops the inaccessible and unknown.

It is shut out from us by an investing zone of ice ; and this barrier is so permanent, that successive explorers have traced its outline, like that of an ordinary seacoast.

The early settlements of Iceland, and their extension to Greenland, as far back as 900 A. D., indicated a protruding tongue of ice from the unknown north, along the coast of Greenland. I must express a doubt if the early voyages of Cabot and Frobisher and the Corte-reals did more than establish detached points of this line of ice. The voyages, however, of the Basque and Biscayan fishermen, about 1575, to Cape Breton, made us aware of a similar ice raft along the coasts of Labrador to the north ; and the commercial routes of the old Muscovy company aided by the Dutch and English whalers, extended this across to Spitzbergen, and thence to the regions north of Archangel in the Arctic seas. The English navigators of the days of Elizabeth, the " notable

worthys of the Northe Weste Passage," spoke of a similar ice-raft up Baffin's and Hudson's Bays, and the Russo-Siberians gave us vaguely a girding line of ice ; which protruded irregularly from the Asiatic and European coasts into the Polar Ocean. Lastly, Cook proved that the same barrier continued across Behring's Straits as high as $70^{\circ} 44'$ north.

From all this it appeared that the approaches to the pole were barricaded with solid ice. We owe to the march of modern discovery, especially stimulated by the search after its great pioneer, Sir John Franklin, our ability accurately to define nearly all the coasts of a great polar sea, if not to lay down the no less interesting coast of a grand continuous ice-border, that encircles it.

I have prepared for the inspection of the Society, a diagram or chart, which will show the completeness with which these may now be delineated.

It is worthy of remark, that this ice, although influenced by winds, currents, and deflecting land masses, retains through the corresponding period of each successive year, a strikingly uniform outline.

During the winter and spring, from October to May, or eight months of the year, it may be found traveling down the coast of Labrador almost to Newfoundland, blockading the approaches into Hudson's Bay, and cementing into one great mass the numberless outlets which extend from it and Baffin's Bay to the unknown coasts of the north.

Influenced by the earth's rotation, this ice accumulates towards the westward, leaving an uncertain passage along the eastern waters of Baffin's Bay ; after which it resumes its march along the eastern coast of Greenland, shutting in that extensive region appropriated to the

interesting legend, or that meteorological myth, as it has been designated by Humboldt, of "Lost Greenland." Its next course is to the northeast, sometimes enveloping Iceland; and thence, extending to the east by Jan Meyen's Land and Spitzbergen, it crosses the meridian of Greenwich at some point between the latitudes of 70° and 73° .

I now call your attention to a remarkable feature in this great ice coast-line. Upon reaching a longitude of about 70° east, it suddenly turns towards the north, forming a marked indentation as high as latitude 80° ; then coming again to the south east until it reaches Cherie Island, it continues on with a varying line to the unexplored regions north of Nova Zembla.

This indentation or sinuosity, best known as the old "Fishing Bight" of the Greenland seas, is undoubtedly due to the thermal influences of the Gulf Stream. We know that the coasts of Nova Zembla feel the influences of its waters; and Petermann and many others, guided by the projected curves of Dove, suppose that its heated current is deflected by that peninsula, so as to impress the polar ice to a greater degree of northing than on any other part of our globe.

It would be important to the objects of my communication, that I should trace this ice throughout its entire extent; but I have not the means of doing so with exactness. Barentz, in 1596, was arrested by ice in latitude $77^{\circ} 25'$ upon the meridian of 70° east. Pront-schitscheff met the same rebuff at the same height, thirty degrees further west (100° east.) Anjou, Matieuschin, and Wrangell found it in a varying belt along the Asiatic coast, at farthest but fifty miles in width.

The enterprise of our American whalers has also

traced this ice across Behring's Straits, as high as latitude $72^{\circ} 40'$; and it is probable that Herald Island, in latitude $71^{\circ} 17'$, is a part of a great island chain, continued from Cape Yacan to Banks' Land and the Parry Islands; an archipelago, whose northern faces are yet unexplored, but which undoubtedly serves as a cluster of points of ice cementation, and abounds more or less with polar ice at all seasons of the year.

We have now followed, throughout its entire circuit, this immense investing body. The circumpolar ice, as I will venture to name it, may be said to bound an imperfect circle of 6,000 miles in circumference with a rude diameter of 2,000 miles, and an area, if we admit its continuity to the pole, one-third larger than the continent of Europe.

But theory has determined that this great surface is not continuous. It is an annulus, a ring surrounding an area of open water,—the Polynya, or Iceless Sea.

Polynya is a Russian word, signifying an open space; and it is used by the Siberians to indicate the occasional vacancies which occur in a frozen water-surface. Although such a vacancy as applied to a polar sea is generally recognized to exist, it is right for me to state that this opinion is not based upon the results of exploration. It is due rather to the well elaborated inductions of Sabine and Berghaus and, especially, of our accomplished American hydrographer, Lieutenant Maury. The observations of Wrangell and Penny, and still more lately of Captain Inglefield, although strongly confirmatory, were limited to a range of vision in no instance exceeding fifty miles, and were subject to all the deceptions of distance. As, however, the arguments in favor of the existence of such a sea are of the highest interest to

future geographical research, and so far as I am aware have never yet been grouped together, I shall take the liberty of presenting them to the Society.

The North Polar Ocean is a great mediterranean, draining the northern slopes of three continents, and receiving the waters of an area of 3,751,270 square miles. Indeed, the river systems of the Arctic Sea exceed those of the Atlantic.

The influences of congelation too, aided by the diminished intensity and the withdrawal of the solar ray, increase the atmospheric precipitation, and probably diminish the compensating evaporation. Yet this position calls for further investigation to establish it absolutely; for recent experiments show, that even in the dark hours of winter, and at temperatures of fifty degrees below zero, evaporation goes on at a rapid rate; that it holds, however, in general terms, is evident from the inferior specific gravity of the Arctic waters. They are less salt than those of more equatorial regions. Their average specific gravity (1.0265) indicates about 3.60 per cent. of saline matter.

The atmospheric precipitation extending to the adjacent land slopes, the melting of the snows and accumulated glacial material, and the floods of the great Siberian rivers, are sufficient to account for this.

With such sources of supply, it is evident that this surcharged basin must have an outlet, and its contents a movement independent of the laws of currents generally operative, which would determine them toward the Equator.

The avenues of entrance to and egress from the polar basin, are but three; Behring's Straits, the estuaries of Hudson's and Baffin's Bays, and the interval between

Greenland and Norway, upon the Atlantic Ocean, known as the Greenland Sea. In Behring's Straits, it is probable, from imperfect observations, that the surface current sets during a large portion of the year from the Pacific into the Arctic Sea, with a velocity varying from one to two and a half knots an hour. Neither the soundings nor the diameter of this Strait indicate any very large deep-sea discharge in the other direction.

The Gulf Stream, after dividing the Labrador current, has been traced by Professor Dove to the upper regions of Novaia Zemlia; so that Baffin's Bay and the Hudson and Greenland seas, constitute the only uniform outlet to the polar basin.

It is by these avenues, then, that the enormous masses of floating ice, with the deeply immersed berg, and the still deeper belt of colder water, are conveyed outward. Underlying the Gulf Stream, whose waters it is estimated at least to equal in volume, the vast submerged icy river flows southward to the regions of the Carribean. The recent labors of the U. States Coast Survey and Nautical Observatory have, as the Society is aware, developed and confirmed the previously broached idea of a compensating system of polar and tropical currents; and we are prepared to consider these colder streams, as equalizers to the heated areas of the tropical latitudes, and analogous in cause and effect to the recognized course of the atmospheric currents.

In fact, Dove, Berghaus, and Petermann, three authorities entitled to the highest respect, recognize for the Arctic Ocean a system of revolving currents, whose direction during summer is from north to south, and during winter the reverse, or from the south to the north. The isotherms of Lieut. Maury (projected by

Prof. Flye) point clearly to the same interesting result. Contrasting these great movements of discharge and supply with the surface actions, we find during the summer months, a movement along the northern coasts of Russia, clearly from east to west, from Novaia Zemlia westwardly and south-westwardly to Spitzbergen, where, after an obscure bifurcation, it is met by a great drift from the north, and carried along the coast of Greenland, in a large body known as the East Greenland current. The observations collected by Lieut. Commanding De Haven, show that this stream is deflected around Cape Farewell, passing up the Greenland coast to lat. $74^{\circ} 76'$; where, after coming to the western side of the bay, it passes along the eastern coast of America, even to the capes of Florida. During the winter, when the great rivers of Siberia and America lose their volume by the action of the frost, a current has been noted from the Faroe Islands, north and east, along the Asiatic coast, towards Behring's Straits. And then it is, that the great surface ice, formed upon the coasts of Asia, gives place to a warmer stream, and the heated waters of the Gulf Current bathe and temper the line of the Siberian coast.

All these facts go to prove that the polar basin is not only the seat of an active supply and discharge, but of an intestine circulation independent of either; while the inter-communication of the whales (*B. Mysticetus*), between the Atlantic and Pacific, as shown by Maury, proves directly that the two oceans are united.

Admitting the important fact of a moving, open sea, the recognized equalization of temperatures attending upon large water masses, follows of course. But, is the Arctic Sea, in fact, an unvaried expanse of water? For, if it be not, the excessive radiation and other disturbing

influences of land upon general temperature, are well known. It is, I think, an open sea. And an argument may be deduced for this belief from the icebergs. The iceberg is an offcast from the polar glacier, and needs land as an essential element in its production—as much so as a ship the dockyard on which she is built, and from which she is launched. From the excessive submergence of these great detached masses, they may be taken as reliable indices of the deep-sea currents, while their size is such that they often reach the latitudes of the temperate zone before their dissolution. Now, it is a remarkable fact, that these huge ice-hulks are confined to the Greenland, Spitzbergen, and Baffin seas. Throughout the entire circuit of the Polar Ocean, almost seven thousand miles of circumscribing coast, we have but forty degrees which is ever seen to abound in them.

A second argument, bearing upon this, is found in the fact, that a large area of open water exists, between the months of June and October, in the upper parts of Baffin's Bay. This mediterranean Polynya is called by the whalers, the North Water. After working through the clogging ice of the intermediate drift, you pass suddenly into an open sea, washing the most northern known shores of our continent, and covering an area of 90,000 square miles.

The iceless interval is evidently caused by the drift having traveled to the south without being reinforced by fresh supplies of ice; and the latest explorations from the upper waters of this bay speak of avenues thirty-six miles wide extending to the north and east, and free.

The temperature of this water is sometimes 12° above the freezing point; and the open bays or sinuosities, which often indent the Spitzbergen ice as high as 81°

N. lat. have been observed to give a sea-water temperature as high as 38° and 40° , while the atmosphere indicates but 16° above zero.

But besides these, we have arguments growing out of the received theories of the distribution of temperature upon the surface of the earth.

The actual distribution of heat in this shut-out region can only be inferred.

The system of Isothermals, projected by Humboldt upon positive data, ceased at 32° ; and the views of Sir John Leslie (based upon Mayer's theorem), that the north pole was the coldest point in the Arctic regions, have, as the members are aware, since been disproved.

Sir David Brewster, by a combination of the observations of Scoresby, Gieseke, and Parry, determined the existence of two poles of cold, one for either hemisphere, and both holding a fixed relation to the magnetic poles. These two seats of maximum cold are situated respectively in Asia and America, in longitudes 100° west and 95° east, and *on the parallel of* 80° . They differ about five degrees in their mean annual temperature; the American, which is the lower, giving three degrees and a half below zero. The Isothermals surround these two points, in a system of returning curves, yet to be confirmed by observation; but the inference which I present to you without comment or opinion, is, that to the north of 80° , and at any points intermediate between these American and Siberian centers of intensity, the climate must be milder, or more properly speaking, the mean annual temperature must be more elevated.

Petermann, taking as a basis the data of Professor Dove, deduces a movable pole of cold, which in January is found in a line from Melville Island to the River Lena,

and, gradually advancing with the season into the Atlantic Ocean, recedes with the fall and winter to its former position. Such a movement is clearly referable to the summer land currents with their freight of polar ice.

With the consolidation of winter, the ice recedes, and the Gulf Stream enters more perceptibly into the far north. The mean temperature of the northeast coast of Siberia is forty or fifty degrees colder than that of the western shores of Novaia Zemlia, while in July it is twenty degrees higher.

But, if any point between 75° and 80° N. lat., a range sufficiently wide to include all the theories, be regarded as the seat of the greatest intensity of cold, we may perhaps infer the state of the Polar Sea from the known temperatures of other regions, equally distant with it from this supposed center; though, as the lines of latitude do not correspond with those of temperature, this must be done with caution.

I have been interested for some time in examining this class of deflections; and I find that they point to some interesting conclusions as to the fluidity of the region about the pole, and its attendant mildness of weather.

Thus, for instance, at Cherie Island, surrounded by moving waters, but in a higher latitude than Melville Island, the seat of the greatest observed mean annual cold, the temperature was found so mild throughout the entire Arctic winter, that rain fell there upon Christmas day.

Barentz, a most honest and reliable authority, speaks of the increasing warmth as he left the land to the north of 77° . The whalers north of Spitzbergen, confirm the saying of the early Dutch that the "Fisher-man's Bight" is as pleasant as the sea of Amsterdam.

Egedesminde and Rittenback, two little Danish and Esquimaux settlements on the west coast of Greenland, in lat. 70° , with a climate influenced by adjacent land masses, but, nevertheless, not completely ice-bound, have a mean annual temperature of , and are in the isothermal curve, (summer curve), of 50° ; giving us a vegetation of coarse grasses, and a few crucifers.

In West Lapland, as high as 70° , barley has been and I believe is still grown; though here is its highest northern limit. If 80° be our center of maximum cold, the pole, at 90° , is—at the same distance from it as this West Lapland limit of the growth of barley!

But there are other arguments based upon known facts, and facts popularly recognized, bearing upon the theory of an open sea:

THE MIGRATIONS OF ANIMAL LIFE. At the utmost limits of northern travel attained by man, hordes of animals of various kinds have been observed to be traveling still further.

The Arctic zone, though not rich in species, is teeming with individual life, and is the home of some of the most numerous families known to the naturalist. Among birds, the swimmers, drawing their subsistence from open water, are predominant; the great families of ducks, *Awks*, and procellarine birds (*Anatinæ*, *Alcinæ*, and *Procellarinæ*), throng the seas and passages of the far North, and even incubate in regions of unknown northernness. The eider duck has been traced to breeding grounds as high as 78° in Baffin's Bay, and in conjunction with the brent goose, seen by us in Wellington Channel, and the loon and little awk, pass in great flights to the northern waters beyond. The mammals of the sea—the huge cetacea, in the three great families,

Belinidæ, *Delphinidæ*, and *Phocidæ*, represented by the whales; the narwhal and the seal, as well as that strange marine pachyderm, the tusky walrus, all pass in *schools* towards the northern waters. I have seen the white whale (*Delphinapterus Beluga*), passing up Wellington Channel to the north for nearly four successive days, and that, too, while all around us was a sea of broken ice.

So with the quadrupeds of this region. The equatorial range of the polar bear (*U. Maritimus*), is misconceived by our geographical zoologists. It is further to the north than we have yet reached; and this powerful beast informs us of the character of the accompanying life, upon which he preys.

The ruminating animals, whose food must be a vegetation, obey the same impulse or instinct of far northern travel. The reindeer (*Cervus Terandus*), although proved by my friend Lieut. McClintock to winter sometimes in the Parry group, outside of the zone of woods, comes down from the north in herds as startling as those described by the Siberian travelers, a "moving forest of antlers."

The whalers of North Baffin's Bay, as high as 75°, shoot them in numbers, and the Esquimaux of Whale Sound, 77°, are clothed with their furs. Five thousand skins are sent to Denmark from Egedesminde and Holssteinberg alone.

Before passing from this branch of my subject, I must mention also that the polar drift-ice comes first from the north. The breaking up, the thaw of the ice-plain, does not commence in our so called warmer south, but in regions to the north of those yet attained. Wrangell speaks of this on the Asiatic seas, Parry above Spitzber-

gen; and my friend Capt. Penny, shrewd, bold, and adventurous, confirms it in his experience of Wellington Sound.

In addition to all this, we have the observations of actual travel; although this, confirmatory as it is, must, like the theoretical views, be received with caution. Barentz saw an opening water beyond the northernmost point of Europe; Anjou the same beyond the Siberian Bear islands; and Wrangell, in a sledge journey from the mouth of the Kolyma, speaks of a "vast illimitable ocean," illimitable to mortal vision.

To penetrate this icy annulus, to make the "north-west passage" the northeast passage, to reach the pole, have been favored dreams since the early days of ocean navigation. Yet up to this moment, complete failure has attended every attempt. One voyager, William Scoresby, known to the scientific world for the range and exactness of his observation, passed beyond the latitude of $81^{\circ} 30'$. But after discarding the apochryphal voyages of the early Dutch, whose imperfect nautical observation rendered entirely unreliable their assertions of latitudes, we have the names of but two who may be said to have attained the parallel of 82° ; Heindrich Hudson in 1607, and Edward Parry in our own times.

This latter navigator felt that the sea, ice-clogged with its floating masses, was not the element for successful travel, and with a daring unequalled, I think, in the history of personal enterprise, determined to cross the ice upon sledges. The spot he selected was north of Spitzbergen, a group of rocks called the Seven Islands, the most northern known land upon our globe. With indomitable resolution he gained within 435 miles of his mysterious goal, and then, unable to stem the rapid drift to the southward, was forced to return.

But the question of access to the Arctic pole—the penetration to this open sea—is now brought again before us, not as in the days of Hudson and Scoresby and Parry, a curious problem for scientific inquiry, but as an object claiming philanthropic effort, and appealing thus to the sympathies of the whole civilized world—the rescue of Sir John Franklin and his followers.

The recent discoveries by the united squadrons of De Haven and Penny, of Franklin's first winter quarters at the mouth of Wellington Channel, aided by the complete proofs since obtained that he did not proceed to the east or west, render it beyond conjecture certain that he passed up Wellington Channel to the north.

Here we have lost him ; and, save the lonely records upon the tomb-stones of his dead, for seven years he has been lost to the world. To assign his exact position is impossible : we only know that he has traveled up this land-locked channel, seeking the objects of his enterprise to the north and west. That some of his party are yet in existence, this is not the place to argue. Let the question rest upon the opinions of those who, having visited this region, are at least better qualified to judge of its resources than those who have formed their opinions by the fireside.

The journeys of Penny, Goodsir, Manson, and Sutherland, have shown this tract to be a tortuous estuary, a highway for the polar ice-drift, and interspersed with islands, as high as latitude 77° ; beyond which they could not see. It is up this channel, that the searching squadron of Sir Edward Belcher has now disappeared, followed by the anxious wishes of those who look to it as the final hope of rescue. I regret to say, that after considering carefully the prospects of this squadron, I

have to confess that I am far from sanguine as to its success. It must be remembered, that Wellington Channel is all that has just been stated, tortuous, studded with islands, and a thoroughfare for the northern ice; and the open water sighted by Captain Penny is not to be relied on, either as extending very far, or as more than temporarily unobstructed. If we look up from the highlands of Beechy Head, fifty miles of apparently open navigation is all that we can assert certainly to have been attained by the searching vessels, and to reach the present known limits of the sound would require a progress in a direct line on their part of at least 130 miles.

They left, moreover, on the fifth of August; and early as this is there considered, and open as was the season, they have but forty days before winter cements the sea, or renders navigation impossible by clogging the running gear. By a fortunate concurrence of circumstances, the squadron of Sir Edward Belcher may do everything; but I must repeat that I am far from sanguine as to their success. The chances are against their reaching the open sea.

It is to announce, then, another plan of search that I am now before you; and as the access to the open sea forms its characteristic feature, I have given you the preceding outline of the physical characteristics of the region, in order to enable you to weigh properly its merits and demerits.

It is in recognition of the important office which American geographers may perform towards promoting its utility and success, that I have made the Society the first recipient of the details and outlines of my plan.

Henry Grinnell, the first president and now a vice-

president of this Society, has done me the honor of placing his vessel, the *Advance*, at my disposition ; and the Secretary of the Navy has assigned me to "special duty" for the conduct of the expedition.

My plan of search is based upon the probable extension of the land masses of Greenland to the far north—a view yet to be verified by travel, but sustained by the analogies of physical geography. Greenland, though looked upon by Giéseke as a congeries of islands cemented by interior glaciers, is in fact a peninsula, and follows in its formation the general laws which have been recognized since the days of Forster, as belonging to peninsulas with a southern trend. Its abrupt, truncated termination at Staaten-Hook is as marked as that which is found at the Capes Good Hope and Horn of the two great continents, the Comorin of Peninsular India, Cape South East of Australia, or the Gibraltar of southern Spain.

Analogies of general contour, which also liken it to southern peninsulas, are even more striking. The island groups, for instance, seen to the east of these southern points, answering to the Falkland Islands, Madagascar, Ceylon, New Zealand, the Bahamas of Florida, and the Balearics of the coast of Spain, are represented by Iceland off the coast of Greenland. It has been observed that all great peninsulas, too, have an excavation or bend inwards on their Western side, a "concave inflection" towards the interior. Thus, South America between Lima and Valdivia, Africa in the Gulf of Guinea, India in Cambaye, and Australia in the Bay of Nuyts, are followed by Greenland in the great excavation of Disco. Analogies of the same sort may offer, when we consider those more important features of relief so popularly yet so profoundly treated by Prof. Guyot.

Greenland is lined by a couple of lateral ranges, metamorphic in structure, and expanding in a double axis to the N. N. W. and N. N. E. They present striking resemblances to the Ghauts of India, being broken by the same great injections of greenstone, and walling in a plateau region where glacial accumulations correspond to those of the Hindostan plains.

The culmination of these peaks in series, indicates strongly their extension to a region far to the north. Thus from the South Cape of Greenland to Disco Bay, in lat. 70° , the peaks vary in height from 800 to 3,200 feet. Those of Pröven, lat. 71° , are 2,300, and those observed by me in lat. $76^{\circ} 10'$, gave sextant altitudes of 1,380 feet, with interior summits at least one-third higher.

The same continued elevation is observed by the whalers as high as 77° , and Scoresby noted nearly corresponding elevations on the eastern coasts, in lat. 73° . The coast seen by Inglefield, to the north of 78° , was high and commanding.

From these alternating altitudes, continued throughout a meridian line of nearly eleven hundred geographical miles, I infer that this chain follows the nearly universal law of a gradual subsidence, and that Greenland is continued farther to the north than any other known land. In the old continents the land slopes towards the Arctic Sea; but although in the new world the descent of the land generally is to the east, the law of the gradual decline of meridional chains is universal.

Believing, then, in such an extension of Greenland, and feeling that the search for Sir John Franklin is best promoted by a course which will lead directly to the open sea,—feeling, too, that the approximation of the

meridians would make access to the west as easy from Northern Greenland as from Wellington Channel, and access to the east far more easy,—feeling, too, that the highest protruding headland will be most likely to afford some trace of the lost party,—I am led to propose and attempt this line of search.

Admitting such an extension of the land masses of Greenland to the north, we have the following inducements for exploration and research.

1. Terra firma as the basis of our operations, obviating the capricious character of ice travel.

2. A due northern line, which, throwing aside the influences of terrestrial radiation, would lead soonest to the open sea, should such exist.

3. The benefit of the fan-like abutment of land, on the north face of Greenland, to check the ice in the course of its southern or equatorial drift, thus obviating the great draw-back of Parry in his attempts to reach the pole by the Spitzbergen Sea.

4. Animal life to sustain traveling parties.

5. The co-operation of the Esquimaux, &c. ; settlements of these people having been found as high as Whale Sound, and probably extending still further along the coast.

The point I would endeavor to attain would be the highest attainable seats of Baffin's Bay, from the sound known as Smith's Sound, and advocated by Baron Wrangell as the most eligible site for reaching the north pole.

As a point of departure it is two hundred and twenty miles to the north of Beechy Island, the starting point of Sir Edward Belcher, and seventy miles north of the utmost limits seen or recorded in Wellington Channel.

The party should consist of some thirty men, with a couple of launches, sledges, dogs, and gutta percha boats. The provisions to be pemmican, a preparation of dried meat, packed in cases impregnable to the assaults of the polar bear.

We shall leave the United States in time to reach the Bay at the earliest season of navigation. The brig furnished by Mr. Grinnell for this purpose, is admirably strengthened and fully equipped to meet the peculiar trials of the service. After reaching the settlement of Uppernavik, we take in a supply of Esquimaux dogs, and a few picked men to take charge of the sledges.

We then enter the ice of Melville Bay, and, if successful in penetrating it, hasten to Smith's Sound, forcing our vessel to the utmost navigable point, and there securing her for the winter. The operations of search, however, are not to be suspended. Active exercise is the best safeguard against the scurvy; and although the darkness of winter will not be in our favor, I am convinced that, with the exception, perhaps, of the solistitial period of maximum obscurity, we can push forward our provision depots, by sledge and launch, and thus prepare for the final efforts of our search.

In this I am strengthened by the valuable opinion of my friend, Mr. Murdaugh, late the sailing master of the *Advance*. He has advocated this very Sound as a basis of land operations. And the recent journey of Mr. William Kennedy, commanding *Lady Franklin's* last expedition, shows that the fall and winter should no longer be regarded as lost months.

The sledges, which constitute so important a feature of our expedition, and upon which not only our success but our safety will depend, are to be constructed with ex-

treme care. Each sledge will carry the blanket, bags, and furs of six men, together with a measured allowance of pemmican; a light tent of india-rubber cloth, of a new pattern, will be added; but for our nightly halt the main dependence will be the snow house of the Esquimaux. It is almost incredible, in the face of what obstacles, to what extent, a well organized sledge party can advance. The relative importance of every ounce of weight can be calculated, and the system of advanced depots of provisions organized admirably.

Alcohol or tallow is the only fuel; and the entire cooking apparatus, which is more for thawing the snow for tea-water than for heating food, can be carried in a little bag. Lieut. Mc Clintock, of Commander Austin's expedition, traveled thus 800 miles—the collective journeys of the expedition equaled several thousand; and Baron Wrangell made by dogs 1,533 miles in seventy-four days, and this over a fast frozen ocean.

But the greatest sledge journey upon record is that of my friend, Mr. Kennedy, who accomplished nearly 1,400 miles, most of it in mid-winter, without returning upon his track to avail himself of deposited provisions. His only food—and we may here learn the practical lesson of the traveler, to avoid unnecessary baggage—was pemmican, and his only shelter the *snow house*.

It is my intention to cover each sledge with a gutta percha boat—a contrivance which the experience of the English has shown to be perfectly portable. Thus equipped, we follow the trend of the coast, seeking the *open water*.

Once there, if such a reward awaits us, we launch our little boats, and, bidding God speed us, embark upon its waters.

GENTLEMEN OF THE SOCIETY—if I may be permitted particularly to address you—the resources of those whose philanthropy has fitted out this expedition, must be scrupulously appropriated to the single object of search. But this search is not merely a voyage of rescue; it appeals to the highest interests of scientific inquiry; but to physical geography especially.

A simple inspection of the proposed line of travel will show its peculiar availability for purposes of physical research.

In thermal science, it will connect and continue in series the observations instituted by the Danish Government on the lower coast of Greenland. Thus affording new and valuable data for the extension of the positive Isothermals, and the determination of the distribution of heat upon the surface of the globe.

In terrestrial magnetism, perhaps no spot could be found where an accurate registration would be more valuable. It is intermediate between the Asiatic and American Magnetic Poles, and on a meridian line bearing a uniform relation to each. The elements most wanting in the Gaussian formula might here be contributed largely, and additional light be thrown upon the great questions of the amount and direction of the earth's magnetic force.

So important are these objects, that Prof. Henry, with that liberal view of the objects of the Smithsonian Institution which has made it to be already recognized as fulfilling the just intentions of its founder, "the diffusion of knowledge among men," has volunteered, upon the contingency of future payment, to order the necessary instruments; and the Honorable John P. Kennedy, the Secretary of the Navy, himself a votary of science,

and possessing the rare abilities of reconciling its high interests with the duties of official station, has commended an organization of this branch of my approaching duties to the attention of Congress.

Such an organization it would be my pride to mature, and my labor to render effective. I ask from you such a co-operation as is due to the character of your learned body, and the importance of the interests which it has assumed to take under its charge.