

THE DUTCH IN THE ARCTIC SEAS



SAMUEL RICHARD VAN CAMPEN.

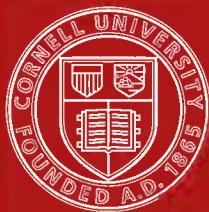
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THE DUTCH IN THE ARCTIC SEAS.

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MAP OF THE NORTH POLAR REGION

AFTER V. A. MALTE-BRUN, THE ADMIRALTY CHART, AND OTHER AUTHORITIES, SHOWING
THE SUGGESTED PRIMAL AND ALTERNATIVE ROUTES FOR A
DUTCH ARCTIC EXPEDITION,
AND ALSO DE PETERMANN'S SUPPOSED CONFIGURATION OF GREENLAND

BY
SAMUEL RICHARD VAN CAMPEN.
1876.



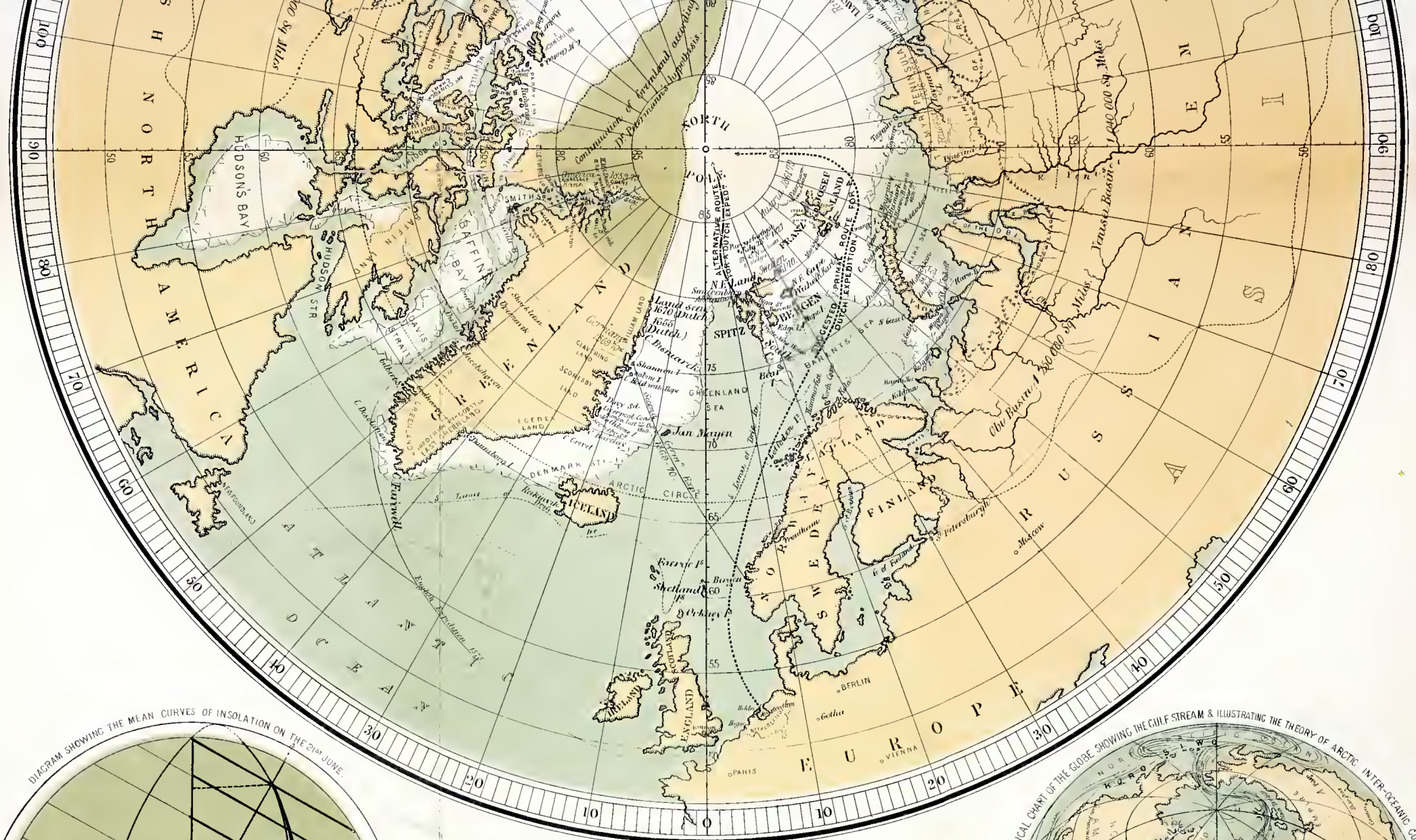
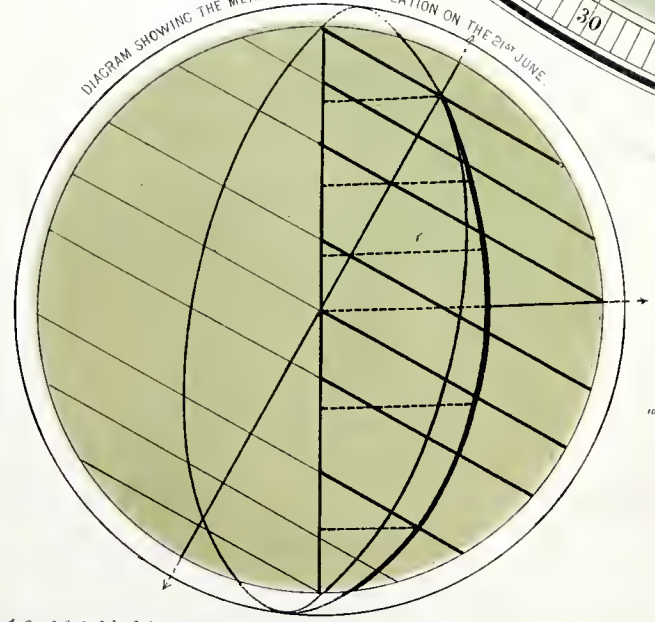


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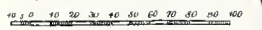


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Scale of English Miles 63-1"
(For Polar Map only)



Scale of English Miles. 63-1"
(For the Netherlands Map only)



ISOMETRICAL CHART OF THE GLOBE SHOWING THE GULF STREAM & ILLUSTRATING THE THEORY OF ARCTIC INTER-OCEANIC CURRENTS.



THE
DUTCH IN THE ARCTIC SEAS.

BY
SAMUEL RICHARD VAN CAMPEN,
AUTHOR OF "HOLLAND'S SILVER FEAST."

IN TWO VOLUMES.

With Illustrations, Maps, & Appendix.

VOL. I.

A DUTCH ARCTIC EXPEDITION AND ROUTE.



LONDON:
TRÜBNER & CO., LUDGATE HILL
1876.

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A

DUTCH ARCTIC EXPEDITION
AND ROUTE:

(BEING)

A SURVEY OF THE NORTH POLAR QUESTION,

INCLUDING

*EXTENDED CONSIDERATIONS FOR THE RENEWAL
OF DUTCH ARCTIC RESEARCH.*

BY

SAMUEL RICHARD VAN CAMPEN,

AUTHOR OF "HOLLAND'S SILVER FEAST."

With Map and Appendix.

LONDON:
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1876.

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TO THE
HONOURABLE BENJAMIN MORAN, F.R.G.S.,
UNITED STATES MINISTER AT LISBON,
IN RECOGNITION OF HIS PERSONAL KINDNESS,
HIS LONG AND VALUABLE PUBLIC SERVICES,
AND
HIS DEVOTION TO LITERATURE,

This Work

IS RESPECTFULLY INSCRIBED

BY

THE AUTHOR.

“ 't Erkentlijk Vaderland, door liefde en vreugd gedreven,
Neemt weer zijn kindren op, die uit den dood herleven ;
Vergeldt hen, juicht hen toe, strooit lauwren voor hen heen,
En reket d' uitslag niet, maar telt het doel alleen.”

TOLLENS.

“ . . . La Patrie, avec reconnaissance,
Prépare de ses fils la noble récompense,
Leur offre des lauriers, et, de leurs grands projets
Considère le but et non pas le succès !”

CLAVAREAU.

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P R E F A C E.

IN introducing the following work to the reader, some explanation is perhaps advisable respecting its origin; especially as in it (particularly in Volume I.) is involved, in a measure, the history of a public cause, or at least what the writer has wished might become such. Should the relation, however, embrace too much of the *ego*, I trust the reader will be indulgent, since these Dutch labours, albeit labours of love towards a venerated ancestral nation, are certainly not undertaken without some personal sacrifice and self-denial.

The first two, or original, parts of the volume are the greatly amplified results of two short articles which appeared in the "Transatlantic" magazine of July and August last, under the general heading which forms the title of the present work, and were inspired by the revival of the spirit

of Arctic research in England, and the desire I felt to see a similar spirit awakened after so long a repose in Holland.

It was speedily found that to investigate the field of Dutch Northern enterprise alone at all thoroughly would involve no small amount of research. But I had proposed to myself a much wider field than this in view of the advocacy also of a modern Dutch expedition. This fact seemed to necessitate a glance at the whole North Pole question, and consequently involved the gleaning of data from the vast mass of literature existing upon this subject generally, the extent and formidability of which, for the thorough investigator, may be said to be only comparable to that which, in another way, the Arctic navigator is but too certain to encounter in the vast and formidable ice-fields of the Polar regions; for the far Northern voyages, however fruitless of results in other respects, considered as to their definitive aims, have rarely failed to add something to the accumulating mass of literature on this subject.

These remarks, however, apply more particularly to my researches since this book was resolved upon; and my later investigations have caused me to modify my views somewhat in one or two respects. If I ever entertained any other than serious views

of the kind of enterprise which calls men from comfortable homes and genial climes to frozen and inhospitable latitudes, I now regard Arctic exploration more as work and less as play than I did even when the gaily-decked "Alert" and "Discovery" left the shores of England with a nation's benedictions.

Of the original brief papers more notice was taken, particularly in Holland, than I could have hoped for; and I have to acknowledge here very encouraging letters from several of the *savans*, and even statesmen of the Netherlands, whose congratulations upon my having taken up this subject were highly to be prized. I may even mention the very cordial recognition of my too trifling services thus far by Mr. N. W. Posthumus, the Secretary of the Dutch Geographical Society, whose own zealous efforts for a renewal of Arctic enterprise on the part of his countrymen have been highly appreciated, and whose natural interest in this subject caused him, perhaps, the more readily to welcome a "*medestrijder*" from without. Nor should I omit mention of encouraging words received from Lieutenant Koolemans Beynen, of the Dutch Royal Navy, speaking for himself and Commodore Jansen; which were the more welcome since the former officer personifies, if one may so say, the principle of modern

Dutch Arctic enterprise, having himself accompanied Captain Allen Young on his "Pandora" cruise last year to Peel Strait, and is now contemplating a repetition of the voyage with the gallant Captain in the present season.

To the editor of "Het Vaderland" at the Hague I am especially indebted. Prior recognitions of humble labours on my part of a more strictly patriotic character relating to Holland having come to my knowledge, I ventured to send to that paper the magazine containing the article advocating a Dutch expedition; also a copy of the "European Review" (of July 24, 1875) containing an article on the same subject, invited by its editor (Mr. Blanchard Jerrold), who had considered the subject as one which might fairly be regarded as of public interest. Both these articles were favourably noticed by "Het Vaderland," which quoted from the latter anonymous article the concluding and most considerable paragraph, in which I had gladly recognised the fact "that enterprise"—albeit not of the kind I was then urging upon their attention—"was not dead among the Netherlanders, nor, indeed, the spirit of discovery;" and also the following loyal expressions, which I venture to say were penned and quoted with equal pleasure:—

“ Whatever pertains to the arts and sciences in their higher as well as in their common forms and applications, is sure of finding a ready recognition on the part of the royal family of Holland. London, so recently favoured with the presence of the Queen of the Netherlands, needs not to be acquainted with the fact of her Majesty’s peculiar interest in matters of high public concern, nor have we reason to believe that the resumption of Dutch Arctic exploration would be at all unwelcome to her. It is not unknown in geographical circles, moreover, that Prince Henry of the Netherlands, the patron and honorary president of the Dutch Geographical Society, takes a lively interest in questions germane to this which we would now urge upon the consideration of Hollanders. And what more fitting enterprise than an efficiently organised and well-equipped Government Arctic expedition could there be, to crown the pyramid of giant undertakings which have characterised the rule of the restored dynasty, and particularly the twenty-six years’ reign of King William III. ? ”

These acknowledgments on the part of one of the leading papers of the Netherlands I could not fail to appreciate highly, and I embodied my thanks in a letter to the editor, which he was good enough to publish, supplying it with the exceptional Dutch feature of a heading indicating its subject ; and perhaps a translation of the principal paragraphs of the letter may be appropriately quoted here as a part of the “ history. ”

“ It was to me an agreeable task to pen those pages [the magazine article], hoping as I did that they might serve to incite the Dutch nation to take its place once more in the field of Arctic enterprise. I was, moreover, strengthened in this labour by the certainty I felt that the wish, at least, could not but be shared by some of the patriotic and enlightened citizens of the Netherlands.

“ In the course of my somewhat extended Dutch researches in the British Museum, the part early enacted by the Netherlanders as, next to the English, the greatest maritime people, could not escape

my notice ; and the organisation of an English Arctic expedition drew my attention to the service Holland has performed in the special province of Arctic research. Unfortunately, however, the memorable deeds of the Dutch are in this respect wholly confined to the proud era of the old Republic—to the days of Maurice and of Frederick Henry. At a time, therefore, when neighbouring states—including some but now for the first time seeking recognition among naval powers, and, strictly speaking, interior states—are rallying their forces for an onslaught upon the vast *terra incognita* of the North, thoughtful and proud-spirited Netherlanders cannot but ask themselves whether they are not neglecting their duty, so long as the fatherland of Barents and Heemskerck remains behind. In those days of grand adventure, wherein Holland boasted a score of peerless navigators, and dotted the habitable globe with her colonies, the more distinctive aims of the seafaring nations were to add territory to their primal limits, and bring wealth to the coffers of the State.

“NOW, at least, as applying to Arctic Discovery, this grain of selfishness is no longer apparent. It is at the call of *science*, of advancing *civilisation*, that England has sent forth her promising expedition *via* Smith’s Sound. For England’s old rival on the seas, the track of Barents remains invitingly open. Lag behind or fail to avail herself of this she must not. And ‘a spirit’—to conclude with words elsewhere employed—‘whose high courage, unyielding as the ice he encountered, was in the appreciation and pursuit of duty equal to adamant itself, such as that which William Barents reveals in his work for the admiration of all the ages, beckons with resistless power to the Netherlanders of to-day to take up once more the path of honourable distinction, and renew in the records of the world’s progress the glorious deeds of the fathers.’”

My thanks are also due to Colonel D. D. Muter (to whom, in earlier numbers of the “*Transatlantic*,” the author is indebted for the first encouragement to his pen) for enabling these Netherland notices to do double duty, by giving them in his weekly journal, and for editorially encouraging

the enterprise. Nor are my obligations less great to the editor of the "Geographical Magazine" for a generous recognition of my earlier labours for the revival of Dutch Arctic research. In the autumn of last year, at the friendly suggestion of Mr. Nicholas Trübner, I sent through the latter one of the original papers to which I have alluded to the editor, Mr. Clements Markham, offering the articles to his magazine; quite conscious myself, however, of their being in everything but their subject unsuited to its pages. The papers were courteously declined; but the editor added to the refusal a suggestion most acceptable to me—viz., "I should, however, be very glad to insert a letter from you, urging the propriety of the despatch of a Dutch Arctic expedition, and a renewal of the enterprises of Holland in a field where she formerly won such renown."

The letter was accordingly written, and found a place in the January number of the "Geographical Magazine." I venture to reproduce it here.

THE REVIVAL OF DUTCH ARCTIC EXPLORATION.

To the Editor of the "Geographical Magazine."

SIR,—The interest with which you view whatever relates to geographical research may warrant me in addressing you for the purpose of urging the propriety of the despatch of a Dutch Arctic Expedition, and a renewal of the enterprises of Holland in a field where she formerly won such renown. This subject is one in which

I have taken particular interest ; and late recognitions of its importance encourage the belief that an appeal through your pages may prove of great weight. Perhaps, too, one may, as a citizen of what was once known as New Netherland, speak with not less hope of being heard, next, at least, after one of their own nationality ; and certain I am that the country which boasts its Kane, its Hayes, and its Hall among explorers of the American Polar regions, and as the real pioneers of the promising route chosen for the present English Expedition, would rejoice not less than England to see the countrymen of Linschoten, of Heemskerk, and of Barents awaking to renewed zeal in this field, and emulating their old adventurous spirit and activity.

“There is no doubt that the Dutch possess to a remarkable degree the qualifications essential to the successful prosecution of Arctic investigation. Habituated from the infancy of their nation to battling with the waves, their many discovery enterprises, and their widespread colonisation of the globe, has accustomed them to distant voyages, and upon almost every sea ; and if for upwards of two centuries they have surrendered to other countries all practical scientific efforts in the far Northern waters, they have, to reinspire them to Arctic enterprise, a heritage of brilliant deeds in past times. Though limited to a short period, the literature of the Dutch descriptive of their Northern voyages is perhaps the richest of any nation’s in truly romantic and thrilling story. What country, indeed, has not adopted into its language Gerrit de Veer’s faithful narrative of the three voyages of Barents ? And what Hollander is not stirred to the very soul by the grand poem of Tollens, portraying, in graphic verse, the scenes of the memorable third voyage, and the wintering in *Novaya Zemlya* ? Thus, in both their prose and poetic literature have the Dutch immortalised their Arctic heroes. The fame, moreover, of that early authority in magnetic and cosmographic lore, the indomitable Plancius, who spurred his countrymen on to the renewal of efforts officially stayed by the States-General, will endure so long as the literature of the Netherlands shall remain to furnish for it a fitting shrine. But now another Plancius is needed to incite the slumbering ardour of the Dutch to new enterprise—another Barents to follow up and complete the researches of the first. The enthusiasm of the race that gave to the world such men sleeps for the moment, awaiting, it may be, the distinct and persuasive utterance of tongue and pen, gifted with true eloquence, to call it

once more into play. Yet the field which Barents, Linschoten, Heemskerck, and the rest made peculiarly Holland's own, lies invitingly open to her, and her people possess those characteristics which specially fit them for the resumption of their old-time work. 'It is even possible,' as I have elsewhere suggested, 'that success would sooner crown the equipment of an expedition commanded by so competent a scientific officer as Commodore Jansen'—though it is not unknown that Holland has begun educating younger officers of her navy in ice navigation—'than that which, under Captain Nares, has recently quitted the shores of England. However unanimous may have been the opinions among English Arctic explorers and men of science as to the route chosen for the "Alert" and "Discovery," it is well known that high scientific authorities even in England have inclined decidedly to the route which lies between Spitzbergen and Novaya Zemlya, upon which Barents, with a persistence that now seems to have been prescient of later discoveries, sailed to nearly the farthest extent that has been reached.

"Put England had the best of rights to choose the route she has selected. The last distinctive attempt on the part of her navigators to reach the Pole was made by the gallant Parry in a line directly north from Spitzbergen, and Parry's experience was, we confess, rather confirmatory of continued ice than of "open water." It must, however, be here borne in mind that he was not pursuing his object upon any idea of a thermal passage existing to the Pole; and his famous sledge journey was prosecuted at a distance of some hundreds of miles west of the European flood-gate of the Gulf Stream. But it is to the renewal of Dutch Arctic enterprise in friendly rivalry with England, rather than the fitting out of an expedition to pursue any route we might prescribe, that we would urge the people of the Netherlands. The choice of routes may well be left to the Dutch geographers, though it would be wise that the radial points of attack should diverge considerably, and the practicability of a passage upon the bosom of the Gulf Stream might for once be fairly tested.

"There are, moreover, reasons in favour of a renewal of Arctic enterprise on the part of Holland which, appealing specially to her people, are happily wanting to other countries. The ancient landmarks whereby discoverers were wont in past ages to distinguish the lands and seas first sighted or traversed by them, are in danger of being removed, and names effaced from the charts by later hands, unrestrained by reverence for those whose posterity omit to keep

alive the spirit of research. The age that has given to Barents' Sea the designation by which it is now known, has also witnessed the substitution of new names of points, capes, sounds, inlets, straits, and islands for those which would have borne down to future generations not only the nationality of the discoverers, but also the approximate period of discovery. In this respect Holland suffers an injury, which should excite her people to seek redress—redress that is most capable of being found in the resumption of the work of exploration at the North.*

“That enterprise is not dead among the Netherlanders is placed beyond doubt by the stupendous magnitude of their own internal improvements, such as the new ship-canal to Amsterdam, the railway over the Meuse, connecting Rotterdam with the south, and the vast project of draining the Zuyder Zee, not to speak of the grand and expensive scheme of the Dutch Government itself for the purpose of inland defence, nor of the undertakings of real moment in their rich empire of Insulind. Moreover, intelligence has but recently come to me that Enkhnyzen is formally moving with a view to this business of Arctic research. A number of the ‘most influential residents of Enkhuyzen,’ states ‘Het Vaderland,’ have, as members of the Geographical Society, constituted themselves into a department; the object being principally the renewal if practicable of the Arctic whaling business, and the advancement of science which must result from that work. The announcement appropriately closes with the words, ‘May the example given by Enkhuyzen arouse others to follow!’ Fitting it is, surely, that the citizens of this ancient trading port of the Netherlands, whose zeal in this field of research is already historic, should now be foremost for a renewal of Dutch Arctic enterprise. That history may further repeat itself in this matter, may we not next see her old southern rival Middelburg come forward once more as a genuine ally of her northern neighbour? Nor can the capitalists and leading citizens of Amsterdam remain indifferent in this matter. The city of Plancius and of Barents, like that of Moucheron and the adopted home of Haarlem’s Linschoten, is able to wield a most potent influence in forwarding such objects, and from her abundant wealth could well add to her stupendous home enterprises that of practical Arctic investigation. And even for the bringing about of a Government Expedition—the

* “A Plea for a Dutch Arctic Expedition,” *European Review*, vol. i. p. 116.

kind demanded for really effective Arctic work—this zeal and encouragement on the part of towns and individuals are not less necessary.

“ Writing with the firm conviction that there *will be* a Dutch Arctic expedition—for I cannot believe that I misinterpret the real spirit of the Dutch people, nor estimate too highly the evidences favourable to this belief—I feel assured that too much importance cannot be attached to the results likely to accrue therefrom ; knowing that Holland possesses the men thoroughly competent to direct such an enterprise and to achieve and weigh results.

“ The numerous discoveries to the west of Greenland in the Arctic zone, which have been made within the last thirty years by England and America, attest what can be done by determined effort in this direction. What, then, may not be done in the much wider field on the European side, now an explored waste upon the map? Men from the great neighbouring state to Holland, steering their way in the almost hopeless direction of the east coast of Greenland, achieved results with which the nation appears to be well satisfied ; planting high in those regions the German standard, and placing many names on the chart of those latitudes to mark the presence of explorers from this comparatively inland state. Those ‘ border provinces ’ of the European Polar regions, Sweden and Norway, have hardly ceased since the days of the Northmen from the pursuit of new investigations ; the former threatening, under the guidance of Professor Nordenskiöld, to realise to us the dream of the old merchant adventurers ; while it is to the latter that Holland is herself indebted for the finding of the priceless relics of her unfortunate Barents. Explorers even from the South have also won noble trophies on this Northern field. The Austro-Hungarians, having their sea-view limited mainly to the waters which penetrate the city of Marco Polo, smitten with a desire for Arctic research, have found their way to high latitudes, and these adventures on their part have not been without signal advantage to science, as the name of Emperor Franz Josef’s Land bears witness ; and I but echo the assertion of a distinguished Dutch geographer in saying that there are not a few men in Holland who yearn for the opportunity of giving to some great unnamed spot in these ice-bound regions the designation of ‘ Prins Hendrik’s Land.’

“ S. R. VAN CAMPEN.

“ 2 VERNON PLACE, W.C., December 18th, 1875.”

As the result of influences which these humble efforts of the writers may perhaps have done something to stimulate, it is gratifying to be able to state that already Amsterdam is making a move in this matter. For may we not take the action of the Dutch Society for the Promotion of Industry as fairly representative of the city in which it is located, if not even of the nation itself? That Society has, within the past month (April, 1876), presented an important address to his Majesty of the Netherlands, urging various considerations, utilitarian and other, for the resumption of Dutch Arctic enterprise, and the employment therein of "ships of his Majesty's Marine."

It is with peculiar satisfaction that I conclude this little sketch of personal efforts in this direction (which I have felt that I might pardonably allude to) with a quotation from that address, expressive of sentiments entirely in accordance with those which the reader will find elaborated in the following pages: "Considering all this" (summarised on p. 191), "we are of opinion that as a seafaring nation Holland should not remain behind, since not only the maintenance of national honour, but also important advantages for the future, are concerned. From the onward tendency of the human mind, and the

continued development of science and industry, it is safe to augur that discovery expeditions to the Polar seas will become more numerous, and in this case the participation of Holland is even a vital question."

In allusion to a special feature of this work, I ought, perhaps, to say, that when led to the investigation of the subject of Arctic exploration, the question of routes was brought forcibly under my notice by two or three short letters in a London paper, in criticism of the course chosen for the English Expedition, and calling attention to the theory (not unknown to geographers) put forward by Captain Silas Bent, formerly of the United States Navy, favouring the existence of a "Thermal path" to the Pole in the route of the Gulf Stream, a theory very plausible, and urged more definitely by Captain Bent than by any other advocate of a "Gulf Stream" route. These letters were from the hand of his friend Dr. M. S. Fife, of the Mississippi Valley Society in London; and though it will not be found that I entirely "endorse" the theory thus brought more especially to my notice, yet, as it accords with the old route of Barents, the propriety of its investigation, and its conversion, if possible, from a theory into a fact, appealed to my judgment,

and may be said to have had some influence in shaping the first part of my work. Moreover, through the kindly intervention of Dr. Fife, a little correspondence took place between myself and the accomplished advocate of the theory, and I cannot refrain from giving here (as I violate no confidence in so doing) an interesting letter, full of encouragement to Netherlanders.

“717 GARRISON AVENUE,
ST. LOUIS, MO., Dec. 13, 1875.

“S. R. VAN CAMPEN, Esq.,
London.

“DEAR SIR,—I give you thanks for your kind letter of 26th ult., as well as for the printed slips enclosed, which I have read with much interest. I am rejoiced that you have taken in hand the important task of giving publicity to the grand achievements of the Dutch in Arctic explorations in early times, since I am sure your work will show that they were second to none, if they do not stand ahead of other nations in the heroic daring and successful penetration of that unknown region of the world. In January, 1869, I delivered my first address in this city upon Arctic matters, and then expressed my belief in the correctness of the report of Dutch whalers having *reached the Pole* in the seventeenth century, ‘notwithstanding it is the fashion to treat them as fables,’ and I have no good reasons for changing that belief from all that has been written and said upon the subject since that opinion was expressed. The English, or other expeditions, may, by the use of steam, force a passage through Smith’s Sound into the open Polar Sea, and thence succeed in reaching the Pole; but I feel quite sure that the only practicable routes will finally prove to be along the paths of the Gulf Stream between Spitzbergen and Nova Zembla, and of the Kuro Siwo through Behring’s Straits, and that in the end the credit will be awarded to the Dutch as having been the first to attain to the earth’s northern axis, as it is now freely acknowledged that the Norsemen discovered the American continent five centuries before Columbus made his

wonderful voyage to the West Indies, and am perfectly willing that my record in this prediction shall stand the test of time with its further developments.

“ Dr. I. I. Hayes inspired the opposition manifested by the American Geographical Society to my theory (as found most notably in the President Judge Daly’s Annual Address, January, 1870), as he was recognised by that Society as the best authority in this country upon Polar matters. He, however, was not an impartial arbitrator, since he was then endeavouring to get up an expedition by the way of Smith’s Sound, and had entirely committed himself to that route as the best. So far the question, of course, stands undecided between us, and I feel under obligations to him and the Geographical Society, since their opposition has given a far wider publicity to my views than they would probably have otherwise obtained.

“ With the advantages you have had from a thorough examination of all the authorities upon the subject of which you are writing, it would be quite out of place for me to think that I could make any suggestions to you, though I am none the less grateful to you for your kind offer to receive any that I might feel disposed to make. All I can do is to extend to you my cordial wishes that you may succeed in doing such justice to your ancestral nation in this matter as will not only reflect the most gratifying distinction upon yourself, but will also make all Hollanders feel that with our pride of country, and of the grand possibilities that lie before us, we, as Americans, feel a just and honourable interest and pride in everything that redounds to greatness and prosperity of our mother countries.—With renewed thanks for your courtesy, I am, very sincerely yours,

“ SILAS BENT.”

My obligations are due to several Dutch authors for kindly offices rendered during the course of this labour, invariably accompanied with expressions of interest for the success of the undertaking—to Mr. P. A. Tiele, the Librarian of the Leyden University, for the proof sheets of his review in “*De Gids*” of Mr. S. Muller’s “*Geschiedenis der Noordsche Com-*

pagnie," also, later, to the learned author himself, for a copy of his work, so fully detailing the operations of the Netherlanders in the far North; to the Rev. J. de Koo, for works invaluable in my researches; to the Rev. M. Cohen Stuart, D.D., and Mr. N. W. Posthumus for similar favours; to Mr. J. K. J. de Jonge, Deputy Government Archivist at the Hague, for answers to sundry inquiries connected with a department of my subject upon which he alone is the authority in Holland (enabling me, for one thing, early to understand how much importance to attach to the rumoured discovery of a Barents journal by the Norwegian Captain Gundersen); and, not least, to the kindly offices, not wholly relating to this work, of Dr. M. F. A. G. Campbell, Royal Librarian at the Hague, of whose uniform courtesy and willing assistance all authors who have had to do with Holland, or especially with the treasure-stores of the institution over which he presides, must feel indebted.

Warm thanks are, moreover, due to M. V. A. Malte-Brun for a copy of "Les Trois Projets," invaluable (in the absence of any information on the subject in our own language) for its account of the late proposed French Arctic expedition. The alacrity with which this distinguished author placed at

my disposal his own sole copy of the work, which I was unable to obtain elsewhere, and the hearty interest manifested by him in my undertaking, afforded me great encouragement, especially since this representative French geographer expressed a decided opinion “that, in the seventeenth century and the beginning of the eighteenth, the Arctic seas were more extensively navigated by Dutch whalers than is generally supposed; and that they may have had information with respect to Gilies Land and Franz Josef Land, which from their indifference to science they have allowed to be forgotten, as has also been the case with respect to early discoveries in the heart of Africa.”

I am permitted to lay before the reader the full text of M. Malte-Brun’s letter, which cannot fail to interest all to whom the man and his work are known:—

“PARIS, RUE JACOB 16,
8 Janvier 1876.

“MON CHER MONSIEUR,—Je vous fais mes compliments d’avoir eu la bonne pensée de réunir en un livre tout ce qui intéresse les navigations des hollandais dans les mers arctiques.

“Vous rendrez certainement un utile service aux sciences géographiques, car ces documents sont aujourd’hui épars, et quelques uns d’entr’eux sont, ou peu connus, ou difficiles à se procurer.

“Il est certain pour moi qu’au XVII^{ème} et au commencement du XVIII^{ème} siècles les baleiniers hollandais ont dû naviguer au nord plus loin qu’on ne croit, et ils ont pu savoir sur le Gillis-land sur la terre François Joseph des renseignements que dans leur indifférence

scientifique ils ont laissé perdre. Au pôle comme au cœur de l'Afrique on peut dire de nos jours, avec le poète latin—

‘*Multa renascentur quæ jam cecidere!*’

“Est-il vrai que dans une des dernières explorations suédoises, à la Nouvelle-Zemble, on ait retrouvé un des journaux de Barentz? Il y aurait là une mine précieuse à exploiter! *

“Je vous envoie par la poste, par ce même courrier, mon résumé sur les ‘Trois Projets au Pôle Nord.’ Je vous l’envoie en feuilles, car c’est le *seul* exemplaire qui m’en reste. Je suis heureux de vous en faire hommage, et croyez bien que je m’intéresse beaucoup à la parfaite réussite de votre œuvre sur les navigations arctiques des hollandais.

“Veuillez agréer, cher Monsieur, la respectueuse assurance de ma considération bien distinguée,

“V. A. MALTE-BRUN.

“Monsieur S. R. VAN CAMPEN,

“2 Vernon Place, Bloomsbury Square, Londres.”

Nor have the friendly offices of this eminent geographer, as the reader will perceive, been bounded by those which I have indicated. Indeed no writer on Arctic exploration can fail to be indebted to the man who, more than any other Frenchman, has laboured to make known to his own countrymen the universal investigations in this field.

I would also express my obligations to M. Maunoir, the accomplished Secretary of the French Geographical Society, for his kindly and prompt response to my queries (early made, to one of which —“L’Expédition Lambert échoua-t-elle par défaut de ressources ou à cause de la guerre?”—he replied:

* The Journal turned out to be merely a translation of Pet and Jackman’s, given in Hakluyt.

“ L'Expédition française a échoué, non par manque de ressources, mais bien par suite de la mort du promoteur de cette expédition ”); to Messrs. Chatto & Windus for the loan of a work important to my researches, before it was fairly in the hands of the public; and to Messrs. Sampson Low & Co. for similar favours; also to the courteous officials of the British Museum, the reading-room of which is so freely thrown open to students of all nationalities as to have become, like the blessings of air and light, too widely known and too fully appreciated to require acknowledgment. Nevertheless I must specially thank Mr. George Bullen, the Keeper of Printed Books, and Mr. Richard Garnett, the Superintendent of the Reading-room, and Mr. S. van Straalen, also of the British Museum, for many thoughtful kindnesses extended to me there during several years; also Mr. P. van der Willigen, Secretary of the Nederlandsche Vereeniging in London, for the use of the library of that Society. And also are my special thanks due to Mr. John T. Dexter, Mr. J. E. Cussans, Mr. J. Fletcher, Dr. A. Schwartz, Colonel J. L. Chester, and Miss A. W. Buckland, —to some of whom the writer's obligations are greater than they would be willing that he should publicly acknowledge.

A word as to the plan of the work. In the first place, it has greatly outgrown the limit originally proposed, a very small book only having been my intention, embracing the original papers with little or no amplification; some brief extracts from De Veer's third voyage of Barents, and a translation, which I had been encouraged to look for from a gifted hand, of Tollens' celebrated poem, "The Wintering of the Hollanders on Nova Zembla."

In respect to the latter, I was, at the last moment, disappointed, owing to unavoidable circumstances. This, however, I can hardly regret now, since there would have been a certain inappropriateness in giving in a geographical work a poem, however directly connected with the subject. But I could wish that some poet, with the daring requisite to attempt the translation of this *chef d'œuvre* of Dutch poesy, and possessing something of my own enthusiasm for Holland, would yet place at my disposal an English version of it, in order that it might find a place in our language as a further contribution to this subject.

This masterpiece of Hendrik Tollens was indeed long since translated into French by the accomplished Belgian poet, M. Auguste Clavareau, and it has gone through several editions in Holland

alone, the translator having prefaced it with an historical introduction taken from the historian Van Kampen's account of the third voyage of Barents, in his "Geschiedenis der Nederlanders Buiten Europa." In case, therefore, of being so fortunate as to realise my hope in this matter, I should endeavour to supply either this introduction or an original one.

As the work now stands, Volume II. will give the reader the history of Dutch Northern enterprise, in which necessarily, of course, the voyages of Barents constitute the principal feature, and for these De Veer has been largely drawn upon, particularly for the third voyage. The translation of Phillip (adopted by the Hakluyt Society), slightly modernised, has been followed, and his numerous inaccuracies corrected in the text, when having reason to quote. Nor has it been thought unwarrantable to thus treat his translation, since this worthy man has even added quaintness to the ancient Dutch.

For the first and second voyages of Barents, I have chosen Linschoten for my principal guide; agreeing with the historian of the Northern Company, Mr. Muller, in giving the preference to Linschoten's account of these two voyages—he having

been the chosen annalist of the first, whilst his prominent connection with the second expedition rendered him, perhaps, equally trustworthy with respect to that. For the third, however, De Veer's unvarnished narrative is everything we have, and we could hardly wish for anything better.

Mr. Muller (in a letter to the writer) doubts the trustworthiness of De Veer for the first two voyages (De Veer evidently did not participate in the first), preferring "very much," he says, "the more accurate account of Linschoten, which has never (to my knowledge) been translated into English," adding, "Should not the Hakluyt Society edit these instead of the well-known narrative of De Veer?" One might perhaps rather say in *addition* to that of De Veer (the allusion being to the proposed new edition of the Voyages of Barents which I had been invited to edit). But this interesting writer has been so prominent an authority throughout that it has been thought fit to illustrate the voyages with his admirably quaint old cuts. And this part having been intrusted to the competent hands of Mr. E. Le Bihan, the reader will have no cause for complaint. For the rest of Volume II., the historian of the Northern Company is himself an important authority, yet

even in this concise history of the Northern operations of the Dutch, no ascertainable data whatever have been disregarded.

Although the first to see the light, this work is but the incidental result of the author's researches in the much broader field of Dutch history and literature, and while he would fain hope that it may tend to incite Holland's own geographical writers to greater activity in this direction, and thus to revive an interest in Arctic exploration, should it also lead English readers to search more deeply into that mine of wealth which lies undeveloped in the annals of the Netherlands, he will feel himself doubly recompensed.

BLOOMSBURY, LONDON,
May 15, 1876.

THE DUTCH IN THE ARCTIC SEAS.



A DUTCH ARCTIC EXPEDITION AND ROUTE.



INTRODUCTION.

THE signal part which Holland has enacted on the theatre of the world cannot, in the sense of general achievements, be unfamiliar to the historical student. It is well known, moreover, that her place in the European sisterhood of states has in former times been one of importance far out of proportion to the small area occupied by the Netherlands on the map of Europe ; and though in the particular domain of Arctic research the work of Holland cannot be compared with that of her great maritime neighbour, yet even in this respect her achievements have been far from insignificant. Here, however, it is to be feared, the work of the Netherlanders has not been so well understood. Unfortunately, too, it

has been wholly confined to the early, though it must be owned memorable, period in the annals of Arctic voyaging. While we shall relate the history of these early labours of Holland in the Arctic field—pretty well assured, too, that her claims will become the better recognised therefor—we shall first of all detain the reader with some considerations for a renewal of Dutch Arctic research.

But in connection with Dutch Northern enterprise, and indeed in any sense whatever, it is not easy to take up the theme of Arctic exploration, which has in some form been more or less familiar to the world for the last three centuries, without bestowing a passing thought on the pioneers in maritime adventure, and reflecting how legitimately our age has developed the dauntless spirit exhibited by the two gallant crews of Britons now braving the hardships and dangers of a Polar voyage.

The glimpses we have of the doings of the earliest maritime nations reveal a decided bent toward adventure and even geographical discovery. Those primeval Hollanders, the Phœnicians, furnish the first marked example of this audacious spirit. The ships of Solomon and Hiram, piloted by Phœnicians, went, we read, on their three-years' voyages, returning so many well-laden

argosies. Nor was there any hesitation on the part of these greatest mariners of antiquity to quit the shores of their native continent for the exploration of new realms. How far northward they may have gone we do not know, though it has been conjectured that they penetrated into the Baltic. The numerous colonies they planted on the shores of the Mediterranean and the Atlantic, on the little-known Iberian peninsula, and indeed from the mines of Cornwall and the verdant Milesian island to the Persian gulf, amply attest, however, the extent of their expeditions in furtherance of commercial aims.

Phœnicia itself, like the Phœnicia of the West in modern times, was one of the smallest countries of antiquity. It occupied only a narrow slip of land on the coast of Syria, about 120 miles in length, and probably nowhere more than 18 or 20 in width. This short line of coast was rich, however, in bays and harbours. Seven cities occupied various points, and between them were a number of smaller towns, the abodes of industry and enterprise, forming, as it were, one city, extending along the whole line of coast and the contiguous islands; and this chain of cities, with their harbours and numerous fleets, must have afforded a spectacle

then unequalled in the world, impressing the stranger who visited them with the highest idea of the opulence, the power, and the spirit of the people, who had thus become the common carriers, the colonisers, and the most daring voyagers of their time.*

During the long interval which elapsed between the founding of Sidon and Tyre and the destruction of Carthage, the art of navigation must have very greatly advanced; and though the Carthaginian vessels could hardly bear any comparison with the trim merchantmen or the magnificent floating palaces of the present day, it is evident enough that Hanno's fleet of sixty ships, "capable of carrying thirty thousand colonists of all ages to the western coast of Africa," must have been considerably in advance of some of the Dutch and English pinnaces and fly-boats that braved the Greenland seas in the ages of Maurice and Elizabeth.

Thus enterprise and daring are characteristics by no means peculiar only to our modern civilisation. The spirit which planted Carthage on her great vantage-ground in Africa, and made her the

* Malte-Brun and Balbi, chap. i. Richardson, *Polar Regions*, Introduction.

not unworthy rival of ancient Rome, and which spurred Rome herself on to the conquest of Europe and the known world, only to give place to other conquerors, and to fall under the enervating influences begotten by the pride of an universal sway, was that which established the chief maritime and commercial *entrepôts* of Europe, and culminated in the brilliant era of discovery when England and Holland, by their wondrous zeal and activity, threatened, for awhile, to leave no new lands to descry or unknown seas to traverse.

Perhaps the most glorious fruits of this spirit are to be found in the discovery of America by Columbus, but the same impulse had already prompted the hardy Northmen, and made them in reality the first Arctic explorers, and, as we now know, the true discoverers of America 491 years before Columbus landed on San Salvador, and 496 years before the Cabots (in nearly the same locality as the Northmen) sighted the mainland.

Between the ancient Phœnicians and the sturdy sons of Holland there are some striking points of analogy. The bent of both races on becoming conscious of a distinctly national life was toward the achievement of an empire on the seas and by means of colonisation, which the limited area of

their native territories forbade at home. In both alike the necessities of independent existence prompted to wondrous feats of engineering skill, so that the fortifications of Tyre, its junction with the mainland of Syria, and the extensive and massive piers which formed the harbour of Sidon, and received the fruitful harvests gleaned upon every ocean wayside, were marvels of early civilisation fitly to be compared with the system of canals, dykes, and dams by which the Netherlands have been rescued from the incursions of the sea. Nor has a Dutch historian unfitly compared the Netherlands to Venice,* two names evoking analogous recollections, joyous as well as gloomy; and, years ago, Pieter Corneliszoon Hooft, the famous Drosart of Muiden, in allusion to the shields of the two old republics, inquiringly sang—

“ Waer is paer van vernuft en kraften zoo kloek,
Als de Leeuw met het swaerd en de Leeuw met het boek ? ” †

Reverting to the Northmen, who occupy a sort of middle place in history between the Phœnicians and the Venetians, it is impossible to deny to this

* J. C. de Jonge, *Nederland en Venetie* ('s Gravenhage, 1852), Preface.

† “ Where, of a pair so skilled in craft and wit, is there record,
Save in th' Lion with the book and th' Lion with the sword ? ”

daring race, though the record is but a shadowy one, the earliest page in the annals of modern maritime enterprise and discovery. Indeed, far back in mediæval times, scarcely after the death of Charlemagne, and several centuries before the northern and western voyages of Columbus, or even the still earlier voyages of the Zeni to the Farøe Islands and Greenland—now proved beyond all further cavil to be authentic*—the Vikings became the rulers on every sea. Few countries were there in the then known world that did not feel the force of Norse authority in the eighth, ninth, and tenth centuries, and few were the shores to which the adventurous crafts of Scandinavian seamen did not find their way. Not content with scouring the ocean from the deep fjords of Norway to the warm seas of Spain and Italy, they turned the prows of their frail barks northward, and, unaided by the compass, yet scorning to creep timidly along the coast, like the more southern navigators, and those of ancient times, they boldly plunged into the ice-encumbered ocean, and entered the Arctic regions.†

* See the learned Introduction to the Voyages of the Venetian Brothers, Nicolo and Antonio Zeno, to the Northern Seas, in the Fourteenth Century. By R. H. Major, F.S.A. Printed for the Hukluyt Society, 1873.

† C. R. Markham, *Franklin's Footsteps*, p. 2.

As early as A.D. 890 the great Saxon King Alfred put in living characters the story of the first Arctic expedition, narrated by old Ohthere himself, who "dwelt furthest north of any Norman," and was the first to sail beyond the North Cape.* Iceland, discovered by Naddodr, became settled by Scandinavian nobles, who disdained to yield their liberties to King Harold Haafarger, and there set up, 1002 years ago, a free republic. Likewise Greenland, discovered by Erick the Red, in 982, and colonised by men of true Norse blood, found in Lief, the son of Erick, a Christian missionary, more than seven centuries before the pious Hans Egede began his disinterested work among the Eskimo tribes on those inhospitable shores; and it required the brawny arms and dauntless spirit of an equally valiant race, the Frisians—who, with the Batavians and Caninefates, proved to Tiberius and Vespasian the powerful effects which could be wrought by

* Longfellow has taken "a leaf from King Alfred's 'Orosius,'" and given us, in his "Birds of Passage," a choice poetical rendering of the simple narrative of this first Arctic discoverer, who says to "Alfred, King of the Saxons"—

" And there uprose before me,
Upon the water's edge,
The huge and haggard shape
Of that unknown North Cape,
Whose form is like a wedge."

patriotic courage and love of freedom—to overcome the audacious Vikings. It is an historical fact that those primeval inhabitants of the North Netherlands engaged in this work ; and Frisian officers and seamen were, moreover, employed by King Alfred the Great in organising the first English fleet.*

* According to Mr N. W. Posthumus, Adam of Bremen has recorded, as a fact, that Frisian vessels actually sailed nearly to the North Pole about the year 1035 (*De Nederlanders en de Noordpool-expeditiën*, p. 4).

CHAPTER I.

THE GRAND MODERN EXEMPLAR.

As, therefore, the motives which have animated men from the earliest times have induced them to claim for their possessions the uttermost parts of the earth, and, perchance, to penetrate to them, it is not a little singular that so large a portion of the world should remain still unmarked in our maps and charts. Sir Henry Rawlinson has been quoted as saying, with much appositeness, that outside of Europe—excepting, we may ourselves say, the central portion of North America—little is really known of the geography of the world beyond the highroads of communication. Many interesting geographical problems await solution by the patient toil of future investigators. But it is in the northern and southern extremities of the globe that the widest fields, not hitherto tracked by human endeavour, remain to challenge men's industry and perseverance.

Of other regions we are able at least to form some sort of detailed conjecture. Situated chiefly in the Old World, there have been oases whose archæological springs drew men to them in spite of all impediments ; and but for the mystery surrounding the Polar regions, Central Asia and Central Africa, with the Troys, the Babylons, the Ninevehs, and the land of the Pharaohs—embracing the cradle of the human race, and the remains of primeval civilisations—would seem to offer fairer prizes than might be sought in the vast expanse of congealed sea and land about the neighbourhood of either Pole.

The Antarctic region, ocean-girt as it is, appears not to have possessed the mysterious attraction for men peculiar to the North Pole. The far southern latitudes were never the home of great races, and Antarctic exploration persistently conducted could scarce be looked for in their absence. The one powerfully attractive field, at least for scientific investigation, is that whose charmed circle has been so often beset, but which has hitherto proved barely penetrable—the belt of sea and land lying beyond the 80th parallel of north latitude, embracing within its immense area nearly 2,500,000 square miles, and retaining within its grasp a secret that is perhaps even more desirable for its commercial advantages

than any one of the numerous incentives to the tracing of old Nile itself.

“As a family,” says the geographer Behm, “will of course know all the rooms of its own house; so man, from the very beginning, has been inspired with a desire to become acquainted with all lands, oceans, and zones of the planet assigned to him for a dwelling-place.” The vast unknown region of the Arctic has constituted no exception to this rule. Within its mysterious circle has lain for ages the goal of geographical ambition. At the present time, especially, it is the centre of universal interest; and for men of science, in almost every department, it teems with numberless interesting and instructive problems.

Until within a comparatively recent period, however, the objects which prompted men to Arctic discovery were almost exclusively based on self-interest, or, in other words, were merely incidental in their character. The hope of shortening the passage to “far Cathay,” by sailing to the North-west or to the North-east, has induced by far the greater number of the Arctic expeditions; and the history of these attempts would, in fact—at least until within the last thirty years—constitute the history of Arctic exploration.

Nor can we here entirely pass over these essays. Although they incidentally involve almost the whole work of Holland in the Arctic field, as will be seen later, yet, in the commendable but futile struggle to force a passage to the East by the northward, England has borne a part conspicuous above that of any other country; and, considering her important work following upon the long struggle of the "Passages," she thus becomes the grand modern exemplar in Arctic enterprise. Indeed, whether recounting the history of Northern voyaging in general, or, as in the present instance, aiming to reawaken to Arctic work a former rival of England's in all maritime doings, it is impossible not to treat, in some form or other, of the labours of the latter.

Almost from the hour when Columbus promised a way to the East "by the West," England tenaciously held to the possibility of finding a navigable passage in that direction. Nor this only. She has willingly employed in the great quest men of foreign birth; for the Venetian Cabots, sailing from Bristol, were the first to attempt a North-West Passage, unless we except the rather indefinite essay of Columbus, made only a little earlier.

Englishmen, it is true, have sought to reach this

goal of early mercantile endeavour by sailing to the North-east. Indeed, some time before Holland awoke to commercial rivalry with England, Sebastian Cabot himself—pensioned and appointed “Grand Pilot” of England after 1548, in recognition of his great services to his adopted country—brought about the despatch of Sir Hugh Willoughby and Richard Chancellor on the first voyage ever projected to discover a North-East Passage; and the same venerable seaman cheered brave Stephen Burrough when, three years later, he sailed on his North-eastern voyage of discovery for the Muscovy Company, which resulted in the partial exploration of Novaya Zemlya and the contiguous coasts and islands. Beginning with the expedition of Willoughby, in 1553, and ending with the essay of Captain John Wood, in 1676, to discover a passage to India by the North-east—mainly prompted by the signal hopes which the intervening Dutch Northern voyages had inspired—the long series of attempts by that course, undertaken with merely commercial aims, practically closed.

After this time, however—from the attempt of Captain Phipps (afterwards Lord Mulgrave), a century later, to the last expedition of Sir Edward Parry, in 1827, including the attempts of most of

the Russian explorers, down to Wrangell—for Hudson, in the case of his two North-eastern voyages for the merchants of London, but particularly the first, had quite distinct ideas of going *viâ* the Pole—various expeditions with this object in view, and with that of Arctic research in addition, sought to pierce the ice barrier to the east of Greenland, though the voyage of Parry was almost exceptional as being a distinctive attempt to reach the Pole. The expedition of Pet and Jackman, so far back as 1580, appears in reality to have been the last expedition of any importance sent out by England exclusively to discover a North-East Passage.

But about a hundred years after the expedition of Wood, which closed the long list of North-western and North-eastern voyages made during the seventeenth century, the grand dream of the merchants was a North-West Passage—the solution, in fact, of the very problem which Sir Martin Frobisher in his day declared to be “the only thing left undone in the world whereby a notable mind might be made famous and fortunate.” To this quest, however, a little variety was given when, in 1776, Captain Cook was despatched in search of the same passage, by sailing north-east from Behring’s Straits. Yet he but poorly succeeded, reaching no higher

than $76^{\circ} 44'$ N. ; and his successor in command, Captain Clerke, in an endeavour immediately following, only shared a similar disappointment (in spite of the tempting bait of £20,000 which Parliament had long been holding out to any British discoverer of a North-West Passage) ; but M'Clure and Collinson, later, were more fortunate.

For this particular idea England was always a firm contender. Faith in the existence, and even practicability, of such a passage led to several attempts being made from this time forth to thread the frozen archipelago north of British America. Belief in the North-West Passage theory, indeed, held a place in the minds of men longer far than did the one relating to the course to which the Dutch were always more or less favourably inclined, and, even from the Cabots to Ross and Parry, it prompted thitherward many an English navigator. Nor did it cease to do this until the existence of a water way was finally proved, and until, on this particular altar of discovery, was placed the priceless offering of the noble Franklin and his brave comrades.

Well has it been said that the North-West Passage has been to the seamen of England for the past two or three centuries what the Holy Grail was to

the knights of King Arthur's time; and, in spite of the gallant achievement of M'Clure, Forster had long before perceived the truth when he declared that "the impossibility of a North-West Passage in a navigable sea was an established fact, and would so remain until a changed revolution of the earth should define new boundaries to the realms of Neptune and Pluto." But just as the unhappy fate of Barents, as we shall see, discouraged the Dutch attempts to reach the East through the Arctic seas, so the loss of Franklin and his fellows caused Englishmen to pause in the vain endeavour to find a commercial highway thither *via* Wellington Channel or Melville Sound.

However, the numerous searching expeditions despatched by England in the next ten or twelve years, and which were, in one sense, but the natural outcome of her centuries of endeavour, imparted at length a new phase to Arctic exploration. It was gradually discerned to be a work promotive in the highest degree of a heroic, naval spirit, and most essential of prosecution in the pure interests of science. It is especially because of the new era thus inaugurated by England in Arctic research that we have thought fit to dwell in advance upon her labours—so well calculated to stimulate other

countries to emulate her example, which the great quest for Franklin, in particular, undoubtedly did to a large extent. Nor were the comparatively thorough exploration of the North American edge of the Polar regions by the various expeditions and land parties sent out between 1847 and 1859, with the humanitarian charge to find the lost men, or distinct vestiges of them, as the first object, and the important American expedition under Dr. Kane, which opened up new fields to future Arctic explorers—albeit his own somewhat wild reckoning took him far north of the real object of his quest*—the least of the results which accrued to the world from the Franklin searching expeditions, the influence of which, while extending to other countries, was destined not to be lost upon England herself, though until recently she has for so long a time been reposing on her laurels.

* Dr. Kane, apparently with mingled feelings of satisfaction and chagrin, records the fact that, on his return to Upernavik in the autumn of 1855, “Franklin’s party, or traces of the dead which represented it, had been found, nearly a thousand miles to the south of where he had been searching for them.” But if this instance of signal miscalculation must be charged against the discernment of the explorer whose rare ability and skill rendered him almost prescient, it will not appear so strange, after all, when it be remembered that Arctic *savans* no less renowned than Dr. Petermann had declared, “that the ‘Erebus’ and ‘Terror’ were beset near the Siberian coast, and that the best way of reaching them was by sailing across the Polar ocean between Spitzbergen and Nova Zembla in the middle of winter!”—*Quarterly Review*, vol. cxviii. p. 152.

CHAPTER II.

HOLLAND'S ENTERPRISE AND DUTY.

THE foregoing brief outline will perhaps have served to show what an attraction the mysterious North Polar region has had for England. For the Dutch, however, in a scarcely less degree than for the English, the Arctic field has in the past possessed a singular magnetic power. England and Holland, indeed, may be said to hold as of right a sort of quit-claim on the North Pole. They have not, it is true, discovered its secret, but their hardy navigators were among the earliest to undertake the quest, and strive with invincible courage to force their way through the ice-barrier. Yet it is a noteworthy fact, as applicable to Holland, that since brave Hendrik Hudson, in the employ of the Dutch East India Company, nearly 270 years ago, made the attempt to reach the long-sought goal of Cathay by pushing his way through the ice-clogged

waters round Novaya Zemlya, but, abandoning that enterprise, turned his bark southward, and founded in the New World another Netherland, upon which a second Amsterdam arose, the work of Holland in the field of Arctic research has been comparatively *nil*.

When we consider the vast number of voyages that have recently been made in pursuit of Arctic discovery by various nations, the absence of Holland for so long a time from this field is remarkable, and the propriety of her re-entering the arena by the side of her old rival on the seas may well suggest itself to those who have at heart the fame of that ancient European commonwealth.

But whilst allowing to Holland the utmost credit for her early achievements in the field of Arctic discovery, and conceding to England a far more noteworthy position in the same field, we must not forget that within recent times other countries—even some of those most secluded from the Northern seas—have sent forth expeditions to contest the time-honoured claim of these two nations. It was, we fear, greatly because of the shame felt at England's inaction for so long a time past that, moved by an unanimous public sentiment as interpreted by a powerful press—with the notable exception of the "Times," which actually opposed this movement—

the Government were brought at length to concede the demands made by science and civilisation in this respect upon the British nation.

But little more than two years since, the learned President of the Royal Geographical Society, at the head of a deputation to urge upon Her Majesty's Ministers the propriety of sending out a Government expedition to the Arctic regions, used these words: "Every first-class power of Europe and America, except England, has sent forth expeditions for Arctic discovery during the last twelve years;" and he further urged that, as no scientific expedition had been despatched by England since 1845, it was high time that she resumed her old place in the van of Arctic research. But now that an Arctic expedition has been sent out, with liberal Government support, ably officered and well manned, and fully equipped for a long absence from British shores, these words and those arguments have lost their force and application with reference to England.

The language may, however, still be read with profit by Netherlanders. It is impossible, indeed, that the quotation should not possess a double point for them, and for every one who holds in special regard the fair fame of Holland in the

past, or who would see her evidence in the future, by her unwonted enterprise, if not by might, her claims to a first-class position in Europe, so far, at least, as a nation of scarcely four millions of people may hope to do.

The sphere of Arctic discovery affords in no small degree a chance for this to be done. The nation which in its earlier career girdled the earth with a belt of settlements; which can boast her Van Linschotens, her Heemskerks, her Vlamings, her Tasmans, her Le Maires, her Van Noords, her Houtmans; which is able to contribute to the annals of maritime adventure perhaps the most important, and to those of Arctic exploration certainly one of the most interesting, of chapters; and which has been all this time accustomed to the sea, cannot be wanting in any of the elements requisite for a Polar expedition worthy of the age and of any people, or in the capacity for achieving all the success that is possible in this direction.

The Dutch, moreover, may perhaps fairly encourage themselves by the idea that no power in the world can wrest from them their early-won distinction in this field of enterprise. In the three voyages of Barents 280 years ago, as described in the simple narrative of his companion voyager and

diarist, Gerrit de Veer, but especially in that memorable third voyage, and the wintering in Novaya Zemlya, which the pen of Tollens has immortalised in their poetic literature, the Dutch have something so gallant and heroic to point to by way of attempts to solve the great Polar mystery, as seems to render comparatively secure their Arctic fame, and almost to excuse the inertness which has characterised them in this particular in more modern eras. There are considerations, however, which even here outweigh, as will presently be seen, this willingness to rest in possession of past glories.

Situated as Holland is out of the current of European travel, and, moreover, walled in by the almost insurmountable barrier of her cherished language, the world is (and is but too likely to continue) in comparative ignorance of the important undertakings of the Dutch within the confines of their own territories. Yet let her join the ranks of modern explorers, and send forth a national expedition to the North Polar seas, and her labours will assuredly not go for nought in the estimation of other countries.

It is true that Holland is not without just claims to be considered as already within those ranks, so far as inland discovery is concerned. Has not she

sacrificed on the altar of Nile exploration literally of her fairest? *

Travellers in her Eastern possessions, too, have brought back and given to the world, within the last few years, valuable scientific fruits. More than this, it is not unknown that the Dutch are already occupied with the subject of equipping a

* Most of our readers will no doubt readily recall to mind the lamentable fact to which we here refer, namely, the death of the enterprising Dutch ladies, Madame Tinné and her sister the Baroness Van Capellan, in 1864, and later that of Miss Alexandrine Tinné, daughter of the former. The deaths of the two first named occurred as they were making a half-pleasure, half-exploring tour up the White Nile; whilst Miss Tinné, the real inspirer of these bold enterprises of woman, was cruelly assassinated by false Tawarek chiefs, when proceeding upon her principal expedition, destined for the heart of Africa.

The remarkable life of Miss Alexandrine Tinné, it may be observed, has not lacked biographers in many languages, and her dauntless courage, exhibited in another way, was well worthy the country of Kenau Hasselaar. In our own language Professor William Wells, of Columbia College, has paid, excellently, his part of the considerable debt which New York owes to Holland, in his "Heroine of the White Nile;" while in Holland itself the Secretary of the Dutch Geographical Society, Mr. N. W. Posthumus, has performed a lasting service to Geographical Science by giving to the world an elaborate address, delivered by him before the Society, setting forth the claims of Miss Tinné to a place in the honoured roll of African explorers. And, *apropos* of our own subject, it is not unworthy of mention that, to use the words of Professor Wells, "her first great journey was to the North Cape, away up towards the frozen oceans," having been carried out under the guidance of a celebrated Norwegian artist. Thus the region which attracted Barents and his fellows so long ago was the first to charm this martyr-heroine of Barbary plains and of Holland's later history.

private expedition for the better exploration of Sumatra, their possessions in the East being so extensive that no thorough exploration of any portion has yet been made. The extent of the Dutch Indies, which seem relatively so small, will perhaps be better realised when it is understood that the coast of Acheen is itself as extensive as that of France.

And perhaps it may be here remarked, with reference to the Arctic whaling ventures of the various nations (which have contributed largely to train men for more momentous service), that the Dutch during a long period characteristically contended for the prizes in this field; and the sum of knowledge of the Spitzbergen and Greenland seas, gathered by Commodore Jansen, of the Dutch Navy, together with his observations upon the habits of the cetacean tribe in those waters, no less than in the broader sphere of nautical science, have been gladly recognised by both England and America.*

* See, among others, his article on the Gulf Stream in "Ocean Highways and Geographical Review," New Series, vol. i. p. 98. In this article the writer defends the late Lieutenant Maury's system of research, if not indeed his general opinions, against the criticisms of Professor C. Wyville Thomson. True to the memory of his friend, Commodore Jansen also contributed to the same magazine an interest-

But in the field of true Arctic discovery—the only one now offering genuine inducements to national enterprise—it must be owned that Holland has to point alone to her early deeds. There is great danger, moreover, if she do not set up anew her landmarks, that the names which her navigators placed on Polar charts, like those in so many other parts of the globe, will soon have become totally erased from the maps, and ere long forgotten, completing the analogy which has been traced between Holland and Phœnicia, by bequeathing no native contemporary record of her own immortal deeds.

The enduring honour which associates itself in successive generations of men with the discovery and naming of landmarks, affords the surest materials out of which to reconstruct a nation's history when its literature may, perchance, have perished. Already has Mr. Motley very pertinently queried—“Where are Cape Nassau, William's Island, Admiralty Island, Cape Plancius, Black-hook, Cross-hook, Bear's-hook, Ice-hook, Consolation-hook, Cape Desire, the Straits of Nassau, Maurice Island, Staten
ing sketch of the life of Maury, shortly after his death, and likewise furnished that most readable and instructive account of the phenomena of land and sea breezes given in Maury's Physical Geography of the Sea.

Island, Enkhuyzen Island, and many other similar appellations?" *

May not the nations whose representatives on the seas have placed upon the chart of the Novaya Zemlya and Spitzbergen region the names of Cherie Island and Alderman Freeman's Strait (the Bear Island and Walter Tymens' Strait of the Dutch), Swedish Foreland and Ice Fjord,—nay, and Capes Bismarck and Petermann, be held mainly answerable for this work of cosmographical sacrilege?

The Dutch, arresting their efforts in the far North with the early undertakings of Barents and his fellows, and prudently contenting themselves, we had almost said, with cartography in the kinder climes of the New World, where they employed (with possibly better success) some of the same names so dear in Fatherland, and also with the consolidation of their equatorial empire in the East, have not sought the honours of nomenclature for the American Polar regions. But it may safely be assumed that discoverers in those parts would not like to see the names whereby they have there marked their enterprises—such names as recall memories of Washington and Jackson, of Jefferson and Lincoln, of Ellesmere, Franklin, Peabody,

* History of the United Netherlands (London: John Murray, 1867), vol. iii. p. 558.

Grinnell, Kane, Parry, Kennedy, Ross, and Hall—thus rudely defaced or ignored by later voyagers. There is but one course, therefore, for the Dutch to pursue in this respect, and that is, to furbish anew the courage and daring which characterised them in former times, and assert their right to recognition in the face of the world; insisting in future, at all events, on a fair division and acknowledgment of geographical distinctions.

It could perhaps be fairly argued that Holland has a theme of tolerably engrossing interest before her in the Achenese war, while England resorts to Arctic exploration at a time of profound peace throughout her dominions, when her seamen are rusting in indolence, and when there is no valid gauge of the sufficiency and completeness of her naval resources.

Yet we cannot think, notwithstanding this possible plea, that Dutch spirit would allow of entire excuse on such grounds. Acheen, though it may draw somewhat both upon the blood and the treasure of the nation at home, can cause little more than a mere diversion of Holland's strength and resources; while even viewed from this standpoint, the expedition of Captain Hall, conceived and (in part) conducted in the height of the American Civil War, and the second German expedition, originated

by Dr. Petermann and commanded by the gallant Koldeway, which was being prosecuted when all Germany was in arms, prove that Arctic investigation, like many other objects of science, may make headway through the instrumentality of countries apparently diverted, at the time, by warlike pursuits. Nor does France, in a certain sense, furnish a less encouraging example. Indeed, we have the best authority for saying that the Arctic expedition, projected shortly before the war by Lieutenant Lambert, of the French Navy, and almost on the point of departure when his country became suddenly involved in desperate strife, was abandoned for no real want of resources, or of resolute purpose on the part of Frenchmen to prosecute Arctic enterprise, even amidst national disaster, but solely because of the death of the gallant promoter of the undertaking.*

* The project of M. Gustave Lambert, perhaps not very familiar to our readers, was one of three much-discussed schemes for penetrating to the Pole by different routes, which came up after the year 1865. The schemes were ably discussed before the French public by the distinguished geographer and present President of the Council of the French Geographical Society, M. V. A. Malte-Brun, in his work entitled "*Les Trois Projets d'Exploration au Pôle Nord,*" meaning thereby the English, German, and French propositions for advancing towards the Pole. In this work were fairly examined the respective values of the plans of the late Admiral Sherard Osborn, by Baffin's Bay and Smith's Sound, now being carried out by the English expedition under Captain Nares; that by Spitz-

Were it not that the demands of science are blind and unreasoning, the Dutch might very well urge, as a counter-argument to these for the renewal of Arctic research on the part of Holland, the fact of the great expenditure now being incurred by the country in prosecuting her public works; for no nation beneath the sun is engaged in more stupendous enterprises for the development of its home and colonial resources than is Holland at the present time. Enough to state that she is forthwith to take in hand the recovery of a large portion of the Zuyder Zee, by which bold undertaking nearly six per cent. in productive acreage will be added to the national area.

But assuming that States-General and Cabinet see not their way clear for such an enterprise as we would here advocate, under the distinct sanctions of Governmental support, may it not be that some modern Plancius will come forth and persuade the wealthy merchants of Amsterdam themselves to fit out an expedition worthy of their great city? Let one of her own respected citizens furnish the reply: "As the city of Amsterdam at the close of the sixteenth century promoted Polar expeditions, when Bergen, as advocated by Dr. Petermann and supported in England by General Sabine, and that by Behring's Straits, as projected by Lieutenant Lambert, and endorsed by the learned societies of France.

the States, despairing of success, had become discouraged, so shall the Amsterdam of the second half of the nineteenth century demonstrate that it is still the life-giving heart of the nation, exhibiting not a feeble pulsation, but the central fountain, whence streams forth a vigorous, beneficent pulsation to all the other parts." * From such a city and capital it is reasonable to entertain large hopes in regard to the matter of Holland's engaging anew in Arctic research.

It is worth bearing in mind that during the eventful period of maritime discovery, in the sixteenth and seventeenth centuries, every attempt practically to pass the barriers of the far North was made at the cost of private persons, or, rather, at the expense of companies of merchants; and in later times, also, the world has been largely indebted to private enterprise for such knowledge as it has been able to gain of the Polar regions. An example is at the present moment being furnished to our times of what even individual enterprise may do in promoting the advancement of geographical discovery, leaving out of the account here the almost continuous Arctic researches of Professor Nordens-

* N. W. Posthumus, *De Nederlanders en de Noordpoolexpeditiën*, p. 36.

kiöld, sustained by the munificence of private capitalists of his country. Witness the despatching, by the proprietors of two great metropolitan newspapers in London and New York, of the already successful Central African expedition, under the leadership of the brave discoverer of Livingstone. In one of these instances, indeed, the display of individual enterprise has extended to Arctic research.

Obviously, however, no expeditions in the world stand more in need of the financial aid, skilled experience, and disciplinary control which Governments only are able properly to command, than those having for their end the attainment of the North Pole; and the little pinnace "Search-thrift," in which brave Stephen Burrough set sail in the spring of 1556 from Gravesend, and the quaint 100-ton ship "Mercurius," of Barents, with its fishing-smack tender, which left the Texel on the 5th of June 1594, or the two vessels of the famous third voyage, commanded by Jacob van Heemskerck and Jan Corneliszoon Ryp, which sailed from Amsterdam on the 10th of May 1596, not to speak of the diminutive cock-boat "Hopewell," of the Muscovy Company, in which Hudson in 1607, with a crew of ten men and a boy, thought to sail straight across the Pole to Japan, and actually reached

nearly the highest latitude that has ever been attained, contrast strangely enough with the perfectly appointed screw-steamers "Alert" and "Discovery," of the Arctic expedition recently launched by England.

CHAPTER III.

GOVERNMENT EXPEDITIONS.

AT this point Mr. Clements Markham's observations on the value of Government expeditions recur with peculiar cogency and force, and this subject may not perhaps unreasonably claim some notice at our hands.

That clear and thoroughly competent author and geographer (a cousin, we believe, of the accomplished seaman whom England has sent out in secondary command of her expedition) states that during the searches made for Sir John Franklin, officers and men sought Arctic service as the most popular employment in the navy. There is no doubt that private expeditions, without naval discipline, inefficiently equipped, and inadequately provisioned, are exposed to great dangers; but so would they be in all other parts of the world. It is for this reason that all officers with Arctic experi-

ence insist upon the necessity for a Government naval expedition, and for officers and men being under naval discipline and control.

An Arctic expedition, Mr. Markham tells us—speaking, too, with Arctic experience—must be thoroughly equipped, wanting nothing that can be deemed essential to either its success or safety; and such thorough provision is only likely to be made by Governments, acting through experienced Arctic and naval officers. Moreover, in the case of considerable numbers of men passing through an Arctic winter, naval discipline and naval *esprit de corps* are extremely important. In this view the Hon. George M. Robeson, Secretary of the United States Navy, now fully concurs. In his report to the President, after examining the rescued men of the “Polaris,” he emphatically says that “there is little of either success or safety in any expedition which is not organised, prosecuted, and controlled under the sanctions of military discipline.”

The dangers of Arctic navigation are thoroughly understood; and those who are best acquainted with them, through a long practical experience, are the best—indeed, the only—authorities as to their value. Sir George Back is not the man to advocate the exposure of his professional brethren to undue risks.

No one knows better what those risks are than the brave officer who battled so long with the Spitzbergen ice, who starved with Franklin on the barren lands of Arctic America, and who wintered in the moving pack. Nor (as Mr. Markham well says) are Collinson, Ommanney, Richards, M'Clintock, Sherard Osborn, or Vesey Hamilton, the men to give foolhardy advice. Yet all are of opinion that, with modern appliances, and by working in the light of former experience, there is no undue danger in Arctic service, provided that the expedition be under naval discipline and Government control.* To quote, on the last point, the very words of one of the most venerated of these authorities, the late Admiral Osborn: "An exploration of the Polar area should always be sent under naval auspices and naval discipline. I have no faith in purely private expeditions on such a service as this I advocate."†

Touching the attractiveness of Arctic service for brave seamen, the English Board of Admiralty could attest how very few of their own Polar ex-

* *The Threshold of the Unknown Region.* By Clements R. Markham, C.B., F.R.S., Secretary of the Royal Geographical Society (London: Sampson Low & Co.), fourth edition, p. 281, *et seq.*

† Paper in advocacy of an English Arctic Expedition, entitled "The Exploration of the North Polar Region," *Journal R. G. S.*, 1866, p. 279.

plorers have been content with one voyage, and with what dogged pertinacity they press upon reluctant Governments the fitting out of fresh expeditions to those seas, which are at once so awful and yet so fascinating. Practical illustration of this is furnished by the distinguished authority just cited. Captain Osborn states, in the same paper from which we have quoted, that he had frequently been asked by old shipmates, "Are we going up that way again, sir? Please don't forget I am a volunteer."

As already intimated, the danger from Arctic service is by no means so great as it might at first glance seem to be. This may be seen by the low percentage of deaths furnished by this service. A distinguished naval officer, who has served in the Arctic regions, declares that "of all the seas visited by men-of-war, the Arctic have proved the most healthy;" and Mr. Posthumus observes that since the year 1841 England and America have sent out thirty-two expeditions, the total number of deaths from which has amounted to only 38 men, or 1·7 per cent.; which would only appear relatively more favourable were it to include the expeditions of the Swedes, Norwegians, and Germans.* Also, the late

* *De Nederlanders en de Noordpoolexpeditiën*, p. 31.

Lieutenant Maury, in 1865, stated before the Geographical Society of London, what would be equally true at the present time, that "if they looked at the wreck-charts, they would see that more lives were lost in sight of our own shores during last year than had perished during forty and odd years in all the Arctic expeditions put together."

Dr. Hayes furnishes some important testimony bearing upon this point, and at the same time arguing for the general cheerfulness prevailing among Arctic crews, itself a great conservator of health. In the journal of his voyage in the schooner "United States" in 1861—made, however, at the expense of private enterprise—he records the fact that they "were always and had been in perfect health," that "he was his own 'ship's doctor,' and a doctor without a patient;" and that, "believing in Democritus rather than Herculitus, they had laughed the scurvy and all other sources of ill-health to shame."*

Sad and tragic as was the fate of the brave men of the "Erebus" and "Terror," Sir Roderick Murchison, writing in 1869—and dwelling for the

* The Open Polar Sea. A Narrative of a Voyage of Discovery towards the North Pole, in the Schooner "United States." By Dr. I. I. Hayes. New edition, illustrated (London: Sampson Low & Co., 1867), p. 201.

moment only on the reflection that, while the North-West Passage had been solved by the heroic self-sacrifice of Franklin, Crosier, Fitzjames, and their associates—could truly say that the searches after them had entailed only “a very small loss of life,” and, “whilst adding prodigiously to our geographical knowledge, they had, in times of peace, been the best school for testing, by the severest trials, the skill and endurance of many a brave seaman.”*

In the light of the present advanced stage of Arctic navigation, which the Parrys and M'Clintocks have reduced to a science, and rendered comparatively safe, well does Mr. Markham say of such an enterprise as this we would here urge upon Holland, “It is one which, while requiring the highest qualities of seamen to conduct successfully, and involving dangers and hardships to individuals such as it is the pride of naval men to laugh at and overcome, it is yet absolutely free from a chance of any such catastrophe as overtook Sir John Franklin and his gallant crews.”† Much less would it be likely to entail the experiences

* Preface to Sir F. Leopold M'Clintock's Voyage of the “Fox.”

† Threshold of the Unknown Region (Sampson Low & Co., 1876), p. 273.

undergone by Barents and Heemskerk in their rude crafts.

In the organisation of the early Dutch expeditions, of which ampler narration will hereafter be given, it is true that the enthusiasm of Linschoten and Barents, and the active zeal of Plancius and of the Enkhuyzen Pensionary Maalson, did not pass as of small moment with the enlightened statesmen of their time. Prince Maurice and the illustrious advocate Barneveldt embraced thoroughly the theory of a North-East Passage to the seats of Oriental commerce, and the States-General gave their support to the second expedition, firmly believing that the speediest of ocean-routes to Cathay was already, to all intents, within their power of attainment.

This was, in fact, a Government expedition, and consisted of seven ships—two from Enkhuyzen, two from Zealand, two from Amsterdam, and a sort of reporting yacht from Rotterdam. It ultimately proved a more signal failure, however, than the less ambitious experiment previously made, so much so that it might be accepted by believers in omens as an unhappy augury for future Government expeditions on the part of Holland.

On the return of this expedition, the Govern-

ment, after mature deliberation, decided to prosecute the search for the North-East Passage no further at the public expense. The States-General, however, worthily closed the public record with respect to Dutch Arctic enterprise by offering a reward of 25,000 florins to any navigators who should accomplish a voyage to China by the desired route, and a proportionate sum to those whose efforts towards its achievement might be deemed commendable, even though not crowned with success.

This was highly honourable to Holland. But perhaps, in spite of all, it was more to the national honour, and especially to the immortal renown of Amsterdam, that, thanks to the chief pilot of these voyages and to the cosmographer Plancius, the first city of the country did not allow these undertakings to close with the second voyage. Amsterdam listened to the representations of Barents and Plancius. A third and final expedition was fitted out. It realised few of the hopes, we must acknowledge, of its sanguine projectors, but it made their names for ever famous in the annals of Arctic exploration, and it gave to the world the first authentic instance of civilised men penetrating to within less than ten degrees of the North Pole.

CHAPTER IV.

POLAR PROBLEMS.

BUT what are the prospects as to the solution of the North Polar mystery for those countries whose spirit of enterprise shall prompt them to co-operate with England in her laudably resumed labours ? Far be it from us to encourage too ardent and sanguine expectations, the disappointment of which must incalculably diminish the enthusiasm of the millions—an enthusiasm before which, in these matters at least, a Government, if it be wise, will bow. Yet, on a calm review of the position, it is scarcely possible to resist the conviction, that now, if ever, the steady prosecution of Northern geographical research, sustained by various Governments in friendly rivalry, promises a rich harvest of results to those engaging in it, and the work of Holland would certainly not prove the least remunerative.

The mythological fables of centuries ago—the

weird fictions of the barnacles and of the men whose heads were borne beneath, instead of upon, their shoulders, were dispelled by the early Dutch voyagers. The dreams of Golcondas in the East, awaiting the discovery of shorter than the ordinary routes to bring their treasures nearer the commercial centres of European civilisation, are given up for ever. In the North-west, M'Clure, rewarded by the British Parliament for following a water-line which he conclusively demonstrated could yield no navigable passage, has shown the futility of the effort to realise it; and in the North-east the serried masses of ice encountered and sought to be forced with almost superhuman bravery by men of every European race, effectually disposed of the hope of navigating, to any great extent, the frozen sea which bounds Asia on its northern side.

The threshold of the unknown region, indeed, has been ploughed by ships and narrowly scanned by competent observers to such an extent that, while it may, perhaps, be said we do not know what can be discovered, we do certainly know where all anticipations of further progress are altogether in vain. It is upon no merely speculative chance of attaining a knowledge of the unknowable that the "Alert" and the "Discovery" have been

equipped from English shores. Those vessels go to reap the harvest of fields discovered, though not traversed, by the American explorers Kane and Hayes, but especially by the gallant Hall in the "Polaris."

The issues of that latest American expedition are clear and determinate. It may be true that the vessel was not built, nor equipped, nor manned for pushing on to higher northern latitudes than those that were attained; and that the death of her commander, and the lack of the moral force of disciplinary control on the part of his successor, might have brought disaster to the expedition had resolute endeavours been put forth to gain the immediate vicinity of the Pole, as was evidently Captain Hall's desire and intent; but the *consensus* of opinion of the officers, numbering in their ranks at least one experienced Arctic navigator, and more than one man of science, tends to establish firmly the belief that there is, at certain seasons of the year, even by the channel which forms so great an artery for the downward flow of the vast ice accumulations of the Arctic winter and glacial region, an open, navigable way to the Northern point of radiation.

So far has evidence been gathered up that bears definitely out the conviction pointing to the exist-

ence of ways to the Pole, that dissuasion falls idly upon men now, as long ago it fell upon the ears of Columbus, when his eager eyes saw the floating evidences, washed by the waves of the Atlantic upon European shores, of the existence, far away to the west, of a world not identified by the geographers of his time.

Present this evidence at any great length we cannot here. The broken ice, however, driven through clear water by strong winds from the north-east; the increasing mildness of the climate the farther northward the "Polaris" steamed in Robeson Channel; the trend of the coast-line of Greenland away towards the east, indicating (as was originally suggested by the scientific acumen of Dr. Kane) its probably true cosmographical existence as a vast island, rather than as a continent jutting down from the Pole; the prevalence to the north-east of Robeson Channel of densely-laden water-clouds, which could not well have been there had the further expanse been securely ice-bound; the large herds of game roaming the highest known northern lands; the flight of birds away from the more southern ice-fields, as if in quest of genial atmospheric conditions and sustenance at the North; and the presence among their winged

coveys of species that brood upon islands for the safety of their young—pointing fairly to the existence of islands in open water: these and other definitely noted facts are even more persuasive to further investigation than the same order of data observed by Columbus could have been to the search for the American continent.

The latter argument is worthy of being further dwelt upon. It is a singular fact that birds that in the warm months of summer seek the congenial air of European countries, are known to fly away at the approach of the cold season, unresting on the wing, almost blackening the horizon by their numbers, far over perpetually frost-bound Greenland, as if *en route* to a tropical atmosphere in the immediate vicinage of the Polar axis.

The knot and the brent goose, the latter well known among the summer visitants of Holland, find Europe too severe, toward the close of the autumn, to tempt them to prolong their stay. The brent goose, of which Kane gives particular accounts,* has been observed to reproduce its kind only upon islands, natural instinct teaching the bird that its

* Arctic Explorations: The Second Grinnell Expedition in search of Sir John Franklin, in 1853, 1854, 1855 (London: Trübner & Co., 1856), vol. i. pp. 302, 303.

eggs are not safe where foxes roam at will. The knot, on the other hand, furnishes the singular example of a bird of which no egg has yet been found; the presumption being that it needs greater quietude and warmth than inhabited countries give to induce it to pair and multiply its species.*

Yet these feathered children of nature are known to take their periodical flight farther northward than the daring of man has penetrated. Here, surely, are the truest guides—dumb though they be—to the region we have been wont to imagine so hemmed in by eternal barriers of ice that life was impossible within its circle. Man may err, but Nature does not lie, and in following closely upon the heels of Nature it is impossible to mistake the clues that are available for the solution of Polar problems.

Some observations placed upon record by that illustrious explorer to whom science, in whatever relates to Arctic exploration, would seem to be superlatively indebted, recur to us at this point as worthy even of a somewhat extended quotation—marvelling as one is led to do at the apparent rever-

* See also an interesting account of this bird, quoted from Professor Newton, in Markham's "Threshold of the Unknown Region," fourth edition, pp. 304-306.

sal of those laws of nature, ordinarily so opposed to the conclusion, by which is rendered possible the existence of an open Polar sea.

“An open sea near the Pole,” says Dr. Kane, “or even an open Polar basin, has been a topic of theory for a long time, and has been shadowed forth to some extent by actual or supposed discoveries. As far back as the days of Barents, in 1596, without referring to the earlier and more uncertain chronicles, water was seen to the eastward of the northernmost cape of Novaya Zemlya; and, until its limited extent was defined by direct observation, it was assumed to be the sea itself. The Dutch fishermen above and around Spitzbergen pushed their adventurous cruises through the ice into open spaces varying in size and form with the season and the winds; and Dr. Scoresby, a venerated authority, alludes to such vacancies in the floe as pointing in argument to a freedom of movement from the north, inducing open water in the neighbourhood of the Pole. Baron Wrangell, when forty miles from the coast of Arctic Asia, saw, as he thought, a ‘vast, illimitable ocean,’ forgetting for the moment how narrow are the limits of human vision on a sphere. So, still more recently Captain Penny proclaimed a sea in Wellington Sound, on

the very spot where Sir Edward Belcher has since left his frozen ships; and my predecessor, Captain Inglefield, from the masthead of his little vessel, announced an 'open Polar basin,' but fifteen miles off from the ice which arrested our progress the next year.

“All these illusory discoveries were, no doubt, chronicled with perfect integrity; and it may seem to others, as since I have left the field it sometimes does to myself, that my own, though on a larger scale, may one day pass within the same category. Unlike the others, however, that which I have ventured to call an open sea has been travelled for many miles along its coast, and was viewed from an elevation of 480 feet, still without limit, moved by a heavy swell, free of ice, and dashing in surf against a rock-bound shore.*

* It is not, perhaps, too much to say that Dr. Kane's supposed discovery in this respect has already passed within practically the same category as those of the other explorers. Yet his successor, Dr. Hayes, on the 19th of May 1861, when planting the American flag at the northernmost point attained by him, from a high elevation beyond even Morton's farthest, looked out upon what gave every indication of being a vast open sea. The experience of Captain Hall, however, who exceeded Morton's farthest by nearly two degrees, and Dr. Hayes' by something less, proved their "open sea" to have been a mere Polynia, or water-hole. He found the supposed Polar sea to be "a sound opening into Kennedy Channel, with an inlet on the east, probably marking the north shore of Greenland" (*Nature*, vol. viii. p. 171).

“It is impossible, in reviewing the facts which connect themselves with this discovery—the melted snow upon the rocks, the crowds of marine birds, the limited but still advancing vegetable life, the rise of the thermometer in the water—not to be struck with their bearing on the question of a milder climate near the Pole. In this recapitulation of facts,” continues Dr. Kane—we have passed over the learned author’s observations on the evident gradual elevation of the Polar lands, climatic changes, and so forth—“I am not entering upon the question of a warmer climate impressed upon this region in virtue of a physical law which extends the isotherms toward the Pole. Still less am I disposed to express an opinion as to the influence which ocean currents may exert on the temperature of those far northern regions; there is at least one man, an officer in the same service with myself, and whose scientific investigations do it honour, with whom I am content to leave that discussion.* But

* Reference is undoubtedly made here to Captain Silas Bent, formerly of the United States Navy, whose theory of Thermometric Gateways to the Pole has attracted considerable attention among scientific men both in Europe and America. About the year 1855 Captain Bent discovered and traced out a corresponding stream in the North Pacific to the Gulf Stream in the Atlantic, and deduced a system of inter-oceanic circulation between the Arctic Ocean and the Atlantic and Pacific Oceans. His theory of the practicability of an

I would respectfully suggest to those whose opportunities facilitate the inquiry, whether it may not be that the Gulf Stream, traced already to the coast of Novaya Zemlya, is deflected by that peninsula into a space round the Pole."*

Scarcely less interesting are the remarks of Dr. Hayes bearing upon these same problems, but especially upon that question of an open sea at the Pole. He states at the outset of the account of his voyage that his chief object and aim was "to explore the boundaries of the open Polar Sea—at least to determine if such a sea did exist," and in a chapter upon the former he says—

"By referring to the circumpolar map, the reader will be able to form a more accurate judgment and a more correct understanding of what is meant by the term 'Open Polar Sea' than he could from the most elaborate description. He will observe that about the North Pole of the earth there is an extensive sea, or more properly ocean, with an average

approach to the Pole being made on the bosom of the Gulf Stream was first propounded in the winter of 1868-69, in an address delivered before the St. Louis Mercantile Library Association, which was published; and the theory was warmly espoused by, for one, Professor T. B. Maury, and ably discussed by him in "Putnam's Magazine" and the "Atlantic Monthly." A second address upon the subject, delivered by Captain Bent before the same society in 1872, is also published.

* Arctic Explorations, vol. i. pp. 306, 307.

diameter of more than 2000 miles. He will observe that this sea is almost completely surrounded by land, and that its shores are, for the most part, well defined, the north coasts of Greenland and Grinnell Land, which project farthest into it, being alone undetermined. He will note that these shores occupy, to a certain extent, a uniform distance from the Pole, and are everywhere within the region of perpetual frost. He will remember that they are inhabited everywhere by a people of the same race, to whom the soil yields no subsistence, who live exclusively by hunting and fishing, and confine their dwelling-places either to the coast or to the banks of the rivers which flow northward. He will observe that the long line of coast which gives lodgment to the Arctic nomads is interrupted in three principal places, and that through these the waters of the Polar Sea mingle with the waters of the Atlantic and Pacific Oceans, these breaks being Baffin's Bay, Behring's Straits, and the broader opening between Greenland and Nova Zembla; and if he traces the currents on the map, and follows the Gulf Stream as it flows northward, pouring the warm waters of the Tropic Zone through the broad gateway east of Spitzbergen and forcing out a return current of cold waters to

the west of Spitzbergen and through Davis Strait, he will very readily comprehend why in this incessant displacement of the waters of the Pole by the waters of the Equator the great body of the former is never chilled to within several degrees of the freezing-point; and since it is probably as deep, as it is almost as broad, as the Atlantic between Europe and America, he will be prepared to understand that this vast body of water tempers the whole region with a warmth above that which is otherwise natural to it, and that the Almighty hand, in the All-wise dispensation of His power, has thus placed a bar to its congelation, and he will read in this another symbol of Nature's great law of circulation, which, giving water to the parched earth and moisture to the air, moderates as well the temperature of the zones—cooling the Tropic with a current of water from the Frigid, and warming the Frigid with a current from the Tropic.

“Bearing these facts in mind, the reader will perceive that it is the surface-water only which ever reaches so low a temperature that it is changed to ice; and he will also perceive that when the wind moves the surface-water, the particles which have become chilled by contact with the air mingle in the rolling waves with the

warm waters beneath, and hence that ice can only form in sheltered places, where the water of some bay is so shoal, and the current so slack, that it becomes chilled to the very bottom, or where the air over the sea is uniformly calm. He will remember, however, that the winds blow as fiercely over the Polar Sea as in any other quarter of the world; and he will, therefore, have no difficulty in comprehending that the Polar ice covers but a small part of the Polar water, and that it exists only where it is nursed and protected by the land. It clings to the coasts of Siberia, and springing thence across Behring's Straits to America, it hugs the American shore, fills the narrow channels which drain the Polar waters into Baffin's Bay through the Parry Archipelago, crosses thence to Greenland, from Greenland to Spitzbergen, and from Spitzbergen to Nova Zembla,—thus investing the Pole in an uninterrupted land-clinging belt of ice, more or less broken as well in winter as in summer, and the fragments ever moving to and fro, though never widely separating, forming a barrier against which all the arts and energies of man have not hitherto prevailed."

CHAPTER V.

OPINIONS OF THE GEOGRAPHERS.

THE existence of an open sea at the Pole, and the question as to the presence at the Northern axis of our globe of those mighty currents—"the warm rivers of the sea," as they are termed by Commodore Jansen—which are known to exert so marked an influence on climates in other parts of the world, are certainly *among* the grand problems to be solved by that minute investigation which is looked for from future Arctic exploration.

It is pertinent to our subject to notice that singularly well-balanced opinions of high Arctic authorities upon these two points have not been withheld even in advance. For instance, Dr. Augustus Petermann, whose eminence as a geographer and Arctic authority we need not here proclaim, holds that "all facts connected with the geography of the Arctic regions, whether as

regards the extent of actual exploration or the observation on the currents, climate, drift-ice, and drift-wood, lead to the conclusion that the regions under the Pole consist of an expanse of sea and not land," and that the same would be found to be navigable; and his long advocacy of the Spitzbergen route has been largely based on the almost certain influence of the Gulf Stream for helping to attain the highest Northern latitude.

Another learned German writer, Dr. Joseph Chavanne, arguing from data furnished by the more recent expeditions, while sustaining the theory of the warm poleward currents of the Gulf Stream and Kuro Siwo, moreover deduces the conclusion that both an Arctic continent (or archipelago) and an open Polar sea would be found at the Northern axis of our globe.*

* The following are the several conclusions arrived at by Dr. Chavanne (see, for original paper complete, carefully discussing the subject, Petermann's "Mittheilungen," heft viii., 1874), which are certainly very interesting: 1. The long axis of the Arctic land-mass (which probably consists of an island archipelago separated by narrow arms of the sea, perhaps only fjords) crosses the mathematical pole; it thus bends round Greenland, north of Shannon Island, not towards the north-west, but runs across 82° and 83° N. lat. in a northerly direction, proceeding thence towards N.N.E. or N.E. 2. The coast of this Arctic continent is consequently to be found between 25° and 170° E. long. in a mean N. lat. of 84° and 85° , the west coast between 90° and 170° W. long. in a latitude from 86° to 80° . 3. Robeson Channel, which widens suddenly north of $82^{\circ} 16'$ N. lat.,

Sir Edward Sabine, a name distinguished among scientific discoverers and, as a companion of Parry and Clavering on important Northern voyages, a practical Arctic authority, has indicated his views upon both questions in one brief sentence. In his annual address as President of the Royal Society, in 1864, he queries, "May it not be possible that the iceless sea teeming with animal

still widening, bends sharply in 84° N. lat. to the west; Smith Sound, therefore, is freely and continuously connected with Behring's Straits. Grinnell Land is an island which probably extends to 95° W. long., south of which the Parry Islands fill up the sea west of Jones' Sound. 4. The sea between the coast of the Arctic Polar land and the north coast of America is traversed by an arm of the warm drift-current of the Kuro Siwo, which pierces Behring's Straits, and thus at certain times and in certain places is free of ice, allowing the warm current to reach Smith Sound. 5. The Gulf Stream gliding between Bear Island and Novaya Zemlya to the north-east washes the north coast of the Asiatic continent, and is united east of the New Siberia Islands with the west arm of the drift-current of the Kuro Siwo. On the other hand, the arm of the Gulf Stream, which proceeds from the west coast of Spitzbergen to the north, dips, north of the Seven Islands, under the Polar current, comes again to the surface in a higher latitude, and washes the coast of the Arctic Polar land, the climate of which, therefore, is under the influence of a temporarily open Polar sea; hence both the formation of perpetual ice, as well as excessive extreme of cold, is manifestly impossible. 6. The mean elevation of the Polar land above the sea diminishes towards the Pole. 7. The sea between Spitzbergen and Novaya Zemlya to Behring's Straits is even in winter sometimes free of ice, and may be navigated in summer and autumn. 8. The most likely routes to the Pole are—first, the sea between Spitzbergen and Novaya Zemlya; and second, the sea north of Behring's Straits along the coast of the unknown Polar land (*Nature*, vol. x. p. 230).

life, described by Kane as viewed from the northern limit of his research, is, as he himself surmised, but the extension of the same equatorial stream which produces corresponding abnormal effects at every point to which its course has been traced?" and adds, "When philosophical research shall be resumed within the circle which surrounds the Pole, this, perhaps, will be one of the earliest problems to receive solution."

On the first point, moreover, Sir Roderick Murchison, to whom science is so largely indebted and the revival of Arctic exploration is so greatly due, from his chair as President of the Royal Geographical Society (in 1865), had no hesitation in declaring it as his belief, based upon geological grounds, that there was "a Polynia, or sea, around the Pole," which he considered borne out, too, by the nature of the pack-ice north of Spitzbergen—attested by Parry, Scoresby, and other voyagers—"without a trace of these icebergs, carrying blocks of terrestrial remains, which float down Baffin's Bay from the glaciers on the coast of Greenland."

Again, Dr. I. I. Hayes, who has earned a right to be termed, perhaps, the highest living Arctic authority in America, believes not less than did his predecessor Kane, or possibly than Captain Bent,

in the existence of an open Polar sea, "navigable at least during the months of July, August, and September," also in the paramount influence of the Gulf Stream in tempering the waters of the Arctic Ocean;* and the greatest hydrographer of our times, the late Lieutenant Maury, held to the theory of an open sea at the Pole; while in France, M. Malte-Brun and other eminent geographers and men of science that might be named, practically endorse the theory of Lieutenant Lambert, which involves the existence at certain seasons of the year of a navigable Polynia, materially influenced by the mighty currents coursing their way to the Polar regions through Behring's Straits and between Novaya Zemlya and Spitzbergen.

The observations, moreover, of Hedenström, Anjou, and Wrangell—proud names, be it said, in Arctic annals—have led the Russian geographers to accept the theory that there is a part of the Polar Ocean always open; hence, indeed, the name Polynia. But neither Maury nor Hayes, we may here observe, could fairly be cited as encouraging the belief that the Gulf Stream, though its influence be ever so extended, may really serve as a means of approach to the North Pole.

* The Open Polar Sea (Sampson Low & Co., 1867), p. 317.

We only get incidentally, and in a general way, the opinion of Professor C. Wyville Thomson upon these questions. Both he and Dr. Carpenter, in dealing with the subject of ocean currents, have found sufficient in the Gulf Stream to absorb their attention, and, from its important bearing upon our subject, that stream will, further on, demand somewhat more special notice. Professor Wyville Thomson, however, attaches little importance to Behring's Straits in the marvellous economy of circulation at the North Pole. In an important chapter on the Gulf Stream in his work entitled "The Depths of the Sea," he indeed goes so far as to say (p. 397), that "The North Atlantic and Arctic seas form together a *cul-de-sac* closed to the northward, for there is practically no passage for a body of water through Behring's Strait."

It is easier, perhaps, to cite distinguished authorities whose speculative notions tend to the belief, particularly, in an open Polar sea, than those of a positively opposite opinion; yet it is fair to say that the most practical men in Arctic research—such as Sir George Back, Sir Leopold M'Clintock, Mr. Clements Markham, and especially the late Admiral Osborn—are exceedingly sceptical upon both of the points we have named. Indeed, the last eminent authority,

and a very Sir John Barrow for his zealous advocacy of Northern research, doubted seriously whether there was "any open sea round our Arctic Pole," and was equally sceptical as to any Gulf Stream route to the Pole, though, as an experienced navigator, he was sufficiently convinced of the wide prevalence of what he terms "the laws of those mysterious currents which flow through the waters of the ocean like two mighty rivers—the Gulf Stream and the Ice Stream;" while the accomplished geographer upon whose shoulders his Arctic mantle may be said especially to have descended, looks to sledging expeditions, with ships merely for centres, as the main hope of solving Northern problems even at the Pole itself, and thinks that "the Gulf Stream slowly mingles with the Polar current, and eventually its waters go south again along the east coast of Greenland, on the surface." *

While numerous opinions, *pro* and *con*, might be cited upon these questions, it could avail little to multiply them, since nothing can be really decided except by actual research. And they may well be submitted to the test of practical investigation, if the great mind of Kane was forced, with all his lights, to leave them in abeyance.

* Threshold of the Unknown Region, p. 102.

Undoubtedly, however, the problem of currents is of greater moment in its bearing upon Arctic investigation itself than the question as to whether land or water, the influence of genial climes or the unbroken reign of the frost-king rules at the Pole—simply because in it is involved the greater ease or greater difficulty of our approach to those regions.

But to solve this latter problem, and to wrest from Nature the many secrets which for ages have been locked within her icy embrace beyond the reach of man, is the work of the bold Arctic explorer of the future, whether it be accomplished against the greatest odds, or be aided by agencies of Nature's own, the existence of which have not as yet been fully proved.

There can be no doubt that we are only just beginning to learn something of the laws which govern ocean-currents. Some among us venture to put faith in the possibility of ascertaining somewhat of the causes, as well as of the force and direction, already gauged, of the winds sweeping over the earth. These are at present little more than moot problems, although upon their solution the commercial interests of great nations and the physical wellbeing of millions of people very largely depend. It can scarcely be expected that Arctic discovery,

whatever may be the nature and the magnitude of its results, will give us new lands to conquer or to colonise, or new highways from point to point of the habitable world. But as certainly as the North Pole exists is it necessary to our command of the forces of Nature, in the interests of mankind, that we should know in what way the ice and snows, the long night and day, the tides, and the geological formation of lands and islands about that mysterious summit of the Polar axis, react upon more favourable and fully inhabited climes. The "Alert" and "Discovery" have gone forth, then, at the call of England, not to serve England only, but the entire world. And not less important, we may add, would prove a Dutch Arctic expedition for the service of science and mankind.

CHAPTER VI.

THE ARCTIC REVIVAL.

BUT is there scope for rivalry on the part of various Governments in attempting the solution of North Polar problems? If the English expedition be so hopeful in its promise of achieving grander objects than hitherto have been accomplished, what is there left to do? In answer to these questions let us distinctly say, that the shrewdest and most practical minds among Arctic explorers and experienced geographers are by no means convinced that the route now taken, by Smith Sound and Robeson Channel, is the only practicable one to the North Pole. It may be convenient for the purpose of an adverse theorist to decry the blunders of Dr. Petermann, in his argumentation and illustrations of the theory of a Spitzbergen route; but it is worth while to remember that such a route—rather an alternative one than a primary route,

as here proposed—has the powerful recommendations of men who are great in Arctic research and geographical science, and whose judgment cannot lightly be impugned—as General Sabine, Sir Edward Belcher, Admiral Ommanney, Admiral Richards, and Captain Inglefield.

As essential, however, to an understanding of the subject of routes, even for our purpose, we must notice, before proceeding further, the principal schemes that have been proposed within the last ten years for reaching the North Pole.

The movement which may be said to have culminated in the departure, on the 29th of May 1875, of the English Arctic Expedition—if, indeed, the real culmination be not left for Holland to supply—was not, it is well known, of very recent origin. Even more than ten years ago, as has been seen, the hope of establishing a practicable sea-passage between the Atlantic and Pacific Oceans in the North Frigid Zone had been for ever given up, and the “great Arctic *desideratum*,” namely, the attaining of the North Pole itself, had begun to haunt the minds of men of science, and to be, so to speak, the competitive theme with the leading Geographical Societies.

It was not, however, until the year 1865 that the

subject came prominently before the world, when it was formally brought forward by the Royal Geographical Society of London. The question as to the best way of attaining the Pole was inseparably connected with the subject of Arctic exploration itself, in its new and thoroughly scientific aspect. No one doubted the importance of the latter, but upon the first there was much controversy. Accordingly, the question of routes took the precedence, and an active and memorable discussion followed.

At a meeting of the Royal Geographical Society of London, held January 23, 1865, Captain Sherard Osborn read his celebrated Memoir "On the Exploration of the North Polar Region," in which he took strong and definitive grounds in favour of the despatch of an English expedition by the way of Smith Sound.* At the next meeting, on the 27th of February following, the first letter of Dr. Augustus Petermann, addressed to the President,† was read, urging upon British geographers the claims of

* Proceedings of the Royal Geographical Society, vol. ix. pp. 42-58.

† On the Proposed Expedition to the North Pole. A Letter addressed to Sir Roderick I. Murchison, K.C.B. By Dr. Augustus Petermann, Hon. Cor. Mem. R.G.S., Gotha. (Proceedings of the Royal Geographical Society, vol. ix., 1865).

the Spitzbergen route, which he had been advocating since 1852. On both these occasions the subject was freely discussed, but especially at the latter meeting, when the two rival routes to the North Pole had been fairly placed before the world. What had hitherto been a living question merely with geographers and men of science was now become one of universal interest—an interest, indeed, continued, with only temporary abatement, down to the present time.

The plan proposed by Captain Osborn was to proceed in properly provided steam-vessels to Smith Sound, at the head of Baffin's Bay; to there leave them in safety, and explore northwards along the west coast of Greenland, by means of sledges and boats. And this, it may be parenthetically observed, is substantially the plan of the present English expedition, allowing for a natural enlargement and perfection of scheme consequent upon the advance made in science and Arctic navigation during the last ten years, and the farther penetration towards the Pole by this route of the "Polaris" expedition.

The project of Dr. Petermann (previously advocated by General Sabine) provided for trying to reach the North Pole *via* Spitzbergen, pushing through the ice-pack to the north of that island in

steam-vessels, when, it was contended, no ice barrier would be found, "even right under the Pole itself," which might not be successfully overcome by an expedition of the modern kind; while, in the event of an open sea existing at the Pole, an expedition by the other route, with its ships left behind, would totally fail in the main object. Dr. Petermann also pleaded the calorific character of the Gulf Stream in recommendation of the route he advocated, and which he considered as being the most favourable for reaching the North Pole.

Such, briefly, were the two principal projects of the time. Nor were arguments on either side wanting on the part of zealous advocates. At a meeting of the Royal Geographical Society, held in the April following, Mr. C. R. Markham, the secretary, read an elaborate paper on the best route for North Polar exploration,* in which he brought forward additional evidence in support of Osborn's plan, summing up his own observations in the following short but salient sentence: "By the Spitzbergen route there is a bare chance of doing little; by the Smith Sound route there is a certainty of doing much."

If strong argument and stirring eloquence could

* Proceedings of the Royal Geographical Society, vol. ix. pp. 138-146.

have prevailed upon Admiralty Boards in England at this time to undertake the renewal of Arctic enterprise, there can be no doubt that the vast North Polar region would not now be so appropriately denominated a *terra incognita*. But the want of unanimity regarding routes which prevailed, as we already know, in English geographical councils was a serious drawback.* And even in regard to the Spitzbergen route, some held that the expedition sought to be organised ought to proceed between Spitzbergen and Novaya Zemlya, and others that most would be accomplished by coasting along the eastern and northern shores of Greenland.† The latter idea, however, cannot be said to have taken shape till 1867.

There was no experienced Arctic officer who doubted but that one or the other of the princi-

* A list of the principal names associated with this memorable discussion may be of interest. For the Spitzbergen route originally were General Sir Edward Sabine, Admiral Sir Edward Belcher, Admiral Ommanney, Admiral Fitzroy, Captain (now Admiral) Richards, Captain Inglefield, Staff Commander S. E. Davis, Lord Dufferin, Captain Allen Young, Mr. James Lamont, and Mr. W. E. Hickson. For the Smith Sound route, the late Admiral Osborn, Admiral Sir George Back, Sir Leopold M'Clintock, Captain Vesey Hamilton, and Mr. C. R. Markham. And the late Lieutenant Maury, who was then in London, also took the side of the Smith Sound route.

† Annual Address of Sir Roderick Murchison, 1868. *Journal of the Royal Geographical Society*, vol. xxxiii. p. clxvii.

pal routes indicated would prove feasible if tried. But while such was the case, and while all rejoiced at the prospect of reviving the spirit of enterprise and adventure among the seamen of England, the united efforts of the councils of all the leading learned societies were not sufficient to induce the Government to decide the question for themselves of routes, and despatch an Arctic expedition in 1865.

Meanwhile the subject thus powerfully revived in England, was not allowed to lie dormant in other countries because of England's unwillingness to re-engage in Arctic enterprise. Germany, France, and America took up the subject. It was quickly proved that the zeal of the distinguished geographer of Gotha (regarded by some in England as discordant) was not bounded by his efforts to induce England to send an expedition into the European Polar seas. In spite of the paralysing influence upon ordinary enterprises of three successive wars involving his nation, this man of science pushed forward his scheme for a German Arctic expedition, and curiously enough, almost in the midst of dire international strife, made Arctic exploration a school for recruiting an infant German navy.

The experiences of the two German expeditions

have contributed an interesting and valuable chapter to the history of Arctic enterprise; but it must be confessed that one looks in vain through the annals of those voyages for any development of the favourite route of their projector, so stoutly contended for through four-and-twenty years; while, unhappily, they failed to do much, if anything, towards solving for us the great Arctic problem.

They were undertaken, it is true—certainly the first German expedition—with the object of getting as near to the Pole as possible; but with the exception of Koldewey's tentative effort above Spitzbergen in 1868, they failed by close upon 5° in reaching as high a latitude as had been attained nearly three centuries before by Barents and Hudson; while, on the east coast of Greenland, Dutch whalers sighted considerably higher points in 1655 and 1670 than did the Second German Expedition. The experience of the latter of "perils," too, off the east coast of Greenland (allowing poetical latitude to partial annalists), "compared with which even Barents' wondrous boat voyage from Novaya Zemlya pales, and Kane's escape from Smith Sound sinks to the dimensions of a boating excursion," was, we have no doubt, far from the realisation of

the hopes of Dr. Petermann. Nor was there anything achieved by it that would entitle the East Coast of Greenland to take rank as a fourth Polar route. Professor Geikie, however, appears to have thus distinguished it in his *Life of Sir Roderick Murchison* (vol. ii. p. 301).

But it is just to say that these expeditions were, comparatively speaking, only feebly provided, according to the English view of what an Arctic expedition should be.*

In France—the country of La Perouse and Belot, yet really so strange to Arctic work—a very different route from either that of Osborn or of Dr. Petermann gained the attention of geographers; and, not less than in England and Germany, was the movement in favour of an expedition accredited to one man. Stirred by an emulation not unlike that which a century ago impelled France to take up the work of geographical discovery where England, with the loss of her greatest navigator, temporarily dropped it, but awakened especially by the zealous efforts of a scientific young naval officer, formerly of the Polytechnic School, Lieutenant

* The best vessel despatched, the “*Germania*,” a steamer of 143 tons burden, was built in the space of thirty-six days, and cost only £3150; and the wrecked “*Hansa*,” a tender, was a sailing brig of 242 tons.

Gustave Lambert, the French people turned their eyes towards the far North as a promising field of enterprise ; and it is worthy of notice that they proposed to pursue their researches by the very route which, so long ago, had baffled Cook, and which his hardly less hapless successor in command also found to yield no prospect of a navigable passage northward.

No record of baffled attempts, however, even had not later investigations, and indeed individual research, lent encouragement to his views, could have deterred an enthusiastic Frenchman like Gustave Lambert, who, as M. Vivien de Saint-Martin has said, was at once a man of action and a man of science. Nor would it appear that the conception of his expedition having Behring's Straits for its route, was in any real sense the outcome of the English discussion upon this subject. It was conceived, it is only just to say, in complete ignorance, as M. Malte-Brun tells us, of the projects of Osborn and Petermann, and the ground over which it would be necessary to proceed was suggested to the projector by the *sight* of the thin ice covering the Polar Sea to the north-west of Behring's Straits, about 73° N., promising apparently a passage to the mariner bold enough to advance right through

it, together with the appearance of the physical state of the sea in those high latitudes, the probable effect of insolation, and, finally, the information he was able to draw from the scattered traditions of Arctic navigators.*

But in touching upon the scheme thus conceived for an expedition by Behring's Straits, we are instinctively led to go through the history, even although the briefest possible account may seem like a digression here. Returning from those seas to France—armed at all points with considerations both theoretical and practical in support of his scheme—M. Lambert discerned in the public attention which had been drawn to the subject of Arctic exploration by Captain Osborn and Dr. Petermann only a new motive for emulation. To his delight, moreover, he found that the Royal Geographical Society of London was engaged in confirming and applying almost his own theories; though he still drew, from a thorough study of the history of the Franklin search expeditions, new and important inductions in favour of his own project.

On the 19th October, 1866, he represented the subject for the first time before the Com-

* *Les Trois Projets d'Exploration au Pôle Nord.* Par V. A. Malte-Brun (Paris, 1868), pp. 146, 147.

mission centrale de la Société de Géographie, setting forth the considerations which induced him to believe in the possibility of attaining the North Pole, and on the practicability of his route. The matter met with the cordial encouragement of the President, M. d'Avezac, and the rest of his *confrères*; and at a meeting of the Society, held on the 20th of December, 1866, it was made a subject of special discussion, when M. Lambert, in an elaborate and luminous paper, treated of the whole history of Arctic research; setting forth fully his own scheme, presenting in a clear light the scientific bearings of the subject, and the importance of a French expedition by Behring's Straits.* He insisted strongly upon the existence of an open sea to the north-west of Behring's Straits in the neighbourhood of the Pole, and upon the possibility of avoiding, in a favourable season, the barriers of broken ice that had hitherto prevented access; insolation during the Arctic summer epoch, and the currents themselves, coming to the aid of the mariner.

Among geographers and men of science there could be no doubt about the encouragement with

* See, for M. Lambert's paper, Bulletin de la Société de Géographie, V^{me} Série, tom. xiv.

which the idea of a French Arctic expedition was received ; but it was not until July 4th, 1867, that Gustave Lambert, in a letter to the then President of the Council of the Geographical Society, M. de Quatrefages, was enabled to announce “ l'heureux point de départ acquis à la question du Pôle Nord,” by the formation of a Committee of Patronage ; consisting of the first scientific men of France, headed by the Council of the Geographical Society, and having influential sub-committees in the various departments throughout the country.*

The next object of M. Lambert was to secure the recognition of his project by the Chief of the State ; and this was successfully accomplished at a later period by the Marquis de Chasseloup-Laubat, formerly Minister of the Marine, President of the Geographical Society, who, with M. de Quatrefages, represented the subject to the Emperor. After the complete endorsement of the undertaking by the Geographical Society and the Scientific Association of France, if anything was wanting to secure for it the popular favour, that object would seem to have been gained in the characteristic encouragement given to the project by the Emperor, who himself

* See, for list, &c., *Gustave Lambert au Pôle Nord.* Par J. P. O. Comettant. Paris, 1868.

headed the subscription list with the magnificent sum of 50,000 francs.*

The enterprise had now become fairly launched ; every visible sign boded success. Frenchmen, with a warmth of enthusiasm and a confidence peculiar to their nature, believed that their expedition would but have to make its way to Behring's Straits to claim the Arctic secret for its own ; and M. Lefèvre has even recorded that Dr. Petermann, when learning of the project of M. Lambert, exclaimed, " Si jamais on va au Pôle, ce sera par là ! "† Certainly no arguments of the German geographer's are absolutely opposed to the accuracy of this statement ; and indeed a generous subscription on his part attests the sympathy with which this enterprise of a neighbouring nation was regarded by him‡—a happy proof of his own assertion that " science is not bounded by the limits of nations, but that its cultivators all over the world are one united brotherhood."§

* See Letter of M. Petrie, conveying the Emperor's subscription, Bulletin, &c., tom. xiv. 201.

† Souvenirs de la Conférence de M. Gustave Lambert sur l'Expédition au Pôle Nord. Par M. Achille Lefèvre (Caen, 1869), p. 13.

‡ Lettre du Docteur Augustus Petermann à M. Charles Maunoir, Secrétaire du Comité de Patronage pour l'Expédition au Pôle Nord. Bulletin, &c., V^{me} Série, tom. xiv. 315.

§ Words on receiving from the President the Founder's Medal of the Royal Geographical Society of London, May 25, 1868. (Proc. R. G. S., vol. xii. p. 214.)

The projected expedition of M. Gustave Lambert, thus in some sense a national one, was not, unfortunately, a government enterprise; else there can be little doubt that we might here be sketching the history of a real expedition, instead of a mere attempt. Enthusiasm, however ardent, proverbially cools at sight of subscription lists, and the fact of a large amount of money being required to carry out the scheme left its projector an arduous task to perform; so that neither "with the violets of 1869" (as Captain Osborn had hoped), nor with those of 1870, was M. Lambert enabled to witness the departure of his expedition. That "happy point," unfortunately, was never attained.

Unhappily for the cause of science, and perhaps for the national glory of the most scientific of peoples, the threshold of the unknown region was not destined to be overstepped by France, or at least the day for the despatch of an Arctic expedition by her was to be indefinitely postponed. Events but too fresh in the recollection of Europe advanced with maelstrom fury, and took by surprise, not only the French Arctic Expedition, but France itself; and the unhappy death of the chief promoter of the enterprise in the siege of Paris, caused the abandonment of an undertaking intended to prove one of

the three routes to the Pole, which at this period engaged the attention of the world. We had almost said, that for aught we know, the "Boreal," with its Arctic outfit, is still waiting in the harbour of Havre for a second Lambert to come forward and take it on its long passage to "Polynia" by Behring's Straits.*

* This we could not now truly say, having been opportunely favoured with the particulars (not obtainable from books) respecting the issue of M. Lambert's enterprise. A recent letter from the President of the French Geographical Society, and one of the promoters of the late proposed expedition, unexpectedly includes a clear account of the ending of the ill-fated enterprise, which we give with much pleasure in the language of the accomplished geographer, assured that our readers will welcome it, and that in thus giving it we violate no confidence. We may, however, first observe that, if apologies seem almost necessary for the considerable space we have already unexpectedly devoted to this once-proposed Behring's Straits expedition, let it be remembered that its patriot projector is well entitled to all the honour we can pay to his memory, and indeed—having conceived his project on Arctic ground—may well claim to rank among the "Heroes of the Arctic," almost by the side of Barents, Hall, and Franklin.

M. Malte-Brun says :—

"En effet, l'expédition polaire de Gustave Lambert a été arrêtée dans ses préparatifs par la guerre, et par la mort de Lambert, qui, VOLONTAIREMENT, est allé au devant des balles allemandes à l'affaire de Buzenval, lors de la dernière sortie de l'Armée de Paris.

"Au moment où éclatait la guerre, Gustave Lambert avait déjà réuni, en faisant des conférences dans toute la France, près de 400,000 frs. Il avait acheté un navire neuf, provenant du Canada; il l'avait baptisé le *Boréal*, et il le faisait parer, agencer, disposer au Havre, pour le rendre propre aux navigations polaires. Déjà il avait engagé un *second*, marin habile, exercé, et quelques autres personnes. Mais ces dépenses avaient déjà diminué ses ressources; il n'avait plus assez d'argent pour continuer, et parfaire l'armement. Cet homme énergique et convaincu allait se remettre en route pour aller, de

But if this be not so, and if we cannot give France credit for actually *doing*, we must allow to her the merit of having gallantly *purposed*; and we are sure our readers will join us in the wish that France may immediately revive her late interest in this subject, and make one in the bold phalanx which shall

ville en ville, faire de nouvelles conférences afin de compléter la somme qu'il jugeait nécessaire à son entreprise (600,000 frs.), lorsque la guerre éclata et vint ruiner ses espérances et ses projets.

“ Il demeura désolé, anéanti, dans Paris faisant le service de capitaine au 84^e bataillon de la garde nationale, demandant à faire partie des 10,000 hommes résolus que M. de Beaurepaire voulait organiser pour faire une sortie décisive, et vers Noël 1870, lorsqu'il jugea tout perdu, le cœur brisé d'assister, lui impuissant pour la relever, à l'effondrement de la patrie, il s'engagea simple soldat dans un régiment de ligne, et alla se faire tuer sur les pentes du parc de Buzenval. Ramené, très grièvement blessé au flanc, à l'ambulance du Grand Hôtel, où il fut l'objet de soins dévoués, il aurait pu, au dire du Dr. Nélaton, s'en tirer avec du calme et un repos d'esprit que lui refusait sa nature ardente et passionnée. On ne put lui cacher la triste issue de l'affaire du 19 janvier, le désespoir, le délire s'emparèrent de lui, . . . il mourut !

“ Il laissait un testament, par lequel il léguait le *Boréal*, les sommes qui lui restaient, &c., &c., au Ministre de la Marine, à la condition que le Ministre reprendrait ses projets d'exploration au Pôle nord et y donnerait suite. Par des raisons d'État le Ministre refusa. Alors on fit la Liquidation de l'Expédition Lambert ; le *Boréal* fut vendu ; on indemnisa chèrement les personnes déjà engagées dans l'affaire, et le reste des fonds, 80,000 à 100,000 francs, fut déposés à la Caisse des Dépôts et Consignations, attendant que le Ministre de la Marine juge à propos de reprendre ce projet d'exploration au Pôle, par la voie du détroit de Bèring, ce qui est bien improbable aujourd'hui.

“ Voila, mon cher Monsieur, l'histoire de la triste fin de ce fameux projet d'exploration au Pôle nord.”

determinedly wrest from the Arctic foe its long-withheld secret.

The circumstances resulting from the war, in all probability, likewise prevented the despatch of a third German expedition, which was promised about the same time by Dr. Petermann, to be sustained by the liberality of an opulent Bremen merchant. Perhaps it is not too much to hope that this will yet be equipped.

In the year 1868 another attempt was made by the advocates of English Arctic enterprise to bring about the despatch of an expedition. A second paper, by Captain Osborn, favouring the route by Smith Sound, was read before the Geographical Society of London, wherein was urged more strongly than ever the expediency of pursuing this route; especially since the investigations that had meanwhile been made by Torrell and Nordenskiöld around Spitzbergen were deemed to be adverse to the prospect of successful efforts in that direction.

All arguments, however, were still unavailing with the British Government. But the universal interest by this time awakened in the "three projects" caused the friends of Arctic enterprise in the United States to determine that the peculiarly American route

should not henceforth become at any rate the exclusive possession of England.

Nor was the man wanting there suited to the enterprise, if enthusiasm and daring can constitute a fitness for Arctic service. In Charles Francis Hall the Smith Sound route—which certainly is entitled to rank as *one* of the important ways to the Pole—had a hardly less ardent advocate than in Captain Osborn, and he was destined to link his name imperishably with it, and to give additional lustre also to the American name in connection with Arctic research.

Urged on by his zeal for ethnological and kindred studies—a zeal to which the present writer can bear witness, as having heard the self-sacrificing explorer recount his experiences among the Eskimos, surrounded by living and other illustrations of his industrious research—Captain Hall began mooted, almost before the embers of civil strife had cooled, the plans for a new American Arctic expedition, to proceed by Smith Sound and Kennedy Channel *en route* to the Pole. Encouraged by the United States naval authorities, he succeeded eventually in obtaining a grant of \$50,000 from Congress;*

* Among those most ready to listen to this Arctic enthusiast—for such Captain Hall truly was, and sought no concealment of the

the Government also placed at his disposal an old United States gunboat, which he rechristened the "Polaris," and in the summer of 1871 the expedition sailed in pursuit of the great quest.

Upon the importance of the general results of this comparatively feeble expedition—acknowledged by all to have been very great—we need not here dilate, nor upon its influence in deciding England to test, by the thorough means which she is bringing to bear, the practicability of the Smith Sound route; but we may ask, in the words of Mr. E. Vale Blake, "If so much could be accomplished by a divided and disaffected party, what might not be done by a united and properly disciplined body equally well equipped?"* It is worthy of remark, too, in passing, that it was undoubtedly

fact—were such men as the late Senator Sumner of Massachusetts, Senator Sherman of Ohio, and Senator Fenton of New York; the bill for Government aid to the enterprise having been originally introduced into the House of Representatives by the Hon. Mr. Stevenson of Ohio, and, after its introduction into the Senate, referred to the Committee of which the late Hon. Charles Sumner was chairman. It was, therefore, due to the energetic influence of such men, supported by men of science, with Professor Joseph Henry, President of the National Academy of Sciences, at their head, that Captain Hall was enabled to obtain the means for carrying forward this undertaking, which must ever redound to the honour of the United States.

* *Arctic Experiences*. Edited by E. Vale Blake. (New York: Harper Brothers, 1874.) Preface.

due to the forethought of the man who, more than all others, had given impetus to the renewal of English Arctic enterprise, and hence to the despatch of the present expedition, that a naval officer was sent to Baffin's Bay in the spring of 1873, fortunately resulting in the rescue of the crew of the "Polaris."

Before the expedition of Captain Hall was organised, indeed in 1868, Sir Roderick Murchison had expressed the desire that a mutual plan of action, though a division of labour, might be agreed upon by the different countries then manifesting a special interest in Arctic research, for the development of the several routes we have mentioned—to wit, that Germany might test the Spitzbergen route, France the route by Behring's Straits, and England and America together investigate the merits of that by Smith Sound. The substantial success of the "Polaris" expedition, at any rate, did much to remove the doubts—if any had ever existed on the part of English and American geographers—that the latter route would prove a *cul-de-sac*.

It is not more than two years since the learned President of the American Geographical Society expressed the hope that Americans themselves would

not be dilatory in following up the important success of the "Polaris" expedition. But as England has in the meantime appropriated to herself the cherished route of our explorers, we cannot forbear the suggestion—that is, if we may make it without prejudice to our present cause, *i.e.*, the Dutch Expedition *in futuro*, or rather *in spe*—that American enterprise in this direction may be turned to the route by Behring's Straits, especially if France does not now desire to avail herself of it.*

* The route by Behring's Straits, so zealously advocated in France as the preferable one, has perhaps already been more thoroughly investigated by Americans than by any others—notably by the American whaling master, Captain Thomas Long. In 1867, Captain Long of the "Nile," together with three other enterprising American whaling captains—Raynor of the "Reindeer," Phillips of the "Monticello," Bliven of the "Nautilus"—saw or discovered Wrangall Land (believed, however, to have been previously sighted by Kellett), and give us certain points well fixed by astronomical observations. American whalers, indeed, have pushed their enterprises far into the Arctic Ocean by Behring's Straits, and coasted extensive high lands to the north of Siberia as far as latitude 74° , in, it is thought, the sea first seen by Wrangall; though Cook and Clerke (1778-79) considered they had reached the extreme limit of navigation in these seas by attaining Icy Cape (in lat. $70^{\circ} 30'$ N.) on the American coast, and North Cape (in 69° N. lat.) on the Asiatic side. It is worthy of note, too, that in seas regarded impenetrable by these earlier navigators, the Americans established a highly profitable whale fishery, realising as much (according to Dr. Petermann) as \$8,000,000 in two years. The exploration of Wrangall Land by Captain Long, it may be mentioned, has been pointed out by the Italian geographer, Signor Guido Cora (in his "Cosmos"), as the only instance of research

It may be too much to hope that such an expedition will spring up in the busy Centennial year; but it would be surely a crowning honour if, after centuries of vain endeavour, American spirit should be able to write the Archimedian word of the North Polar secret on the last page of our hundred years of history.

that has been made within the last fifteen years between the estuary of the Yenisei on the one side and Lancaster Sound on the other, or almost half the circumference of the Polar circle. Captain Long, too—a veritable Scoresby of the later time—enunciated the opinion that, if ever a transit be made between the Eastern and Western Oceans, it will not be by lines hitherto tried, but by an enterprise directed from Behring's Straits. The result of his investigations and discoveries, together with some very sensible suggestions, were communicated by him to the "Pacific Commercial Advertiser" of Honolulu in 1868, and were honoured by being embodied with considerable detail in Sir Roderick Murchison's annual address before the Royal Geographical Society in the same year, as well as being given at length in Petermann's "Geographische Mittheilungen."

We may, moreover, here observe that Captain Long claimed whatever merit there was (applying, it is presumed, to the route) in the project of Octave Pavé, a young Louisianan of French extraction, who in the summer of 1871 created some excitement in the geographical world by his scheme for going to the North Pole on an indiarubber raft *via* Cape Yakan. The scene of this farcical proposal was San Francisco; and we cannot but recommend, seriously and in all modesty, to the enterprising merchants of that wealthy city to redeem its fair name from the trifling slur thus cast upon it, by fitting out a genuine and strong expedition, to be placed, perhaps, under Government control, to try this route. San Francisco is surely a fitting *base d'opération* for an enterprise by Behring's Straits, as is shown by its having been the design of M. Lambert to avail himself of it for the French expedition.

Respecting the merits of the three projects we have sketched, thus designed to prove the three different routes to the North Pole, we may not inappropriately conclude with M. Malte-Brun's observations. While pronouncing that proposed by France as "undoubtedly the boldest and most audacious," the "chief obstacle" to the English plan is, he says, "the great expenditure of time and force" imposed by the Smith Sound route. And as to the remaining project he observes: "By the German plan there is less distance before arriving upon the theatre of first operations, fewer dangers and obstacles than by Smith Sound; but in moving from the last base of the expedition, the unknown and unforeseen with all their rigours stare one in the face—still there would then be the joy and glory in case of triumph."*

* *Les Trois Projets d'Exploration au Pôle Nord*, p. 146, *et seq.*

CHAPTER VII.

THE GULF STREAM ROUTE.

FOR Holland, every consideration inclines us to fall back on the way or ways afforded by the wide ocean portal, as the only practicable avenue of approach to the North Pole, and one which would take her seamen over ground long since ploughed by Dutch keels. Nor have those far Northern waters, once so attractive to her navigators, remained unfrequented, at least by other nationalities, during the last ten years; although England, it is true, did not incline to the Spitzbergen route.

While the Smith Sound route has continued to be further tried by American explorers, and is now the chosen route of the "Alert" and "Discovery" expedition, it should be remembered that the Spitzbergen seas have been almost annually visited by adventurous Arctic voyagers, particularly the Swedes and Norwegians; and every argument that

was used in favour of this direction in the active days of route discussion holds good at the present time.

The facts upon which the course of the English expedition has been determined all tend to show that it is to the North-east the search for an open Polar sea and for Polar secrets must be directed; that the winds which keep the pack broken and moving sweep from that quarter down through Robeson Channel; and the British expedition is gone to *meet* the current which from that channel passes south through Davis Strait. Whence comes that current, however? How does it reach the circumpolar region in such a state that it carries before it, on its return circuit, such enormous masses of ice?

The answer men have furnished is plain. The Gulf Stream that laves the coast of Britain, saving her populations "from the paralysing rigours of a Labrador winter"—to use the late Admiral Osborn's words—passes up between Novaya Zemlya and Spitzbergen, bearing drift-wood, the marine plants which grow only in mild temperatures, and innumerable other of its treasure stores; some of which it deposits on those far Northern coasts, while other tribute is borne still onward, and is found at points

more to the west; thus pointing out, to all theoretical appearance, a channel polewards.

“It has long been known,” to quote a learned American reviewer, “ever since Dr. Franklin was a commissioner of the Colonies at the British Court in ante-revolutionary times, that the Gulf Stream, or at least a branch of it, flowed to the Arctic regions by the way of Spitzbergen, thus indicating to the explorer the true way to the Pole, as unerringly as the wild buffalo of the West points out to the hunter, by its beaten paths, the easiest and best routes through the Rocky Mountains; and yet, strange to say, all the Polar navigators, from Parry to Dr. Kane, have ignored this fact, and sought passages to the Pole in vain, far to the westward, by the way of Davis Strait and Baffin’s Bay. Whilst Nature has been beckoning them on to the true thermal gateway to the Pole, they have cast their eyes in a different direction, and wandered about in *culs-de-sac*, only to be baffled and wearied, and driven back by impassable barriers of ice as often as they have made the attempt.”* To quote, likewise, Professor T. B. Maury on this point: “There certainly issues, from the space around

* “The Atmosphere of the Ocean.” Bledsoe’s (Baltimore) Southern Review, vol. v. p. 402.

the Pole, a ceaseless and mighty flow of water to the tropics. In its course, icebergs of huge proportions are carried off from the mainland. So vast are these ice-masses, and often so numerous, in floating clusters, as to defy computation. . . . The single drift of ice which bore on its Atlean shoulders the English ship 'Resolute,' abandoned by Captain Kellett, and cast it 1200 miles to the south, was computed to be at least 300,000 square miles in area, and seven feet in thickness. Such a 'field of ice would weigh 18,000,000,000 tons.' We say that this was a single drift through Davis Strait, only one of the avenues of this current from the Pole, and only a fractional part of the drift in the year.

“What a mighty flow of water from the south must that be which, wedging itself into this space around the Pole, ejects such masses out of this space as quietly and easily as the steam-driven piston of the engine throws its *jet d'eau!* We dwell upon the might and magnitude of this ice-bearing river from the Pole, because in gauging these we gauge the energy of the reciprocal heat-bearing 'river' from the tropics, *i.e.*, the Gulf Stream.”*

* The Atlantic Monthly, vol. xxvi. p. 504, 505.

The current that is equal in its power to the accomplishment of these stupendous mechanical operations, provided it does not become, as some theorists think may be the case, a deep-sea current on reaching the ice-laden waters, surely is strong enough, when only half its force is spent, to bear any vessel that will take advantage of its existence as near to the Pole as a ship can approach when steaming against the volume of its returning waters, by that time reduced in temperature.

Nor does it avail to argue, that the stream, if navigable through its entire course as a surface current, must have been found and used to good purpose in high Northern latitudes long ago. "If it still seems incredible," says Professor Maury, "that the thermometric gateways exist, only because no explorer has followed or even found them, it should be borne in mind that the cordon or belt of ice, several hundred miles broad, extending around the Polar basin, describes a circle the circumference of which is nearly 3000 miles. The two great currents (the Gulf Stream and Kuro Siwo), according to Captain Bent, open gaps or navigable channels through this ice-belt. Such channels or gateways, let us say 50 or 100 miles wide, might, in a circuit of 3000 miles, easily escape the notice of the hand-

ful of explorers who have gone in search of a North-West Passage. The thermometric gateways, it will be remembered, go to the North-east." *

The arguments we have cited certainly possess force, and we may fairly conclude that one of these openings must have lain across the path of Barents, on his roundabout way to Novaya Zemlya. He seems, too, almost instinctively to have been persuaded of the existence of some such passage, but the then incomplete state of scientific knowledge precluded that brave seaman from its discovery, unless haply he could have fallen in with it by a species of immortal accident. The "gateway" so narrowly missed, however, in that case, by Barents, was, it is claimed, actually pursued to a high latitude by the Austro-Hungarians, Lieutenant Weyprecht of the Navy, and First Lieutenant Julius Payer of the Engineers, in 1871, who found an open sea before them, and the services to science of these gallant Arctic explorers have not been overlooked, even by nationalities foreign to their own.

The attempt, or attempts, of these explorers to follow the Gulf Stream to the Pole, as perhaps the first recorded instance of the kind, strictly speaking,

* "The Dumb Guides to the Pole." Putnam's Monthly Magazine, New Series, vol. iv, p. 740, note.

entitles their experience to somewhat detailed notice here. Their names, however, have become more especially familiar to us in association with Arctic voyaging because of the expedition under their charge, of which all knowledge was lost for two years, until in 1874 the heroes of the ill-fated "Tegethoff" were rescued in the Bay of Downs (Novaya Zemlya), after undergoing perils very similar to those encountered by Barents and Heemskerck three hundred years before; though, curiously enough, Novaya Zemlya proved the rescue of the former rather than the scene of their dreary imprisonment.

But now to speak of the first expedition. Sailing with the object we have indicated, Lieutenants Weyprecht and Payer left Tromsö on June 21st, 1871, in a hired Norwegian sloop of only 70 tons, and a crew, all included, of eight souls. On the 21st of August they had reached latitude $77^{\circ} 17' N.$, in longitude $28^{\circ} E.$ The ice between the 28th and 36th meridian of longitude was looser and thinner than they had previously met with; so much so, that they declared that a strong steamer would have had no difficulty in taking a straight course through the ice, particularly between meridians 28° and $32^{\circ} E.$, where it was thinnest. On the 29th of August,

in $77^{\circ} 30' N.$, longitude $42^{\circ} E.$, they were surprised by the entire absence of ice. On the night of September 1st they attained, within loose ice, their highest latitude, by the log, in $78^{\circ} 48' N.$; and although this cannot be considered as an extraordinary point to have attained, it should be stated that obstacles other than ice prevented their farther northward progress, such as the fog, which was very thick, and a strong head-wind, together with want of provisions, the unwillingness of the crew to advance farther, and a damaged stem. "The ice," their preliminary report states, "would not have been an obstacle."

It now remained a question with them whether the region thus free of ice which they traversed was only a bight in the ice or the open Polar Sea. They believed it to be the latter; and, to convince themselves of it, next ran down on a south-easterly course to $75^{\circ} 44' N.$, in longitude $52^{\circ} E.$ There was no ice whatever to be seen in their course below the 78th parallel of latitude up to the coast of Novaya Zemlya. "The fact," their report goes on to say, "that a small sailing vessel could, without encountering great impediments, go almost beyond the 79th degree of latitude, which nowhere has yet

been reached by a ship except by the west of Spitzbergen,* will, by itself, prove the Novaya Zemlya sea to be the most favourable basis for attempts to reach the Pole."

They returned to Tromsö on the 4th of October. It is worthy of note that the change in the water from a higher to a lower temperature, as indicated by their report, appears to have been a very rapid one, particularly near the northern limit of the voyage, and occurred most frequently when in closest proximity to the ice, so that they were enabled in the thickest fog to run close up to the barrier, guided by the thermometer.

The experience of the Austro-Hungarians in 1871, however, was not altogether singular. The year was undoubtedly remarkable as a most exceptional one for "openness." Nor was it less memorable by reason of the numberless craft of the bold Scandinavians themselves which this year dotted the Novaya Zemlya and Spitzbergen seas with their sails; these daring fishermen, while in the pursuit of their legitimate calling, never failing to add to our store of Arctic knowledge; and only two weeks

* Captain Hall about the same time took his ship as high as latitude 82° 16' N., by Smith Sound.

after the discovery, if such it may be termed, of Weyprecht and Payer, Captain Mack, a Norwegian, in another small fishing vessel, ran about 300 miles to the south-eastward in a sea similarly open, thus indicating, apparently, that they had completely pierced the ice-belt on the path of the Gulf Stream. Captain Mack, indeed, by the help of a strong current running east, having a temperature of 44° Fahr., sailed beyond the 80th degree of longitude. This was on September 12th, and only the day before another Norwegian fisherman, Johannesen, experienced similar freedom of movement in even a little higher latitude. The successful adventures of all these men in the autumn of 1871 is said to have added to "the known Arctic seas which can be navigated in *open* seasons an area 'equal to that of the German Empire.'" *

But the endeavour on the part of Weyprecht and Payer to follow up the success, as it seemed to be, of 1871, the next year, and accomplish their design, was attended with results which quite reversed their previous experience. They were seeking for un-

* Yachting in the Arctic Seas; or, Notes of Five Voyages of Sport and Discovery in the Neighbourhood of Spitzbergen and Novaya Zemlya. By James Lamont, F.G.S., F.R.G.S. Edited and illustrated by W. Livesay, M.D. (London: Chatto & Windus, 1876), p. 207.

known lands and new discoveries in a somewhat different direction to that in which they found them, and certainly in more distant seas; and—Mr. Lamont has well expressed it—“be the motives and the risks what they may, we cannot but admire the pluck and perseverance of the men who plunged into the uncertain pack on August 21st, 1872, and were carried by fate where inclination refused to lead them.” *

The remarkable drift of the steamer “Tegethoff” from Cape Nassau to the lands these explorers were enabled to bring to our knowledge, and to baptize with the names of their Emperor and their chief patrons, we have no need to recount, if indeed it came within our province to do so. But the very misfortunes of their expedition must constitute the strongest incentive to future explorers, for it shows what grand discoveries may be made, even by accident, in the Arctic seas, and that men, though called upon to encounter the greatest dangers and hardships, may yet return to hear their names applauded, and to take their rank among the heroes and discoverers of their generation, and indeed of all time.

But there may be gleaned from this remarkable

* *Yachting in the Arctic Seas*, p. 208.

drift of 5° an important argument bearing upon our special subject. The fact that the ship of the Austro-Hungarians was certainly carried northward (though they distinctly attribute this to the wind and not to the current) may not unreasonably be claimed as showing the existence of the Gulf Stream, or of some other strong northward surface current, in this locality more than probable, and this might still with profit be further treated.

Until, at any rate, the Arctic flood-gate of the Gulf Stream shall be actually found and scrutinised with the same pertinacious zeal and industry as Captain Nares will bestow upon *his* work; and until it shall be demonstrated that twice the force which bears an ice-continent onward as a toy is incapable of carrying a ship, let it be confessed that much remains undone and unattempted which is manifestly within the reach of human attainment. At all events, the drift of the "Resolute" and of the "Tegethoff"—the one downward, the other upward—must not be forgotten in connection with the existence of these supposed currents. The drift of Captain Tyson's party, in 1873, from Littleton Island for fully 25° , and also of the "Polaris" crew itself, further demonstrate the uniform downward current through Baffin's Bay.

To again employ the eloquent and forcible language of Professor Maury with respect to this route (in 1869): "Enterprises have been tried under the most propitious auspices; most of them have been guided by the most expert seamen of the world, upheld by the most lavish outlays of moral sympathy and material wealth, and animated by a zeal which the eternal ices of the North could not chill. In vain have they attempted every route save the one now suggested. Their failures and disasters have been most signal. The paltry successes they have reaped—paltry when compared with the means employed—have been reaped only by crossing immense plateaux and mountains of ice with infinitely more pains and perils than attended Hannibal's or Napoleon's passage of the Alps. And this fact alone, however it may shed lustre and glory on the heroic explorers, reflects but little light on the Arctic problem—unless, like the floating fragments of some ship that has foundered and gone down, it serves to tell a tale of warning, and to reveal the rocks on which the fairest hopes lie stranded."*

Surely, to shed light on this problem, and to test

* "The Gateways to the Pole." Putnam's Magazine, New Series, vol. iv. p. 526.

at once the practicability of a passage to the Pole by the Gulf Stream, is an enterprise well worthy to engage the energies of a nation. Here is a work for the Geographical Society of the Netherlanders and for Holland. Another Barents, following up the researches of the first, is needed to continue the exploration of the European threshold of the hitherto trackless North, and, perchance, co-operate from this direction with Captain Nares and Commander Markham in the coveted labour of sounding the depths and tracing the outline of the "open Polar sea."

Every sign of warmth that is found on the north-west point of Greenland, where the coast-line extends away to the north-east, is found also, in a somewhat less degree, on the shores of Spitzbergen, though wanting in the more southern region of *Novaya Zemlya*. Animal life, vegetable growths, climate, and birds bear infallible testimony to the same order of facts in this northward track of the great ocean current, as seems to have persuaded the Government and a majority of dominant minds in England to pursue the outward passage of that self-same current.

Captain Bent, of the United States, has not achieved a world-wide renown as an illustrious

leader in the realms of science; but his investigations in the character of chief hydrographer in Commodore Perry's Japan Expedition, and his clear sound sense in directing attention to the most likely open and navigable ways to the Pole, enhance marvellously the weight of reasoning (countenanced by the great name of Sir Edward Sabine) on behalf of that route which was long ago appropriated almost exclusively by the Dutch.

CHAPTER VIII.

THE EARLY DUTCH WHALERS.

IT is the opinion of the last-named authority (Captain Bent), and that of many Arctic explorers, as well as of distinguished geographers, that sufficient credit has not been given for what was done in the early, unscientific days by the Dutch whalers. This is a moot question; but there can be little doubt that those bold skippers did push their enterprises far to the northward; probably discovering some of the same lands which it has been the honour of recent commanders to place upon our maps, and attaining, it may be, almost fabulous latitudes. However—as they were not professed explorers, but merely whalers, careless alike of the interests of posterity and of the perpetuity of their own names—no logs or journals of their cruises were kept, or at least none have come down to us. The consequence has been an impossibility in authenticating

many of the voyages made to the Arctic seas by the Dutch whalers.

Whether a mention of voyages which are only traditional is calculated to add force to arguments for the renewal of Arctic enterprise, may perhaps be questioned; yet some of the accounts are at least interesting. Moreover, so far as they can be relied upon, it is just that Holland should receive due credit for them,* especially since we have to complain that all her work in this field is of a date only too remote.

As long ago as "the reign of Charles II. of glorious memory," Master Joseph Moxon, hydrographer to his Majesty, stated that stout Dutch skippers had vowed to him of their sailing to 89°, and even as far as the North Pole, and in one instance "that they had sailed two degrees beyond the Pole;"† and Captain John Wood laid great stress upon those and similar statements in arguing for the despatch of his expedition to discover a North-East Passage. The unfortunate issue, however, of Wood's voyage in the stranding of his vessel on the rocks off Novaya Zemlya, after getting no

* It has been thought not out of place to include this class of voyages in the Appendix to this volume, indicating their character, however, so as not to mislead the reader.

† A Brief Discourse, by Joseph Moxon, F.R.S., 1675.

higher than 76° N., converted that navigator from an earnest advocate of such projects into a disingenuous critic of all the early Dutch voyagers who claimed to have reached high latitudes, and he even scouted the authenticity of the voyages of Barents.

Faith in the trustworthiness of the early accounts of high latitudes declared to have been attained by Dutch whalers was greatly revived, just a century ago, by the writings of the Honourable Daines Barrington, a Fellow of the Royal Society. This author, believing in the possibility of attaining the North Pole, industriously collected all that he could find upon the subject of these too mythical voyages, and communicated the result of his investigations to the Royal Society. He also embraced the same in his "Tracts on the Probability of reaching the North Pole;" and a no less distinguished naval officer than Admiral Fitzroy has expressed confidence in their credibility, and declared it as his opinion that the papers of Daines Barrington embodying these accounts—first printed about the time the latter was labouring for the despatch of Captain Phipps' expedition, and reprinted in 1818, when Polar

voyaging was revived in England—were entitled to more attention than they had received.*

Whether this be so or not, Hollanders are certainly under greater obligation to that *savant* for his painstaking inquiries than certain of his own countrymen, anxious for the adoption of the Smith Sound route, have, on their own part, been willing to allow—if only because of the earnest way in which he defended the truthfulness of the really authentic Dutch narrations.†

It was seriously asserted in the accounts cited by Daines Barrington that Dutch ships had reached the immediate vicinity of the Pole; that they had there found an open sea, a comparatively warm temperature, and a swell and a roll of the sea indicating a broad, unobstructed expanse of water. One ship, of which the journal is given in great detail, reached as far north as 88°, some 83°, and

* Proceedings of the Royal Geographical Society, vol. ix. p. 120.

† Even respecting their more traditional voyages to the North he says: “I must beg leave also to make an additional observation on the account as stated by Wood, which is, that Dutch ships only went to the northward in search of whales, but did not give it out that they intended to make for the Pole, which, if they had done, it might possibly have been an inducement to carry on a deception by forgery and misrepresentations. To this it may likewise be added, that the Dutch are not commonly jokers.”—*The Possibility of Approaching the North Pole Asserted*, p. 35.

many 82° N. ; and the conversation, gravely given by Moxon as having taken place in an Amsterdam ale-house, about the Dutch sailors having gone two degrees beyond the Pole, is repeated.

Captain Osborn, however, when alluding to these accounts, apologised for the last statement in these words : “ But it is only fair to add that this was said in dreamy Amsterdam, over strong Dutch beer.” This was, no doubt, quite accepted by his geographical audience in London ; but will the logical sequence be so readily and cheerfully allowed by those who especially venerate the traditions of the ancient capital on the Y ? Evidently Daines Barrington and Sherard Osborn entertained different views as to the sober truthfulness of the men of that seafaring nation, or at least concerning the veracity of “ Dutch skippers.”

As perhaps might be expected, Dr. Petermann does not disparage these accounts. Moreover, although he would take from Englishmen the early discovery of Witche’s Land and award it to Germans of this generation, he has ever been earnest in his defence of the Dutch northern landmarks.

He more than intimates, indeed, that Franz Josef Land may have been first discovered and

its sounds sailed through more than three centuries ago by a Dutch sea captain, Cornelis Roule by name, who, it is claimed, reached as high as $84\frac{1}{2}^{\circ}$ or 85° N.* And, as bearing upon the narrations of which we have spoken, we read in one of his celebrated letters, that "from Sir Edward Parry's farthest in $82^{\circ} 45'$ N. lat. a navigable sea was extending far away to the north, as reported by the old Dutch and English skippers, who owned that they had sailed as far north as 88° , and beyond the Pole itself, and found a navigable sea;" and that "however much Captain Osborn may ascribe these reports to 'dreamy Amsterdam and to the strong Dutch beer,' the general correctness of the old Dutch navigators, and the non-discovery of land, speak in their favour, as it is well known that navigators and maritime explorers are in general much more predisposed to discover land than to have to report upon the continuation of the sea."†

This is not, of course, a perfect indorsement of

* It is only just to state that Dr. Petermann has said, "I consider it also highly probable that that great Arctic pioneer William Baffin may have seen the western shores of Franz Josef Land as long ago as 1614" (Letter to the President of the Royal Geographical Society, given in *Nature*, vol. xi. p. 37).

† Proceedings of the Royal Geographical Society, vol. ix. p. 92.

these stories on the part of the German geographer, but it is far from denying their possible truthfulness. If, however, foreign *savans* have thus inclined to believe in their probable accuracy—and, according to M. Malte-Brun, Gustave Lambert was not an exception—it is due to Dutch impartiality, perhaps, to say that Commodore Jansen, who has examined the logs and journals (so far as found) of the early voyages, has been unable to confirm these statements; although to do so would be to transfer to his own countrymen, even after so long a time, the belt of Arctic championship now resting with Englishmen.

There are, indeed, one or two instances given by Commodore Jansen of high Northern latitudes claimed to have been reached by Dutchmen which may be noticed in passing, particularly as the remarks connected with them tend to lead us back to the subject with which we are more especially engaged.

He mentions the story of the captain of a Dutch man-of-war, waiting at Spitzbergen to protect the homeward-bound fleet, who, having some time at his disposal, and finding open water, ran as far as 89° N.; but, as in most of these cases, the account is unsupported by evidence. The remark, however,

follows, that this only shows the general belief which then existed that there was no land to prevent any one from sailing to the Pole, and that it might be done if there was open water. "When our whalers," to quote the words of our Dutch authority, "drifted from $79\frac{1}{2}^{\circ}$ in eighteen days, 2° towards the south, attached to a large ice-field forty miles long, and did it in one season two or three times, they saw that there was always a continuity of these ice-fields; and they calculated that, as during the summer season from the 1st of June till the 31st of August, or five times eighteen days, five times the length of the ice-fields must drift south, the breadth of the pack must be 10° of latitude, or the distance to the Pole; and that if there was a passage for the ice, there would be one for ships under favourable circumstances. Therefore Torus Carolus says, 'Whether there is a passage, God only knows; but if any, it must be sought here.'"*

The Burgomaster Witsen, moreover, after a close investigation of the highest latitudes reached by the Dutch whalers, comes to the conclusion that none has ever been higher on the Novaya Zemlya

* "Notes on the Ice between Greenland and Nova Zembla: being the Result of Investigations into the Records of Early Dutch Voyages in the Spitzbergen Seas. By Capt. Jansen, of the Dutch Navy" (Proceedings of the Royal Geographical Society, vol. ix. p. 178).

side than 82° N.—which, however, if really true, is itself rather in favour of this basis of approach. But he cites, as being “informed with certainty,” the high latitude said to have been attained by Cornelis Roule, in the longitude of Novaya Zemlya who found land, birds, and also open water. This information, says Commodore Jansen, appears to have been received by Witsen after his book “On North-East Europe and Asia” was in the hands of the printer (1705), so that he had no time to make inquiry, and we have had to take the account of Roule’s voyage from Witsen in this imperfect form.*

Altogether, there is much of apparent fact and of indisputable logic connected with these accounts. Certainly, could they be depended upon, there would be reason for supposing that a strong northward current had helped the Dutch whalers to attain their high latitudes, and another argument would be afforded for the route we have proposed. At

* When making his investigations, Commodore Jansen found a speech made by the learned Pontanus in 1646, in which he says that it is much warmer in 82° north of Novaya Zemlya than in 76° ; but he adds that it is difficult to get there, and still more so to get back; and Pontanus, therefore—who was evidently a member of the “Opposition” of those days—did not advise “any one to try to reach Cathay by that route” (Proceedings of the Royal Geographical Society, vol. ix. p. 163).

all events, let us heartily endorse the suggestion and echo the prayer embraced in the couplet which we find appended to the account of Witsen:—

“GO AND SEE IF THIS IS TRUE,
AND MAY GOD PROTECT THE EXPLORERS!”

CHAPTER IX.

THE ARCTIC BARRIER AND GULF STREAM.

THE annals of Arctic exploration, however—the records of the countless voyages of daring navigators to the North, from the remote and almost mythical days of Norse adventure to the recent expedition of the Austro-Hungarians—admonish us that, as the North Pole is still unreached, there are decided uncertainties connected with the achievement of this great emprise of our times, be it attempted by what route it may. Perhaps in the whole history of human endeavour nothing can serve better to impart lessons of patience under disappointment to men than the long record of baffled attempts to reach the Pole; and whether it be true or not that there were instances of the early Dutch whalers (as some still think, though we strongly question the fact) having really sailed to it, the only data actually in our possession

point clearly to the expediency of provision being made for severe resistance, and possible defeat, in any attempt to pierce with ships the great ice-barrier prevailing at about the 80th to the 81st degrees. This renders obvious the necessity of an alternative being found for the route we have proposed.

But before suggesting the alternative let us glance at our subject in one or two other aspects. There is only too strong evidence that the Polar pack, met with to the north of Spitzbergen, and indeed for a wide circuit, is comparatively continuous. This may be the case even directly over the track of the Gulf Stream (assuming it to be a surface current), owing to the accumulation of vast masses of ice; which would even admit of a veritable "river" running beneath the body, provided the accumulative tendency be greater than the power of the stream to clear its own course, or rather to bear away the ice upon its bosom.

Yet it can hardly be possible, one would think, that temporary openings, in the line of the northward current or currents, may not exist, which, if found, would enable a comparatively easy passage to be made with a steam vessel to the Pole

in favourable seasons. The latter may, however, in this sense, be very exceptional. Nevertheless the weighty opinions we have cited, tending to the belief that the Gulf Stream *might* and probably *would* facilitate the approach to the Pole, were the route to be thoroughly investigated, should constitute some warrant for the trial being made.

Again, no Arctic expedition should consist of less than two good ships having steam-power;* and, doubtless, one season's exploration by a well-planned expedition would prove sufficient to indicate pretty clearly whether success or defeat is to be the reward on this line of research (though if an opening readily presented itself, the Pole would of course soon be reached). In the event, moreover, of no passage being found, and retreat being made, it may be safely assumed that a scientific

* Captain Tyson thus describes an appropriate vessel for such a service: "The vessel—a steamer, of course—which is expected to prosecute with any hope of success the search for the Pole must be built as strong as wood and iron, properly combined, can make her: sharp bows, and stem sloping, so that on striking ice she will run out on it. If the stem is straight or perpendicular, the vessel brings up with a heavy thud, which is very damaging to her. The hull should be so modelled as to allow the vessel to rise up or lift up in case of severe pressure by ice; neither should it fall in above the water-line or be wall-sided."—*Arctic Experiences*, p. 394.

undertaking of this kind in the Northern seas would not have been wholly in vain.

Such an Arctic "Challenger Expedition" would return with its own peculiar fruits, and would assuredly earn the gratitude of the scientific world. It should be remembered that, with all we have heard respecting the Gulf Stream theory, and in spite of the efforts of the Austro-Hungarians, no thorough or practical test of its worth has yet been made; and the scientific value of the trial, directed by men such as Holland could employ in this work, would, not to speak of the honour of conducting so important an enterprise, be well worth the cost of the experiment. Even Captain Osborn, and for England too, "fully recognised the importance of a ship or ships being sent to follow up the course of the Gulf Stream;" and declared that so mysterious a stream, "equal to fifty Niles in volume and length," ought, "for a thousand reasons," to stimulate the sailors of a sailor-nation to trace it to its farthest extent.

Let us, however, look at the Gulf Stream, considered apart even from its bearing on our general subject. The day is past for regarding this stream as having an existence only in the fertile brains of theorists. Both its existence and its great

influence as an ocean current are now generally conceded ; and the importance of ascertaining its presence in high Northern latitudes, even beyond the Arctic barrier, cannot but be regarded as a matter of scientific importance, second only, perhaps, to that of exploring those mysterious regions themselves.

In glancing at an interesting or important theme, historical illustrations usually add force, and certainly lend attraction to the subject ; and even with respect to the Gulf Stream, Professor Thompson B. Maury has arrayed such illustrations in a striking manner, though perhaps not the most pertinently. In proof of what does not take place with the Gulf Stream he says : “ Fourteen times, in the last eight hundred years, has the Thames been frozen over. Fairs have occasionally been held, booths built, and oxen roasted upon it. Since 1294 the Baltic has been eight times frozen over ; once so firmly that Charles X. led his whole army over it from Holstein to Denmark. Twice in the history of Flanders wine has been cut with hatchets. In 1708, ice in the harbour of Copenhagen was twenty-seven inches thick. In 1794, Pichegru encamped on the ice in Holland. The Zuyder Zee, the Hellespont, the harbour of Leghorn, Marseilles, and Genoa, the Rhine, the Rhone, the Danube, the Scheldt, the

Seine, and the Po have at times been locked in ice. Never were even the edges of the Gulf Stream stiffened with frost. We have no account of its slightest congelation in any part of its vast area, not even off the shores of Norway or Novaya Zemlya."

This extract forcibly illustrates an obvious fact, which may be said indeed to apply to the whole briny expanse of the ocean. But as for this remarkable current in the sea, it is hardly possible to exaggerate its importance and singularity. This marvellous river in the Atlantic has, in reality, for more than a century been a wonder to mankind. Compared with it, as to size, the largest of other rivers are but mere gossamer threads, Captain Livingston, an early investigator of this subject, putting it down as three thousand times larger than the Mississippi.

In 1775, Doctor Franklin, who brought lightning from the clouds, discerned also the reality of this warm river in the ocean, and the use that might be made of it by the frosted mariner in winter as a convenient refuge from the blinding snowstorms, and as a means of giving him his longitude, and warning him of his approach to this continent.

Its peculiarity and wondrous influence, indeed,

have been attested by all eminent observers in physical science. Professor Tyndall (in one of his lectures delivered before the Royal Society) says of it, "This stream entirely abolishes the differences of temperature due to the difference of latitude of North and South Britain, and renders the harbour of Hammerfest in Norway (71° N.) clear of ice all winter."*

Ansted describes it as "a great and wide stream of water, larger than all the rivers of the world together, running in a definite channel, through colder water of a different colour, so that, when a ship enters the stream in smooth water, one may see the bows dashing the spray from the warm and dark blue waters she is entering, while the stern is within the pale green and cold waters of the Banks of Newfoundland."

Professor C. Wyville Thomson, moreover, has given considerable study to this subject, and has furnished us with the results of the more important observations regarding the Gulf Stream.† In distinctive terms he describes what he understands to be the Gulf Stream as follows—viz., as "that mass

* Heat as a Mode of Motion, p. 197.

† The Depths of the Sea. By C. Wyville Thomson, LL.D., F.R.S.S., &c. (London: Macmillan & Co., 1873.) Chap. viii.

of heated water which pours from the Straits of Florida across the North Atlantic, and likewise a wider but less definite warm current, evidently forming part of the same great movement of waters which curves northwards to the eastward of the West India Islands."

He says that "the remarkable conditions of climate on the coasts of Northern Europe are due in a broad sense solely to the Gulf Stream." He further believes, with Sir John Herschel, and we might say Sir Charles Lyell, that its ultimate source is the equatorial current of the Atlantic, of which he regards it as simply a reflux, being the drift of the trade-winds. The path of that portion which trends north-eastwards is determined, according to his view, he says, by the great initial velocity of the equatorial water which escapes from the Straits of Florida.

The glory of the Gulf Stream as it issues from the straits has, as Professor Wyville Thomson observes, been the theme of every physical geographer; a theme, it may be said, immeasurably enhanced in grandeur when the stream is considered as tempering the atmosphere over a vast area of the northern hemisphere. But neither its grandeur nor its heat-giving influence is easy to portray in words.

Perhaps figures may best serve for this purpose, though these can scarce be comprehended.

Mr. James Croll, in an important paper on Ocean Currents in relation to the distribution of heat over the globe, in the "Philosophical Magazine,"* cited indeed by Professor Wýville Thomson, enters into a minute examination of the amount of heat conveyed by the Gulf Stream from the Tropics into the Temperate and Arctic regions. Mr. Croll calculates the Gulf Stream as equal to a stream of water 50 miles broad and 1000 feet deep flowing at a rate of 4 miles an hour, consequently conveying 5,575,680,000,000 cubic feet of water per hour, or 133,816,320,000,000 cubic feet per day. This mass of water has a mean temperature of 18° C. as it passes out of the gulf, and on its northern journey it is cooled down to 4°·5, thus losing heat to the amount of 13°·5 C. The total quantity of heat, therefore, transferred from the equatorial regions per day amounts to something like 154,959,300,000,000,000,000 foot-pounds.

In more general terms Professor Maury has illustrated this; the tenacity also with which the Gulf Stream retains its heat to gradually impart it for ameliorating the climate of North-Western

* See "Philosophical Magazine" for February 1870.

Europe, and melting the ices of the Arctic, constitutes not its least wonder. He says, "Mathematical calculations show that the heat actually set free in a winter's day by the Gulf Stream is enough to warm up the whole column of atmosphere resting on France and the British Islands from the freezing-point to summer heat;"* and Lieutenant Maury says that the latent heat set free by precipitation, over England, in one day, when the wind is from the westward, is equal to that created by the combustion of all the coal consumed in the island throughout a whole year."

Professor Wyville Thomson declares the Gulf Stream to be nearly uniform in temperature throughout the greater part of its depth. He further observes that "keeping in view the enormous influence which ocean currents exercise in the distribution of climates at the present time, I think it is scarcely going too far to suppose that such currents—movements communicated to the water by the constant winds—existed at all geological periods as the great means, I had almost said the sole means, of producing a general oceanic circulation, and thus distributing heat in the ocean."

* So calculated by Principal J. D. Forbes; see "Travels in Norway," p. 202.

Observations of the Scottish Meteorological Society show that the winter temperature of the Shetland Islands is raised 36° , and that of London 20° , by the influence of the Gulf Stream upon their climates, and that the Norwegian coast is still more greatly affected by its contact. By it the laws of equal winter temperature are curved from their normal position 1600 miles northwardly.

This striking feature in the effect of the Gulf Stream is well illustrated in the isothermal charts of Dr. Petermann, Berghaus, Dove, Keith Johnson, Sir Charles Lyell, and also the interesting isothermal chart of the North Atlantic basin of Professor Wyville Thomson, but notably in the charts of Dr. Petermann accompanying an important article on the Gulf Stream;* the series of the latter embodying the results of the reduction of 100,000 well-authenticated observations of the surface temperature of the principal inhabited portions of the northern hemisphere. From what we have said, moreover, respecting this abnormal curve in the line of temperature, the reader may perhaps derive some advantage in picturing it to himself by a glance

* *Der Golf-Strom und Standpunkt der thermometrischen Kenntniss des Nord-Atlantischen Oceans und Landgebietes im Jahre 1870.* (Geogr. Mittheilungen, Band 16, Gotha, 1870.)

at the isometrical chart illustrating the Gulf Stream and Ocean Currents accompanying this volume.

There are a variety of theories respecting the origin of the Gulf Stream which we should not entirely overlook in connection with a special mention of this subject.

A deep-rooted opinion in the minds of men so far back as Dr. Franklin's time, and one repeated by him, was that which held that the Gulf Stream is the escaping of the waters that have been forced into the Caribbean Sea by the trade winds, and that it originates in the pressure of those winds upon the water which drives up into that sea-head, as it were, for this stream.

Professor C. Wyville Thomson has, as already seen, attributed the Gulf Stream to much the same cause. Both he and Dr. Carpenter have a good right to speak upon this subject, it may be observed, from their connection with the Deep-Sea Dredging expeditions of recent years in the North Atlantic, undertaken by the Admiralty at the instance of the Council of the Royal Society, and which have been conducted with such profitable results; yet it is noticeable that these two men of science here differ radically—and, indeed, “agree to differ”—in their opinions.

We have already noticed that Professor Wyville Thomson regards the waters of the Atlantic forced northward by the Gulf Stream as practically forbidden an outlet through the Arctic Ocean, and hence that the current must find its way back again after performing its great function of tempering the climate of North - Western Europe, and perhaps to no little extent the Arctic regions ; “burrowing downwards” — as Dr. Carpenter has criticisingly termed the process — into the deep trough of the mid-Atlantic in its return circuit, and yielding to the northward flow.

He cites Humboldt in support of his opinion, who considered that he demonstrated, in 1812, that the low temperature of the tropical seas at great depths could only be owing to the currents from the Poles to the Equator ; and D’Aubuisson, in 1819, he says, also attributed the low temperature of the sea at great depths at or near the equator to the flow of currents from the Poles.

He compares the North Atlantic—having a depth off the west coast of Iceland of at least 4800 feet—to a bath, with the Gulf Stream as a vast supply pipe whence issues forth a ceaseless volume of hot water, and says : “ Into the corner of this basin, as into a bath—with a north-easterly direction

given to it by its initial velocity, as if the supply pipe of the bath were turned so as to give the hot water a definite impulse—this enormous flood is poured, day and night, winter and summer. When the basin is full—and not till then—overcoming its northern impulse, the surplus water turns southwards in a southern eddy, so that there is a certain tendency for the hot water to accumulate in the northern basin, to ‘bank down’ along the north-eastern coasts.

“It is scarcely necessary to say that for every unit of water which enters the basin of the North Atlantic, and which is not evaporated, an equivalent must return. As cold water can gravitate into the deeper parts of the ocean from all directions, it is only under peculiar circumstances that any movement having the character of a current is induced; these circumstances occur, however, in the confined and contracted communication between the North Atlantic and the Arctic Sea. Between Cape Farewell and the North Cape there are only two channels of any considerable depth, the one very narrow along the east coast of Iceland, and the other along the east coast of Greenland. The shallow part of the sea is entirely occupied, at all events during summer, by the warm water of the Gulf Stream,

except at one point, where a rapid current of cold water, very restricted and very shallow, sweeps round the south of Spitzbergen, and then slips under the Gulf Stream water at the northern entrance of the German Ocean.”*

The seeming conflict of currents along the Arctic barrier, between Novaya Zemlya and Greenland, is another notable feature in the economy of ocean circulation of the North Atlantic.

It is a well-ascertained fact that a strong current, termed by some geographers the Arctic Current, runs downward along the east coast of Greenland. This is believed to originate in the masses of ice which surround the North Pole, whence it runs along the coast of Greenland to Cape Farewell. Having doubled this cape, it flows up the west coast of Greenland to about latitude 66° N., when it turns to the south along the coast of Labrador. It eventually joins the Gulf Stream between latitude 44° and 47° N., and is the means of strewing the Atlantic Ocean with the immense icebergs which are often observable in the summer from the steamers plying between New York and Liverpool.

It has been calculated that 20,000 square miles

* *The Depths of the Sea*, pp. 398, 399.

of ice-drift are annually brought by it along the coast of Greenland to Cape Farewell, or are carried into warmer regions, where they gradually dissolve and disappear.*

But to return to the Gulf Stream. Professor Wyville Thomson cites Professor Buff as entertaining substantially his own view—to wit, that the movement of the Gulf Stream is traceable to the trade-winds. And Mr. A. G. Findlay, a high authority on all hydrographic matters, is pointed to as admitting, in a paper on the Gulf Stream, read before the Royal Geographical Society of London,† that the temperature of North-Eastern Europe is abnormally ameliorated by a surface-current of the warm water of the Atlantic which reaches it, and also as contending that the Gulf Stream proper—that is to say, the water injected, as it were, into the Atlantic through the Straits of Florida by the impulse of the trade-winds—becomes entirely thinned out, dissipated, and lost opposite the Newfoundland banks, about latitude 45° N. The warm water of the southern portion of the North Atlantic basin is still carried northwards; but Mr. Findlay, says

* The Imperial Gazetteer. Edited by W. G. Blackie, Ph.D., F.R.G.S. (London: Blackie & Son, 1873-74.) Vol. I., p. 245.

† See Proceedings, vol. xiii.

Professor Wyville Thomson, attributes this to the movement solely of the anti-trades—the south-west winds—which by their prevalence keep up a balance of progress in a north-easterly direction in the surface layer of the water.*

Mr. George W. Blunt, a well-known American hydrographer, in a *résumé* of this subject, contained in the journal of the American Geographical and Statistical Society for 1870, expresses an opinion quite in accord with Mr. Findlay. He speaks of the Gulf Stream as “that much misrepresented current of the ocean, which body has to bear with the inventions of Maury, the stupidity of weather predictors, and the assumptions of meteorologists,” adding that he does not believe that it has any existence “beyond the Western Islands,” and that “the Gulf Stream, as a current, entirely ceases and loses all its equatorial heat to the eastward of the longitude of 40° W.” Mr. Lamont, however, bears this direct testimony to its existence in the higher latitudes: “I am positive that I have seen the current running among the Thousand Islands at the rate of seven or eight miles an hour.”†

* The Depths of the Sea, p. 390.

† Seasons with the Sea-Horses; or, Sporting Adventures in the Northern Seas (London: Hurst & Blackett, 1861), p. 165.

The Gulf Stream off the coast of North America has been very carefully investigated by the officers of the United States Coast Survey—at first under the superintendence of Professor Bache, and more recently under the direction of Professor Pierce. In 1860, Professor Bache published an account of the general result up to that time,* and the latter has been taken note of by Professor Wyville Thomson.† Fourteen sections through the Gulf Stream had been carefully surveyed at intervals of about 100 miles along the coast—the first almost within the Gulf of Mexico, from the Tortugas to Havana, and the last off Cape Cod, latitude 41° N., where the stream loses all parallelism with the American coast and trends to the eastward. These sections, it is claimed, illustrate the leading phenomena, during the earlier part of its course, of this wonderful current, which Professor Bache himself describes as “the great hydrographic feature of the United States.”

But what are the opinions of Dr. Carpenter and the late Lieutenant Maury upon this subject?

* Lecture on the Gulf Stream, prepared at the request of the American Association for the Advancement of Science, by A. D. Bache, Supt. U. S. Coast Survey. From the “American Journal of Science and Arts,” vol. xxx.

† The Depths of the Sea, p. 386.

Certainly some allusion to the views of these eminent theorists upon the Gulf Stream problem should not be omitted here. And while their views fail to accord with each other, they are both equally in disagreement with the opinions expressed by Professor C. Wyville Thomson.

Nor should we omit wholly the opinion of so eminent an authority in the domain of physical science as the late Sir Charles Lyell, although we do not find his name associated with the recent special discussion of this subject, by which the Gulf Stream has been raised to the dignity of a "controverted question." Let us, however, in the first place, note his views.

Sir Charles Lyell expresses the opinion, too, that this great current is chiefly caused by the trade-winds. He appears to have adopted the conclusion of Rennell, that the Gulf Stream arises from a combination of circumstances occasioned mainly by the northward flow of a branch of the Mozambique current into the Caribbean Sea and the Gulf of Mexico, "which are also supposed to be heaped up by the blowing of the north-east trade-winds."* With him, no less than with the majority of other

* Principles of Geology. By Sir Charles Lyell, Bart., F.R.S. (London : John Murray, 1875.) Vol. i. p. 494.

writers, the favourable climate of Western Europe is set down to the influence of the Gulf Stream.

Dr. Carpenter's position is that, in the first place, the obstructions offered by the Isthmus of Panama and Central America to the passage of the equatorial current from the Atlantic to the Pacific in no way contribute towards the production of the Gulf Stream ; and, in the second place, that the heat of the Gulf Stream has no influence in elevating the climate of Europe and the British Islands.

He entertains a strong opinion—much the same, indeed, as Mr. Findlay—that the dispersion of the Gulf Stream may be said to be complete in about latitude 45° N. and longitude 35° W. ; and though that stream itself cannot affect the climate of North-Western Europe, that nevertheless its mildness is due to the movement of equatorial water in a north-easterly direction. He indeed attributes all movements of ocean-water of great magnitude to “a general convective circulation, and of this general circulation he regards the Gulf Stream as a peculiarly modified case.”*

Dr. Carpenter questions the correctness of the doctrine, according to Professor Wyville Thomson, that the north-east flow is an extension or pro-

* *The Depths of the Sea*, p. 384.

longation of the Gulf Stream, still driven on by the *vis a tergo* of the trade-winds, adopted and strongly defended by the latter. He believes that the northward flow of the waters would, as he himself states, and as already shown, continue even "if the North and South American continents were so completely disunited that the equatorial currents would be driven straight onward by the trade-winds into the Pacific Ocean, instead of being embayed in the Gulf of Mexico, and driven out in a north-east direction through the narrows off Cape Florida."*

Upon the theory which Dr. Carpenter bases his opinion—while not endorsing Mr. Findlay's views, attributing the movement beyond the 45th parallel of latitude entirely to the drift of the anti-trades—the north-easterly flow is regarded as "due to the *vis a fronte* originating in the action of the cold upon the water of the polar area, whereby its level is always tending to depression."

Dr. Carpenter, in the course of his investigations of this subject, and as the result of his deep-sea dredgings, brought out many facts of a very inter-

* "On the Gibraltar Current, the Gulf Stream, and the General Oceanic Circulation." By Dr. W. B. Carpenter, F.R.S. Reprinted from the Proceedings of the Royal Geographical Society of London, 1870.

esting character, and made some most valuable contributions to various departments of science. His chemical and thermal analyses of the waters of the Mediterranean and adjacent Atlantic developed some remarkable facts. One of these is the satisfactory determination of the supposed cause of the vertical currents—accounting for an *inflowing* of the surface-water through the Straits of Gibraltar and an *outflowing* under-current of equal strength and velocity—which is always found there. Dr. Carpenter attributes this to the greater evaporation which takes place in the Mediterranean Sea over that in the Atlantic outside the Straits of Gibraltar, and shows it to be susceptible of experimental elucidation.

Mr. Bent has very intelligently explained and discussed this and one or two incidental questions pertinent to our subject as follows: “Let us suppose that the waters in the Mediterranean and adjacent Atlantic were of a uniform depth of 1000 feet, and were at rest. Evaporation now begins, and a layer of 10 feet is taken off the surface of the Mediterranean. This destroys the equilibrium of volume or quantity, and a surface-current begins at once to flow from the Atlantic into the Mediterranean to restore that equilibrium.

When this is done and the depth of the water in the Mediterranean again becomes 1000 feet, the equilibrium of weight is destroyed by the additional salt that is carried in by the new layer of 10 feet of water and placed on top of that contained in the original 1000 feet, all of which was left behind when the evaporation of water took place; this greater weight pressing laterally against the lighter waters of the Atlantic, flows out, as an under-current, to restore this disturbed equilibrium of weight.

“Dr. Carpenter’s opinion is, that the same phenomenon is produced in the circulation of the oceans by the disturbance of equilibrium from the expansion by heat of the waters in the tropics, and the contraction by cold of those in the Polar and northern regions, and the currents thus produced would continue to flow to and from the equator and the Poles whether the equatorial or tropical belt was free from obstructions or not; and furthermore, that the warm waters which contribute heat for the amelioration of the climates of Europe and the British Islands come—in conformity with this law of circulation just explained—directly north from the tropics, along the west coast of Africa and Spain, on their way to the Polar regions.

“Now, I entirely agree with Dr. Carpenter, that these influences form the *basis* of the oceanic and inter-oceanic circulation, and that, if the earth was at rest, this circulation would be uniformly vertical, and as uniformly due north and south in all parts of the world. But Dr. Carpenter seems to forget that there are other great forces caused by the revolving of the earth upon its axis, which, if not of primary importance in the production of currents, are at least very potential in changing the direction of this circulation, in showing why the currents incline obliquely to the *east* when flowing from equatorial regions to the north or south, and obliquely to the *west* when flowing from the Polar regions towards the equator.

“Were it not for this obliquity of flow, the cold currents which, according to Dr. Carpenter’s theory, must *always* be *under-currents*, would never appear at the surface of the sea; but this, we know, is not the case, as every one who crosses the western limits of the Gulf Stream and Kuro Siwo sees on passing through the heavy ‘tide-rips’ that mark the chafing where they rub swiftly against the cold currents from the north that intervene between them and the continents to the west. There is another force, or law of mechanics, which has been well estab-

lished and long known, with which Dr. Carpenter's position very strangely conflicts.

“This law was demonstrated by Mr. William Ferrell, of Cambridge, in 1860, and is regarded as an extension of Hadley's explanation of the trade-winds. Ferrell's demonstration is in the following form, viz. : ‘In whatever direction a body moves on the surface of the earth, there is a force arising from the earth's rotation which deflects it to the right in the northern hemisphere, but to the left in the southern.’* ”

“It follows from this law, that in the northern hemisphere every river current tends or presses more towards the right bank than towards the left, no matter which way its course may lie, whether east and west, like the Ohio, or north and south, like the Mississippi, or in any other direction. So, too, a railroad train must always bear more heavily on the right rail of the track along which it is flying.

“Without stopping to discuss this law of terrestrial mechanics, it may be enough to point out that it must be, in some degree, potential in giving direction to the trade-winds and ocean currents.

* See Ferrell's *Motion of Fluids and Solids Relative to the Earth's Surface*, p. 25.

It *may* be counteracted, and is sometimes counteracted by greater forces, but always makes itself felt in the resultant motion. Dr. Carpenter and his co-theorists—of whom, however, there are but few even in England—bring the Gulf Stream to Newfoundland and there leave it. They forget that, if no other forces were at work to carry it to the north and east, this very law of the earth's rotation would carry it onward towards the British Islands." *

In thus presenting the views of Dr. Carpenter, we have afforded the reader an insight into those of another writer upon these questions, who, if less a man of science, is perhaps not less a practical observer in the domain of which he treats than the eminent physicist we have referred to. But in passing we may note that Captain Bent, in discussing the subject of heat derived from the Gulf Stream, and its ameliorating influence upon the climate of Great Britain, and indeed Europe, has raised a question that may well create alarm in British geographical and scientific circles, perhaps even greater than should the theory of Dr. Petermann, which cuts the English Expedition off from

* *Thermal Paths to the Pole.* By Silas Bent. (St. Louis, 1872.) Pp. 27-29.

the Pole—for it places the inhabitants of all Europe at the mercy of America, or perhaps, more properly, the two Americas.

He contends that if the Isthmus of Panama were removed so as to allow the equatorial current of the Atlantic to flow freely into the Pacific Ocean, the Gulf Stream would be destroyed, and the enormous amount of heat derivable from it lost—described as equal in quantity to one-fourth of all the heat received from the sun, by nearly the entire area of the Atlantic Ocean embraced between the Tropic of Cancer and the Arctic Circle; thus bringing the whole of Europe at once to “its normal climatic condition—that is, France and Austria would have the climate of Canada, and England, Germany, and Northern Europe would become a frozen wilderness, such as British America and Labrador.”

Captain Bent naturally refers to this phase of the case as forbidding to reflect upon, for the inhumanity suggested by the very thought of America’s exercising such a power; and Dr. Carpenter has amusingly alluded to the exceedingly humane considerations by which she might deem herself deterred from meting out this dire fate to so large a part of the civilised world.

But if the above be regarded, in the opinion of English critics, as an extravagant position to take on the part of this theorist, it is not unworthy of note that, incidentally, Sir Charles Lyell has said substantially the same thing. Nor has he displayed so different a system of reasoning, though he leaves the startling result to be brought about by the quiet and gradual, but possibly surer, processes of nature and time.

In the extract we may give to illustrate this, one gets again Sir Charles Lyell's opinion regarding the origin of the Gulf Stream, wherein he, too, appears to disagree with Dr. Carpenter. He says: "For instance, the waters in the Gulf of Mexico which are driven westward and piled up by the continued influence of the east wind, are now deflected back by the Isthmus of Panama. But it is obvious that if this isthmus had no existence, these waters would flow on westward into the Pacific Ocean, instead of giving origin to the Gulf Stream. And," he continues, "as the watershed of the isthmus is in one part only 250 feet above the level of the sea, the breach here supposed is no extravagant speculation, but would be effected by a change of level not greater than we can show to have occurred in parts of the British

Isles since the commencement of the Glacial period."*

The theory of Lieutenant Maury respecting the Gulf Stream has been given us in a nutshell by Commodore Jansen, in an article published in the "Geographical Magazine" not very long ago,† and hence it need not take up much space here; though it would be possible, and indeed interesting, to devote many pages to the examination of this subject from the point of view alone of the writer who was the first to map out the sea and bring it systematically within the domains of philosophical research.

While he considers that modern investigations and examinations, important as they have been, have not even yet entirely relieved it of mystery, still he thinks they "encourage the opinion that this stream, as well as all the *constant* currents of the sea, is due *mainly* to the constant difference produced by temperature and saltness in the specific gravity of water in certain parts of the ocean. Such difference of the specific gravity is inconsistent with the aqueous equilibrium, and to maintain this equilibrium these great currents are set in

* Principles of Geology, vol. i. p. 250.

† See *ante*, p. 25, note.

motion. The agents which derange equilibrium in the waters of the sea, by altering specific gravity, reach from the equator to the poles, and in their operations they are as ceaseless as heat and cold; consequently they call for a system of perpetual currents to undo their perpetual work.”*

This, says Commodore Jansen, is Maury's hypothesis, and adds, that facts do not reveal that the trade-winds are the cause—hence the need for an hypothesis. He says: “The sun, heat, and cold are the principal sources of motion. The only thing we have to do is to observe the motions of the sea and air, their temperatures and densities; and these facts, when grouped together in sufficient numbers and” (he is now using the words of Maury) “catechised with reverence by a mind unbiassed by theories and speculations, will themselves reveal the cause or place in our hands the clue to such explanation as man is permitted to comprehend.”

It is true, Lieutenant Maury admits that the agents already mentioned as the foundation of his hypothesis “are not the *sole* cause of the currents,” and it may be well to quote him a little further.

* Maury, quoted by Commodore Jansen. See “The Physical Geography of the Sea, and its Meteorology.” By M. F. Maury, LL.D. (London: Sampson Low & Co., 1860.) P. 24.

“The winds,” he says, “*help* to make currents by pressing upon the waves and drifting before them the waters of the sea ; so do the rains, by raising its level here and there ; and so does the atmosphere, by pressing with more or less superincumbent force upon different parts of the ocean at the same moment, and as indicated by the changes of the barometric column. But when the winds and the rains cease, and the barometer is stationary, the currents that were the consequence cease. The currents thus created are therefore *ephemeral*. But the changes of temperature and of saltness, and the work of other agents which affect the specific gravity of sea-water and derange its equilibrium, are as ceaseless in their operations as the sun in his course, and in their effects they are as endless. Philosophy points to them as the *chief* cause of the Gulf Stream and of all the *constant* currents of the sea.”*

Mr. Croll has observed that Maury’s conclusion seems to resolve itself into this—that the waters in inter-tropical regions are expanded by the heat, and those in the Polar regions are contracted by the cold, and that this tends to produce a surface-current from the equator to the poles, and an

* Maury, *op. cit.*

under-current from the poles to the equator. Maury and Dr. Carpenter, therefore, do not, in certain respects, materially differ, though the former, Lieutenant Maury, yields to no one in respect to the great importance and influence he attaches to the Gulf Stream.

There is no one, however, who has written more interestingly upon this subject than Professor T. B. Maury, and with him we may conclude.

Magnificent as are the proportions of the Gulf Stream, it is but a small part of the mighty flow of waters which move as steadily as the stars in their courses, in the Torrid Zone, round the world. The cause of this flow—involving a theory already touched upon—is thus in part explained by this writer: “By the earth’s rotation on its axis, objects on its surface, between the tropics, are carried from west to east at a rate of 1000 miles an hour, whilst, as we advance towards the poles, this rate decreases with the decrease in the circumference of the parallels of latitude, so that when we arrive at points where the circumference is only 12,000 miles, instead of 24,000, as it is at the equator, this velocity of rotation is but 500 miles an hour, and so on decreasing until reaching the pole.

“Now, an object set in motion toward the equator from the polar regions, where the velocity of rotation is small, will constantly be arriving at points on the earth’s surface where the velocity is greater, and not at once acquiring this greater velocity, its direction will tend obliquely to the westward. Hence we find those streams or currents which flow from the pole toward the equator always taking a south-westwardly direction whenever the continents and islands will permit.

“These streams from the northern and southern hemispheres meeting at the equator, form and give direction to the equatorial currents, the waters of which are thrown to the westward ; but interrupted by the continents which lie across their paths, and changed in their specific gravity by the expansive heat of the sun, they throw off hot streams to the north and south, like blood from the heart in the animal system, to carry their life-giving warmth and nourishment along their paths to the earth’s extremities.”

And in allusion to the thermometric theory, Professor Maury says :—

“If it be true that the Gulf Stream reaches the Pole with heat enough to melt its ices, it ought to

follow, conversely, that the cold, counter under-current from the Arctic Ocean, that offsets the Gulf Stream, will, in its long flow to the South, lose but little of its Arctic cold, and reach the tropics with frigerific power. Such, at least, would be the demand of a remorseless logic. Anxiously we turn to ask, 'Is this demand satisfied? Do the nicest mean observations attest the fact indubitably?' Here is a gigantic balance, hung by the Creator Himself, one scale at the Pole, the other at the tropic. The first is, as yet, invisible; the other we can read. We know that they must be *in equilibrio*. Let us go to the tropic, and with the deep-sea thermometer drag up an answer from this unbiassed and incorruptible witness.

"We have the most exact observations, taken with a variety of exquisitely-constructed instruments, and continued, at a vast expense of money and care, through many years. They all tell the same story, so that Science may be said to have sat at the feet of this great aqueous traveller to the Pole and heard him recount its mysteries. Professor Bache, of the United States Coast Survey, records that 'at the very bottom of the Gulf Stream, when its waters at the surface were 80° in temperature, the instruments of the Coast Survey recorded

a temperature as low as 35° Fahrenheit'!* The cushion of water under this must have been even colder; and this cushion is the counter under-current whose testimony we are seeking."

"There is no room for surprise," he continues, "when we are told that the Gulf Stream enters the space round the Pole at a temperature above the freezing-point (28°), when we find warmer water (at 36°) almost at the Pole, and outside the heat-bearing current.

"The Arctic current that offsets the Gulf Stream and flows south, reaching it at 35° temperature, could not have left the Pole colder than 28°; for then it would have been *frozen up*. In its transit to the south it only loses 6° or 7° of its temperature.

* This would seem to conflict with the testimony of Professor C. Wyville Thomson, who, as we have seen, declares the Gulf Stream to be of practically equal temperature throughout its entire depth.

The quotation really comes, however, from Lieutenant Maury, who further observes: "These cold waters doubtless come down from the north to replace the warm water sent through the Gulf Stream to moderate the cold of Spitzbergen; for within the Arctic Circle the temperature at corresponding depths off the shores of that island is said to be only 1° colder than the Caribbean Sea, while on the shores of Labrador and in the Polar seas the temperature of the water beneath the ice was invariably found by Lieutenant De Haven at 28°, or 4° below the melting-point of fresh-water ice. Captain Scoresby relates that on the coast of Greenland, in latitude 72°, the temperature of the air was 42°; of the water 34°; and 29° at the depth of 118 fathoms."—*The Physical Geography of the Sea, and its Meteorology*, pp. 58, 59.

Is it, then, a thing incredible, that the Gulf Stream, this mighty 'river in the ocean,' whose caloric, 'if utilised, could keep in blast a Cyclopean furnace, capable of sending forth a stream of molten iron as large as the volume discharged by the Mississippi river' — is it incredible that this current may reach the Polar region at 36° ? Remember it begins its race off Florida at 86° . It might then lose 50° of its heat (against the loss of 6° or 7° of its counter-current), flow on to the Pole, melt its ices, and yet have 8° of heat to spare before it would fall to 28° , the ice-point. The estimate of its rate of thermal reduction, as given by the United States Hydrographical Bureau, is that, so far as traced, 'it loses 2° of heat in running over 10° of latitude;' *i.e.*, it suffers a loss of 1° in every 300 miles. A simple calculation shows that it ought to reach the Pole at this rate, certainly not below 48° or 50° (more probably 60°)."*

The majority of opinions upon this subject, therefore, appear to point definitely to the conclusion that the Gulf Stream by no means exhausts its force or its heat on its approach to the Arctic barrier, up to which point it has been distinctly traced; but

* "Gateways to the Pole." Putnam's Monthly Magazine, New Series, vol. iv. pp. 527, 528.

rather that it flows on to the very Pole, effecting there, too, not the less wonderful results because they are as yet veiled in mystery. What we have shown, moreover, only adds force to the observation of Captain Osborn respecting the importance of a distinctive examination of the Gulf Stream upon its own merits; but it also strongly sustains the idea earlier advanced, that it would more than likely facilitate, if really followed, the approach to the North Pole of an Arctic expedition.

However, the object we have in view is the revival of Dutch Arctic enterprise, and the pursuit of such enterprise by whatever route and by whatever mode may best appeal to the judgment of enlightened and scientific men: the primal motive from this point of view being not merely to reach the North Pole, but to discover and bring to light the hidden mysteries of that unknown region of the globe.

Lest, therefore, the route we have set forth should not avail for this purpose—or, indeed, should not promise such encouragement as even to induce Netherlanders to investigate it on the ground itself, in the event of their taking up this subject—let us turn our attention for a brief space to another way, by which it can hardly be pos-

sible that the Pole may not be reached by men determined to win so grand a prize : namely, *via* Spitzbergen ; to be attempted by means of ships, or ships and “ sledge-boats.”

CHAPTER X.

THE ALTERNATIVE ROUTE.

LET us once more clearly define the primal route we have proposed, and its alternative.

1st, *The Gulf Stream route*, which is supposed to offer a comparatively uninterrupted ship-channel by following the course of the Gulf Stream (not hitherto traced) deflected northwards from Norway and Novaya Zemlya.

2nd, *Alternative route via Spitzbergen*, being that way to the North Pole which would make Spitzbergen the base of operations.

The "Gulf Stream" route has had our first claims, because it seems desirable, upon every account, that the exploration of the North Polar area should be made, if possible, by means of ships, or with ships at a convenient distance. It is therefore clear that, if anything like an unobstructed ship-channel is to be found to the Northern

point of radiation by following any existing upward current, such channel should be sought out and pursued. A direct line from Spitzbergen, however, we cannot think would be found to offer such a channel. Nevertheless, as forming the nearest and most convenient known base of operations, this may, we think, with propriety be proposed as an alternative to the first.

In case of adopting the Spitzbergen route, however, it would be necessary to bring to bear a combined plan of attack upon the foe which has so long held men at bay. The ship, the sledge, and an appropriately designed sledge-boat, would be almost equally necessary; whilst to note carefully, from the Spitzbergen outlook, the best season for advancing Polewards, would be equally indispensable.

Dr. Petermann has, it is true, expressed the belief—and, indeed, some other eminent authorities also—that a strong steam vessel would be able to make its way through the pack, at the most favourable season of the year, at almost any point; he further believes that by this means, and with the experience gained by the more recent expeditions, “the central area *will* be penetrated as far north as the Pole.”*

* Letter addressed to the President of the Royal Geographical Society, by Dr. Augustus Petermann, *Nature*, vol. xi. (1874) p. 37.

In the absence of any known change of views, moreover, on his part, it may be of interest to quote a most hopeful opinion expressed by that geographer ten years ago (in a letter supplementary to the one already referred to, urging the despatch of an English expedition by Spitzbergen) as to the proper plan to be pursued by this route. He says :—

“A new expedition to the North Pole by way of Spitzbergen might leave port about the 1st of March, before the drifting masses of ice from the Siberian shores encumber the Spitzbergen seas; it would then have a chance to sail, under favourable circumstances, in one stretch to the North Pole, perhaps in three or four weeks, and arrive there at the beginning of the Polar dawn and summer. Within the six summer months the whole western—the American—boundary of the Arctic basin, from the northernmost known point of East Greenland to Behring Strait, might be reconnoitred, the Asiatic boundary being already tolerably well known by Russian research. In September or October one of the vessels might be sent home with tidings of the season’s proceedings, the other remaining for the winter as near as possible to the Pole, in order to make scientific observations, by which the key-

stone would be added to our whole meteorological system of the Northern Hemisphere; the second vessel returning in the spring. In the harbour of Spitzbergen (*sic*), in latitude 80°, the expedition would have a fixed base for constant communication with England, attainable all the year round from the Thames by a fortnight's sail."*

For England read Holland, and for the Thames the Y, and Spitzbergen is then placed only nearer and more approachable as a base for convenient communication with home, should a Dutch expedition be despatched by this route. Moreover, could such success be met with in the North as attended Sir James Ross in the Antarctic regions—who with singular good fortune pushed through 800 miles of pack-ice and came to open water—there would indeed be hope of our realising this picture.

But the lessons of experience are opposed to the probability of so successful a penetration of the North Polar area from this point as Dr. Petermann would encourage us to look for; and it may, perhaps, be fairly questioned whether, in the light alone of the experience afforded by the two German expeditions, the learned writer himself would not now regard such ease of procedure in the matter of Arctic re-

* Proceedings of the Royal Geographical Society, vol. ix. p. 110.

search in extreme latitudes as partaking too much of the *couleur de rose*.

The deductions of enlightened theory, based upon such glimpses as we have been able to obtain of the mysterious North Polar realm, are interesting and even profitable, and speculative views will continue to be entertained regarding the best means of approach to it, until ascertained facts, as the result of well-directed enterprise, shall displace the theoretical in the minds of men.

After all, any approach to mere speculation, when advocating expeditions and the staking of human lives, is to be avoided. To send men into the Arctic seas with the idea that ice and snows and north winds are not to be emphatically the rule, and that dangers, privations, and hardships are to be but remote contingencies, would be opposed to the judgment of the most plausible arguer for the Spitzbergen route, or the route by Smith Sound. The experience of Arctic navigators must be our guide, and this, if it were not indeed our only data, has cost too much to be ignored.

What, then, does experience teach with reference to the Spitzbergen region? The answer we are obliged to give is, that three centuries of severe battling on the part of heroic seamen at this point

has not furnished us with one authentic instance in which the Polar pack has been successfully penetrated. Up to the line which Spitzbergen marks and to the western and northern shores of that island, Captain Osborn has himself truly said that "yachtsmen go for pleasure and poor Norwegian fishermen sail in almost open boats;" but to sail far beyond it becomes quite another matter, and a feat hitherto attended with great if not insurmountable difficulties.

Passing over the older voyagers, we need hardly do more than mention the names of Phipps, Buchan, Franklin, Scoresby, Clavering, Lütke, Parry, Nordenskiöld, Koldewey, Leigh Smith, Lamont, as those who have attempted to reach the Pole by Spitzbergen, or who have made examinations of the ice in that neighbourhood, to confirm the truth of what we state.

Yet what was their experience? In 1773, Phipps, with the *North Pole* for his distinctive aim, cruised all the summer, and as late as the 20th of August, north of Spitzbergen, without being able to reach the 81st degree of latitude. In 1818, Buchan and Franklin, encouraged by the reports of the whalers of a comparatively open sea, repeated the attempt, but without reaching higher than

80° 34', being opposed by the same inevitable barrier which had stopped all other expeditions from the time of Hudson, and returning convinced that the Spitzbergen meridians afforded little hope of extreme northward advance with ships.

Scoresby, who for so many years, and with such intelligent aim and forethought, cruised in the waters between Spitzbergen and Greenland, succeeded only once in attaining 81° 30', though he found at one time a stretch of water extending 300 miles, and observes, "Had it been my object, I might have penetrated to a considerable degree towards the north, but prudence dictated my return." Scoresby, however, as is well known, was a whaler, and was not attempting to reach the Pole.

Similar to these was the experience of Captain Clavering, in the "Griper," in 1823, sent out in company of Captain Sabine on a scientific errand to Spitzbergen. While the important pendulum observations of Sabine were being made, Clavering examined the pack edge directly north from Cloven Cliff, with no opening perceivable as far as the eye could reach, in latitude 80° 20' N.

The history of Parry's gallant effort north from Spitzbergen, in sledge-boats, is well known; and

the latitude of $82^{\circ} 45' N.$, which he attained, remains to this day a feat unparalleled in the annals of authentic Arctic voyages. His attempt, however, from its peculiar bearing on our subject, will demand more special mention farther on.

The experience of Lütke, like that of the Austrian explorers previously described, belongs to a somewhat different locality—to the Barents Sea and the Novaya Zemlya region. He failed to reach so high a latitude, by several degrees, as even Phipps, or as high as Leigh Smith, Nordenskiöld, and Lamont attained. And could we but ascertain the experience of the numberless Dutch and English whalers which, during a long period, frequented this region, we should not probably have anything very different to record; for, as touching the former, Commodore Jansen does not find that any of the Dutch whalers got beyond about $80^{\circ} N.$

Thus, $81^{\circ} 42'$, recorded by the Swedish expedition of 1868, and $81^{\circ} 30'$ by Leigh Smith, are substantially the same as Scoresby reached, and higher than even Dutch whalers themselves claimed at this point. The mean of these latitudes may therefore be put down as almost the extreme limit to which free sailing can be looked for north of Spitzbergen, and this parallel has only been attained

by approaching from the westward of that island. Any advance northward beyond about $81^{\circ} 30'$ must be achieved by determined persistence, either with strong steamers, watching their opportunity, or by resorting to sledge and boat travelling.

Yet much depends upon the openness of the season; and for the moment, taking opinions and not experience for our guide, there is reason to believe that in a very exceptional season a ship might push two or three degrees higher without encountering much difficulty.

Parry states that before the middle of August 1827, a ship might have sailed to 82° "almost without touching a piece of ice;" and it was the opinion among the officers of the expedition that "by the end of that month it would probably have been no very difficult matter to reach the parallel of 83° , about the meridian of the Seven Islands." *

Phipps, on the other hand, found his ship being closely beset, in 1773, in latitude $80^{\circ} 48' N.$, on the 6th of August. Yet, again, it was as late as the middle of September that we find Weypright and Payer, Mack, and Johannesen pushing their way

* Narrative of an Attempt to Reach the North Pole (London, 1828), p. 148.

unobstructed north and east from Novaya Zemlya in 1871; while the investigations of Leigh Smith and Nordenskiöld were made equally as late, or even later, in the season.

We cannot forbear remarking here, even at the expense of a possible digression, that some who apparently have faith in the ability of ships to penetrate to the Pole, and who substantially endorse the Spitzbergen route, look upon the Novaya Zemlya base as yielding the greater hope of a successful northward advance.

Of these, that practical seaman and Arctic navigator, Captain Allen Young, would seem to be one—that is, assuming him not to have changed his opinion since the days of active route discussion, as some have evidently done. He then expressed the conviction “that when the ice travelled southwards the surface of the sea ceased to freeze in the months of July and August; that there must be a space of open water found in the rear of the ice which had come south; and that if a screw-steamer could be taken up to the edge of the ice between Novaya Zemlya and Spitzbergen, between the meridian of 40° and 50° E., in the middle of July, she would, by cruising along the edge, find an opportunity of forcing her way into the pack. Should

she succeed in getting five or six miles inside the pack, she would be in comparatively smooth water, and could then push on to the north, working through the ice as it moved south, until, having passed through two or three hundred miles of the pack, she would then arrive at open water in the rear of the pack, and would sail away to the Pole, returning by the same route, or by any other meridian as might be found advisable."*

It was at about the same point in the Barents Sea indicated by Captain Allen Young as a preferable one to start from, that Mr. Lamont of Knockdow, on the 19th of June, 1869, recorded in the journal of his first "Diana" cruise that somewhat remarkable prognostication, of which he tells us in his new work, respecting the possibility of finding "large lands" northward, where Franz Josef Land has since been discovered. Just before this he says, "I should very much like, with fine weather and plenty of coals, to try and get into a high latitude somewhere about here (75° 11' N., 48° 32' E.), either directly or by sailing to Cape Nassau in Novaya Zemlya and trying to get northwest."†

* Proceedings of the Royal Geographical Society, vol. xii. p. 154.

† Yachting in the Arctic Seas, p. 205.

Nor would it, perhaps, be too much to infer that the Novaya Zemlya meridian would at the present time be his choice from which to attempt a poleward voyage with a ship, if an essay so hopeless, in his view, were by any process to be made; while it may also be doubted whether the Austro-Hungarians themselves, though now little inclined to the Gulf Stream theory, would not, after all, have most hope of attaining a very high latitude from the same sea in which the "Tegethoff" met the ice, and their Norwegian walrus-sloop found fair sailing, and from which also, apparently, the highest latitudes were made by the Dutch whalers.

Indeed, Lieutenant Weyprecht, on his own part, has said "that he considers the route through the Siberian seas, as far as Behring Strait, as practicable as before, and would readily take command of another expedition in the same direction."* Moreover, according to Linschoten, it was the opinion of Plancius that the "true and most practicable way to the point under the Polus Arcticus" would be found above Novaya Zemlya;† and the noble Barents expired believing, and with his last breath

* Quoted by Dr. Petermann in his 1874 letter, *Nature*, vol. xi. p. 38.

† *Geschiedenis der Noordsche Compagnie*, door Mr. S. Muller, Fz. (Utrecht, 1874), p. 43, note.

affirming, that, had he stood more between the latter island and Spitzbergen, he would have succeeded in entering the open sea.

Entirely irrespective, therefore, of the possible presence of the Gulf Stream to assist the poleward voyager at this point, the weight of evidence would seem fairly to incline toward the Novaya Zemlya base as the more favourable one from which to approach the North Pole.

But to return to Spitzbergen. It has seemed due alike to our subject and to the reader that we should present, in the first place, the less promising aspects of this route; and there can be no doubt that the sum of experience gained by explorers at this point is opposed to the probability of the Pole being reached by ships on the Spitzbergen meridian. Yet this does not necessarily furnish a conclusive reason why, in a peculiarly enterprising and daring age, the attempt should not be made. Nor is it by any means certain that the navigator who shall unite boldness with prudence, and perseverance with determination, may not, with all our improved facilities for ice navigation, succeed in such an undertaking.

Spitzbergen, upon many accounts, offers a superior base whence to prosecute Arctic research. It is

of importance to remember that it is within certain and easy reach every summer from the Dutch ports; affording secure harbourage on its northernmost coast, and being itself a far advance polewards; while natural influences combine to render the region more tolerable to existence, even in winter, than Novaya Zemlya, several degrees farther south—facts, altogether, which make it at once the most convenient and desirable point within the whole range of the Arctic Circle from which any European expedition might push investigations.

Then again, the fact that the islands abound in deer and other game, and in wild-fowl, is a desideratum, as supplying a possible need; and the promise also of the recoument of a large share of the expenses from the profits of the fisheries, in the case of ships remaining long here, is a matter not to be lightly regarded. And upon this point Mr. Lamont's testimony is very *apropos*, where he says, truly enough, that "the fact of a small vessel like the 'Diana' being able largely to recoup her heavy expenses has an important bearing on Arctic exploration."*

To encourage the Arctic explorer by Spitzbergen,

* Yachting in the Arctic Seas, p. 90.

moreover, there may now be brought to bear a comparatively new element in ice-navigation—viz., the screw-steamer, which has hitherto had no really effective trial by any route from which we have had time to get results. With the exception of the essays of Leigh Smith and Nordenskiöld, and perhaps of Koldewey—which were rather examinations of the ice than serious attempts to steam to the Pole—all expeditions whose ships have sought to push through the ice-barrier north of Spitzbergen belong to an era in Arctic navigation anterior to the days of steam vessels.

This may, therefore, reasonably afford hope; and probably the confident belief of Dr. Petermann which we have quoted, that the Pole will yet be reached by ships, was founded no less upon the fact of the admirable adaptability of steam-power in difficult navigation than upon the theories of an open Polar sea and the continuation of the Gulf Stream. No ship, however, can be expected to make its way through the ice-pack so long as the latter remains unseparated and continuous. Perhaps, therefore, a greater encouragement than any other is to be found in the ever-changing, drifting character of the ice (though this possesses also its dangers).

All Arctic navigators bear witness to this fact,

but it is especially illustrated by the experience of Sir James Ross in his Antarctic cruise. He found that the pack-ice changed its place very rapidly, and—although he was without the grand modern essential we have spoken of—was enabled to pursue his voyage without very great difficulty. For example, when in February, 1842, he encountered a tremendous pack of 500 miles in extent, he found, only four weeks later, the sea entirely open and almost free of ice; and this might prove to be the case sometimes in the hitherto blockaded seas between Spitzbergen and the North Pole, especially if a ship were to remain for a period on the ground and watch her opportunity.

In this latter point a good deal is involved. It is impossible, either after a thorough investigation of this subject, or, we imagine, any lengthened practical Arctic experience, not to recognise the great difference there is between “open” and “close” seasons in the Arctic seas; so that the success of Arctic voyages, almost more than any other enterprises, must depend not a little upon good fortune.

Let there be, first, a stanch, well-provided, and well-manned Arctic ship, with officers of experience, prudence, and determination, and *then* an

open season, and there is good reason to believe that the North Pole may be reached *via* Spitzbergen. That there is a probability of this we may judge from the opinion expressed by the commander of the "Hecla," in 1827, already cited; but more especially if, coupled with that, Dr. Petermann be correct in stating that Parry saw a "navigable sea" before him when about to turn from his Sisyphus-like labour on that memorable 23d day of July, 1827.

Some observations gleaned from an article of Mr. R. A. Proctor's, contributed not so very long ago to an important scientific journal, seem worthy of notice at this point as favourable to the Spitzbergen route, and also to the chance of reaching the Pole with ships ("by the path which Parry followed"); and it is noticeable that this man of science finds some encouragement for the Spitzbergen route itself in the presence of the Gulf Stream in these high latitudes—of which he traces one branch up to the west of Spitzbergen, "the main stream making its way," he says, "towards Nova Zembla."

Mr. Proctor avails himself of the arguments of Herr W. von Freeden in Petermann's "Mittheilungen," and asks if Nature herself does not point

out this track past Spitzbergen as the proper course for North Polar explorers. Here, we are told, in the first place, the mildest temperature is to be found; here also is an assisting current—*valeat quantum valere debet* (adds Mr. Proctor). But the chief circumstance to which attention is drawn 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.

Another interesting fact noticed is, the great depth of the sea in this part of the Atlantic. Scoresby long ago endeavoured in vain to find a bottom here with a two-mile line; and Von Freeden quaintly remarks that the whole of the Bernese Oberland might be hidden, “its presence unbetrayed even by an eddy,” under the ocean to the north of Spitzbergen. “Here, then, if anywhere,” adds Mr. Proctor, “a ship might expect to find her way through, though experience has shown again and again that the way is full of dangers.”

Again, pointing to Parry’s experience during his boat-and-sledge expedition, when carried back by the movement of the ice over which he travelled, and to the lessons taught by his defeat, Mr. Proctor says: “The very fact that Parry’s great ice-ship floated freely shows how wide and deep the sea must

be even far to the north of the spot 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 between the North Pole and Parry’s farthest point, and far to the north of the latter point”—a practical recognition, it may be observed, of Sir John Barrow’s truism, “Where ice can float, a vessel can float also.” “On the other hand,” concludes Mr. Proctor, “the ease with which Parry’s party pushed 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.”*

This brings us naturally to the famous poleward attempt of Sir Edward Parry in this direction as the final argument in favour of the Spitzbergen route, and, taken with all its lessons, perhaps the

* “The German and Swedish Expeditions to the Arctic Regions,” *Nature*, vol. i. pp. 312, 313.

most hopeful one. Certainly no single failure of the kind has been more frequently made use of by writers to point out that which they deemed the way to success.

It has long been considered, at least until very lately, that Parry, although he came short of realising the grand object of his expedition, was successful in demonstrating, almost beyond a doubt, the possibility of a future expedition, organised upon the same model, but profiting by his mistakes, being able to reach the North Pole. The plan surely had novelty to recommend it; and, as an enterprise, the voyage was undoubtedly the boldest ever voluntarily undertaken on the broad ocean, whether ice-bound or otherwise.

The idea, however, it is right to say, was more Scoresby's than Parry's. The lengthened observations of that veteran whaler in the Greenland seas, and his constant reflection on the subject of the best way of reaching the Pole, led him, after the failure of the ship expedition of Buchan and Franklin, to advise an expedition to proceed from Spitzbergen by open boats, so fixed on runners as to be easily dragged over the ice, and yet be ready to sail through any passages of open water.

The experience of Parry and Franklin (the latter

having, indeed, himself offered to conduct the expedition) led them to thoroughly approve of the plan, which also had the support of Sir Humphrey Davy, the President of the Royal Society; and when such men deemed it feasible, it was not likely to want for attentive consideration from the public, nor to fail at length to secure the favour of the Admiralty.

Parry, fresh from his recent retracing of the steps of Bylot, Baffin, Fox, and Middleton, was placed in command of the new expedition, and proceeded, in April, 1827, in the famous discovery-ship "Hecla," for Spitzbergen. Even this was not early in the season for the kind of journey contemplated for the expedition; but detention north of Spitzbergen, the looking out of a safe anchorage for the ship, &c., caused the summer to be well advanced before the real work was commenced, and it was June 23d before the now historic boats "Discovery" and "Enterprise" were manned, and started on their difficult journey (for we must here differ from Mr. Proctor).

But not to be betrayed into narrating the details of this Herculean poleward struggle. We know too well that Parry and his party did not reach their intended goal. They were baffled; but not until

they had attained a latitude which gave to the Spitzbergen route, and still associates with it, the highest point ever reached by civilised men, so far as we have authentic knowledge. In getting no nearer than 435 miles from the Pole—or 172 from the ship—they calculated that they travelled, during their sixty-one days' absence, fully four-fifths of the necessary distance, in miles to have made the journey to the Pole and back in a direct line; and, in spite of other discouraging circumstances, they were only compelled to give up the attempt because the ice was being swept faster to the south than they could drag the boats to the north.

Subsequent experience has shown that this result was only natural in the case of an attempt made thus in the height of the Arctic summer, when all the ice-fields were in motion; though some now believe that it would not have been essentially different had Parry set out from Spitzbergen even in the early spring, basing their opinion mainly on the experience of Professor Nordenskiöld north of Spitzbergen in the beginning of April, 1873, after the wintering in Mossel Bay. But although Nordenskiöld "repeated Parry's failure," it is evident that he did not repeat that navigator's gallant endeavour, for he went no farther than the Seven

Islands before deciding that the nature of the ice offered no inducement to a serious effort. Nor do we understand that his expedition was organised at all with the view of reaching the North Pole in this way.

We, however, find Captain Osborn himself, and Mr. Markham with him, declaring that Parry, instead of starting on such a journey in June, ought to have wintered in Spitzbergen, and started for the north in February; and that (Parry's experience having clearly shown that the food-allowance was insufficient, and the weight the men were compelled to drag too heavy), in view of the perfection to which sledge equipment is now brought, "the weights would be infinitely less for the men to drag, whilst the provisions would last months instead of weeks."

But the several errors committed in carrying out this plan of an expedition were such as only experience could be expected to remedy. The season, moreover, was most exceptional, owing to the extraordinary rainfall, which was so great that Parry himself declares that twenty times as much rain fell in the course of that one summer as during any preceding one he had spent in the Arctic regions.

Sir Edward Parry himself, although compelled to desist from his attempt, believed in the essential practicability of the route he chose, and in his plan for an expedition. He wrote a letter, it is said, on his return, pointing out the causes of the failure, and recommending that a ship should go in the winter to Spitzbergen, in order that the sledge-and-boat journey might be undertaken at a more favourable season ;* and Dr. John Rae, who expresses the opinion that Parry chose the “right route,† but the wrong season of the year,” also states that he “had it from the navigator Parry himself that the ice he saw to the north of Spitzbergen would not have been difficult to travel over at the proper season of the year.”‡

* Proceedings of the Royal Geographical Society, vol. ix. p. 119.

† It may be noted that Captain J. C. Wells, R.N., deems the meridian running past the west side of Spitzbergen, and westward of Parry's track, the true “gateway to the Polynia,” and gives this name to his book recording a voyage to Spitzbergen, made in 1872.

‡ See letter in *Nature*, vol. v. p. 110.

CHAPTER XI.

PRACTICAL QUESTIONS.

ENGLAND has never been induced to repeat the heroic experiment in the Greenland seas which stands to the credit of the noble Parry. It remains not only the last, but the most remarkable of her Spitzbergen attempts; and perhaps the numerous repulses she has met with in this direction may fairly justify her in turning as she has done to a route which until now she has left practically untried.

But in the case of Holland the arguments are fairly reversed. England would seem to be out of her latitude in the Spitzbergen region, while it belongs to Holland by right of prior occupancy, and indeed of discovery. And yet the Dutch have completely abandoned it for the past two centuries, and left to other nationalities the sole continuance of a work manifestly belonging to themselves to prosecute; they have indeed ceased

from *all* researches in the high latitudes, and have yet to make their first *real* poleward attempt.

There are certainly valid reasons for urging upon Holland the revival of Northern exploration. Other countries would rejoice to see an Arctic expedition launched by the one country, we might almost say, that in early times sent out from her busy ports—some now acquiring an unenviable fame as “dead cities”—her enterprising voyagers, discovering, colonising, and conquering in all parts of the globe.

An expedition *via* Spitzbergen would be a very inexpensive undertaking, at least when compared with the English expedition, equipped for a three years' absence, by a route which makes the Pole nearly twice the distance from the home base that it would be for Holland by the Spitzbergen route. Sir Edward Parry's expedition was gone but six months from England and cost only £9900, and the voyage of the “Fox,” which brought back the sad but priceless trophies which told the fate of Franklin, cost England only £8400. In striking contrast with these amounts is the sum required for fitting out the present expedition by Smith Sound, which has already cost, we may say, the £95,000 originally appropriated, besides a probable expense of £20,000

to £30,000 per annum whilst absent. Added to this will be the expense of keeping up annual communication with the "Discovery" (which it is gratifying to see is not to be overlooked), and possible relief expeditions. England has undertaken to go to the North Pole, and she will do it; but it is impossible to deny that she has chosen the most expensive route conceivable for this enterprise.

England, however, is a great nation, and would not think of doing things by halves. But, then, a small people may prove itself a great nation. This, indeed, Holland has done more than once. It might surprise the outside world—so ignorant of what Holland really is—to see how easily she could supply a couple of Arctic ships, or even men-of-war, if the latter were demanded, at the present time from her really extensive fleet; with what ease, too, she could equip and send forth an Arctic expedition, and sustain it even for a series of years in the Spitzbergen seas, and still carry on her "little war" on the other side of the globe. The Netherlands of to-day, in point of naval strength, is fully worthy of the Netherlands of the days of Tromp and De Ruyter, though this fact may be little realised by the world at large.

And this is just the reason why the Dutch

should despatch an Arctic expedition—in order to call the attention of other nations to that little country which has but recently been pointed out as affording “a true *terra incognita* in the centre of Europe.” It would, we say, do more to make Holland known abroad than any one thing she could do; but it is quite certain that the Dutch are not possessed of such national vanity as to act from a motive of this kind, albeit armed *cap-à-pie* with true national pride.

We have early pointed sufficiently to the great internal enterprises of Holland; and such signs of progress must effectually do away with the byword which has in times past been flung at the Dutch as being the “Chinese of Europe.” Nor do we require here to point out the inappropriateness of the derisive language sometimes indulged in by foreigners when alluding to this worthy people; still, perhaps, we should intimate that those who do thus indulge only exhibit, in the estimation of the Dutch, an ignorance so profound as to completely turn the tables upon themselves. Happily, though, the writers are few who have not some idea of Holland’s glorious *rôle* in history, and upon this foundation alone she might generally, and with perfect safety, base her claims to respect.

But determined enterprise in the direction of Arctic research would remove effectually all such taunts as the above, just as it has given to the little Scandinavian nations, particularly to Sweden, the reputation of being foremost in promoting the advancement of scientific investigations. And who would hear of Sweden and Norway, we had almost said, if it were not for their Arctic enterprises ?

Researches in the direction of Spitzbergen do not absolutely require Government sustentation : private enterprise might do very much here. By no means would we be understood as opposing private enterprise in this matter. There is nothing to prevent a private expedition from being as thorough and efficient as one organised under the auspices of a Government. But this is hardly likely to be the case ; and in Arctic exploration, in view especially of the object now aimed at, the Government supervision might make all the difference between success and failure.

Still individual effort is indispensable in any case. It will not do to wait for Admiralties to take the initiative in such matters. This very thing Captain Osborn told the British geographers. And eloquently the noble sailor added, " Columbus would

never have reached the new continent; the immortal Cook would never have made his voyages round the world; the illustrious names of Franklin, Ross, and Parry would not have been added to the rolls of fame; if past Admiralties had been waited for to organise scientific research and geographical exploration."

A Government expedition would, it is true, go with the certainty of being sustained until the objects sought to be achieved were either accomplished or given up as impossible of achievement. But in any case, this would undoubtedly mean important discoveries beyond the threshold of the region hitherto unpenetrated, if even the North Pole were not attained.

Let, for example, two screw-steamers be sent out in the summer—either first to cruise in the Novaya Zemlya seas and examine the prospect in that direction, or direct to Spitzbergen—and, finding a secure harbour for one to remain in, try to push as far north as possible in the autumn with the other. As we have already seen, there are fair reasons for believing that 83° N. might be reached in any case with the ship; and if so fortunate as this, and yet ice-bound for the winter, resort should be had to sledges and boats

as early as practicable in the spring for pushing explorations northward, and in other directions. Assuming this latitude to be reached, it would place the explorers within 420 geographical miles of the Pole. The English Expedition hopes to get within 500 miles of the North Pole; they hardly expect to get nearer with the ships. The rest of the way they expect to do with sledges and boats; for, be it noted, the English Expedition provides also for an "open sea" at the Pole, although the idea is opposed by their ruling geographers.

To keep to the ship as long as possible would, we think, be preferable to adopting entirely Parry's plan, resorting to boats and sledges only when compelled to do so in case of becoming hopelessly fast in the pack. The object of the remaining ship would be to afford relief in case of possible abandonment of the pioneer vessel, and to secure the return of the exploring party from Spitzbergen. But in event of the worst, there is very little danger of the actual loss of the pioneer party.

Captain Nares, the gallant leader of the present English Expedition, and an officer possessed of practical Arctic experience, has given us his opinion on this point in very unqualified language, and also shown what might be expected

from such a sledge-and-boat enterprise. In a paper which he wrote some years ago, he says, "It is now a comparatively easy matter to start with six or eight men, and six or seven weeks' provisions, and travel some 600 miles across snowy wastes and frozen seas, from which no sustenance can be obtained. There is now no known position, however remote, from which a well-equipped crew could not effect their escape by their own unaided efforts."

Lieutenant Payer bore testimony to the great encouragement these words afforded him and his companions when their ship became inextricably beset, and when she was finally abandoned in the 80th parallel of latitude. The probabilities of a glorious success, or at least of making important discoveries, will, we think, far outbalance, for the men who shall thus do and dare, the risks of being swallowed up and never heard of more.

In the first place, it is hardly probable that important lands would not be found to exist in the unexplored waste of the European Polar regions, although the increasing depth of the ocean directly north, or west of north, from Spitzbergen, would seem to indicate the reverse of this, so far as explorers have been able to penetrate.

We think Spitzbergen and Franz Josef Land may be but two large islands of an extensive archipelago, either extending northward or circling round on the 81st and 82d parallels towards President's Land and Grant Land. Gilies Land, lying between Spitzbergen and Franz Josef Land, and discovered and charted (half imaginatively) nearly two centuries ago, is thought by Mr. Lamont to be of considerable extent, and to reach, perhaps, far to the northward; and it is possible that Wrangell Land and other lands far over towards Behring's Straits might themselves be found to be but a part of a vast island system really existing, if the fact were but understood, in the unknown region round the Pole.

Dr. Petermann entertains the theory that Greenland extends far over towards Wrangell Land and the Siberian coast; and Admiral Lütke has indicated, what amounts to the same thing, that Wrangell Land is an island, or group of islands, which may extend to or perhaps touch Greenland. This theory, however, converts the Smith Sound route into a *cul-de-sac*, or at all events cuts it off from the Pole, which we do not think warranted by any analogies arrived at through explorations so far as they have extended northward by this route; nor

can we conceive of such a configuration of Greenland as this theory involves.*

* However little importance may be attached by geographers generally to the theory here alluded to, it is perhaps due to the eminent geographer who advanced it, and to our subject, to quote the following sentence from Dr. Petermann's first letter (*Proc.*, vol. ix. p. 93) explanatory of this point. That writer says, "From the total absence of drift-wood north of Smith Sound, I conclude that those inlets can have no connection with the Polar Sea on the Asiatic side and off the continental coast of North America, and that a neck of land not far to the north of Cape Parry, as seen by Morton in 82° , turns those waters into a bay." He then adds that "the supposition of land stretching from Cape Parry as far as the North Pole is a mere speculation founded on nothing but the wish that it should be the case."

Upon this point it may be observed that Captain Tyson—"freeing himself," he says, "entirely, in describing the hydrography of Smith Sound, from the geographers, chartmakers, and romancers"—expresses a positive opinion that "on the west side, above what is called Grinnell Land, far north of Hayes's Cape Union, there is land;" for he could trace the coast with the spyglass leading northward as far as the eye could see. "This coast-line is to the westward of the cape, but runs N. or N.N.E." He is inclined to think that the land trends to the eastward at about $82^{\circ} 20'$ or $25'$; and owing to the moderateness of the current through Robeson Channel, and other reasons, he does not believe the theory of an open Polar Sea is warrantable, but rather that the space northward is occupied by an archipelago. He nevertheless has "no doubt that Smith Sound is the 'true gateway to the Pole'" (*Arctic Experiences*, p. 388, *et seq.*)

Dr. Petermann, it should be remembered, has had already twice to extend the northward limit of Smith Sound and the channels beyond in his map of these regions; first, after Kane's considerable advance in that direction; and, recently, on account of Hall's penetration to $82^{\circ} 16'$; having unceasingly excluded Smith Sound from the category of Polar routes since the publication of his first map in 1852, which shows Wellington Channel as the only opening into the Arctic Ocean between Greenland and Behring's Straits. We have indicated in outline Dr. Petermann's conception of Greenland, &c., on the principal map accompanying this work.

But an expedition by Spitzbergen might do well to have an eye upon the Smith Sound route as a possible safety resort by which to return in case of reaching the Pole with only a boat-and-sledge party. The "Polaris" expedition found both the coasts of Greenland and Grinnell Land stretching away to the north as far as the eye could reach ; and other reasons would go to show that the land on one side or the other of Robeson Strait extends far towards the North Pole.

Hence there would be the hope, in case of an expedition being shut within the Polar Sea, that it might by means of sledging facilities get out by the way of Smith Sound, or be reached by that way ; especially if an expedition were soon to be despatched ; for, in the first place, there would be the chance of making a conjunction with Captain Nares' party ; secondly, an expedition could be pretty well assured of help reaching them sooner or later by that route, and certainly up to the time of the departure of the English ship "Discovery."

It is not unworthy of notice, however, that the English Expedition provides for just the reverse of this, by allowing for the possibility of the "Alert's" coming out on the European side, and pushing her way homeward by the east coast of Greenland,

aided by the current known to pass down that coast. But should a ship by the Spitzbergen route succeed in reaching the Pole, there would probably be found more than one current that would bear it with comparative certainty and safety back over the European threshold at some point or other.

Far more important geographical results, moreover, could reasonably be looked for by this route, in the event of navigation proving possible, than by the restricted route pursued by the English Expedition. For the latter, although starting with two fully-manned ships, contemplates eventually reaching the Pole only by a sort of processional march by sledges from the advance ship; the gradually dwindling number of men who are expected to attain that destination reminding one of a Robinson-Crusoe-like possession of that point, or of the half-realistic pictures of Jules Verne.*

* It is impossible not to admire both the ingenuity and caution displayed by the plan of the English Expedition in the respect to which we have alluded. Admiral Richards, when expressing his preference for the Spitzbergen route (*Proceedings of the Royal Geographical Society*, vol. ix. p. 123), thus briefly described the process: "To get from Smith Sound by sledges will probably require the whole resources of one ship. There will be six or seven sledges and sixty or seventy men to drag them. It does not follow that the whole of the seven sledges will go to the North Pole; six out of the seven will go to enable the seventh to get there, and the six will fall off as soon as they have performed their particular function of feeding

We have already alluded to the obvious preference for ship-exploration over that of sledging, if any extended knowledge is to be acquired of the boundless North Polar area. Both the advantage and

the seventh, and return to the ship one by one. Therefore the seventh sledge and ten men will be all that will arrive at the North Pole." Referring the reader for particulars respecting the English naval system of Arctic sledge-travelling, and for details as arranged for the present expedition, to important articles entitled "The Arctic Expedition," contained in the "Geographical Magazine" for March, June, and November, 1875, we may, however, here describe the process by which the Pole is expected to be reached, in somewhat more detail than the quoted language has done it, it being a matter of no little interest.

The spring travelling of 1876 was expected to commence about the 1st of April, when the "Alert" would have (already in the autumn) attained a point within 500 miles or 56 days of the Pole. From this point the important achievement will be left to be accomplished by a system of *depôts* and auxiliary sledges. In the present case the force of the advance ship admits of but six sledges and 52 men entering upon this work, leaving 10 in the ship, including officers. Employing substantially the language of the magazine, let us call the sledges A, B, C, D, E, and F—five of 8 men, and one of 12 men. All start with 40 days' provisions, the object being to enable A to advance singly to the Pole; F, the 12-man sledge, consequently having 480 rations, and the other five 320 rations. After 5 days F has 432 rations left, and requires 60 to go home. He fills up the other five sledges (who by that time are down to 288 rations) to 320 rations again, leaves 176 rations at the *Depôt* I., and returns (assuming they all started on April 1st) on April 10th. He then comes out again to *Depôt* I., consuming 120 rations out and home, and leaves 360 rations, making 536 at the *depôt*. After another 5 days (10 days in all), E, in like manner, fills up the four other sledges to 320 rations, leaves 128 at *Depôt* II., and returns to *Depôt* I. with the 32 that are left to him. He there fills up to 320, goes back to *Depôt* II. with 288, leaves 256 there, making 384 in all, and goes home. Two *depôts*, at distances of 5 and 10 days from the ship, are now

the importance of this kind of exploration are well illustrated by what Sir James Ross accomplished in the Antarctic seas. In only three brief seasons he traversed no less than 41,500 miles; or more than all the foot-explorations of the Franklin search expeditions, extending over thirty-six

stocked with 216 and 384 rations respectively, and four 8-man sledges are loaded with 40 days' provisions each, at a distance of 10 marches from the ship. Sledges D, C, B, and A then advance for 5 more days (15 in all), and find themselves with 280 rations. D fills up the other three sledges to 320, and keeps enough to take him back to Dépôt II. (128 rations), leaving 120 rations at Dépôt III. He takes enough at Dépôt II. to take him to the ship, and returns home. Three sledges then advance for 10 days (25 from the ship), when they have 248 rations left. Sledge C fills up the two others to 320 each, leaves 120 at Dépôt IV., and goes home, taking 40 at Dépôt III., 40 at Dépôt II., and 40 at Dépôt I. B and A then go on until they are 36 days from the ship, when A is filled up to 320 rations, and left to do battle with the unknown obstacles ahead single handed. B leaves 80 rations at Dépôt V., takes up 48 at Dépôt IV., 40 at Dépôt III., the same at the other two, and so reaches the ship. Sledge A is now 36 marches from the ship, and filled up to 40 days' provisions. He presses onward to the North Pole until half are consumed, when he will be 56 marches from home on about May 26th; and, we will hope, at the goal. He returns to Depot V. in 20 days more, when all will be consumed. But he there finds 80 rations left by B, which take him to Dépôt IV., where he picks up 48, at Dépôt III. 40, at Dépôt II. 40, at Dépôt I. what more he requires, and so returns to the ship after an absence of 112 days.

Thus it will be seen that the clockwork precision necessary in carrying out this plan, and the closely limited time given in the pursuit of their undeviating course, will allow of little opportunity for making observations and discoveries, either by the several sledge-parties going and coming, or by the last 8 men—the fortunate "A's."

years;* and his discovery of Victoria Land, the work of a single month, was pronounced by the President of the Royal Geographical Society, when presenting him with the gold medal his services had earned, to be “the greatest geographical discovery of modern times.”

An expedition by this route, resolutely determining thus to brave the winter, if need be, in the moving pack—for it is only too certain that the pack is not stationary, even in winter—would surely be one of the boldest of Arctic enterprises, and hardly less so (assuming it at all possible of execution) would be a real North Pole journey on the plan of Parry’s attempt. But, with the perfection to which Arctic navigation and sledge-traveling have been brought, the probabilities of success are greatly enhanced; while, as we have shown, there is very little doubt of the ultimate return of the exploring party.

This, undoubtedly, is one of the practical questions to consider in connection with determined researches in the Arctic seas. However, the case of Barents so long ago, the safe return of Parry’s party itself, of all the expeditions to the American

* Estimated by Sir Leopold M’Clintock at about 40,000 miles (Proceedings of the Royal Geographical Society, vol. ix. p. 43).

Polar regions since the ill-fated Franklin, and lastly, the rescue of the Austro-Hungarians in these very seas, after their remarkable experience, all evidence the probable safety attending that which might justly be deemed a rash adventure. But who would now think of saying that the expeditions to which we have alluded had better not have been undertaken, or that the results did not abundantly repay the risks and outlay ?

This may well afford real encouragement to renewed Arctic enterprise. And should not the Dutch do something more than look on and applaud the work of others ? The numerous expeditions and cruises undertaken in the Arctic seas by the Swedes, Norwegians, North Germans, Austrians, and Americans, within the few past years, have, as Sir Henry Rawlinson has suggested, kept the attention of geographers steadily turned to the problems remaining for solution in the far North ; and now we have the strong and promising expedition which England has sent out in emulation of the enterprises of these several nations, with Smith Sound for her route and the North Pole for her objective point ; leaving the old field of Dutch Northern enterprise untenanted to beckon through past memories to the Netherlanders to come and take possession of their inheritance.

The Dutch Society for the Promotion of Industry, prompted by these very facts, has, through its Board of Directors, recently presented an important address to the King of the Netherlands, calling his Majesty's attention to this subject, which address we should not omit to notice.

In that address it is forcibly urged that the support which is being given to Arctic expeditions by the various Governments warrants the advocacy of Holland's re-engaging in such enterprises. It is the firm conviction of that Society that these discovery voyages cannot fail, in the first place, to extend our knowledge of the Northern Seas, their inhabitants and their coasts, and that then this enlarged knowledge must necessarily lead to the extension and development of the fisheries, commerce, and navigation in these regions; that the fact, moreover, of the Dutch nation in the past having been foremost in such adventures is itself a sufficient warrant for the Society's pressing this matter upon the attention of the Government; and that while trade and navigation may be expected to be particularly advantaged by them, the interests of science will at the same time be promoted.

Another feature brought out prominently in the address is the advantage which is sure to accrue to

a branch of industry standing in direct relationship to navigation and to pure scientific inquiry—to wit, shipbuilding and shipping interests in general. By Polar voyaging, it is contended, experience in the proper equipment of ships, in accurate observations, the education of skilful naval officers and vigilant seamen, will all be greatly promoted; and it is considered, moreover, that the present state of the Dutch merchant marine, and the competition between steam and sailing vessels, which is daily increasing, renders the moment opportune for Holland's taking up this subject, and striving for a revival of her once-flourishing whaling trade and seal-fisheries; and fittingly the directors point to the recent successful efforts of some of the active citizens of Enkhuyzen for the establishment of a company for engaging in these Northern enterprises.

It is noticeable, too, that the Dutch Society for the Promotion of Industry does not even despair, in view of the successful penetration of the Swedish and Russian expeditions to the mouths of the Siberian rivers (which, we may observe, the Dutch themselves demonstrated was possible two hundred and eighty years in advance of Nordenskiöld), of being able yet to open up a commercial route, *via*

the north-east, "for the produce of Central Asia, and tea from China;" but it takes a still broader view of this whole subject by advising also Antarctic voyages, rendered convenient by reason of their Eastern possessions for a base of operations, and ventures to suggest to his Majesty, in conclusion, that "the question has arisen whether naval expeditions, often undertaken chiefly to afford a field of exercise for the navy, and for exhibiting the Dutch flag, might not be advantageously made serviceable for promoting the study of the natural sciences, and especially for obtaining a knowledge of the products of the several countries, by allowing young naturalists, burning with scientific ardour for the pursuit to which they wish to devote their lives, to take part in naval expeditions; the expenses of the Treasury of the country being only thereby slightly increased, whilst the knowledge of distant countries, so invaluable for a commercial people to possess, would be enhanced at a trifling cost, and a way thus opened up by science for trade and industry."*

The Dutch geographers—the Van Zoelens, the Veths, the Jansens, the Kans—may well feel that it

* From the text of the address, given in *De Standaard* (Amsterdam), No. 1241, April 10, 1876.

especially pertains to their nation, which, by the exploits of its bold and skilful mariners, has delineated on the map of the world the principal lands in the European Polar seas, to complete, even after so long an interval, this grand survey upon which we have been dwelling, by a determined endeavour to hoist the Dutch tricolour at the Northern axis of the globe. It would be but a weakening of the dignity of their calling, however, to attempt to point out the *cui bono* of such a survey on their part by the hope of obtaining profitable commercial results, since it is quite enough for geographers to be assured that the scientific objects to be attained are worthy of the effort; though undoubtedly with respect to Spitzbergen enterprises generally, there is a commercial feature that may justly be taken cognisance of by others.

Sir John Barrow, for forty years Secretary of the English Board of Admiralty, has well put this point before us—and it would not do here wholly to pass over this renowned authority, so justly termed “the mainspring of all Arctic enterprises.” In language which Sir Roderick Murchison, in 1855, quoted most appositely to the British geographers, he says:—

“But it may be asked, ‘*Cui bono*’ are these

northern voyages undertaken? If they were merely to be prosecuted for the sake of making a passage to China, and for no other purpose, their utility might fairly be questioned. But when the acquisition of knowledge is the groundwork of all the instructions under which they are sent forth, when the commanding officer is directed to cause constant observations to be made for the advancement of every branch of science—astronomy, navigation, hydrography, meteorology, including electricity and magnetism, and to make collections of subjects of natural history—in short, to lose no opportunity of acquiring new and important information and discovery; and when it is considered that these voyages give employment to officers and men in time of peace, and produce officers and men not to be surpassed, perhaps not equalled, in any branch of the service, the question ‘*Cui bono?*’ is readily answered in the words of the Minister of Queen Elizabeth, *Knowledge is Power.*”

Mr. Markham has termed the earliest of Barents’ essays “the first true Polar voyage;” but it must be owned that, in withdrawing practically from the field after this and the two succeeding attempts of Barents and his companions, the Dutch have dealt with Arctic exploration only in the sense of the

early attempts, which were *exclusively* to reach China.

We cannot perhaps more fitly conclude this part of our subject, therefore, and so bring to a point what has been already urged, than by adopting the words of the learned Secretary of the Royal Geographical Society, himself a not less zealous advocate of Arctic research in our own times, nor less an Arctic authority, than was the learned Secretary of the Admiralty a generation since: "It is a pity that the Dutch should not resume their Spitzbergen enterprises, and, reviving the memory of former achievements, once more take their place among Arctic explorers. Surely the countrymen of Barents, of Vlamingh, and of Linschoten have the old spirit left among them, and are ready to assume their rightful part in the same rank with explorers of other countries, who are now gathering and marshalling their forces for an onslaught upon the vast unknown Polar region." *

* The Threshold of the Unknown Region, 4th edition, p. 53.

CHAPTER XII.

ANTICIPATED RESULTS.

THE scientific results likely to accrue from an examination of the unknown North Polar area, by successfully attaining the highest latitude, are hardly less numerous and important than the region to be explored is boundless in extent. The writer last quoted has well said upon this point: "It may be shown that no such extent of unknown area, in any part of the world, ever failed to yield results of practical as well as purely scientific value; and it may safely be urged that as the area exists, which is mathematically certain, it is impossible that its examination can fail to add largely to the sum of human knowledge. Further, it is necessary to bear in mind that the Polar area is, in many most important respects, of an altogether special character, affording exclusive opportunities of observing the condition of the earth's surface and physical pheno-

mena under certain extreme and singular circumstances, which are due to the relation of this area to the position of the axis of revolution of the terrestrial spheroid, and which have to be considered, not only with reference to the present time, but to the earth's past history. It may be received as certain that discoveries will be made in all branches of science, the exact nature of which cannot be anticipated."

But sufficient for brief consideration are the more definitive results which may be said to be fairly ascertainable, and by which the boundaries of our knowledge in respect to the whole vast realm of physical science, long ago invaded and widely opened up to us by the wisdom of Copernicus, Kepler, Galileo, Descartes, Newton, Huygens, and other immortal names, would be greatly enlarged.

The additions, for example, to our geographical and hydrographical knowledge; the determination, by accurate geodetic measurement, of the precise shape of our globe; observations fixing the power of the pendulum to measure heights, and other pendulum experiments, such as would contribute to our knowledge of geodetic science, and rejoice some modern Huygens to conduct; the solving of the problem of insolation; the ascertainment of the

amount of solar heat received by the earth, and locating the point of greatest cold ; the clearing up of numerous meteorological, magnetical, and electrical questions ; and immensely adding to our information in the domain of biology, and even in ethnology,—these are some of the results which may be confidently looked for by such an expedition as is here advocated, if successful. In the words of M. Gustave Lambert, the scientific conquest of the Pole would fecundate all the sciences.

Geography and cosmography would be the first to derive important advantage from an opening up, in even the smallest degree, of the unknown North Polar region. To ascertain whether the Arctic Ocean is one vast sea of ice, or whether important lands may not be scattered through it, but especially to settle the true configuration of Greenland, are matters of the first significance to geographical science.

Some geographers have with reluctance defaced from their maps the coasts of that sea of which Baffin detected the limits ; but the last two questions handed down to us from the eighteenth century, besides the new ones that have arisen, remain to be answered by future Arctic expeditions. What really are the western coasts of Greenland ?

Are they prolonged indefinitely towards the Pole, or, trending to the west, may they there be traced ?

England evidently has not had faith in the geographical theory of the distinguished editor of the "Mittheilungen," and the tracing of the western coasts of Greenland may be left to her. But an expedition is wanted to penetrate to the Pole from the *eastern* side, in order to assist in solving these important questions. In the domain of geographical discovery Hollanders would be particularly at home ; and what Sir Edward Sabine has termed "the greatest geographical achievement which can be attempted," would seem to be the most surely attainable by approaching the North Polar seas through the wide ocean portal.

Upon the advantage to the science of hydrography likely to be derived from an Arctic expedition by Novaya Zemlya or Spitzbergen little, perhaps, need be said. Already the question of streams and currents has entered considerably into the discussion, as being of real moment and as inseparable also from the question of routes. But the important question of currents is of practical interest with respect to navigation. The science of hydrography must determine this, and only through it can we arrive at a clear solution of the problem as to where

in the supposed open Polar Sea the Gulf Stream exhibits its latest force and the Arctic current begins.

Directly associated with this is the more strictly astronomical phenomenon of the oscillations, or the rise and fall of the tide; and we very well know that observations at the North Pole, and at intermediate points above latitudes which have been attained, would increase our knowledge upon this point. Kepler explains it by a succession of analogous movements to those of the flanks of an animal that respire, thus attributing to the earth a kind of characteristic vitality. We know, indeed, to a certainty that the movements of the waters of the ocean are in their principal action controlled by the moon, and in their secondary action by the sun. The effect has been described by Alfred de Musset in a phrase as fine and poetical as it is purely French, "The ocean, which rouses itself under the kisses of the pale moon." Thus from the question of currents even to that of tides, it is a matter of deep interest to "discover the actual condition of this secluded ocean, which has never yet been cut by keel of mortal ship."

The science of geodesy would profit amazingly by the series of pendulum observations which could be

made in the vicinity of the North Pole. This would offer the first opportunity for accurately ascertaining the shape of the earth. The nearest point to the North Pole at which the pendulum has been swung, of which we have the results, is at Spitzbergen, upwards of 600 miles to the south, in observations taken by Sir Edward Sabine, though careful experiments were made by the scientific men of Captain Hall's expedition two degrees nearer; being prescribed in accordance with the advice of the National Academy of Sciences. These, fortunately, were not lost to the world by the untoward event which happened to the "Polaris" expedition, and the physical results, altogether, of that important Polar voyage promise to fill a book of 800 pages in the quarto publications of the Smithsonian Institution.*

It is considered that our knowledge of the true shape of the earth must remain incomplete so long as it rests merely on geodetic and astronomical measurements, these being essentially affected by

* In anticipation of the appearance of this volume, Dr. Bessels has brought out a map exhibiting the approximate co-tidal lines of the North Atlantic and North Pacific Oceans, and of the Arctic seas. Cape Fraser, in Smith Sound, is about the position where the tide of Baffin's Bay meets that from the north (Geographical Magazine for April 1876).

the course of local gravitation, and therefore by the distribution and density of the subjacent materials. "The proportion of gravity near the Pole to gravity near the equator," says Sir George Airy, "is as 180 to 179. Pendulum experiments give the law of change and gravity, and enable us to infer what is the ellipticity of the earth, provided the law of gravitation be true. If the ellipticity, thus formed, agrees with that calculated from trigonometrical surveys, it will be a strong proof of the correctness of the law of gravitation." This is but one simple department of science, yet from the example it affords it is easy to see how important is Arctic research.

The Polar regions offer, perhaps, greater advantages than any other part of the globe for the observation of natural phenomena of every kind, and our knowledge of terrestrial magnetism and atmospheric electricity will become not a little extended by means of an Arctic expedition gaining a high latitude. Whether these forces operate in an extraordinary degree, or whether on the whole less strongly than we have had reason to suppose, can only be ascertained by actual observations at the mysterious Northern axis of our globe.

Already considerable advantage has been derived

from the careful observations made at Van Rensselaer Harbour, not only in these particulars, but in meteorology and astronomy, by Dr. Kane, and reduced and discussed by Charles A. Schott of the United States Coast Survey,* and also by the observations of Sir Edward Belcher, of Sir Leopold M'Clintock during the important voyage of the "Fox," and by others. But it is altogether desirable to get nearer to the Pole, if possible, in order to renew similar observations.

In solar and stellar chemistry, the additions to our knowledge in recent years have been numerous and important; but we have the assurance of Professor Roscoe that there is much remaining that needs to be settled concerning the solar corona and the zodiacal and auroral lights to give us a more perfect knowledge of chemistry as thus applied.

In the department of optics, therefore, the observations of the spectrum, of the sun and of the aurora, and also of the study of the twilight, cannot but be most important at that mathematical Northern focus of our planet, where the year consists of one day and one night each of six months' duration. In fact, experiments upon these points

* Smithsonian Contributions, vols. x., xi., xii., and xiii.

can only be advantageously pursued in extreme latitudes.

Among all the subjects recommended for investigation by the English Expedition, by the Arctic Committee of the Royal Society, and embraced in the "Scientific Manual of Instructions"—a book of nearly 800 pages, edited by Professor T. Rupert Jones, F.R.S.—nothing, scarcely, is more largely dwelt upon than the subject of the Aurora Borealis. Lieutenant Weyprecht considers it as a phenomenon as yet defying all description and any systematic classification, but thinks it an atmospheric phenomenon with which meteorological conditions have much to do. The advance of spectrum analysis—through the scientific experiments of such eminent physicists as Lockyer, Huggins, Janssen, and Ångström—is certain to greatly facilitate such investigations. They can, however, only be prosecuted advantageously in high latitudes, when the path of the sun above the horizon gives special opportunities for the necessary observations.

Nor is the Arctic winter so unpleasant a season for the pursuit of such observations. The long Polar night, with its flashing lights of the aurora borealis, is pronounced not only "more endurable, but more enjoyable" than the short days of the

same season in England, obscured by winter fogs ; and Dr. Kane says, "The intense beauty of the Arctic firmament can hardly be imagined ; it looked close above our heads, with its stars magnified in glory ; and the very planets twinkling so much as to baffle the observation of our astronomer."

It is almost needless to say that the climate of the northern hemisphere depends in great part upon the atmospheric conditions of the Arctic regions, and herein lies one of the most important subjects for investigation. The temperature of the air at the North Pole has long furnished a fruitful theme of speculation, both in connection with the influence of the sea and the sun.

In an interesting paper on the climate of the North Pole, by Mr. W. E. Hickson, read some time since before the Royal Geographical Society, that writer says : "It has always been popularly supposed that the immediate areas of the Poles must be the coldest regions of the globe, because the farthest points from the equator. Hence the argument that the higher the latitude the greater must be the difficulties and dangers of navigation. Quite an opposite opinion, however, had begun to prevail among meteorologists on the publication, in 1817, of the Isothermal system of Alexander von Hum-

boldt, which showed that distance from the equator is no rule for cold, as the equator is not a parallel maximum of heat. The line of maximum heat crosses the Greenwich meridian, in Africa, 15° north of the equator, and rises, to the eastward, 5° higher, running along the southern edge of the Desert of Sahara.

“In 1821,” continues Mr. Hickson, “Sir David Brewster pointed out, in a paper on the mean temperature of the globe, the probability of the thermometer being found to range 10° higher at the Pole than in some other parts of the Arctic Circle. No new facts have since been discovered to invalidate this conclusion—many, on the contrary, have come to light tending to confirm it.”*

Hence astronomical observations, the knowledge of those regions, and of the distribution of land and water, observations concerning the temperature of the sea at different depths, concerning the temperature and pressure of the atmosphere, and the study of the ruling winds in relation to the currents, must necessarily afford improved means of understanding the meteorology of our more temperate latitudes.

The country which shall now employ its scientific

* *Journal of the Royal Geographical Society*, vol. xxxv. pp. 129, 130.

reserve in pushing onward Arctic research has before it the splendid possibility of being first to gain such a knowledge of the Polar phenomena of the globe as may afford the data for accurately predicting the nature of the seasons, the absolute demand of modern science; "but surely"—to use the words of Dr. Balfour Stewart, as applied to England when she was hesitating upon this subject—"we cannot expect Nature, who is usually so reticent, will disclose her secrets to a nation or a race who will not take reasonable trouble to complete their knowledge of the physics of the earth."

In the department of zoology, the North Polar world affords extensive scope for interesting observations. The animal kingdom, strangely enough, if perhaps less profusely represented amidst the frosts and snows of the far North than in the tropical and the more temperate latitudes, is in no respect deficient in magnitude and singularity near the Pole. In mammalia, the cetacean specimens are proved to be abundant, as also the mollusca; but naturalists are instinctively asking for more facts bearing upon the distribution, or possibly the gradual disappearance of mammalian types towards the Pole, and Arctic expeditions of the future must give the answer to all such ques-

tions. It is sufficiently well known, moreover, that numerous remains of animals exist in the far North belonging to a period not very remote, which give evidence of having once been inhabitants of tropical regions, to which their descendants are now confined.

In regard to bird life, perhaps even in numbers, no other part of the globe can equal the Arctic regions in certain seasons. We have already spoken of the migratory birds found to be so numerous in high northern latitudes, and apparently seeking still more Arctic climes, as constituting one of the strongest arguments in favour of an open Polar sea. Professor Newton of Cambridge has made some interesting investigations upon this subject, and discerned, what we have already shown, that these northern migrations of a certain group of birds tend to the conclusion "that beyond a zone where a rigorous summer reigns, there may be a region endued with a comparatively favourable climate." Well may he conclude, "If so, surely the conditions which produce such a climate are worth investigating."

Geological investigations are already well begun by what has been done in Greenland, Spitzbergen, and Novaya Zemlya; but especially by Professor

Nordenskiöld in North Spitzbergen. This beginning has abundantly demonstrated that the Arctic field is a most important one in this respect, and that its cultivation cannot fail to bring to light many new and interesting facts in the domain of geology, and hardly less in that of palæontology.

Professor Geikie tells us that once "a great part of England and of Europe and North America was buried under the ice like Greenland. Earlier still it had its jungles, and palms, and other tropical plants; yet further back it lay beneath a wide deep ocean; and beyond that time can be traced many still more remote periods, when it was forest-covered land or wide marshy plains, or again buried under the great sea." It is clear, too, that Greenland itself might point to changes through the long vista of the ages equally remarkable. Captain Tyson, whose "Experiences" fairly entitle him to rank as the historian of Captain Hall's expedition, says the entire land round Polaris Bay is covered with marine fossils, showing that both the plains and the highest mountains have at some remote period been an ocean-bed. He found three fossilised sea-snails, one on top of a mountain; and "at the height of two thousand feet the clam-shells were so

thickly scattered that one could not put his foot down without crushing them.”*

In respect to fossil animals and plants the Polar regions are regarded as richer than those of any other part of the globe. To complete the history of the earth, therefore, it is necessary that much more information be given us by daring explorers concerning the geology and palæontology of the Arctic world.

In the distinctive department of mineralogy the Arctic regions, if not the richest on the globe, are certainly not wholly wanting in interest. The Arctic steamers voyaging to the American Polar seas replenish their coal supplies from the native hills of Disco; and Captain Allen Young brought home from his short “Pandora” cruise more than forty mineralogical specimens, according to the list given us by Lieutenant Koolemans Beynen in his description of that voyage, and as named by Professor Behrens of Delft.† Cryolite, with which this list is headed, has a commercial value

* Arctic Experiences, edited by E. Vale Blake (Harper Brothers, 1874), pp. 391, 392.

† De Reis der Pandora naar de Noordpoolgewesten, in den Zomer van 1875. Door L. R. Koolemans Beynen. (Published under the direction of the Dutch Geographical Society.) Amsterdam, 1876. Appendix B.

of considerable importance, and so far as hitherto discovered, is only found abundantly in Greenland. Arctic research, therefore, may in no slight degree extend our knowledge of the mineral riches of the earth.

Modern ethnography, moreover, assures us of changes in circumpolar lands of comparatively recent date, and upon this point it is desirable to know more. Even respecting Scandinavia, we have the remarkable testimony of Pliny, Mela, Solinus, and others—according to Mr. Henry Howorth, an eminent authority of our time—that Scandinavia was considered by the Roman geographers to be an archipelago. Ptolemy, indeed, speaks of the Scandinavian islands. And with regard to the more strictly circumpolar lands, nearly every Northern explorer from Von Wrangell to Hall attests the fact, for such it may be termed, of their gradual upheaval, from having once been islands in the Arctic. In the American Polar regions, Franklin in the west and Dr. Richardson in the east bear out this fact, while Dr. Kane has given most important testimony regarding the gradual upheaval of Greenland. Explorers of Spitzbergen also speak of the same process as silently at work there. Hardly less important in this respect, then, would

be investigations in the extensive islands of the European Polar seas, Spitzbergen included.

The botanical results from an Arctic expedition, even by the ocean ways we have suggested, might prove of great importance, although regions wrapped in perpetual ice would not naturally be looked upon as favourable to the germination of plants and trees. Spitzbergen and Greenland are rich in flora. The annalist of Captain Hall's expedition states that there were many species of flora found at Thank God Harbour, Newman Bay, some highly variegated, and of most beautiful colours, but odourless. Not only were the forms most elegant and graceful, but the colours were as brilliant as tropical flowers; and in many spots the groups or patches gave the appearance of fairy gardens, presenting a striking contrast to the rugged region in which they were found. Dr. Hooker has also pointed out that the flora of Greenland, though one of the most poverty-stricken on the globe, is possessed of unusual interest; and Von Heuglin found 290 kinds of plants in Spitzbergen, and no less than 226 in Novaya Zemlya. The study of the distribution of these would be greatly facilitated by an Arctic expedition.

In the event of finding land at the North Pole,

especially should Greenland be found to extend far in that direction, an interesting—perhaps the most interesting—problem to solve by the enlightened Arctic explorer will be the ethnological one. Moreover, should the “open Polar sea” prove a reality, it is not less certain that light would be shed upon this question by an expedition penetrating to the highest latitude. It might reveal an actually existing race akin to the “Arctic Highlanders,” of which Sir John Ross considered there were evident traces in Greenland anterior to the Eskimo—an almost prehistoric race of men, Asiatic in origin—in which he has been sustained by the opinions of Arctic authorities no less eminent than Baron von Wrangell, Kane, Inglefield, General Sabine, and Mr. Markham; the latter, indeed, having made special investigations relative to this subject.

There even now exist traditions among the Eskimo tribes of far Northern lands peopled by superior beings to themselves, where herdsmen fatten their musk oxen, and where live men with long beards having churches and clocks—not so different, indeed, from the theory Grotius entertained, but which even the early Dutch expeditions very easily exploded. More pertinent, however, to the immediate subject, and most creditable to the perception of this great

man, is the following opinion of Grotius as to the common origin of the far Northern races of the Old and New World, given a century before the discovery of Behring's Straits: "I should not dare assert whether they" (the Russians, with whom the Dutch voyagers talked at Waigatz) "had not heard something of that strait between Tartary and America, of which the common origin of the two peoples, apparent from looks and manners, evidences the existence."*

Certain it is that inhabitants have been found as high in Greenland as 79°; and in latitude 81° 30' N. Captain Hall still found traces of human beings. Yet "until within the last nine centuries," says Mr. Markham, "the great continent of Greenland was, so far as our knowledge extends, uninhabited by a single human being—the bears, reindeer, and musk oxen held undisputed sway. There was a still more remote period when fine forests of exogenous trees clothed the hillsides of Disco, where groves waved in a milder climate over Banks' Land and Melville Islands, and where corals and sponges flourished in the now frozen waters of Barrow's Straits. Of this period we know nothing;

* See extract from Grotius in sketch of J. H. van Linschoten, by N. G. van Kampen, *Levens van Beroemde Nederlanders*, i. 206.

but it is at least certain that when Eric the Red planted his little colony of hardy Norsemen at the mouth of one of the Greenland fiords at the end of the ninth century, he found the land apparently far more habitable than it is to-day.”*

Mr. MacGahan, in his recent book, descriptive of the cruise of the “*Pandora*,” has given us a lively picture, if such it were possible to do, of the nomadic race which enjoys, undisturbed, the monopoly of the melancholy Arctic region of North America. “A people,” he says, “who live neither by agriculture nor the pasturage of sheep and cattle, nor yet, properly speaking, by the chase, as the chase is ordinarily understood: a people who have for food neither beef, mutton, nor pork; neither fruit, bread, nor vegetables; neither sugar nor salt; who have for drink neither tea, coffee, wine, beer, nor spirits of any kind; for clothing, neither silk, cotton, flaxen, nor woollen stuffs; who have neither iron, nor steel, nor lead, nor copper, nor gold, nor pottery; who have for fuel neither wood, nor coal, nor peat,—such a people are the Eskimos, or, as they call themselves, the ‘Innuits’ of the Arctic.” †

* “On the Origin and Migration of the Greenland Esquimaux,” *Journal of the Royal Geographical Society*, vol. xxxv. pp. 88, 89.

† *Under the Northern Lights*. By J. A. MacGahan. (London: Sampson Low & Co., 1876.) P. 87.

This race of men, living in a region of icy desolation, yet content with their dwelling-place, supplying their every want by means of that Protean animal the seal, have a history, unwritten, known sufficiently well to go back to remote times, but of which we want to know more. This history can only be traced advantageously, and this knowledge acquired by the anthropologist visiting the scene of the migratory wanderings of the Eskimo, and judging by those faint though unmistakable signs which tribes leave in their course, and which tell of origin, however far back.

Mr. Hubert Howe Bancroft, in his monumental work on the Native Races of the Pacific States, classes the Eskimo first in his ethnological list; and this we should perhaps consider as being hardly less because of his supposed antiquity of origin than because of his inhabiting a zone natural to come first in the true order of grouping. The first or Arctic group he styles, with Agassiz, "Hyperboreans," divided into a chain of four littoral tribes, occupying a tract of country, all of it a narrow seaboard scarcely 100 miles in width, the linear extent of which is estimated at not less than 5000 miles, and made up as follows—viz.: the Eskimo, who occupy the Arctic shore of North

America from the mouth of the Mackenzie River to Kotzebue Sound; the Koniagas, who, commencing at Kotzebue Sound, across the Kaviak Peninsula, border on Behring Sea from Norton Sound southward, and stretch over the Alaskan Peninsula and Konigan Islands to the mouth of the Atna or Copper River; the Aleuts, or people of the Aleutian Archipelago; the Thlinkets, who inhabit the coast and islands from the Atna to the Nass River. These four tribes, all nearly related to each other, are often classed as Eskimos; and the picture drawn by Mr. Bancroft of this hyperborean group, particularly the Eskimos, is interesting, full, and instructive.

An able reviewer of Mr. Bancroft's work, describing the narrow, gloomy life of this far Northern race of men, says: "This shore-inhabiting Eskimo tribe is held by many authorities to be the only American people directly connected with the races of another continent. Behring's Strait offers to the inhabitants of both the Asiatic and American coasts an easy canoe transit, nor can certain ethnological affinities be denied. This strange northern man," he continues, "whose cheerless life seems clinging to forbidding nature against such awful odds, is he not oppressed, saddened, and for ever cast down by

the bitter rigours of his environment? Can he have an instant's thought beyond food and warmth? Is it not all with him battle and sleep? Behold him, on the contrary, a sleek, fat, oleaginous fellow, with plenty of good nature, developing, besides the ordinary human courage and ingenuity in capturing his daily food, a few customs we are wont to deem the privileges of civilisation. Eskimo government," he adds, "is patriarchal, and men become venerated as they distinguish themselves in bold pursuits of the whale. Blubber, as in New Bedford, lubricates the avenue to greatness."*

An insight into the life and habits of the modern Eskimo would seem to afford only slight encouragement to the anthropological inquirer. Especially does one wonder how so lethargic a being as he could have wandered across the American continent, surmounting glaciers and icy seas, and taken up his abode, perhaps ages ago, in apparently isolated Greenland, to become the "Arctic Highlander," of which there are said to be such evident traces both on the eastern and western sides.

Yet Mr. Markham clearly inclines to the opinion that this migration, even from distant Siberia,

* "Bancroft's Native Races of the Pacific States." By Clarence King. *The Atlantic Monthly*, vol. xxxv. p. 165.

really took place, as evidenced indeed by the language, though Dr. Rink regards the Eskimo tongue as more nearly allied to the languages of America; while, if we may judge by the inference of a learned anthropological writer, there are palæolithic signs of the Eskimos being certainly pre-Aryan in origin.* Mr. Bancroft, on the other hand, considers them quite an “anomalous race of the New World,” and says, “This is no less true in their language than in their physical characteristics.” He adds, “Obviously they are a Polar people rather than an American or an Asiatic people.”† Mr. MacGahan, however, has truly said that “until all the languages spoken in Northern Siberia and North America, as well as that of the Innuvit, are better understood, this subject must remain in considerable obscurity.”

To engage in this ethnological quest, therefore, by endeavouring to approach these unknown but once (if not now) almost certainly inhabited regions through European Polar seas, would be an inves-

* “Rhabdomancy and Belomancy, or Divination by the Rod and by the Arrow.” By A. W. Buckland, M.A.I. *Journal of the Anthropological Institute of Great Britain and Ireland* (January, 1876), p. 446, *et seq.*

† *The Native Races of the Pacific States of North America.* By Hubert Howe Bancroft. (London: Longman, Green, & Co., 1875.) Vol. iii. p. 575.

tigation of the highest scientific interest and value.

The scientific bearings of Arctic research, it will readily be seen, are of very great importance ; and fairly numerous as is our list of the results which may be looked for, there are many lesser but still interesting points that might be noted. Undoubtedly geographical discovery may of right take the first place ; but Lieutenant Weyprecht has urged the preference of scientific labour, complaining that the conquest of the physical difficulties has usurped the place of this.

He proposes that stations should be established for at least a year at Novaya Zemlya, East or West Greenland, North America, East of Behring's Straits, and in Siberia, at the north of the Lena, to record a series of synchronous observations for comparison at various points, the expenses to be divided among the several nations.

While we would cordially endorse such co-operative action on the part of the various Governments, we would go somewhat farther, and raise the question whether the countries, whose past interest in Arctic exploration would entitle them to be classed among the friends of Northern enterprise and of scientific progress, should not league together, so to speak, and

arrange a system of graduated rewards for discoveries, by whomsoever made, in this vast mysterious realm, which belongs broadly to science, but which no single nation cares to claim.

CHAPTER XIII.

CONCLUSION.

THUS have we presented, in a succinct form, the general features of the North Polar question, and we have anticipated the more important results to be looked for from a successful Arctic expedition. The climatic changes this far Northern region is undergoing, no less than the ethnological, ethnographical, and various other problems to which we have alluded, enter into the grand sum of phenomena which modern Arctic research is expected to reveal to us, and which now lie concealed behind the 80th parallel of latitude.

The importance of this research, and of a more accurate knowledge of our globe, it is impossible now to estimate. The accomplished Secretary of the Dutch Geographical Society has well said that "when Columbus discovered America, no one realised the great importance of the dis-

covery ; nay, many even lamented that this land obstructed the way to India.”* And pertinently he asks, “ Who would now venture to estimate the value of the immense influence this discovery of Columbus has had upon Europe, and indeed upon the whole world ? ” And also, to quote the learned President of our own American Geographical Society, Mr. Justice Daly (uttered in June, 1871), “ If now it should be possible to reach the Pole, and to make accurate observations at that point from the relation which the earth bears to the sun, and to the whole stellar universe, the most useful results are likely to follow, in a more thorough knowledge of our globe.”

For the achievement of these grand objects the enlightened nations of the earth are beginning to re-enlist themselves. Will Holland remain behind in a work so peculiarly the province of a proud maritime nation, and in which formerly she won some of her brightest laurels ? The considerations we have set forth to engage her to re-enter upon this work, and to attempt the Pole by the nearest and most direct route possible from Holland, will, we trust, commend itself to the judgment of the

* N. W. Posthumus, *De Nederlanders en de Noordpoolexpeditiën*, p. 30.

Government and scientific men of the Netherlands, and to the whole country. Columbus's promise of a "way to the east by the west" has never been forgotten, and the great majority of Arctic explorers have steadily sought to open a north-western route. Nothing has seemed to deter seamen from pursuing this track; while the wide ocean portal, which so specially invites European explorers, appears to be comparatively neglected.

It seems, therefore, to be left to the countrymen of Barents to prove its real value. And to the renewed search in this direction, which geographers regret has not yet been authoritatively taken up by those to whom it belongs by a prerogative of inheritance, the Netherlanders may find further stimulus in the following words, inspired by the thrilling story of the very voyages that won for Holland her early Arctic fame, which we quote from the historian of the United Netherlands:—

"What heart has not thrilled with sympathy and with pride at the story of the magnificent exploits, the heroism, the contempt of danger and of suffering which have characterised the great navigators whose names are so familiar to the world? The true chivalry of an advanced epoch, recognising that there can be no sublimer vocation

for men of action than to extend the boundary of human knowledge, in the face of perils and obstacles more formidable and more mysterious than those encountered by the knights of old in the cause of the Lord's Sepulchre or the Holy Grail, they have thus embodied in a form which will ever awaken enthusiasm in imaginative natures, the loftiest impulses of our later civilisation. To win the favour of that noblest of mistresses, Science; to take authoritative possession, in her name, of the whole domain of humanity; to open new pathways to commerce; to elevate and enlarge the human intellect, and to multiply indefinitely the sum of human enjoyments: this is truly to be the pioneers of a possible civilisation, compared with which our present culture may seem but a poor barbarism."

APPENDIX.

CHRONOLOGICAL TABLE OF ARCTIC VOYAGES.

**CHRONOLOGICAL TABLE OF ARCTIC VOYAGES NORTH-EAST AND NORTH-
WEST OF GREENLAND.**

FROM NALDODR (860) TO THE DEPARTURE OF CAPTAIN ALLEN YOUNG TO COMMUNICATE
WITH THE DEVOÏTS OF THE "ALERT" AND "DISCOVERY" (1876).

The asterisk () denotes voyages of doubtful authenticity.*

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel.	Results and Latitude attained.
860	N.E.	Nadlodr	Norwegian	.....	Discovered Iceland.
890	"	Ohthere	"	.....	Sailed round the North Cape.
986	"	Erick the Red	"	.....	Discovered Greenland.
1001	N.W.	Loef, son of Erick the Red.	Norwegians or Northmen.	.....	Sighted Helluland (<i>i.e.</i> , Newfoundland); Markland (<i>i.e.</i> , Nova Scotia); and Vinland or Vinland (<i>i.e.</i> , Martha's Vineyard).
1170	N.E.	*Maddoc, Prince of Wales	Welsh	.....	Visited Iceland and Greenland. A very logical Welsh tradition makes him a discoverer of America (nearly 200 years after the Northmen, and about 300 years before Columbus). Reached lat. 75° 46' N.
1266	N.W.	The Normans of Greenland.	Dane	.....	Letter of the Norman Haldor to Arnold. Voyaged to the Farøe Islands and East Greenland.
1380	N.E.	Nicholo and Antonio Zeno.	Venetian.	.....	Made a voyage, apparently of exploration and discovery, 100 leagues beyond "the island of Thule," supposed to have been Iceland. Was astonished to find the sea not frozen. Reached lat. 73° N.
1477	N.W.	Christopher Columbus	Genoese	.....

1496	N. W.	John Cabot ...	Genoese ...	Discovered St. Johns, Newfoundland.
1498	"	Sebastian Cabot ...	" ...	Advanced as far as the entrance to Baffin's Bay. Reached lat. 67° 30' N.
1500	"	Gaspar Cortereal ...	Portuguese ...	Reached the Gulf of St. Lawrence and the coast of Labrador.
1517	"	Sebastian Cabot ...	Venetian ...	Reached, as is believed, Hudson's Bay.
1524	"	Giovanni da Verrazzano†	Italian ...	With French vessels ran along the coast of North America. Discovered the greater part of the coast from South Carolina to 50° N.
1527	"	Hore, of London ...	English ...	Made a voyage, the result of efforts of Robert Thorne, of Bristol. Reached Newfoundland. One ship cast away on the north banks. Visited the Gulf of St Lawrence. Discovered Canada.
1534	"	James Cartier ...	French ...	Made a second voyage to Canada.
1535	"	"	"	Second voyage. Sailed as far as Cape Breton.
1536	"	Hore, of London ...	English ...	Sailed beyond the North Cape. Discovered
1553	N. E.	Sir Hugh Willoughby ...	" ...	Goose Land, Novaya Zemlya, afterwards frozen to death in a harbour of Lapland.
1554	"	Richard Chancellor ...	" ...	Reached the White Sea, and, properly, discovered Novaya Zemlya.
1556	"	Stephen Burrough ...	" ...	Reached the mouth of the Petchora. Discovered Waygatze and Kara Straits. Attained lat. 80° 7' N.
1576	N. W.	Sir Martin Frobisher ...	" ...	Made a voyage to the north-west to reach Cathay, and discovered the strait which bears his name. Reached lat. 63° 8' N.
1577	"	"	Three ships, one of which was equipped by Queen Elizabeth.	Second voyage to Frobisher's Strait, and newly discovered territory, named by the Queen "Meta Incognita." Examined the strait, and on some islands found large quantities of ore, supposed to be gold. Brought home 200 tons of the ore.

† A learned American antiquarian writer, the Hon. Henry C. Murphy, has investigated the subject of the alleged discoveries of Verrazzano, and pronounces them to be utterly fictitious. He transfers their credit to the Spanish voyage led by Estevan Gomez. (The Voyage of Verrazzano, &c. New York, 1875.)

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel.	Results and Latitude attained.
1578	N.W.	Sir Martin Frobisher ...	English ...	Fifteen ships ...	Voyage of adventure to colonise Meta Incognita. Discovered the Friesland of the Zem (<i>i.e.</i> , Faroe Islands), also applying the name to Greenland. Reached lat. 57° 30' N., and returned. Ships scattered by storms.
1580	N.E.	Pet and Jackman ...	" ...	George. William, bark, commanded by Jackman.	Went beyond Waygatzt Strait. Discovered Jugorsky Schar.
1583	N.W.	Sir Humphrey Gilbert	"	Squirrel, bark, 10 tons; Golden Hind, and three other vessels.	Voyage of adventure and discovery to take possession, in the name of "The Colligues of the Fellowship for the Discovery of the North-West Passage," of northern parts of America and Newfoundland. Reached Newfoundland. Found the Portuguese and French engaged in "a notable trade of fishing," having "sometimes more than a hundred sail of ships."
1585	"	John Davis ...	"	Two barks, Sunshine, 50 tons, and Moonshine, 35 tons.	Voyage at expense of merchants of London in search of the North-West Passage. Discovered the strait called by his name, and discovered and named Cape Walsingham. Reached lat. 66° 40' N.
1586	"	"	"	Moonshine, 35 tons ...	Second voyage to discover North-West Passage. Sailed through Davis Strait. Reached lat. 67° N.
1587	"	"	"	Sunshine ...	Third voyage to discover North-West Passage. Held his route along west coast of Greenland. Discovered a promontory 3300 feet high, which he named Hope Sanderason. Reached lat. 72° 12' N. All three voyages made from Dartmouth.
1594	N.E.	William Barents ...	Dutch ...	Mercurius ...	Coasted Novaya Zemlya to Orange Islands.

1594	N.E.	Cornelis Nai.	Corneliszoon	Dane ...	Swane, Mercurius commanded by Brant Tetgales.	Sailed through Jugorsky Schar, and reached, it is believed, the longitude of the Obi.
1596	"	William Barents	...	Dutch ...	With two vessels, of which Jacob van Heemskerck and Corneliszoon Ryp were captains.	The two vessels discovered Bear Island, and then Spitzbergen, which they are supposed to have circumnavigated, though this is doubted. Barents, with Heemskerck and one vessel, traversed the sea between Spitzbergen and Novaya Zemlya, and finally wintered in Ice Haven. Reached lat. 80° 11' N.
"	"	*Cornelis Roule	...	"	Dutch vessel	Alleged by Witseen to have discovered what is probably Franz Josef Land; and to have reached lat. 84½° or 85° N. in long. of Novaya Zemlya.
1603	"	Stephen Bennett	...	English	.....	Sighted Bear Island, to which he gave the name of Cherie Island.
1606	N.W.	John Knight	...	"	Hopewell, bark	Voyage to discover North-West Passage. Vessel victualled at coast of Muscovy and East India merchants of London. Reached coast of Labrador, and landed to examine same, but was never again heard of.
1607	N.E.	Henry Hudson	...	"	Hopewell, 80 tons	Followed the north-east coast of Greenland, then bore off to Spitzbergen, and probably sighted the Seven Islands. Discovered Hold with Hope and Hudson Touches. Reached lat. 81° N.
1608	"	"	...	"	.....	Attempted the North-East Passage; sighted Novaya Zemlya. Reached lat. 75° 29' N., then abandoned the attempt and returned.
1609	N.E. and N.W.	"	...	"	Crescent (Half-Moon), Dutch vessel.	Attempted the North-East Passage in the Dutch employ, reaching coast of Novaya Zemlya, but turned it into a search for a North-West Passage instead. Discovered Hudson River, first named, after Prince Maurice, the "Riviere van den Vorst Maurits." Voyage led to settlement of New Netherland.

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel.	Results and Latitude attained.
1609 to 1612	N.E.	Jonas Poole	English	.....	Made four voyages to Spitzbergen for the Muscovy Company. Entered the Sounds on the west coast. Established the Spitzbergen whale-fishery.
1611 1612	" "	Jan Mayen Thomas Marmaduke	Dutch English	Resolution	Discovered the island called by his name. Alleged to have sailed 2° N. of Hakluyt's Headland.
" 1613	N.W. N.E.	Button and Ingram Thomas Edge and others	" English and Dutch.	In a pinnace and other vessels.	Discovered the Prince of Wales Strait.
1614	"	Fotherby and Luffin	English	With ten vessels	Explored North-East Land, Spitzbergen, and the land east of Stor Fjord.
1616	N.W.	Eylof and Baffin	"	Discovery, 55 tons	Sailed to Spitzbergen for the Muscovy Company, and entered Hinlopen Straits in a boat expedition. Reached lat. 80° N., and believed by Dr. Petermann to have sighted Franz Josef Land.
1617-22	N.E.	Thomas Edge	"	.....	Discovered Bathin's Sea (or Bay), Jones' Sound, the Bay of Wohlstenholme, and Lancaster Strait. Reached lat. 74° 15' N.
1619	N.W.	Jean Munck	French	.....	Discovered Wiche's Land, Hope Island, &c.
1624 1625	N.E.	William Williamszoon Cornelius Loosman	Dutch	Vessel of 80 tons	Penetrated to Hudson's Bay, and wintered in Chesterfield Passage.
1631	N.W.	Lake Fox	English	.....	Said to have reached 5° N. of Spitzbergen.
" 1652	" N.E. and N.W.	Thomas James David Daniel	" Danic	.....	Sailed into the Kara Sea in the employ of the Dutch Northern Company.
1654	N.E.	Gale Hamke	Dutch	Whaler or sea captain	Entered Hudson's Strait. Wintered at Charlton Island. Explored the eastern and south-western coasts of Greenland.

Sighted land on east Greenland coast, in lat. 77° 10' N. Called in Van Keulen's chart the Land van Edam.

1664	N. E.	William de Vlaming ...	Dutch ...	...	...	Through the open nature of Kara Sea by sailing through it round the north of Novaya Zemlya, sailing as far as Ice Haven. Believed to have reached lat. 82° 10' N.
1667	N. W.	Grosceller and Gillam ...	English	...	...	Wintered in Rupert River, at the lower end of Hudson's Bay, and built Fort Charles. See Harris.
1670	N. E.	*Otto Axelsen ...	...	...	...	Attempted to reach the North Pole.
1676	"	John Wood ...	"	Speedwell, frigate; Prosperous, tender.	...	Attempted the North-East Passage. Speedwell wrecked. Examined the ice-pack between Spitzbergen and Novaya Zemlya. Reached lat. 75° 59' N.
1700-5	"	Cornelis Gysbertszoon Zondrager.	Dutch ...	A Zaanadam vessel	...	Made whaling voyages to Greenland seas, of which he wrote accounts.
1707	"	Cornelis Gilies ...	"	...	...	Explored north and east of Spitzbergen, and discovered Gilies Land. Entered Hinlopen Straits; anchored in Loume Bay. Reached about lat. 81° N.
1720	"	*Johnson or Monson ...	English	A whaler	...	Buffon quotes him from Dr. Hickman. Mentions lat. 88° N.
1725	"	Behring ...	Russian	...	...	Sailed from Kamtschatka on a short expedition in the Siberian waters.
1734	"	*Alexander Cluny Murawieff and Pawloff	Russian	Large open boats	...	See Barrington. Lat. claimed 82° N. Sailed through Jugorsky Schaar across to Yelmer Land.
1737	N. W.	Malygyu and Schurakoff	"	"	...	North of Siberia.
1741	B. S.	Middleton ...	Russian	...	...	Determined the position of Repulse Bay. Discovered the straits called by his name (though actually discovered, it is claimed, by a Siberian Cossack in 1648), also Mount Elie.
1746	...	*Andrew Fisher ...	English	Anne Elizabeth, whaler	...	Claimed to have reached lat. 82° 34' N.
1751	N. E.	*MacCallam ...	Scotch	...	...	He saw an open sea to the north, and claimed to have reached lat. 83° 30' N.
1752	...	*John Phillips ...	English	Loyal Club	...	Claimed to have reached lat. 81° N.
1753 to 1769	N. E.	Hans Dirkszoon ...	Dutch...	Vessel from Kampen	...	Made voyages to the North. Alleged to have reached, with five other ships, 85° N.

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel.	Results and Latitude attained.
1754	N.E.	*James Wilson	English	Sea Nymph	Saw a perfectly open sea. Reached lat. 82° 15' N.
"	"	*Captain Guy	"	Unicorn	His fifty-ninth voyage to those seas. According to statement of a Mr. Adams, who was on board, reached lat. 83° N. (June 4), 82° 3' N. (June 5).
1756	"	*James Montgomery	"	Providence	According to his own statement, reached lat. 83° N.
1760	"	Humphrey Ford	"	Dolphin	Reached lat. 81° N.
1760-2	"	Loschkin	Russian	"	(Circumnavigated Novaya Zemlya.
1761	"	Volquart Boon	Danish	—, whaler	Discovered on the coast of Greenland the gulf called by his name. Reached lat. 71° 30' N.
1765	"	Vassili Tchitschagoff	Russian	"	Expedition visited Spitzbergen in an attempt to reach the Pole. Reached lat. 80° 30' N.
1766	"	*Captain Robinson	English	The Reading	Saw an open sea about 85°. Claimed to have reached lat. 82° 30' N.
"	"	*Jonathan Wheatley	"	Grampus	Three Dutch captains declared to him that they had reached 89°. He reached lat. 81° 30' N.
1768	"	*David Boyd	"	Betsy, whaler	Driven up by a gale of wind, beset. Claimed to have reached lat. 82° N.
1768-9	"	Rosmyslow	Russian	Small 10-ton vessels	Wintered at Matoschkin Sclar.
1773	"	Captains Phipps and Lutwidge.	English	Racehorse and Carcass	Voyage towards the North Pole, by Spitzbergen, sent out on the suggestion of the Royal Society and Hon. James Harrington. Attained the lat. of Seven Islands. Reached lat. 80° 48' N. Encountered a barrier of ice, and thought the Pole was surrounded by a calotte of ice.
"	"	*Ralph Dale	"	Ann and Elizabeth	Encountered a great deal of ice, reaching lat. 81° N.
"	"	*John Greenshaw	"	"	Encountered a great deal of ice to the west of Spitzbergen. Attaining lat. 82° N.

1773	N.E.	*Captain Robinson	English	...	Saint George ...	Reached, it is claimed, lat. 81° 16' N., long. 8° E. Sea open to E.N.E.
"	"	*John Clarke	"	...	Sea Horse	He saw an open sea to the north, with great surges coming from the north-east, reaching lat. 81° 30' N.
1774	N.E.	*Captain Bateson	"	...	Whale	Alleged to have attained 82° 15' N.
"	"	*John Reed	"	...	Reckingham	The Dutch captain Hans Derrick affirmed to him to have reached with five vessels 86° of N. lat. His own lat. is put down at 81° 12' 42' N.
1776-8	"	Pages	French	...	Resolution and Discovery. Latter commanded by Captain Clerke.	Reached 81° 30' N.E. of Spitzbergen. Attempted (on his third voyage) the North-West Passage from Behring's Straits east, having first discovered and named the Sandwich Islands. <i>En route</i> entered sound since known as Cook's Inlet. Determined most westerly point of America, naming it Cape Prince of Wales; also width of Behring's Straits. Discovered and named Icy Cape. Reached lat. 70° 44' N., but found it impossible to proceed farther north or east.
1778	"	Charles Clerke	"	...	Resolution and Discovery. Latter commanded by Lieut. Gore.	Captain Cook having returned and discovered Hawaii, and been killed by the Sandwich Islanders, Clerke sailed back to Behring's Straits, and repeated, unsuccessfully, Cook's attempt. Penetrated only as far as lat. 70° 33' N.
1785	"	Captain Hanna	"	...	Sixty-ton brig	Sailed from Canton across the seas of Japan to Nootka Sound. Voyage inaugurated the fur trade with America.
1786	"	Captains Lowrie and Guise.	"	...	Two ships	Sailed from Bombay to Nootka Sound. Advanced northwards, and are said to have discovered the archipelago afterwards named by Dixon Queen Charlotte's Islands.
1788	"	Captain Mares	"	...	Felice, with Captain Douglass in the Iphigenia.	Made second voyage to Nootka Sound. Built a small vessel in the sound. Reached lat. 61° N.

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel.	Results and Latitude attained.
1793	E.S.	Vancouver	English	.....	Looked for a passage to Vancouver Strait, and returned with the conclusion that it did not exist. Surveyed 9000 miles of unknown coasts.
1806	N.E.	Scoresby	"	Resolution, whaler	Explored much of the natural history of Spitzbergen. Reached 81° 30' N., 19° E. long.
1807	"	Rumangoff	Russian	Dec, tender, 35 tons	Visited the west coast of Novaya Zemlya in search of minerals.
1810	"	Hedenstroem	"	.....	First examination of the Polynia, determined to be an open sea (of ice).
1815	"	Kotzebue	"	Rurick, 180 tons	Went beyond Behring's Straits, and discovered the gulf known by his name in lat. 66° 42' N.
1818	N.W.	Ross and Parry	English	Alexandria, 252 tons, and Isabella, 385 tons.	By Baffin's Bay. Gave the names of their vessels to the two capes at the entrance of Smith Sound. They reached the entrance to Cumberland Strait. Attained lat. 77° N.
"	N.E.	Buchan and Franklin	"	Dorothea and Trent	Voyage towards the North Pole. Examined the ice north of Spitzbergen. Stopped in lat. 80° 34' N.
1819	"	Lasarew	Russian	Novaya Zemlya, brig	Surveyed part of the south-west coast of Novaya Zemlya.
"	N.W.	Sir Edward Parry	English	Hecla, sloop; Griper, gun-brig, 180 tons, commanded by Lieutenant Liddon.	Discovered Barrow's Strait, Prince Regent Strait, and Melville Island. Wintered in the pack.
1819 to 1822	"	Franklin, Richardson, Hood, and Back.	"	.....	Expedition to Hudson Bay Territory. Made land journeys of great extent, to Coppermine, Yukon, and Hood rivers. Explored coasts of Bathurst Inlet and part of Coronation Gulf eastward to Point Turnagain.
1820	N.E.	Admiral Lütké	Russian	Griper; Snap, com. by	Visited the Siberian waters.
1821	N.W.	Sir Edward Parry	English	Captain Lyon.	Visited the Duke of York's Strait. Passed two winters in the ice.

1821	N.E.	Admiral Lütke ...	Russian	Novaya Zemlya, brig, 200 tons	Surveyed the coast about Matoschkin Schar.
1822	"	" "	"	.....	Surveyed the coast to Cape Nassau. Reached lat. 76° 35' N.
1823	"	" "	"	.....	Sailed to Barents' Sea. Came upon pack in lat. 75° 30' N. Examined westward to 43° 49' E. long. Reached lat. 76° 5' N.
"	"	Clavering and Sabine ...	English	Griper	Visited the eastern coast of Greenland, which they observed to about 76°. Coast 3000 feet high, with higher mountains inland. Sabine made pendulum observations at Spitzbergen. Reached lat. 80° 20' N. Examined the pack-edge between Spitzbergen and Cape Nassau.
1824	"	Admiral Lütke ...	Russian	.....	Left the coast of Siberia for the north with sledges, and were stopped by the frozen Polynia.
"	"	Wrangell and Anjou ...	"	.....	Made a third attempt to explore Prince Regent's Inlet. The Fury lost.
1824-5	N.W.	Sir Edward Parry ...	English	Griper and Fury ...	Expedition to northernmost parts of Hudson Bay Company's territory. Two winters at Great Bear Lake. Descended Mackenzie River to the Arctic. Surveyed more than 1000 miles of coast, Richardson making scientific collections.
1825-7	"	Franklin, Richardson, and Back.	"	Blossom, Capt. Beechey	Sailed <i>via</i> Behring's Straits round the north- west coast of America, doubling Barrow Point, to which he gave this name.
1826-7	B.S.	Beechey ...	"	Blossom ...	Investigated the geology of Spitzbergen.
1827	N.E.	Keilhan ...	Norwegian	.....	Anchored at Treurenberg Bay, and reached 82° 45', the highest well-authenticated lati- tude, in boats and sledges. With ship attained lat. 81° 5' N.
"	"	Sir Edward Parry ...	English	Hecla	Sailed to Baffin's Bay. Discovered Boothia- Felix, the Magnetic Pole, and King Wil- liam's Land. Vessel abandoned.
1829 to 1833	N.W.	John and James Ross ...	"	Victory. First Arctic steam vessel.	

CHRONOLOGICAL TABLE

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel	Results and Latitude attained.
1832-3	N.E.	Pakhtusof	Russian	Karbasse	Wintered in Kamenka Bay, Novaya Zemlya, and in the spring surveyed the east coast as far as Matoschkin Schar.
1833	"	Jules de Elosseville	French	Lilloise	Lost in the waters between Iceland and East Greenland.
1834-5	"	Pakhtusof and Ziwolka	Russian	Kiokow, schooner, and Karbasse.	Wintered at Matoschkin Schar, and explored east coast to Cape Distant.
1837	"	Von Baer	"	.....	Scientific examination of Matoschkin Schar.
"	"	Sven Loven	Norwegian	.....	Explored the geology, &c., of West Spitzbergen.
1837-9	N.W.	Dease and Simpson	English	.....	Despatched by Hudson Bay Company to complete survey of North American Arctic coast. Met with great success. Many new discoveries made.
1838-9	N.E.	Zwolka and Moissijew	Russian	.....	Wintered in Shallow Bay, and explored portion of west coast of Novaya Zemlya.
1838 to 1840	"	Lieutenant Fabure	French	Corvette la Recherche	Scientific expedition to the north—Gaimard, Bravats, Marmier. Anchored in Madeline Bay, Spitzbergen. Numerous acquisitions to mathematical and natural science. Reached lat. 79° 35' N.
1839	"	Scientific Commission	Russian	.....	Visited north-west part of Spitzbergen.
1845	N.W.	Franklin	English	Erebus and Terror	Franklin, Crozier, and Fitzjames penetrated Lancaster and Barrow Straits, and died in the western part of King William's Land. Reached lat. 77° N. Regarded as the true discoverers of the North-West Passage.
1846-7	"	Sir John Richardson and Dr. Rae	"	.....	Land journey for the Hudson Bay Company, to explore coast from the Mackenzie to the Coppermine, and investigate Boothia.

1848 to 1850	B.S. Kellert and Moore	English	...	Herald and Plover. R. Shedd in private yacht, Nancy Dawson.	Sailed to Behring's Straits to search for Sir John Franklin. Discovered Herald and Plover Islands, and thought to have sighted Wrangell Land.
1850	N.W. Lieutenant De Haven	American	...	Advance, brig, and Rescue, S. P. Griffin, Acting Master.	Mr. Henry Grinnell, of New York, despatched two vessels, under two lieutenants of the U. S. Navy, to search for Sir John Franklin. Visited Lancaster Strait and Wellington Channel. Reached Beechey Island, Aug. 27, and on 29th ten searching vessels met in rendezvous without previous appointment.
1850	Captain Forsyth, accompanied by W. Parker Snow, of New York.	English	...	Lady Franklin's vessel, Prince Albert, yacht, 89 tons.	Search expedition to Regent's Inlet and Beechey Island.
1850-1	" Sir James Clarke Ross and Captain Bird.	"	...	Enterprise and Investigator.	Sent to Lancaster Strait in search of Sir John Franklin.
"	" Captains Austin and Oumunney.	"	...	Resolute and Assistance	Search expedition to Lancaster Strait and Cornwallis Land. Discovered first traces of Franklin's party at Cape Biley, Aug. 23, 1850.
"	" J. Saunders and Dr. Goodsir.	"	...	North Star and Advance, whaler.	Visited Wolstenholme Sound and Pond's Bay via Euffin's Bay.
"	" Captain Penny and A. Stewart.	"	...	Lady Franklin and Sophia.	Sailed under Admiralty orders to Lancaster Strait and Wellington Channel. Discovered sea north of latter.
"	" Sir John Ross	"	...	Felix, yacht	Expedition to Lancaster Sound at expense of Hudson Bay Company.
"	" B.S. McClure	"	...	Investigator	Expedition to Behring's Straits, Banks' Land, and Lancaster Strait. North-West Passage solved by McClure (by observation).
1851	N.W. Dr. Rae	"	...	.....	Descended the Coppermine. Examined the coast of Wollaston Land, &c.

Date.	Direction.	Name.	Nationality	Name and Description of Vessel.	Results and Latitude attained
1851-2	N. W.	William Kennedy	English	Lady Franklin's vessel, Prince Albert.	Sailed with young French volunteer, Bellot, to Prince Regent Inlet, Bellot's Strait, and Prince of Wales Island. Expedition to Behring's Straits.
"	B. S.	Frederick	"	Amprite	
1851-4	N. W.	Belcher and Kellett (Osborn, McClintock, Meacham, Pim).	"	Assistance and Resolute	Expedition in search of Sir John Franklin. Five ships ordered to be abandoned. The Resolute, after abandonment, drifted 1000 miles; was taken possession of by Captain Buddington, and brought to the United States; afterwards refitted and presented, "in the name of the American people," to Queen Victoria.
"	B. S.	Collinson	"	Enterprise	Expedition to Behring's Straits, Banks' Land, and Cambridge Bay. Completed North-West Passage in his ship's twenty days after M'Clure; turned to the south-east, made numerous discoveries, and brought home relics of Sir John Franklin's party.
1852-5	N. W.	Ingfield	"	Lady Franklin's vessel, Isabel.	An expedition to Lancaster Sound in search of the Erebus and Terror. Journeyed to Repulse Bay.
1853-4	"	Dr. Rae	"	.....
1853-5	"	Dr. Kane	American	Advance, brig, 120 tons	Search expedition fitted out at expense of Henry Grinnell and George Peabody. Passed two winters in Van Rensselaer Harbour (lat. 78° 37' N.) Proved extension of channel from Smith Sound far to the north, and discovered and named Grinnell Land. Morton supposed he saw the open sea about lat. 81° 22' N. Reached, with sledges, lat. 80° 56'. Obligated to abandon vessel.
"	B. S.	Maguire	English	Plover	Search expedition to Behring's Straits.

1853-5	N. W.	Inglesfield, Jenkens, Pullen, Master, Elliott, Osborn, M'Clintock, Richards, Vesey Hamilton, Bellot, and Nares.	English	...	Phoenix, Talbot, North Star, Breadalbane, transport; Diligence, storeship; Pioneer, Intrepid.	Sent to Wellington Channel, Lancaster Strait, and Beechey Island in search of Sir John Franklin. Great feats in sledge-travelling: M'Clintock (1853) nearly 1200 miles within 105 days; Mechem over 1066 within 94 days; in 1854 journeyed 1157 miles in 70 days; Vesey Hamilton 1095 miles in 71 days; Krabbé 863 miles in 71 days; Osborn 935 miles in 97 days; Richards 860 miles in 94 days; and Nares (1853) 665 miles in 65 days. Canoe voyage under auspices of Hudson Bay Company down Great Fish River to Montreal Island and Point Ogle. Found relics of Franklin's expedition.
1855	"	Anderson and Stuart	"	...	.....	Despatched in search of Dr. Kane, passing above Van Rensselaer Harbour. Returned to Upernivik and took on board Kane and his party. Despatched to make final search for Sir John Franklin to Peel's Sound, Regent's Inlet, Belot's Strait, King William's Land, and Montreal Island. Beset for 242 days in Melville Bay. Lieutenant Hobson found record of death of Sir John Franklin at Point Victory. Date of death, June 11, 1847. Numerous other relics.
"	"	Lieutenant Hartstene	American	United States ship	...	Made an expedition to the west coast of Spitzbergen, and explored its natural history. Visited west coast of Spitzbergen. Visited west coast, and explored Stor Fjord, Ginevra Bay, and Ryk Yse Islands. Expedition <i>à la</i> Smith Sound to explore the supposed open Polar sea, and fitted out at expense of nearly 400 prominent individuals and firms. Sailed from Boston July 7, 1860. Explored the coast to west of the Kennedy Channel. Wintered in Port Foulke Harbour (lat. 78° 17' 41"). Reached lat. 81° 35' N.
1857-9	"	Sir Leopold M'Clintock	English	Lady Franklin's steam yacht, Fox, 177 tons.	...	
1858	N. E.	Nordenskiöld	Swede	Frithiof, yacht	...	
"	"	Lamont	English	Ginevra, "	...	
1859	"	"	"	"	...	
1860-1	N. W.	Dr. Hayes	American	United States, fore-and-aft schooner, 133 tons.	...	

Date.	Direction.	Name.	Nationality.	Name and Description of Vessel	Results and Latitude attained.
1860-1	N.E.	Duner, Torrell, Nordenskiöld.	Swede ...	.....	Scientific expedition to Spitzbergen. Further explored west and north-east.
1860-2	N.W.	C. F. Hall ...	American ...	George Henry, brig, and Rescue.	Sailed from New London to continue search for survivors of Sir John Franklin. Lost his vessel, the Rescue. Explored Frobisher Strait, finding it to be a bay. Brought back relics of the early navigators.
1863	N.E.	Carlsen ...	Norwegian ...	Jan Mayen, walrus-brig	Was first to circumnavigate the Spitzbergen group. Rewarded by the Royal Geographical Society of London.
"	"	T. W. Taylor ...	English ...	Baron Hambro and Caroline.	An expedition, made at expense of Messrs. Antony Gibbs & Sons, of London, to search for the lost colony of East Greenland, and to found a settlement at Ekahnut. Reached lat. 63° 30' N. Unable to approach the coast. Repeated the attempt under improved auspices, but equally unsuccessful.
1864	"	" ...	" ...	Erik, steamer, 412 tons.	Visited South Spitzbergen and Stor Fjord.
"	"	Nordenskiöld and others	Swede ...	Walrus-sloops, Æolus, &c.	Sailed round North-East Land, but compelled to abandon their sloop, and rowed up Hinlopen Straits, and round North-West Spitzbergen to Ice Fjord.
"	"	Tobiesen and others	Norwegian ...	.....	Made second voyage to Hudson's Bay, with only two Eskimo companions; increased native company; added five white sailors; explored to north and west. Spent five years with the Eskimos, returning with much information respecting Franklin's party, and 150 relics.
"	N.W.	C. F. Hall ...	American ...	Monticello, bark ...	Surveying expedition to Alaska with a view to laying Russian-American telegraph cable near Arctic Circle and across Behring's Straits. Scheme eventually abandoned.
1865-7	E.S.	Col. Chas. S. Bulkeley ...	" ...	Seven vessels.	

1867	N.E. B.S.	Birkbeck and Newton Captain Long...	English American	Yacht Nile, whaler	Sighted Witche's Land and Ryk Yse Islands. Explored (if not discovered) Wrangell Land over 3°. Examined an extinct volcano 2480 feet high. Reached lat. 70° 40' N., long. 178° 15' W.
"	"	Captain Raynor	"	Reindeer, whaler	Coasted Wrangell Land for over 5° of longi- tude. Believed it to extend over 8°, and north for 120 miles, with a south-west cape extending to within 25 miles of Asiatic coast.
"	"	Captain Lewis	"	Corinthian, whaler	Visited coast of Wrangell Land; found flowers and birds, and indications of coal.
"	N.E.	Lord Dufferin	English	Foam, schooner-yacht	Made an exploring and pleasure voyage to North Spitzbergen.
1868	"	Nordenskiöld and others	Swede	Sofia, iron steamer	Reached 81° 42' N., 18° E. Extensive scientific collections made—geological, zoological, and botanical.
"	"	Koldewey	German	Germania	Attempted to reach the Pole <i>via</i> Spitzbergen, and reached Amsterdam Island and as high as 81° 5' N. at north of Spitzbergen.
"	"	Lamont	English	Diana (251 tons), three- masted schooner	Visited Novaya Zemlya. Explored sea between Spitzbergen and Novaya Zemlya, and visited north-west corner of Novaya Zemlya and Stor Fjord.
1869	"	Carlsen	Norwegian	Walrus-sloop	Sailed through Pet Strait, and along the Siberian coast to the mouth of the Obi.
"	"	Bessels	German	Whaler	Explored sea between Spitzbergen and Novaya Zemlya.
1869 to 1870	"	Koldewey	"	Germania, steamer, 143 tons; Hansa, brig.	Visited East Greenland coast. Sailed up as high as lat. 75° 30'. Wintered in Pendulum Islands. Drifted 1100 miles. Hansa wrecked. Valuable scientific results.
1870	"	Lamont	English	Diana	Explored Novaya Zemlya and Kara Sea.
"	"	Johannsen	Norwegian	Walrus-sloop	Circumnavigated Novaya Zemlya.
"	"	Other captains	"	Sloops	Reached Velmert Land.
"	"	Baron Von Hengelin and Count Zeil.	German	Nils Isaken, captain of vessel.	Sighted Witche's Land from Mount Midden- dorf, Spitzbergen. Important scientific re- sults and account of voyage published.

CHRONOLOGICAL TABLE

Date.	Direction.	Name	Nationality.	Name and Description of Vessel.	Results and Latitude attained.
1871	N.E.	Lamont	English	Diana	Visited North-West Spitzbergen, and passed through Hill Sound in a boat.
"	"	Weyprecht and Payer ...	Austrian	70-ton sloop	Explored Bancuits' Sea beyond 78th parallel. The first attempt to follow the Gulf Stream.
"	"	Mack	Norwegian	Walrus-sloop	Visited Kara Sea, and north-east of Novaya Zemlya. Explored 500 miles of coast. In lat. 71° 50' N. found sea clear of ice. Reached lat. 75° 25' N.
"	"	Carlsen	"	"	Visited Ice Haven at north-east of Novaya Zemlya. Brought home the Baronts relics.
1871-3	N.W.	Captain Hall	American	Polaris, altered gun-boat, 387 tons.	Attempted to reach the Pole <i>via</i> Smith Sound. Discovered and named Robeson Channel. Wintered in Thank God Harbour, taking ship to lat. 82° 16' N. Leader died Nov. 8, 1871. Vessel abandoned. Crew accidentally separated, but rescued. Results numerous and important.
1871	N.E.	Leigh Smith	English	Sampson, steam yacht	Explored North-East Land, Spitzbergen, and attained 81° 24' N., 18° E.
1872	"	"	"	"	Visited north-west of Spitzbergen.
"	"	Altman	Norwegian	Walrus-sloop	Landed on Wiche's Land and other islands.
"	"	Johusen	"	Lydiana, schooner	Landed on Wiche's Land. Reached lat. 78° 10' N.
"	"	Nilsen	"	Freta, schooner	Landed on Wiche's Land, sighted Cape Torel, saw Gillies' Land.
1872-3	"	Nordenskiöld and others	Swede	Polhem, Gladan, and Onkel Adam.	Wintered in Mossel Bay, North Spitzbergen. Important gains to science.
"	"	Weyprecht and Payer ...	Austrian	Tegethoff	Wintered in pack, north of Novaya Zemlya.
"	"	Leigh Smith	English	Diana	Relieved Nordenskiöld, and reached Seven Islands. Explored Hinlopen Strait and south shore of North-East Land.

1873	N.W.	Captain Markham ...	English ...	Arctic, whaler ...	Made voyage to Baffin's Bay for acquiring a knowledge of ice navigation. Penetrated to Gulf of Boothia. Returned with rescued officers and crew of the "Polars." Published account of voyage.
1873-4	"	Weyprecht and Payer ...	Austrian ...	Tegethoff ...	Discovered Franz Josef Land, after wintering in pack. Made extensive sledging explorations in the spring.
1874	"	Captain Adams ...	English ...	Arctic ...	Made whaling voyage through Baffin's Bay to the "North Water," ten other whalers leaving Dundee the same season. Went up Lancaster Sound and Gulf of Boothia, to Eventford Bay in the latter.
"	"	David Gray ...	"	Eclipse, 295 tons; Hope, 307 tons, Captain John Gray.	Whaling voyage to the Spitzbergen seas, making important investigations. In May, June, July, and August southerly drift of ice 14 miles a day; floes unbroken in lat. 77° N., but broken 2 $\frac{3}{4}$ ° higher. Reached 79° 45' N.
"	N.E.	Wiggins ...	"	Diana ...	Sailed through Burrough's Strait, and to entrance of Gulf of Obi. Explored Kara Sea to 76° N., 82 $\frac{3}{4}$ ° E.
1875	N.W.	English Expedition under Captain Nares.	"	Alert (751 tons) and Discovery (556 tons), screw steam vessels.	An expedition of discovery, with intention to reach the Pole, if possible, by Smith Sound. Provisioned for a three years' absence.
"	"	Allen Young ...	"	Pandora (430 tons), steam yacht.	Made voyage to Peel Strait, and brought home letters of English Expedition from Carey Islands. Object, to search for the journals and scientific records of the "Erebus" and "Terror;" but, primarily, to accomplish the North - West Passage to San Francisco. Season unfavourable for both.
"	N.E.	Nordenskiöld ...	Swede ...	Proven ...	Reached mouth of Yenisei.
1876	N.W.	Allen Young ...	English ...	Pandora ...	Departed with letters and despatches for the English Expedition. Provisioned for a two years' voyage. Objects same as last year.

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