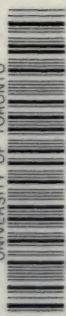


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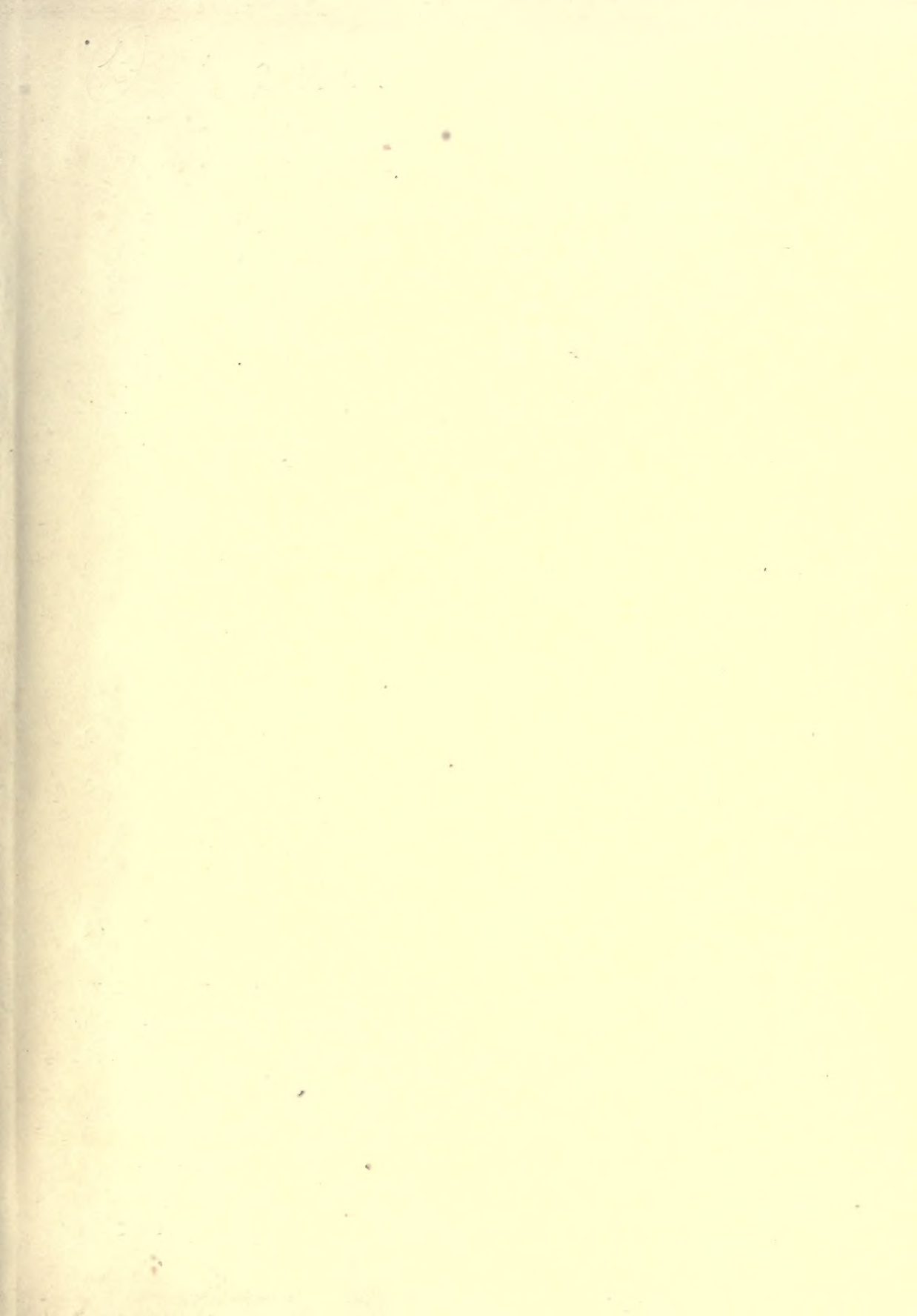
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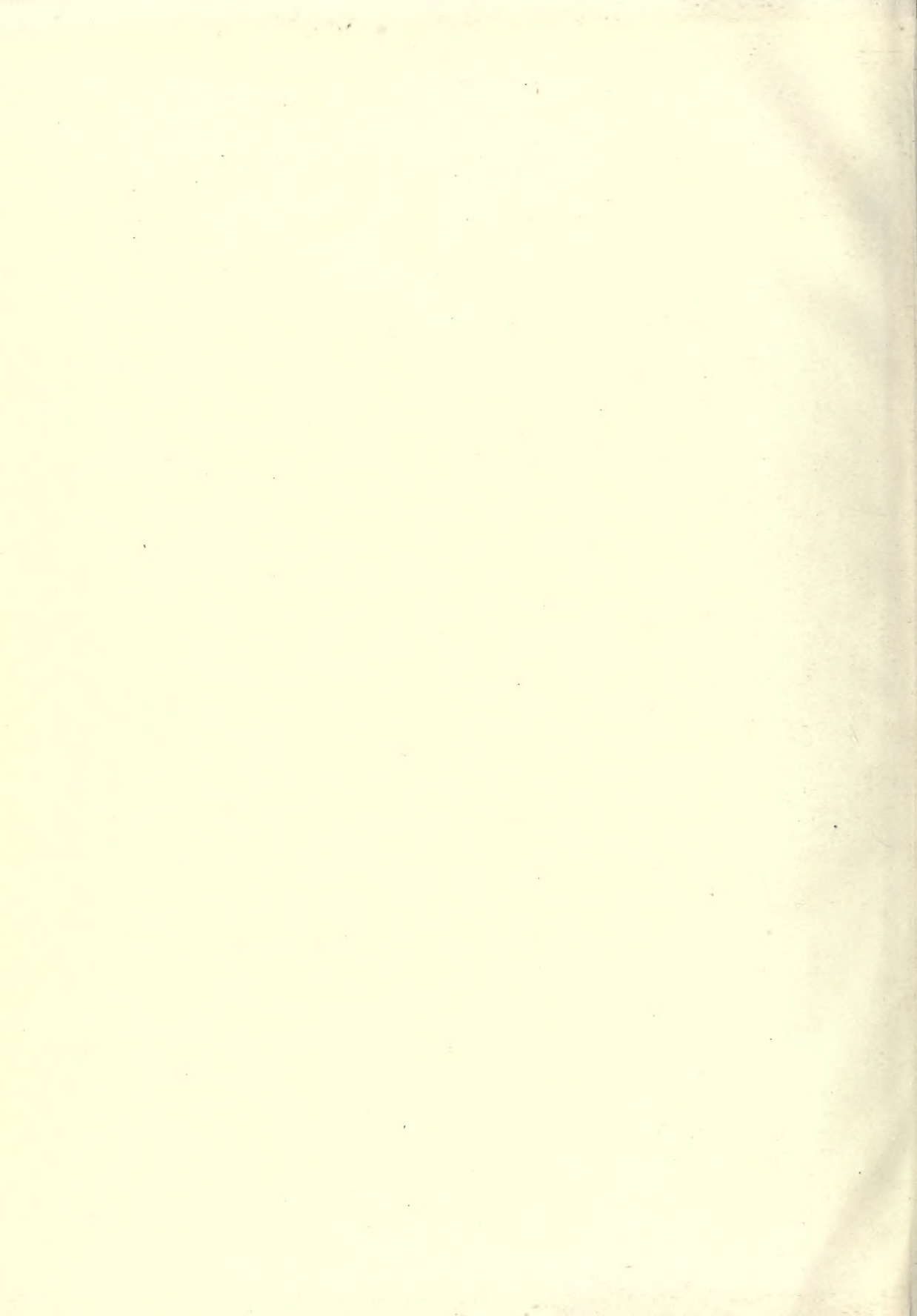
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ON THE "POLAR STAR"
IN THE ARCTIC SEA





*H.R.H. Luigi Amedeo of Savoy.
Duke of the Abruzzi.*

Luigi, duke of the Abruzzi

On the "Polar Star"

IN THE ARCTIC SEA

BY HIS ROYAL HIGHNESS

LUIGI AMEDEO OF SAVOY

DUKE OF THE ABRUZZI

WITH THE STATEMENTS OF COMMANDER U. CAGNI UPON THE
SLEDGE EXPEDITION TO 86° 34' NORTH, AND OF DR. A. CAVALLI
MOLINELLI UPON HIS RETURN TO THE BAY OF TEPLITZ

TRANSLATED BY

WILLIAM LE QUEUX

IN TWO VOLUMES, WITH 212 ILLUSTRATIONS
IN THE TEXT, 16 FULL-PAGE PHOTOGRAVURE
PLATES, 2 PANORAMAS, AND 5 MAPS

VOL. I

LONDON

HUTCHINSON & CO.

PATERNOSTER ROW

1903

PRINTED BY
HAZELL, WATSON AND VINEY, LD.,
LONDON AND AYLESBURY.

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TO HER MAJESTY
THE QUEEN-MOTHER

WILL YOUR MAJESTY ALLOW ME TO DEDICATE THESE PAGES TO THE MEMORY OF KING HUMBERT, WHOSE LOSS WE DEPLORE? HIS MORAL AND MATERIAL ASSISTANCE ENABLED ME TO CARRY OUT THIS VOYAGE, BY THE RESULTS OF WHICH HE WOULD HAVE BEEN MUCH REJOICED IF THE HAND OF AN ASSASSIN HAD NOT SUDDENLY ENDED HIS LIFE BEFORE THE RETURN OF THE EXPEDITION. THE DEDICATION OF THESE PAGES TO THE MEMORY OF KING HUMBERT IS TO ME A DUTY DICTATED BY GRATITUDE, AND THE EXPRESSION OF MY AFFECTION WHICH HAS BECOME STILL GREATER SINCE HIS DEATH. MAY YOUR MAJESTY BE PLEASED TO ACCEPT THE ASSURANCE OF MY UNSWERVING LOYALTY.

LUIGI DI SAVOIA.

INTRODUCTION

THE object of the expedition of the *Polar Star* was to sail as far to the north as possible along some coast-line, and then to travel on sledges towards the Pole from the place where the winter had been passed. The Pole was not reached, but the sledge expedition, led by Commander Cagni, pushed on to a latitude which no man had previously attained, and proved that with determination and sturdy men, and a number of well-selected dogs, the frozen Arctic Ocean can actually be crossed to the highest latitude.

The practical use of Polar expeditions has often been discussed. If only the moral advantage to be derived from these expeditions be considered, I believe that it would suffice to compensate for the sacrifices they demand. As men who surmount difficulties in their daily struggles feel themselves strengthened for an encounter with still greater difficulties, so should also a nation feel itself still more encouraged and urged by the success won by its sons, to persevere in striving for its greatness and prosperity.

Our expedition was composed of Italians and Norwegians. The willing and disinterested assistance of Captain Evensen, and of the Norwegians, in navigating in the midst of ice, brought the *Polar Star* to the highest latitude in the north of Europe hitherto attained by a ship following a coast-line. The well-trying courage,

the steadfast perseverance, the moral and physical endurance of every sort of privation and hardship shown by the Italians composing the sledge expedition under Commander Cagni, has won for Italy the first place among the nations which have approached nearest to the Pole.

Italians and Norwegians behaved throughout this voyage as though the crew were composed of one nationality. I had comrades with me, rather than subordinates. I express, therefore, my gratitude towards all, since to their harmonious co-operation is due the success of my expedition; and I express the same gratitude to the memory of the three brave men who perished whilst on the sledge expedition. Honour to those who sacrificed their young lives in pursuit of a noble idea, and may my admiration, as well as that of their comrades on board the *Polar Star* and of the whole civilised world, afford some consolation to their afflicted families.

As conclusion of this introduction, I feel it my duty to thank His Excellency the Italian Minister of Marine, Vice-Admiral Morin, for having allowed me to have a great part of my work executed in the Royal Hydrographical Institution, and all those who have helped to compile the narrative and scientific portions:—Commander Cagni, Dr. Cavalli, A. Alessio, and G. Schoch (Lieutenants in the Royal Navy), Professors Rizzo, Aimonetti, Palazzo, Cappa, Camerano, Salvadori, Pollonera, Giglio-Tos, Nobili, Parona, Mattiolo, Belli, Spezia, Colomba, Piolti, Ermanno Ferrero, Dr. Filippo de Filippi, and the Cavaliere Ufficiale Vittorio Sella.

November, 1902.

TRANSLATOR'S NOTE

THE temperature is given in Centigrade scale. The miles are geographical miles, or 6,080 feet. The tracks, the bearings, the direction of the winds and currents, are in the true meridian when not otherwise indicated.

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CHAPTER I
Plan of the Expedition

CHAPTER I

PLAN OF THE EXPEDITION

THE Arctic expeditions which have had as their sole object the reaching of the North Pole, on account of the difficulties of such an undertaking, and the very small advantages to be derived from it, have been few. Since the seventeenth century the English have attempted to penetrate to the far east by advancing towards the north in the Arctic Ocean. The voyages of Henry Hudson were followed by others which are not deserving of notice, until 1773, when the British Government sent Commander C. J. Phipps, with the ships *Racehorse* and *Carcass*, expressly for the purpose of reaching the Pole. Passing to the north of Spitzbergen, Phipps was stopped by ice in the latitude of $80^{\circ} 48'$; and though some captains of whalers attained the latitude of $81^{\circ} 30'$ with sailing ships, and though in 1868 Baron Nordenskiöld with the steamer *Sophia* went so far as $81^{\circ} 42'$ in the same direction, these attempts only proved that, even with the help of steam, ships could not advance into the ice of the Arctic Ocean far away from land.

Short History of
Arctic Voyages
towards the Pole.

But although ships were stopped by the ice, might not an attempt be made to cross it with sledges? Commander Parry, R.N., sailed on board the *Hecla*, which he left in June, 1827, in Treurenberg Bay, on the northern coast of Spitzbergen. With two launches built so as to serve as sledges, three officers, twenty-four men, and provisions for seventy-one days, he sailed north, and then drew his boats over

4 On the *Polar Star* in the Arctic Sea

the ice-fields. These did not form, as had been reported, a level plain without obstacles. They were, on the contrary, crossed by ridges of ice, over which the boats had to be hauled with ropes, and intersected by numerous channels on which the boats had to be launched, to be drawn up again on the opposite shore, and thus had to be unloaded and loaded. As the snow was



COMMANDER C. J. PHIPPS

softened by the high temperature, the sailors sank in it up to their waists.

Although the ground covered each day was much less than had been anticipated, Parry continued to push on towards the north, hoping that his difficulties might diminish according as he went farther; but as the state of the ice did not change, and as,

moreover, it drifted every day as much as four miles to the south, thirty-six days after his departure, when in the latitude of $82^{\circ} 45'$, he gave the order to return. For many years this was the highest latitude ever attained by man, and Parry's attempt showed



COMMANDER W. E. PARRY

the difficulty, especially during summer, of travelling with sledges over the ice of the Polar Ocean.¹

¹ Commander Parry was sixty-one days absent from his ship, from June 21st to August 21st. He passed thirteen days in the boats and forty-eight on the ice. The distance in a straight line from Treurenberg Bay ($79^{\circ} 55'$ N. lat. by $16^{\circ} 48'$ E. long.) to the most northern point reached ($82^{\circ} 45'$ N. lat. by $19^{\circ} 25'$ E. long.) is 172 miles.

6 On the *Polar Star* in the Arctic Sea

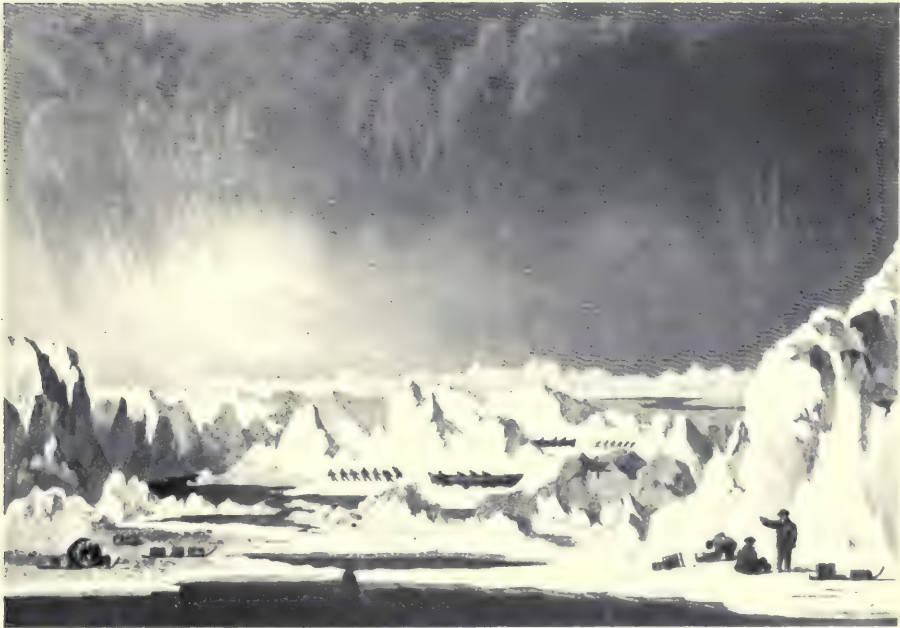
In 1875 the English Admiralty dispatched for the third time an expedition to the North Pole. The preceding voyages had shown that it was as difficult to advance with ships as with sledges. It was hoped that by penetrating into the basin lying between Greenland and America, it would be possible to sail along some coast-line up to the 83rd or 84th parallel, where it would winter, and then advance towards the Pole on sledges in the following spring.

The expedition led by Commander Nares was composed of two ships, the *Alert* and the *Discovery*, one of which was to push as far as possible to the north in the above-mentioned basin, whilst the other should take shelter in some safe anchorage, and bring home the crews in case the former met with any mishap. The ships passed by Smith Sound into Kennedy Channel, and reached Lady Franklin Bay. The *Discovery* was left there at $81^{\circ} 44'$, whilst the *Alert*, entering Robeson Channel, reached the latitude of $82^{\circ} 27'$ off Grant Land. The excursions made during the autumn to discover the direction of the coast ascertained that it trended towards the west, and thus took away all hope of utilising it to establish depôts for the expedition towards the Pole.

In the following spring, however, Nares dispatched towards the north Commander A. H. Markham, with an officer, eighteen men, three sledges, and provisions for seventy days. He could only advance slowly and laboriously, as it was necessary to return over the same road several times in order to transport the heavy loads. After very great efforts he reached the latitude of $83^{\circ} 20'$, where he was obliged to stop on account of the fatigue of his men, among whom had also appeared some cases of scurvy. On his returning to the ship the situation was still more difficult. To the weight of the baggage was added that of the sick, who had to be carried on the sledges, and the expedition would hardly have succeeded in reaching

the *Alert* if a man had not volunteered to go forward to seek for help. The latitude reached by Parry was thus slightly exceeded, by a different road, although the advance had been carried out in the most favourable months.¹

A few years later, in 1882, the United States succeeded in bearing away from England the Polar record, which had been jealously guarded



THE ATTEMPT TO REACH THE POLE.—W. E. PARRY, 1827

for so many years. During the sojourn in Lady Franklin Bay of the expedition led by Lieutenant A. W. Greely for scientific purposes, Captain J. B. Lockwood, by advancing along the coast of Greenland, reached with sledges the latitude of $83^{\circ} 24'$. The fact of having gone

¹Commander Markham started on April 3rd and returned to the *Alert* on June 14th, after being seventy-two days absent. The distance in a straight line from the *Alert* ($82^{\circ} 27'$ N. by $61^{\circ} 18'$ W. long.) to the most northern point reached ($83^{\circ} 20'$ N. by 63° W. long.) is fifty-four miles.

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farther than Markham, though only by four miles, whilst starting from a latitude forty-three miles lower, appeared to demonstrate the advantage to be gained by following the land in order to advance to the north, but it afforded at the same time additional proof of the great difficulty of reaching the Pole.¹



COMMANDER A. H. MARKHAM

Professor Nansen was to give a fresh stimulus to those who were desirous of penetrating the secrets of Arctic regions, but was discouraged by the results of the last expeditions. Abandoning the system followed until then of sailing along some coast-line

¹Captain Lockwood was absent from Fort Conger for sixty days, from April 3rd to June 1st. The distance in a straight line from Fort Conger ($81^{\circ} 44'$ N. by $64^{\circ} 45'$ W. long.) to the farthest point attained ($83^{\circ} 24'$ N. by $40^{\circ} 46'$ W. long.) is 220 miles.

into the highest latitudes where shelter could be obtained during the winter, and then dispatching sledge expeditions in the following spring, he formed the plan of taking advantage of the current which causes the masses of ice in the Arctic Ocean to drift from east to west, and allowing his ship to be carried along by them.



CAPTAIN J. B. LOCKWOOD

When he reached the 84th parallel, and was convinced that the *Fram*, while drifting, would not pass by the Pole, he left his ship with a single companion in order to advance towards the Pole, and from thence proceed to Emperor Franz Josef Land. By the use of sledges drawn by dogs, which had one by one to be killed to feed the survivors, and by daring to abandon all hope of retreat, as he had previously done in Greenland, he succeeded in making an immense advance beyond the parallel reached by his predecessors,

10 On the *Polar Star* in the Arctic Sea

and extended up to 227 miles from the Pole the limits of what was known of the Arctic Ocean.¹

The uncertainty of the existence of a great extent of land to the north of what was already known rendered it necessary, in order to reach the Pole, to travel over the moving ice-fields of the Arctic Ocean. No deposit of provisions could be made on these ice-fields, and, therefore, to facilitate this advance it was essential that the point of departure for the expedition should be established as far as possible towards the north. How could that be done? By letting the ship drift again in the ice, or by sailing along some coast-line as far as possible to the north, by the routes already discovered?

To repeat the attempt made by the *Fram*, and submit to imprisonment by the ice farther to the east than Nansen had done, necessitated remaining for perhaps three or four years in the Polar seas, in which case the sledging expedition could be only carried out after two or three years; and a depôt of supplies should first of all be safely established on Emperor Franz Josef Land, where the sledge expedition would touch on its return. All honour, therefore, is due to Nansen, who, knowing that he should have to stay so long in the Polar ice, prepared and carried out his voyage with that intention. Although my desire of arriving at the Pole was most ardent, it was not, however, strong enough to induce me to remain for some years in those solitary and icy regions. The danger of losing the dogs by disease, the risk of trusting to drifting on the Arctic

¹ Nansen, from March 14th ($84^{\circ} 4' N.$ by $101^{\circ} 47' E.$ long.) to August 9th, the day on which he arrived at Adelaide Island ($81^{\circ} 38' N.$ by $62^{\circ} 11' E.$ long.), having attained in the meanwhile the parallel of $86^{\circ} 13'$, and the longitude of $96^{\circ} E.$, had covered a total distance of 500 miles. To arrive at Cape Flora he travelled a further distance of about 210 miles.

Plan of the Expedition

II

Ocean (a voyage which, though it may be repeated with the same probability of success, may also be accompanied by unknown dangers, even in the case of vessels built like the *Fram*), dissuaded me from attempting to follow the same system, which is, however, certainly the best, because it brings the expedition nearer to its goal,



PROFESSOR FRIDTJOF NANSEN

while at the same time the sledge expedition can be undertaken over ice-fields which are less uneven, because they are farther from land.

The *Alert*, which passed the winter in $82^{\circ} 27'$ latitude off Grant Land, is the ship which has reached the highest latitude by following a coast-line. Considering that it was sometimes, if not always, possible

12 On the *Polar Star* in the Arctic Sea

to steam forward into the sea stretching from Greenland to America, that seemed to be the route most clearly pointed out to be followed. But two expeditions had already taken that direction—that from Norway on the *Fram*, and another from America on the *Windward*. These expeditions, and the obstacles which Markham had encountered with his sledges, led me to discard that route and to tend towards Emperor Franz Josef Land, which is certainly known to extend to about the latitude of 82° . The observations made by Payer, Nansen, and Jackson led me to believe that a ship could reach Prince Rudolph Island, which is the most northern of that archipelago. The crossing of the Sea of Barentz up to Cape Flora might be considered almost free from danger, and if it were not possible for a ship to reach the northern extremity of that group of islands, the lands situated towards the north would at any rate facilitate the sledge expedition.

As there was no certainty that we could reach Prince Rudolph Island, the probable departure of the sledges from Cape Flora, in about 80° latitude, had to be taken into consideration. From this point to the Pole 600 miles had, therefore, to be traversed in going, and as many in returning—a total of 1,200 geographical miles. Would it, I wondered, be possible to cover this distance with the means at our disposal, and in the few months in which an expedition was feasible?

In Eastern Siberia, Baron Wrangell, by employing a number of sledges drawn by dogs, which he sent back according as his supplies were consumed, was able, in the four expeditions which he led along the coast in 1821, 1822, and 1823, to cover the distance of 647 miles in twenty-two days; of 698 miles in thirty-six days; of 782 miles in fifty-seven days; and lastly of 1,326 miles in seventy-eight days.

Lieutenant Peary, in his journeys on the inland ice¹ of Greenland, in 1892 and 1895 covered four times in 140 days a distance of 444 miles from MacCormick Bay to Independence Bay. It remained to be seen if what it had been possible to accomplish along the coast of Siberia, and on the inland ice of Greenland, could not also be achieved on the ice-fields of the Arctic Ocean.²



NANSEN AND JOHANSEN IN THE ARCTIC, 1895

In what was the best season for travelling, from March 14th to May 15th,³ Nansen never made more than a daily average of

¹ The name of "inland ice" is given to the mantle of ice which covers the interior of Greenland.

² Independence Bay is situated in $81^{\circ} 37' N.$ by $34^{\circ} 5' W.$ long. The point comprised between MacCormick Bay and Baldwin Bay is at $77^{\circ} 45' N.$ by $69^{\circ} 39' W.$ long.

³ The latitude and longitude of the *Fram* when Nansen left it was $84^{\circ} 4' N.$ by $101^{\circ} 47' E.$ long. The farthest latitude reached was $86^{\circ} 13' N.$ by $96^{\circ} E.$ long. On May 15th he was in $83^{\circ} 38' N.$ by $64^{\circ} 12' E.$ long.

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five and a half miles. If, by progressing as speedily as Wrangell and Peary, the 1,200 miles required to reach the Pole and to return from it could be accomplished in less than a hundred days, by advancing at the same rate as Nansen, the same distance could not be covered in less than two hundred. During winter in the Arctic regions the continual darkness puts an end to travelling, and during summer, the softness of the snow, the pools and channels which are formed in the ice, render it difficult to make any progress; so that only from ninety to a hundred days in the months of February, April, and May can be utilised for making an expedition. Taking, therefore, only as a basis, the distances accomplished every day by Nansen, I did not feel inclined to attempt the undertaking.

The difficulty of advancing speedily over the ice-fields during the spring is especially caused by the channels which open out even during intense cold, and by the pressure-ridges formed by the ice-floes rising up over each other. Nothing could be done to lessen the delay caused by the channels. But by having many sledges at my disposal, lightly laden, and each driven by a single person, it might be possible for a number of men to make their way much more speedily through the pressure-ridges, whilst progress would be rendered more easy in those tracts which would be comparatively level. By increasing the number of men, and having as many as there were sledges in our expedition, I hoped to exceed the daily average of Nansen, and to attain that of Peary and Wrangell.

Allowing that it might be possible to obtain an average of twelve miles a day, and fixing the maximum weight of a sledge at 617 lb. (so that it might be easily managed by the men, and drawn by eight dogs over slightly uneven ground), calculating also the daily ration for each man at 2 lb. 12 oz., like other explorers, and that for the dogs at 1 lb. 1 oz. 10 dr., and being resolved to kill the dogs

one after the other to feed those which survived, could the problem of reaching the Pole, and returning to the ship, be solved? The enormous distance of 1,200 miles could not be traversed by a single party unaided. Either the sledges would be too heavily laden or, as in the case of Nansen, it would be necessary to have a greater number of sledges than men. It would, therefore, be absolutely necessary to establish depôts on the lands farthest to the north, and to employ auxiliary parties to carry on from them the supplies required to enable a small number of persons to proceed still farther. The expedition, therefore, required to be formed of three detachments, each composed of several persons. The first detachment was to advance from Cape Fligely to the 85th parallel, carrying supplies to feed the entire expedition during the first stage of its march, and for its own food during its return to the ship. The second detachment was to go on farther to the north, up to the 88th parallel, with provisions for the rest of the expedition in its march to the north, and for itself when on its way back; and, lastly, the third detachment was to advance from the 88th parallel to the Pole. These detachments, while returning, could not rely upon the magazine at Cape Fligely, as various causes might oblige them to deviate from their route and to return directly to the ship at Cape Flora.

The plan, as thus conceived, had certainly its drawbacks, which were, chiefly the great number of the staff, and the large amount of supplies that would be necessary. Although it might be possible before starting to carefully select the men composing the expedition, it might, nevertheless, be expected that they would not all prove suited for that mode of life, and that, therefore, the delays would be increased by accidents which would occur all the more frequently the greater the number of the party. On the other hand, it presented many advantages, such as the possibility of selecting, among the

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members of the expedition, those who would be more capable of going on farther, while sending back the weaker ; further, the abundance of supplies would enable us to replace whatever might be damaged without wasting time in repairs ; and, lastly, the large number of dogs, besides drawing the sledges, would also form a reserve of provisions which did not require transport.

My original intention was to proceed to Emperor Franz Josef Land and build a house there, but not to make the ship winter there, as Wellman and Jackson had done ; being uncertain, however, as to whether the ship could be sent back with safety, and thinking also that it might afford the expedition greater comfort, I afterwards decided to use it as a dwelling during the winter.

The plan of the new expedition to the Arctic Ocean was therefore as follows : It was to leave Archangel not later than July 10th for Cape Flora and Northbrook Island, where a magazine was to be established with provisions for eight months, and four boats should be left. Thence it was to proceed to Queen Victoria Sea, and there seek a safe anchorage as far as possible to the north, close to the lands lying to the west of Emperor Franz Josef Land. Sledge expeditions were to be carried on in autumn and in spring : the former were to transport supplies to the lands situated more to the north, and the latter to attempt to reach the highest latitude. When these latter expeditions came back at the beginning of summer, the place where we had wintered should be left, or, if it were then too late to do so, a second winter might be passed there, and in the following year the expedition was to return to Cape Flora with or without the ship. In case we were shipwrecked during the autumn, the supplies on board, and what had been left at Cape Flora, would enable us to subsist until the arrival of the relieving ship which, when two years had elapsed after our departure, would be dispatched to that place. If it

were impossible to do otherwise, we might retreat by means of the boats left at Cape Flora towards Novaya Zemlya or to the Spitzbergen Islands, according to circumstances.

The plan of the sledge expedition was as follows: It was to start as soon as possible in spring, from the place where we had wintered, advancing in the direction of the magazines we had left



TO THE UNKNOWN GOAL

during the autumn, and from these, after leaving the land, cross over the ice toward the Pole. The supplies were calculated so as to maintain a party of four men for forty days; a second party of four men for seventy days; and a third party, composed also of four men, for ninety days. The first party—that which carried the supplies for forty days—was to return to the ship after fifteen days' march, to be reckoned from the last depôt, which might be

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supposed to be situated in 82° latitude, at Cape Fligely; the second party, with rations for seventy days, was to separate from the rest of the expedition after thirty days' march; and the third party was to go as far as possible in the direction of the Pole, advancing for forty days from Cape Fligely. These parties were to be quite independent of each other as soon as they separated. By means of the depôt which I hoped to establish at Cape Fligely, I reckoned on starting from that latitude with sufficient supplies for the above-mentioned parties, in the hope that the last of them might succeed in reaching the Pole and returning to the ship, which would probably be stationed at 80° latitude. The plan was not to be modified, whatever might be the distance which could be covered every day.

Besides attempting to reach the highest possible latitude, the expedition would carry instruments for taking observations on gravitation and terrestrial magnetism, seek to enlarge our meteorological and hydrographical knowledge of the localities which were to be visited, and collect as much information as possible with regard to the fauna and flora of Emperor Franz Josef Land.

CHAPTER II

Preparation and Departure of the Expedition

CHAPTER II

PREPARATION AND DEPARTURE OF THE EXPEDITION

DOGS are undeniably the most useful animals for man in his expeditions with sledges over the ice of the Polar Sea. They have this advantage, too, that, unlike horses and reindeer, they readily eat their fellows. Their weight is small, and they can be easily carried on light boats or on ice-floes. Their loss Getting the Expedition ready. represents but a small diminution of motive power in comparison with what would result from the death of a reindeer or of a horse. The best dogs for the sledge are to be found in Greenland and in Eastern Siberia ; but the Danish Government has forbidden their exportation from Greenland, and it was difficult to procure them from Eastern Siberia. It was, therefore, decided to bring dogs from Western Siberia, as they, too, are good, and in July, 1898, an order for 120 was given to Alexander Tronheim (who had formerly provided Nansen with his dogs).—The English Vice-Consul in Archangel, Mr. Henry Arthur Cooke, kindly took charge of the correspondence with Tronheim, in which he took a special interest and for which I am deeply grateful to him.

Of all the ships for sale in January, 1899, the best for the strength of its timber and the quality of its engines was the *Jason*, a whaler about to start for the seal fishery. It had been built at Sande-Fiord in 1881, and could carry 570 tons of cargo. Its dimensions were as follows : Length on the deck, 131 ft. ; width, 30 ft. 6 in. ;

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and it drew from 15 ft. 11 in. to 16 ft. 6 in. Its engines, which were nominally of 60 h.p., gave a speed of from six to seven miles an hour. The ship had a new boiler, and carried a spare propeller and rudder. It had no propeller-well or rudder-well. The *Jason* was getting ready to start, under the command of Captain Evensen, one of the most experienced and daring whaling captains. When its destination was changed, all the iron tanks which filled the hold were taken out, except four which were to serve to carry fresh water. The coal was put on shore, and the ship was sent to Colin Archer's dockyard at Larvik to undergo the overhauling and changes rendered necessary by its new enterprise.

Many changes required to be made : in its hull, in its masts, and in its cabins. Stanchions were placed in the hold, which met in the centre under the transverse beams supporting the deck, while the lower ends rested on the floor timbers, and the lower deck, which had hitherto been entirely movable, so as to allow the large tanks to be easily filled, was firmly fixed in its position. The masts were changed and the vessel was transformed from a barque to a barquentine. This change was advisable on account of the diminished number of the crew, which having, moreover, only a small proportion of sailors, would hardly have been able to manage two masts carrying square sails. The ten boats of the *Jason*, which were 19 ft. 8 in. and 20 ft. 11 in. long, were kept. Although they were not large enough for a long journey, they were well adapted by their lightness for dragging over the ice, as they weighed only 1,542 lb. without their rigging. The forecastle was cleared out, and accommodation for all the crew provided on the lower deck near the engines. The places which had to be kept warm were thus brought close together, with the advantageous result of a smaller consumption of fuel and the utilisation of the heat of the boiler. The

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deck-house at the stern was taken away, and replaced by a shelter extending from the main-mast to the wheel, built expressly for the Polar regions and covering the officers' cabins, the dining-room, the laboratory, the kitchen, the cabinet for the instruments, and the pumps. The doors opening on it were double, with high leaves. The cabins had no windows, light being only admitted by the doors and by three skylights. To keep the ship free from water, we had, besides the pumps just mentioned, those which



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were worked by a windmill fitted up on deck, and by the donkey-engine, and, when the engines were working, the pipe from the condenser to the bilge.

The straight sides of the ship did not present the shape most adapted for resisting pressure; but as we were to sail in a sea frequented by whalers, and seek an anchorage for winter, a special build was not as necessary as in the case of the *Fram*, which was intended to be imprisoned in the ice. Our old ship, which had already sailed in the Arctic and Antarctic Oceans, and had acquired

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celebrity by taking over Nansen to make the crossing of Greenland, had its name changed. As the object of the expedition was to reach that spot on the surface of the earth near the zenith of which shines a star known to all from the man of learning to the peasant, what name could be more suited to the ship than that of *Stella Polare*—the *Polar Star*?

Commander Schley (now Admiral), who had been sent by the American Government to search for Greely's ill-fated expedition, a part of which he succeeded in rescuing, and who went farther than all the whalers dispatched on the same undertaking, says in his account of his journey¹ that if a naval officer who is put in command of a ship intended to navigate the Polar regions does not fall a victim to his inexperience at the beginning, he soon acquires the knowledge which whaling captains gain by long practice. From the very first I suspected, and later on I verified, that during the short space of time requisite for the acquisition of this knowledge events may occur which, in the case of one who for the first time attempts that sort of navigation, are enough to ruin the expedition, or, at least, to cause the loss of favourable opportunities. An officer who only knew the ice of the Polar Sea by having read about it in books, and who would have wished to man his ship with a crew composed entirely of sailors with little experience of the region of ice, would have endangered the expedition from its very beginning through his false pride. I, therefore, gave up the idea of having a crew composed entirely of Italians. I preferred to choose a safe and capable Norwegian commander, to whom I might trust the guidance of the ship through the ice, and a crew of the same nationality, associating with them some Italian sailors and guides who were specially intended to take part in the expedition

¹ W. S. Schley and Soley, *The Rescue of Greely*, p. 181. (London, 1885.)

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with sledges. By fitting out the vessel in Norway, it would be more easy to provide it with all that was requisite for an expedition in the midst of ice, whilst if any mishap occurred to our

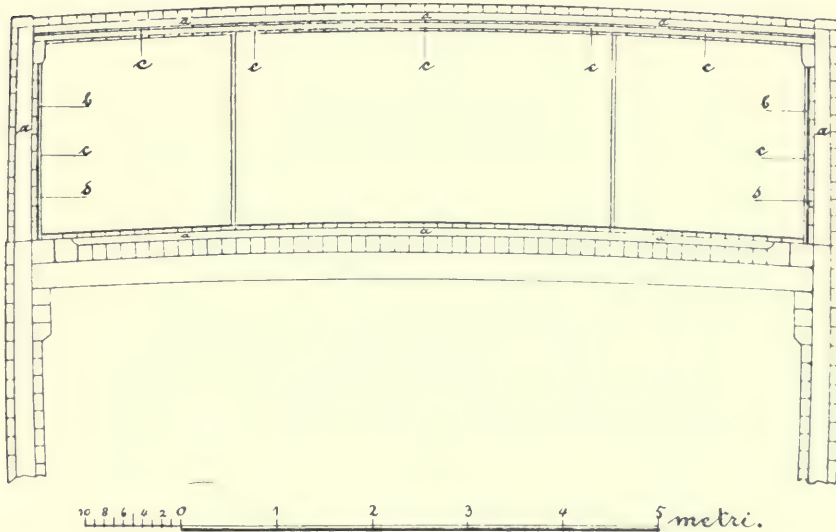


THE *POLAR STAR* AT LARVIK

undertaking the captain and crew would find it more easy to return to Europe. Although the assemblage of a crew of two different nationalities on a ship intended to make an expedition to the Arctic regions did not seem to me to be without its drawbacks,

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astronomy, who could use instruments and make calculations so as to find their way back to land. It was, moreover, necessary that if we found ourselves in difficult circumstances, these persons should have the knowledge possessed by those accustomed to command. The officers of the Italian Royal Navy were those who were most certain to possess this double capacity, and to them I applied, with the kind consent of the Government. Captain Umberto Cagni had



TRANSVERSE SECTION OF THE OFFICERS' QUARTERS

a. Space filled with Cork.—*b.* Felt.—*c.* Inner Timbers.—*d.* Outer Timbers.—*e.* Empty Space.

since the summer of 1898 been already chosen to be second in command of the expedition. He undertook to take charge of the scientific observations. I selected Lieutenant Francesco Querini to assist him in making these observations, and as well to command one of the parties in the sledging expedition towards the Pole, and for medical officer of the expedition, Dr. Achille Cavalli Molinelli, doctor of the highest grade. Although I had not at first intended that this officer should form part of the sledge expedition, he showed later on

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so much experience and daring that he was naturally selected as the leader of one of our detachments in the attempt to reach the Pole.

Not only the officers, but also all the men intended to take part in the expedition required to be endowed with more than ordinary endurance, both moral and physical. During my journey to Alaska I became convinced that it would be more easy to find such men among our Alpine guides, and among the inhabitants of our coasts, than elsewhere. I therefore took with me four guides and two sailors of the Italian Navy, who were specially intended to serve in the boats which were to be carried on sledges; and at Archangel I fortunately replaced, by an Italian, the cook whom I had engaged in Norway.

The Norwegian crew was recruited by M. Torres Bonnevie. Evensen was at once selected as captain, for, being disengaged on account of the sale of the *Jason*, he showed a great desire to take part in this expedition. We required also a mate, two engineers, a boatswain, a carpenter, and three stokers.

They all came willingly, well aware of the dangers they were going to face, and eager to penetrate by courage and fatigue into the mystery which still surrounds the North Pole, and to enrich science by new discoveries.

When definitely organised, the expedition consisted of:—

H.R.H. Louis of Savoy, Lieutenant of the Italian Navy, aged 26, born in Turin, Commander of the Expedition.

Umberto Cagni, Captain of the Italian Navy, aged 36, born in Asti, Second in Command of the Expedition, and in charge of the Scientific observations.

Francesco Querini, Lieutenant of the Italian Navy, aged 31, born at Venice, who took charge of the Mineralogical collections, and was also appointed to assist Commander Cagni in his Scientific observations.

Achille Cavalli Molinelli, doctor of the highest grade, Italian Navy, aged 33, born at Sale (Province of Alessandria), Medical Officer of the Expedition, in charge of the Zoological and Botanical collections.

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C. Julius Evensen, aged 47, of Sande-Fiord, Captain of the *Polar Star*.

Andreas Andresen, aged 28, of Sande-Fiord, Second Officer of the *Polar Star*.

Henrik Alfred Stökken, aged 24, of Sande-Fiord, First Engineer.

Anton Torgrinsen, aged 30, of Larvik, Second Engineer.



1 2 3 4 5 6 7 8 9 10 11 12

THE CREW OF THE *POLAR STAR*

1. Ditman Olausen.
2. Johan Johansen.
3. Felice Ollier.
4. Cipriano Savoie.

5. Carl Christian Hansen.
6. Alessio Fenoillet.
7. Giuseppe Petigax.
8. Simone Canepa.

9. Hans Magnus Dahl.
10. Gino Gini.
11. Giacomo Cardenti.
12. Ole Johansen.

Guides intended to form part of the Expedition with Sledges. { Giuseppe Petigax, aged 38, of Courmayeur, Val d'Aosta.
Alessio Fenoillet, aged 37, of Courmayeur, Val d'Aosta.
Cipriano Savoie, aged 30, of Pré Saint Didier, Val d'Aosta.
Felice Ollier, aged 30, of Courmayeur, Val d'Aosta.

Giacomo Cardenti, aged 32, of Porto Ferrario, Boatswain, Royal Navy.

Simone Canepa, aged 21, of Varazze (Province of Genoa), Sailor of the second class.

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Gino Gini, aged 35, of Acquapendente (Province of Rome), Cook.

Carl Christian Hansen, aged 37, of Larvik, Boatswain's Mate.

Ditman Olausen, aged 28, of Tönsberg, Carpenter.

Hans Magnus Dahl, aged 21, of Christiania, Fireman.

Johan Johansen, aged 42, of Sande-Fiord, Fireman.

Ole Johansen, aged 25, of Larvik, Fireman.

The expedition took with it supplies for four years. Commander Cagni and Michaelangiolo Chiotti, First-class Commissary (in Italy), and Mr. Heim (in Norway) were entrusted with the care of this most important department. A preference was given to those kinds of food which had been chosen by Nansen for the first expedition of the *Fram*, and Sverdrup had chosen for the second, selecting those which had been proved to have been kept well preserved rather than others more tasty, perhaps, but not as yet tried. Most of the biscuits and butter, all the macaroni and rice, came from Italy. In countries where farinaceous food-stuffs are indispensable, macaroni is a very good substitute for bread, which it is very difficult to have fresh every day on board ship, and cannot be conveniently baked in camp. The provisions were all supplied in hermetically sealed tins, an essential condition for their preservation, which also contributes to ward off the danger of scurvy. As much variety as possible was aimed at in the choice of these supplies, so as to avoid tiring the palate. Only a small quantity of wine and spirits was taken, for if it is harmful to drink too much alcohol in the Arctic regions, a moderate amount is not only wholesome, but has also a decidedly moral effect by making the crew more cheerful. The system adopted with the provisions brought from Italy—that is to say, of dividing them into cases of fifty-five pounds each containing the same sort of food—ought to have been followed with regard to all the stores. The cases would thus have been more convenient to handle, and as their contents would be accurately known, it would

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have been easy to verify at any moment how much remained of any given article of food.

Plenty of fur coats and woollen garments were taken, in order that when we arrived at our destination we might adopt whatever it would be found best to wear. Caps, gloves, and gauntlets of wool and of fur were selected, so as to meet every possible degree of cold. For summer wear the expedition was provided with the boots and



IN THE PORT OF CHRISTIANIA

shoes usually worn by sailors, which keep the feet and legs dry, and are easy to put on. Lapp shoes of sealskin called *kömager* were taken for winter wear (they come as high as ordinary shoes, but are not open on the instep, and are tied round the ankle by two thongs), as well as Finn shoes called *fnsko*, of reindeer skin, with the hair outside, and of the same shape as the *kömager*. Besides stockings of every degree of thickness, a quantity of sedges were taken as padding for

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the *kömagers* and *fnskos*. There were also plenty of woollen blankets, sleeping-bags lined with down, beds, and two field-tents, in case the expedition should be obliged to abandon the ship.

The suggestions of Professor Nansen were followed with regard to the equipment to be carried by the expedition designed to cross the ice. The same sorts of lamps and stoves were selected which had rendered him such good service, and had been also employed in the Alaska expedition. The tents were made on the model of that adopted by Mummery for mountaineering, but a little larger, and special attention was paid to the dogs' harness. Everything was got ready while we were in Europe, so as to leave as little as possible to be done on board during the winter, and to avoid the risk of having it badly made.

To the arms already on the *Jason*, which were those carried by all whaling crews, were added eight double-barrelled guns, having one shot barrel of 20-bore, and the other for ball of .303 calibre for the sledge expedition, a Paradox rifle of 16-bore, a double-barrelled gun of .303 calibre, and two Euoplia rifles for ordinary use. Over 440 lb. of guncotton to be used for blasting the ice, were also taken.

Besides the usual meteorological observations which were to be made at the spot where we should pass the winter, the most important were those for astronomy, gravitation, and terrestrial magnetism. For the purpose of observing the temperature and the hygrometrical state of the atmosphere, the direction and the velocity of the wind, and the solar heat, registering instruments were carried which were to be compared with standard barometers, thermometers, and hygrometers. A Sternek pendulum was purchased for the study of gravitation, and a Schneider magnetometer for magnetic observations. There were also sounding lines, current



"The Polar Star."

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gauges, and thermometers to observe the temperature and the density of water at different depths as well as the temperature of the ground, a theodolite, and four sea chronometers. The collection of instruments was completed by six Longines pocket chronometers, sextants of aluminium, and artificial glass horizons for the sledge expedition. Most of these were furnished by the Italian Naval



AT TROMSÖ

Hydrographic Office, and I thank the Government, in the person of Admiral Palumbo, who was then Minister of Marine, for having allowed them to be lent to me for the expedition. The others were purchased. I also here express my gratitude to Captain Ernesto Filippone and to Professors Cesare Aimonetti, Nicodemo Jadanza, Giuseppe Lombard, Andrea Naccari, Luigi Palazzo, Francesco Porro, and Giovanni Battista Rizzo for the help they gave me in getting ready the scientific equipment of the expedition. Besides the instru-

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ments, we also had a collection of books on the Arctic regions, and other scientific works.

I had thought to make use of captive balloons to assist the expedition on its way towards the Pole. The weight of a sledge



WE OVERTAKE A STEAMER IN THE WHITE SEA

being fixed at 280 kilos (617 lb.), and a cubic metre of gas (36 cubic feet) being able to raise about a kilo (2 lb. 3 oz.), a small balloon of 440 cubic metres¹ (15,954 cubic feet) attached to a sledge could raise it; thus sixteen dogs harnessed to two sledges, placed one above the other, would drag a weight equivalent only to that of a single sledge. If the balloons were destroyed by a storm or any other accident, their loss would not have any bad results, as the advance could be continued all the same; moreover, if they could have been employed, for at least a few days, the more serious obstacles, which are those next the shore, would by that time have been surmounted.

Orders were given to prepare four of these balloons and the necessary apparatus to make hydrogen gas. Experiments were made in Paris to ascertain what might be the most suitable form to give them, whether spherical or cigar-shaped, and in Turin the tissues were

¹ The weight of a balloon is about 160 kilos (348 lb.).

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tested to ascertain if it were possible to inflate these balloons when the temperature was from thirty to forty degrees below zero. Commander Cagni's experiments in Paris proved that the cigar-shaped balloon was absolutely useless, but that the spherical might be of service.



AT SOLOMBOL

The experiments made in the Royal Industrial Museum at Turin, under the direction of Professor Lombard, showed that tissues which had long been exposed to very low temperatures were no longer sufficiently elastic to allow the balloons to be inflated in the Arctic regions. Both Professor Lombard and the firm of Godard & Surcouf,

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which furnished the balloons, pointed out how necessary it would be to have at our service a room where the temperature could be artificially maintained not far from the freezing point, whilst the balloon was being inflated. The difficulty of procuring such a locality, and the great weight of sulphuric acid which it would be necessary to carry to inflate the four balloons, as well as the uncertainty of being able to make use of them, rendered it, therefore, advisable to reduce our aeronautic equipment to two balloons which might serve as an experiment.

The photographic equipment consisted of a Dallmeyer camera and of several Kodaks (bull's-eye, cartridge, and No. 5 folding Kodak), with the requisite materials for the development of the negatives.

The total expense of the expedition was as follows:—

	Lire.	£
(a) The <i>Jason</i> , purchase and overhauling	300,000	12,500
(b) Staff and Crew	160,000	6,666
(c) Dogs	17,000	708
(d) Provisions	172,000	7,166
(e) Clothing	72,000	3,000
(f) Outfit of the Sledge Expedition	20,000	833
(g) Scientific Instruments, Books, and Arms	79,000	3,291
(h) Aeronautic Outfit	52,000	2,166
(i) Medical and Photographic Outfit	14,000	583
(j) Sundries, Transport, Coal	36,000	1,500
	<u>Lire 922,000</u>	<u>£38,413</u>

All these preparations kept us fully occupied from the end of January until the beginning of May. On The Departure for Norway. May 7th the members of the expedition took their departure for Norway from Rome, where H.M. King Humbert I.

Preparation and Departure of the Expedition 37

and the officers of the Royal Navy took leave of them at the station. Whilst Cagni, Querini, and Cavalli were putting the stores in order at Christiania as they arrived, I was at Larvik hastening as much as possible the departure of the ship; by May 28th, when the *Polar Star* left Mr. Archer's dockyard for the capital of Norway, the most essential part of the work was completed.

It is not easy to stow away the cargo of a vessel which is about



THE KENNELS AT ARCHANGEL.

to undertake a Polar expedition. The ships intended for these journeys are not very large; the number of articles to be taken on board is very great, and must be so packed that those, at least, required for daily use can be easily got at.

The *Polar Star* had four places for stowage: an under-hold, a hold on the lower deck, a hold aft of the engines beneath the officers' saloon, and another on the deck beneath the steering-wheel. The under-hold was filled with coal only, which, together with that in the bunkers, amounted, when we left Archangel, to about 350 tons. The forward part of this hold was reserved for the dogs' food, in

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order not to sink the bow of the vessel too much, for as these provisions mostly consisted of dried fish and biscuit they took up much room but weighed very little. On the lower deck all the provisions for the crew were stowed away, except towards the stern, where ten tons of petroleum in four large tanks were placed. Next the main hatch of the lower deck, on one side, the provisions which were to be loaded on the sledges were stored, and the clothing in a press on the other side, so that both could easily be removed in case the vessel had to be suddenly abandoned. In the hold next the stern, which opened into our saloon, and since it was near the engines was also the warmest, was placed the wine, which would thus keep better. Whatever might be required to be always within reach was put below the wheel at the stern, and the ammunition, separated from the rest of the cargo, was in the centre of the lower deck in a small magazine. The balloons, which were packed in crates to allow the air to circulate, were placed on deck, along with the apparatus for producing hydrogen gas, and a small boiler. Thirty-six iron tanks, containing about twelve tons of sulphuric acid, were placed in the centre of the deck in an enclosure lined with lead, and provided with a gutter, so as to prevent the acid from burning the boards of the deck in case of leakage. Six tons of iron filings completed our aeronautic outfit. Although we had ascertained the cubic capacity of the holds and knew the volume of the cargo which was forwarded to us, we mistrusted the exactitude of our calculations when we saw the enormous quantity of cases which had to be stowed away within the sides of the *Polar Star*. Thanks, however, to our scrupulous care, we succeeded in getting everything on board.

The morning of June 12th had been fixed for our departure. Visits from august personages, hospitable invitations, and some unpleasant incidents had filled up our time during the last days of our

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stay. On June 8th we went to Lijsaker to pass the evening with Professor and Madame Nansen. It was late at night, but the sky was bright when we took leave of our kindly hosts after passing a pleasant evening, enlivened by dancing, and we could not help thinking with sadness of the unknown regions whither we were tending, where dancing would have to be forgotten.

**Our Stay at
Christiania and
our Departure
thence.**



ALEXANDER IVANOV TRONTHEIM

T.R.H. the Prince and Princess of Naples arrived on June 9th, and we were much pleased by their visit, and kindly wishes for our success. On account of a dispute which occurred with regard to the life assurance of a part of the crew, I took upon myself to assure the Norwegians, as had already been done for the Italians. The officers had been assured by an Italian company,

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and, at their formal request, only in case of some accident which might oblige them to leave the service.

On the evening of June 11th we had taken leave of those persons who had most specially helped us. First of all was Professor Nansen, who, since the winter, had placed himself entirely at my disposal for all the information I might require, helping me with his advice, and busying himself about many matters, which thus allowed me to complete in a short time the organisation of the expedition; and I shall never forget the hours I passed at Lijsaker seeking instruction, during which he not only answered my questions, but anticipated them, taking the same cordial interest in the expedition as if he himself were to lead it. I shall always preserve a grateful remembrance, not only of his advice with regard to the Arctic regions, but also of his great courtesy. I also heartily thank Professors Mohn, Collett, Brogger, and Geelmyden, and Consul Hallager for the help they gave me. I also express my gratitude to all Norway—to its Government, to its learned societies, and to its people, for the assistance they gave to my expedition, for the courtesy I received from them, and for the kindly wishes which they offered on my departure.

We were ready to weigh anchor on the morning of June 12th. H.M. the King of Sweden and Norway had telegraphed to us his good wishes for the success of the expedition. The ships were decked with flags, and many friends came on board. The ladies brought bouquets of flowers—a pleasant remembrance for us, who were going to a flowerless land. Professor Nansen had kindly given me two of his dogs which were born on the *Fram*. We left Christiania at eleven o'clock, whilst the crews of the men-of-war cheered us, and the fort saluted us with its guns.

We arrived at Larvik that night. The captain and the Norwegian sailors went on shore to visit their families; we stayed on

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board with the guides and sailors to superintend the embarkation of the remaining supplies. I breathed freely at the thought that until Archangel was reached there would be nothing more to take on board, but that we would merely have to put in order what we had. The following day we resumed our course towards the White Sea. On the morning of June 28th Cape Sviatossnoss was seen in the distance, and at the same time the first signs of ice appeared, indicated by the whitish colour of the sky. Strange forms appeared on the horizon, caused by

On the Way
to Archangel.



SIBERIAN DOGS

refraction, which, as we advanced, changed into small blocks of ice. It was the ice of the White Sea, only then beginning to leave the vast inner basin, having been previously held back by the north-east wind. It was thin, weak ice, broken up into small floes. A steamer which had overtaken and had passed us had been forced to draw nearer to the land in order to be able to continue its course. We followed the same route, but the *Polar Star*, which easily broke up the small floes with its stem, advanced without stopping, and overtook the steamer in its turn. Our propeller was placed very low, and the planks of the bow were strong, so that we ran no danger from the shock or from the sharp points of the ice ; we

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were thus able to advance at our usual speed, whilst the steamer had been obliged to slow down. In the previous year, at the same season, I had found the White Sea entirely free from ice; these masses of ice confirmed the report that the spring had been rather cold, and that the summer was late, and therefore unfavourable to the continuation of our journey. We passed through that tract of drifting ice, and entered the Dvina during the night; on the morning of June 30th we arrived at Archangel, and cast anchor at Solombol.

Having paid the usual formal visits to the Governor, His Excellency General Engelhardt, and to the Vice-Governor, Prince Gortschakoff, who, on the arrival of the *Polar Star*,
The Sledge
Dogs. had kindly come on board, I went with the courteous English Vice-Consul, Mr. Cooke, to see the dogs. On entering into the enclosure where they were chained, they jumped up and turned towards us, barking furiously. Their aspect was not very reassuring; but as soon as I had fondled one or two of them, I perceived that they were not so ferocious as they had seemed at first. They feared man, probably remembering the many blows they had received since their puppyhood, and if they were kept tied up, it was simply in order that they should not tear each other to pieces. When a few blows had been given to the most turbulent, the uproar soon came to an end; they lay down, and I was enabled to examine them more attentively. There were 121—one more than the number at first agreed upon; some of them were white, others black and white, black, brown, and iron-grey; some were lithe, others thick and heavy; their hair was thick and short, or long and curly; their noses were pointed or blunt. They all had deep chests, strong legs, straight and pointed ears; their tails were long and bushy or fringed, like their hair, and were carried more or less curled up.

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Some resembled large foxes, others were like wolves; the former barked, the latter howled. The tallest were twenty-three inches in height. They were then nearly all losing their hair from the heat, and either from want of sufficient food or on account of the gnats, or because they were tired after their journey, seemed thin and weakly.

On seeing the condition of these animals, on which I had reckoned so much, I felt very uneasy lest they might not be fit to cover the distance over which we intended to travel. It was useless for Tront-



KENNELS ON BOARD

heim to assure me that the dogs should not be judged according to their appearance just then. He did not succeed in convincing me, and the long marches made by Peary and Wrangell seemed a dream which might have been realised by means of other dogs, but never with the help of those we had.

This pack had been brought there by Alexander Ivanov Trontheim, a Russian by birth, but of Norwegian origin. With two other men he had started from Tobolsk, in Eastern Siberia, towards the end of May, and had reached Tumen by means of the Rivers Tobol

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and Toura ; he had then made the journey from Tumen to Koltass by rail, and come down the Dvina to Archangel ; in all, a journey of 1,100 miles. He had arrived at Archangel in the early part of June.

The Siberian tribes dwelling along the shores of the Arctic Ocean—the Ostiaks, the Yakuts, and the Tchuktches—make great use of dogs as well as reindeer for drawing their sledges. Baron Wrangell, who passed three years in Eastern Siberia, and employed the dogs of that country in his expeditions, writes concerning them thus :—

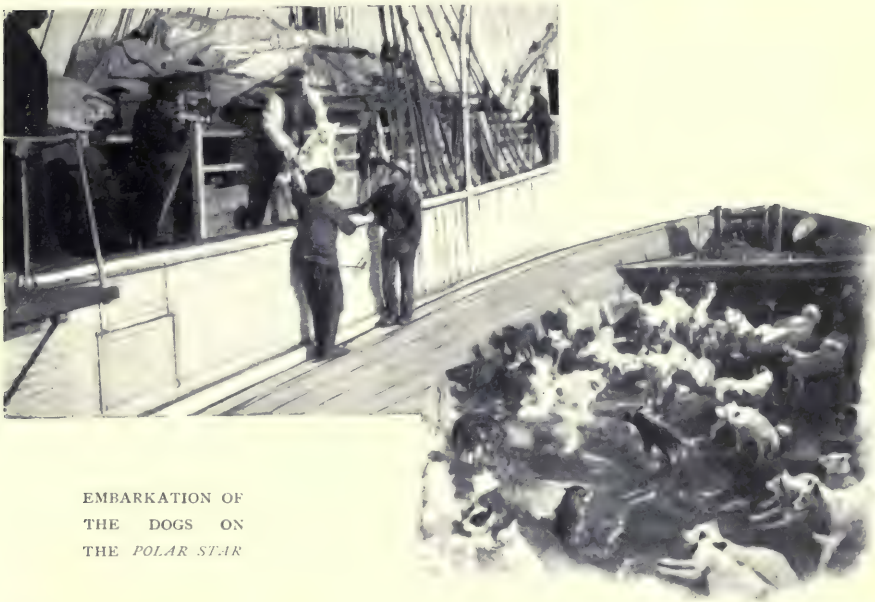
“Of all the animals living in the northern regions, none is so worthy of being noticed as the dog. It is the companion of man in all climes, from the South Sea Islands, where he feeds on bananas, to the Polar Ocean, where he eats fish ; and here he toils in a way to which he is unaccustomed in more favoured regions. Necessity has taught the inhabitants of the north to employ for draught these animals, which are comparatively weak. On all the coasts of the Polar Sea—from the River Obi to Behring Straits, in Greenland, Kamtschatka, and the Kurile Islands—dogs are employed to drag sledges laden with goods and persons for great distances.

“These dogs have much resemblance to the wolf. They have long, sharp, and projecting noses, sharp and upright ears, and a long bushy tail ; some have smooth and some have curly hair. They are of various colours—black, brown, reddish brown, white, and spotted. Their height varies. A good sledge-dog should not be less than 2 ft. 7 in. high, and 3 ft. 8 $\frac{3}{4}$ in. in length.

“Their bark resembles the howl of a wolf. They pass their life in the open air. In summer they burrow in the earth to keep themselves cool, or lie in the water to avoid the gnats ; in winter they bury themselves in the snow, and lie rolled up with their nose

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covered with their bushy tail. The females are killed as soon as born, except enough to preserve the race, and the males alone are employed for sledging. Those born in winter begin to draw in the following autumn, but they are not used in long journeys until their third year. Their feeding and training is a special art, and much skill is required to harness and drive them. The best-trained dog is made leader, and as the speed and the safety with which a sledge travels with its usual



EMBARKATION OF
THE DOGS ON
THE *POLAR STAR*

team of twelve dogs depend on the sagacity and docility of the leading dog, no pains are spared in so training it that it shall always obey its master's voice, and not turn aside from its path when it comes on the scent of game. This last quality is the most difficult to obtain. It sometimes happens that the entire team on meeting with a trail follows it, and no efforts on the part of the driver can check it. In these cases we have often had to admire the skill with which the leading dog has been trained to prevent the others from following the scent.

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If other methods fail, it would suddenly turn round and try to induce its comrades to follow it by barking as if it scented a fresh trail. In crossing the lonely *tundra* in the darkness of night, when the vast plain is veiled by an impenetrable fog, or snowstorms are raging, and the traveller is in danger of not finding a shelter and of perishing in the snow, he often owes his safety to a good leading dog. If the animal has ever been once in that plain, and has stopped there at a cabin with his master, he will safely guide the sledge to the spot where it lies deeply buried in the snow, and when arrived at it, will stop to point out the place where his master must dig to find it.

“These dogs are not employed merely in winter, for in summer they tow the boats up the rivers, and it is curious to witness how they obey their master’s voice, and cross from one bank to another. At his call they plunge into the water with the tow-line, swim to the opposite shore, and on reaching it they re-form in good order and wait for the command to go on. Sometimes even those who have no horses employ the dogs on their hunting expeditions to drag their light boats from one lake or river to another. In a word, for the inhabitants of this country, the dog is as useful and indispensable a domestic animal as the reindeer to the wandering tribes.”¹

A small number of our dogs resembled those of Eastern Siberia as described by Wrangell. They were, however, smaller in height; the others were Samoyed dogs or crossings of different breeds. In the district of the Lower Obi, whence Trontheim had brought them, which is situated between Eastern Siberia and the country of the

¹ Wrangell’s *Siberia and the Polar Sea*, edited by Major Edward Sabine, pp. 72-74. (London, 1840.)

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Samoyeds, dogs are to be found from both parts of Siberia, as well as those bred from crossings of eastern and western races. Although all the dogs brought by Trontheim had been trained to draw the sledge, the great superiority in endurance and strength of those which most resembled the type described by Wrangell was shown later on.

The deck was so encumbered that it was not very easy to



THE LAST FAREWELL

accommodate so many animals. Two rows of cages, one above the other, were built against the bulwarks of the ship, on both sides. The first row rested on the deck, the other was one yard above it, and these cages were separated by wooden partitions. Four dogs were placed in each, and chained to the corners, so that though they could stand up to eat and drink, they could not bite

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each other. As the cages and their floors were covered with gratings and tarpaulin, they could be frequently washed while the dogs were kept dry. This was an excellent arrangement, and thanks to it these animals lived for a month on board without suffering much discomfort, while, as they were left undisturbed and always kept clean, they gave very little trouble, to our great satisfaction.

We were awakened on the morning of July 3rd by a pleasing announcement. Count Oldofredi, Count Rignon, Cavaliere Silvestri, and Colonel Nasalli had just arrived from Moscow. The *Polar Star* leaves Europe. With the greetings of their Majesties, Count Oldofredi also brought many presents from the Queen and from the Duchesses Letitia and Helena of Aosta, who, following the practice observed in other expeditions, had thought before our departure of packing up in boxes various objects to be distributed on certain anniversaries among the officers and crew. This pleasant visit was followed the next day by that of the Ambassador, His Excellency Count Morra di Lavriano, who also brought me the kindly wishes of the staff of the Embassy at St. Petersburg imprinted on the cylinder of a graphophone. General Morra went away the same evening, leaving with all of us, but especially with me, a grateful recollection of his visit.

On July 9th the ship was decked with flags to salute the Grand Duke Vladimir, who was passing by on his return from Katharinenhafen. He came on board to visit the ship and to wish the expedition good luck, but though the *Polar Star* was ready to go to the Arctic regions, it was not as yet in a fitting state to receive a visit from a Prince. The deck and the inner rooms were encumbered with cargo, and we had only ceased coaling on the previous evening, on account of the draught of the vessel, which had already attained the maximum depth the navigation of the Dvina allowed of.

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Our departure had been fixed for July 12th. On the eve of that day those among us who were Catholics had assisted at mass in a chapel, which had been courteously opened at our request, when more than one of us turned his thoughts towards Heaven to implore it to give success to our enterprise, and to watch over those who were dear to us. In the afternoon the dogs were brought alongside on a pontoon, and put into their kennels one after the other. Towards the evening the *Polar Star*, with the Italian and Norwegian flags at its mast-head, left her moorings, and descended the Dvina, towed by two tugs. Dr. Cavalli and I remained on shore to pass a last evening with our friends from Italy.

On the following morning we left Archangel. The timber rafts between which we passed, lowered their flags to greet us as we went rapidly on our way towards the bar of Berezof. We then finished coaling, and our visitors took their leave at five o'clock. What a friendly inspiration had been theirs, to come to greet us in that remote country, and to bring us at the last port of civilisation the farewell of our distant home! Their society had enabled us to pass those days more quickly, and the thought of the long months which must elapse before we could again communicate with the rest of the world rendered us all sad at that moment. They went down into the tug, and we gave them a last cheer from the deck. The *Polar Star*, driven by her propeller, then began to glide over the tranquil waters of the estuary, and whilst standing out to sea we were saluted by a Russian cruiser which signalled to us: "We wish you a happy voyage."

CHAPTER III

In Barentz Sea and Queen Victoria Sea

CHAPTER III

IN BARENTZ SEA AND QUEEN VICTORIA SEA

THE Emperor Franz Josef Archipelago was accidentally discovered in 1873, by the Austrian expedition under the command of Weyprecht and Payer. The newly found land which had been sighted that autumn by the explorers was visited in the following spring by Payer, who went as far as Cape Fligely with sledges. He believed that the group consisted of lands of considerable extent, some of which, such as King Oscar Land and Petermann Land, he discerned to the north and to the west of Prince Rudolph Land. As it was impossible to extricate the *Tegethoff* from the ice, it was abandoned towards the end of the second year, and the explorers reached Novaya Zemlya in their boats.

A Sketch of the History of the Expeditions dispatched to Emperor Franz Josef Archipelago.

In 1880 and 1881 Mr. Leigh Smith, in his yacht *Eira*, reached the southern coast of Emperor Franz Josef Archipelago without much difficulty, and as he found a certain extent of free water to the south, he surveyed the coast up to Cape Loffley. He thus increased our knowledge of that group of islands, and proved that they could be reached by ships, but whilst the *Eira* was on the point of leaving that land for the second time, it was crushed by the ice near Cape Flora, and rapidly sank. The shipwrecked sailors passed that winter, with only a small quantity of provisions, in a wretched hovel built of stone and with the wreckage

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which they had been able to save from the ship, and in the following summer sailed in their boats to Novaya Zemlya, where they were taken on board a ship which had been sent to their assistance.

The discoveries of Leigh Smith had thrown no light on the northern and western part of the group of islands forming Emperor Franz Josef Archipelago, and, in consequence, it was still believed



PUZZLED!

that vast tracts of land extended to the north of the Arctic Sea. The English explorer, Jackson, thought, therefore, to take advantage of these lands by establishing depôts of provisions there, and thus facilitate an advance in sledges towards the Pole. Having arrived with his ship, the *Windward*, into an open sea near Cape Grant, towards the middle of September, 1894—which was rather late in the season—he was forced to build a station at Cape Flora, on Northbrook Island, and winter there. The *Windward* returned to Europe in

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the following summer; two years later it again touched at Cape Flora, in order to communicate with the explorers, and again in 1897, to bring them back to Europe. Jackson and his companions made three expeditions with sledges. In the first two he travelled towards the north, and, passing through the British Channel, reached $81^{\circ} 20'$ N. lat. In the third he went towards the west, making



THE POLAR STAR MEETS THE FIRST ICE (LOOKING FORWARD)

the circuit of Alexandra Land, and ascertained the most westerly point of that group, to which he gave the name of Cape Mary Harmsworth. Jackson, in his first two journeys, was prevented from advancing towards the north by stretches of open sea. He succeeded, however, in making a hydrographical survey of the coasts of the north-west portion of the group, and cast doubts on the existence of any great continents whilst confirming, on the con-

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trary, that of a great expanse of sea, called by him, in honour of his Sovereign, Queen Victoria Sea.

When, finally, Nansen came to the south of White Land (Hvidten Land), he added to our knowledge of the part already explored by Jackson—that of the portion of the archipelago extending up to the islands which he discovered. He corrected the data of Payer, and also questioned the existence of Petermann Land and King Oscar Land.

The voyages of the *Eira* and *Windward*, as well as those of the whalers *Baleina* and *Diana*, had proved that it was always easy to cross Barentz Sea as far as Emperor Franz Josef Archipelago, whether by advancing from Novaya Zemlya in an expanse of sea comprised between the 45th and 55th degrees of east longitude, or by following the south-east coast of Spitzbergen, and sailing thence directly to Alexandra Land. No ship had ever sailed in Queen Victoria Sea, nor was it known how to get there; but since, in accordance with the observations of Payer, Jackson, and Nansen made in different years during the spring, we supposed that that sea was navigable as far as Cape Fligely, we might hope to reach it either by advancing into the British Channel or by coasting towards the west along Emperor Franz Josef Archipelago.

It was a splendid evening when we lost sight of the Dvina, and the ship, although heavily laden, steamed swiftly into the White Sea, then free from ice. The next day at mid-day, Cape Kanin was indistinctly seen through the mist; and this was our last sight of Europe.

In conformity with the practice of those who had preceded me, I had resolved to advance as far as a point situated in the 72nd degree of latitude and the 48th of east longitude,

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whence I intended to steer directly to Cape Flora. On leaving Cape Kanin a light north-westerly wind had sprung up, which soon freshened, and rendered the sea rather choppy. The ship began to roll, and this our guides and dogs found rather unpleasant. The former disappeared into their bunks, whilst the latter by their howling showed their annoyance at the

The First Ice of
the Arctic Sea.



THE POLAR STAR MEETS THE FIRST ICE (LOOKING AFT)

occasional splashings which they received. Luckily, the wind soon dropped, and the sea became calm, thus allowing both men and beasts to rest in peace.

During the afternoon of July 17th we met ice for the first time, in the form of long strips, noteworthy merely as the fore-runners of larger masses. Larger masses were encountered in the night and towards eight o'clock on the following morning,

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during a thick fog, we were stopped by the ice-pack¹ in about 75° 14' N. lat.

I began to walk impatiently up and down the deck, fixing my eyes on the impenetrable curtain which hindered us from seeing thirty yards before us. All around us reigned a profound stillness the air being only disturbed by the flight of some stormy petrels, or by the sound of pieces of ice falling into the channels opening between one ice-field and another. I felt uneasy at this loss of time, reflecting that it would be difficult for us to reach Emperor Franz Josef Archipelago if we began to meet with hindrances while still 300 miles away. It would be an unfortunate beginning for the expedition if we were unable to reach that archipelago, and obliged to winter in Barentz Sea.

A slight breath of wind arose towards three in the afternoon, and all at once the fog disappeared. To the north-east and to the north-west one vast ice-field was to be seen from the deck, whilst to the south, from whence we came, the sea stretched away out of sight. The sun was sparkling on the points of the hummocks,² and reflected by the pools of fresh water which the thaw was forming on the ice-fields. When looking from the quarter-deck, it seemed as if it would be impossible to go farther, but on going up the rigging, or to the tops, or into the crow's-nest at the mast-head,³

¹ The ice-pack is a mass of drifting ice, formed by separate ice-floes, of which the limits cannot be seen. It is called "open" when the pieces of ice do not touch; "closed" when they are pressed one against the other.

² Heaps of ice of various heights caused by the pressure of the ice-fields.

³ The whalers' look-out. It is an open barrel as high as a man. The bottom is movable, to allow entrance; it is usually placed at the top of the main-mast or fore-mast, at a height of from fifteen to twenty yards above the sea-level. It is indispensable for ships sailing through ice, as from thence can be seen channels invisible from the deck.

In Barentz Sea and Queen Victoria Sea 59

it could be seen, according as one went higher, that what appeared to be a boundless field of unbroken ice was a number of small floes, from 300 to 500 yards broad, separated by channels through which the ship could proceed. The captain went up into the crow's-nest, and with a powerful telescope tried to discover the best route to follow. We made reckonings to ascertain our position (on account of the fog, we had not been able to take



CAPE FLORA AND CAPE GERTRUDE, ON NORTHBROOK ISLAND: SEEN FROM THE SOUTH

observations for the last two or three days), and found that we had deviated from our course by three degrees towards the east, and were then in the 51st meridian.

Masses of ice soon began to strike against the hull and scrape along it. They were not, however, very thick or very solid, and the bow easily cut its way through. From the look-out in the crow's-nest the captain signalled to the engine-room to stop or go full speed ahead, and to the steersman to shift the helm to one side or the other.

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The ship passed on from one mirror-like expanse of water to another, and advanced at a good speed towards the north, a region which the very dark tint of the sky above it indicated was more free from ice.¹ Towards midnight, when the mate took the captain's place, we were sailing among ice-floes, and at six o'clock next morning, in $76^{\circ} 20' N.$ lat., the open sea lay stretched before us. The strong north-east winds which had prevailed during spring had probably driven the ice away from Emperor Franz Josef Archipelago, and, indeed, we saw no more of it, but continued our course in open water until, during the night of July 20th, we sighted the misty outline of Northbrook Island.

Emperor Franz Josef Archipelago lay before us, and we had reached it without much difficulty. As the vessel drew near, by a clear bright night, lit up by the sun low down on the horizon, we saw Northbrook Island rise slowly out of the sea—a mass of white with a few dark headlands projecting out of the ice-cap which covered it. Then Cape Flora and Cape Gertrude, with their great masses of rock, rose slowly on the horizon, whilst in the west we began to make out Bell Island and Mabel Island, which resembled Northbrook Island. Drawing still nearer, we could distinguish on a level tract of ground the huts left by Jackson's expedition and hear the cries of the sea-birds flying above the rocks. As we came up, some walruses which were lying on the ice plunged into the water and followed our ship. When we were close to the shore, the part of the island covered by ice was hidden from us by a high, pointed mountain. The verdant plain on which stood Jackson's huts, the open sea stretching away out of sight towards

¹ Even when water cannot be seen, its presence in the midst of the pack can be easily divined from the colour of the overhanging sky, which is dark at that spot, whilst the rest is lit up by the reflection of the ice.

In Barentz Sea and Queen Victoria Sea 61

the south, the thousands of birds hovering over the rocks, and the brightness and warmth of the day, made the place seem less Arctic, and Cape Flora made a favourable impression upon us.

Our first thought was to go on shore, to visit the huts in which those other explorers had passed nearly three years cut off from civilisation, with no other object than to increase our geographical and scientific knowledge. We had also to seek for news of Wellman's



THE HUTS LEFT BY JACKSON'S EXPEDITION

expedition, which had landed the year before at Cape Tegethoff, in Emperor Franz Josef Archipelago, and was to be brought back to Europe during the present summer by the whaler *Capella*, which was to leave Norway shortly after the *Polar Star*. A stranded iceberg projected to about a hundred yards from the beach,¹ and we cast anchor near it, with the ship's bow 150 yards from the shore.

¹ An iceberg is a mass of ice of considerable size, which becomes detached from the glaciers covering the Arctic lands, and drifts according to the currents and the winds. An *iceberg*, therefore, cannot be formed by the piling up of ice-floes. These form what are called *floebergs*.

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The bottom was of sand and rock. A narrow strip of ice fixed to this, which the wind had not been able to detach, nor the heat of the weather to melt, ran along the beach, which at a short distance from the sea rose to the height of seven or eight yards, and formed the edge of the level ground on which the huts of Jackson's expedition had been built. These huts were five in number—three were made of logs, as is the custom in the north of Norway and in Siberia, whilst the other two were cottages of irregular shape, with double walls built of thin boards. The house where the expedition had lived was built against a great rock, which protected it from the north-west wind, and seemed to have been only recently abandoned by the explorers. The provisions remaining in the two circular huts, which had served as store-houses, were for the most part unfit for use.

Half a mile away, and near the sea, the remains of the dwelling where the crew of the *Eira* had sought shelter were still to be seen. A few men had passed the winter there, uncertain of the future, but thanks to the energy and the capacity of their leaders, they maintained their courage, and safely returned to their country. What lessons might be gathered from these few remains of a dilapidated hut!

We thought that we were the first to arrive that year in that locality and were, therefore, much surprised to find the captain of the *Capella* had already been here, and left a note for us. That vessel had arrived on July 15th, and perceiving no traces of Wellman's expedition, had started again to look for them at Cape Tegethoff. The *Capella* had steered more to the east than we had, and had always sailed in an open sea.

Our observations were facilitated by a calm and bright day. Whilst we were taking them, the crew was busied in landing provisions for eight months and five tons of coal; in case any misfortune

In Barentz Sea and Queen Victoria Sea 63

happened to the ship, which would oblige us to retreat, these stores would enable us to subsist until the following summer. Owing to the never-ending twilight, it was a pleasure to remain on deck and observe the varied effects of light which followed each other swiftly across the heavens and the ease with which we had made so speedy a voyage augmented our hopes of being able to make the *Polar Star* pass the winter in a high latitude.

On July 22nd, with Captain Evensen, I ascended to the top of



IN NIGHTINGALE SOUND—BELL, MABEL, AND BRUCE ISLANDS

the cape in the direction of Miers Sound, to find out if from that point it might be possible to perceive British Channel. We were enveloped in fog while on the summit, but when it lifted, Miers Sound was seen to be completely closed by ice, near Windward Island. Bates Sound, on the contrary, was free, and from the tint of the sky it might be conjectured that Nightingale Sound was also free from ice almost as far as the northern end of Bruce Island. The port where the *Eira* had been sunk, when seen from on high, appeared to be a good anchorage, although open to the

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ice descending from Nightingale Sound. The sea was open towards the south. When Nansen had come to Cape Flora towards the end of May, and when in the preceding year the whaler *Fridtjof* had brought Wellman's expedition to Cape Tegethoff, British Channel was found closed by the ice in the direction of De Bruyne Sound; when we arrived at Cape Flora much ice was seen in that direction from the crow's-nest. I was, therefore, convinced that De Bruyne Sound was probably closed, and as I had seen that Nightingale Sound was open as far as the north of Bruce Island, decided on advancing to the north of British Channel by that route. Later on I bitterly regretted my decision; in the Arctic regions, more than elsewhere, one should never be tired of keeping a look-out, for an expedition while advancing can be only guided by the eyes.

On returning to the ship we found Captain Cagni taking pendulum observations. He had shut himself up in one of Jackson's huts, and lay stretched on the earth watching the swing of the pendulum—a position which was anything but pleasant, considering the temperature, and the sheet of ice which covered the ground. During the night a wind set in from the south. The ice began to drift against the coast, and rendered our position so unsafe that in the morning we were obliged to raise anchor and seek shelter in Miers Sound. An iceberg of moderate size, but large enough to make our launches run some danger, was for some time a very inconvenient neighbour. The weather was bad on the 23rd, and no work could be carried on. The wind dropped during the night; but on the following morning it began to blow with still greater force, from the south-west and from the north-west alternately in strong gusts, on account of which it was thought prudent to keep the fires lighted and the engines ready. Captain Cagni, who had gone on shore that morning to bring back the instruments, had much difficulty in coming on board. In the



Capes. Fodes. Stephens and Grand. Alexander Land.



In Barentz Sea and Queen Victoria Sea 65

afternoon the wind appeared to abate. Four launches were drawn up on the shore, and we could have left Cape Flora had not a thick fog hindered us from continuing our voyage.

On July 26th, though the fog still continued, I resolved, nevertheless, to raise anchor, and to enter Nightingale Sound. We



A WALRUS HOISTED ON BOARD

went on, with our eyes fixed on the bow of the vessel, whilst soundings were taken every half-hour to ascertain the nature of the bottom. We passed close to a few icebergs, which were not very large, and were flat on the top. A light breeze cleared away the fog, and allowed the sun to

We try to pass through British Channel from Nightingale Sound.

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with ice, and ending in the sea by an ice-cliff, whilst to the east the rocky coast to the south of Bell and Mabel Islands stood out sharply against the sky in dark tints. Ahead of us the channel appeared to be free from ice, and we continued to advance at full speed, stopping only every half-hour to take soundings. On the low headland of Bell Island could be seen the wooden hut left by Leigh Smith; and near Bruce Island strips of rotten ice made us slow down. On the approach of the ship numerous seals disappeared into their rocky retreats, while groups of walrus remained motionless. We succeeded in bringing the vessel near to a group of three, which were fast asleep. Several shots awoke them, when they glided instantly into the sea, and the mass of ice on which they had lain, freed from their weight, rocked up and down in every direction. One had been mortally wounded, and our men jumped on the ice with harpoons to prevent it from sinking. We skinned the enormous animal when it was hoisted on deck with some difficulty, and brought its skin back to Italy. It was the only walrus that we killed.

We continued to advance through Nightingale Sound, gradually slackening our speed through the ice-fields, which we found more closely packed as we made our way towards the north. The *Polar Star* was at last completely imprisoned, and unable to stir; but it was only for a few hours, as a little later, during the night, and near the northern extremity of Bruce Island, we were once more in a large expanse of smooth water. Although the fog had again become thick, and it was not prudent to advance, I was still determined to go on, and we proceeded thus for more than half an hour, having always open water ahead. The unexpected opening out of the ice which had taken place during the night led me to believe that I had passed British Channel while in the fog, without even seeing its shores, when a

In Barentz Sea and Queen Victoria Sea 67

violent shock caused all my illusions to vanish. The captain came down on deck and said quietly, "We have got to the end of the navigable region." "What a strange land," I exclaimed, "where we ceaselessly pass from hopes to delusions, and from delusions to hopes!" It was only the beginning of my trials; patience and perseverance were the virtues most frequently required through this voyage.

The next day was calm and clear. To the west could be made out the great glacier which covers Alexandra Land, and all Clement Markham Bay; to the south, Bruce Island; in the distance,



BATES SOUND—CAPE FLORA IN THE DISTANCE

Northbrook Island, which, seen from the north, presented the Arctic appearance of all the other islands in this locality, and Hooker Island was seen indistinctly to the east. British Channel, in a westerly direction, showed a level stretch of ice which, judging by the absence of hummocks, did not seem to have been subjected to any pressure. It was impossible to advance, and it therefore became necessary to attempt to reach Queen Victoria Sea by doubling Cape Mary Harmsworth, a route which ever since our departure I had always considered as presenting the greatest likelihood of success.

As the state of Barentz Sea was so favourable, since the pack

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had drifted 240 miles from Emperor Franz Josef Archipelago, it was probable that the navigation of that sea would not be found too difficult, and it was there that in 1897 the *Windward* had made its way beyond Cape Mary Harmsworth.

We return to Nightingale Sound after having failed to advance towards Cape Mary Harmsworth. We again made Nightingale Sound. The glaciers were sparkling to right and left of us; the walruses, startled by the shots and the presence of the ship, had disappeared. We passed near Cape Forbes, and from thence followed the coast in the direction of Cape Grant. To the south of Alexandra Land could be seen a white reflection of the sky; might it not be the indication of an ice-field? On arriving at Cape Grant we were obliged to acknowledge that, on the contrary, it was the ice-pack, which stretched away from the coast, out of sight, towards the south and west. After going a short distance farther, the fog obliged us to stop. The extensive ice-fields which surrounded us were of old ice, a mile and more broad, and more than two yards thick, and we were therefore obliged to steer carefully in order to avoid collisions which might injure the ship. We gained a few miles more on July 28th, until we arrived in the neighbourhood of Cape Crowther, but without any hope of being able to go farther.

If the state of the ice were the same as that which had been met with by Jackson, it stood to reason that since we had arrived near Cape Mary Harmsworth, we should have waited for a favourable opportunity of continuing our journey into Queen Victoria Sea. But since we had been stopped near Cambridge Bay, and as we should have to travel in that direction, in a year unfavourable to navigation judging by the obstacles we had already encountered, it was not advisable to wait, and then to persist in advancing by that route. Moreover, by following that coast-line, we went farther and farther

In Barentz Sea and Queen Victoria Sea 69

from the more northern of the Emperor Franz Josef Islands, and in case we found it impossible to reach Queen Victoria Sea, the sledge expedition would be forced to traverse a much greater distance in order to be able to make use of the stores left on the islands. By going back into British Channel we would, on the contrary, remain almost on the same meridian as the lands lying to the north; and even supposing that we were not able to reach them, we might feel less uneasy in leaving the ship in the channel and carrying out the expedition with sledges. Though I had come at first with the intention of attempting to reach Queen Victoria Sea at any cost, after all other attempts had failed by circumnavigating Alexandra Land in a westerly direction, I was constrained to change my plans when I found myself checked so soon, and to turn towards British Channel, either to pass through it or to winter there.

All these thoughts were passing through my mind whilst I looked from the crow's-nest over the immense ice-fields which lay stretched around us, and through which we were making our way towards Cape Grant. All their details were distinctly visible from aloft, and the eye could follow the ridges formed by the pressure of the ice and the channels which intersected them in every direction. The captain suggested to me to explore De Bruyne Sound, but I preferred, on the contrary, to return to Nightingale Sound, in order not to lose more time. My impatience made me commit another error of judgment, and persevere in that already made when I was on the summit of Cape Flora. On the evening of the same day (July 28th) we were again moored to the ice situated to the north of Bruce Island, but more to the east and to the south of the point which we had reached on the previous day.

CHAPTER IV
In Barentz Sea and Queen Victoria Sea
(continued)

CHAPTER IV

IN BARENTZ SEA AND QUEEN VICTORIA SEA—(continued).

WE were in the midst of very extensive ice-fields; the ice, which was about thirty inches thick, could be easily crossed by sledges, but was a serious barrier to the further progress of the ship. Unlike, however, the ice which two days previously we had seen more to the north, near Cape Peterhead, these fields were crossed by pressure-ridges and intersected by lanes, which led us to suppose that navigation might be possible.

Near Bruce
Island. Order
of the Day on
Board.



IN OPEN WATER

For three days (July 29th, 30th, and 31st) we remained near the northern extremity of Bruce Island, in perfectly smooth water, entirely surrounded by ice-fields, and almost always enshrouded in fog, which was often very thick. We took advantage of this enforced rest to give the dogs some exercise. We feared that we might have

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had to assist at a furious combat, but they were so surprised to find themselves at liberty that they took no notice of each other.

Our days were passed in the following manner; We rose between six and seven, and met at eight o'clock for our first breakfast, consisting of cooked ham or compressed meat, oatmeal, butter, and coffee or chocolate on alternate days. The morning was always spent in preparing the dried fish for the dogs' food (by cutting it up and steeping it in water), and in cleaning out the cages where they lived, which was rendered easy by the tarpaulin which lined the bottom.

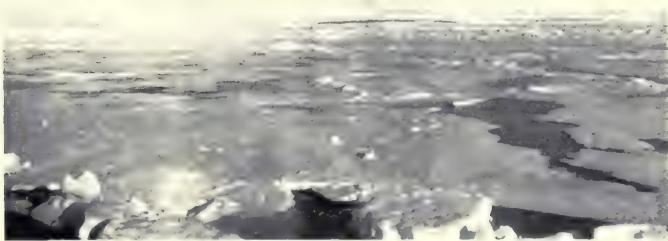
At mid-day we met again for dinner, which consisted of soup, two dishes of meat, and dried fruit. From two to five, whatever work had to be done on board was performed, for which, after deducting the officers, the engineers, the firemen, and the cook, there remained only seven persons available, and there was always plenty to do in mending the partitions of the kennels, at which the dogs were continually gnawing. The dogs were given 1 lb. 1 oz. 10 dr. of fish before our supper, which took place at half-past six, and consisted of soup, a dish of meat, and preserved fruits. We drank tea at our morning repast, and in the evening each of us had a glass of wine. The end of the day was spent in walking up and down on the deck or on the ice, and in listening to the gramophone or the piano. On account of the prolongation of daylight, it was sometimes late at night when we withdrew to our cabins. On Sunday, prayers were said together, and Captain Cagni used to give a short address.

The temperature was not Arctic. The thermometer was always above freezing point, and calm weather was the rule, but it also brought on fog, which hindered all navigation. We were still clothed as on our departure from Archangel, with the exception that we wore high sailors' boots, which kept our feet dry while walking among the pools on the ice.

In Barentz Sea and Queen Victoria Sea 75

August 1st.—The weather has at last become clear in the morning ; the wind blows at first from every point of the compass, and then a breeze sets in from the east. Since we have been in the channel, the easterly and westerly winds have brought clear weather, whilst a northerly or southerly wind carries fog with it. Ought that to be attributed to the open water to be found near Cape Flora and in Queen Victoria Sea? The fog clears away at last, and we can see the shores of the lake in which we are shut up.

First Pressure
of the Ice. We
despair of ever
passing British
Channel.



THE ICE TO THE NORTH OF BRUCE ISLAND

From the crow's-nest we can see other lakes towards the north-west on the other side of a narrow strip of ice, but it seems impossible to break through the two ice-fields which surround us. We can only try to continue our journey towards the north-west by forcing a way with the bow of our ship through the ice which closes to the north the open water in which we are lying. The pressure of the two ice-fields which have met at this point has made them overlap and form a pressure-ridge for a distance of about a hundred yards. By backing two or three ship's lengths, and then steaming forward at full speed, the

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Polar Star breaks the ice for ten or fifty yards at every shock, and then remains embedded in the fragments. The ship can usually be extricated by backing the engines, and when that does not succeed, our crew goes down on the ice and clears away the broken ice around the ship with long poles, thus allowing the engines to back. After frequently repeating this manœuvre the ship remains at last completely hemmed in, and can be no longer backed, which seems at first to be the consequence of the pressure of the masses of ice broken by each shock, until we remark a slight movement in the ice-field to our left. Much against our will, the ship unfortunately remains situated in the line of pressure, whilst a few hundred yards away, both in front and to the rear, she would be in complete safety. The ice-field to our left scrapes slowly along the sides of the ship, and, floating forward, destroys the result of all our work, by closing up again the passage before us. It then stops, remains motionless for a few hours, and moves on again towards five o'clock, while still pressing on us strongly. The ice bends, it is lifted straight on end, and runs along the sides of the ship, rising until it touches the taffrail; at the stern the rudder receives the full force of the concussion, and bends towards the left, creaking from top to bottom. The *Polar Star* heels over five or six degrees.

Our conversation, whilst we are at table, is drowned by the noise of the creaking of the rudder, and we listen attentively to every sound, though we do not like to seem to notice it. The rudder continues to groan under the pressure of the ice, and from time to time the vessel receives slight shocks; then all is silent. But after a few minutes the noise begins again. After supper the ice-fields begin once more to crack and to move. The pressure is stronger than before, and it is now perpendicular to the sides of the ship, which, being driven sideways, is carried about twenty yards to the left, and



*"The Polar Star" under the first ice pressure
in British Channel.*

In Barentz Sea and Queen Victoria Sea 77

breaks with her sides, instead of with her bow, the ice, which rocks, sinks, and disappears beneath her. The rudder, which previously had been driven to the left, is now carried to the right, and after this last effort the pressure luckily ceases.

August 2nd.—We are this morning moored to another ice-field, at about 300 yards from our previous position. During the night the ice opened ahead of us, and we cleared the barrier which had caused us so much fatigue yesterday, and no little excitement. It



THE *POLAR STAR* NIPPED BY THE ICE (SIDE VIEW)

often happens thus in these regions ; many hours of labour are vainly spent in attempting to force a passage through ice which does not move, or which closes up again, whilst later on it opens out in a moment, from some cause or another, and we can proceed without any effort. To what is due this opening and closing of the ice-fields ? To the tides, to the currents, or to the winds ? We take care to keep far away from the point where the pressure is felt. The sky is again clouded, and there is a light breeze.

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In the evening we take a walk towards an iceberg a few miles from the ship, but we cannot reach it; the ice is broken all around, and we hear it groan. The movement of this colossus of ice is not the same as that of the ice-fields which surround it; on the side towards which it advances the ice-floes are piled up, and on the other it leaves behind it a small space of open water. On the ice in the neighbourhood are seen the circular holes made by the seals coming to the surface to breathe, though we do not perceive any. The ice-fields are level; some are small, and others several square miles in extent. Where they meet, they form a line of piled-up blocks of ice of varying height, or a channel of varying width, according as at that moment the pressure is felt or not.

August 3rd.—The day is cloudy, and, the ice being compact, the dogs are let out. Shortly after, the sky becomes clear and we perceive that channels are being rapidly formed. As it takes some time to bring the dogs on board, I am doubtful whether I ought to advance or not; but seeing that the channels grow wider, I decide to go forward, and to leave the dogs on the ice, taking them up later on at the spot where we shall stop, which certainly cannot be far off. I leave them, therefore, and along with them Lieutenant Querini, two guides, and a sailor; the dogs follow us and go faster than we can, as we are forced to break our way through the ice with the prow of the ship. The points where there is any pressure are passed without much difficulty; there is a succession of stretches of open water, and as we think that the ice will soon stop our progress, we continue to advance towards the north-east. The fog returns and makes us lose sight of Lieutenant Querini and his companions, who have been stopped by some channel. In about half an hour, seeing that only a few obstacles impeded our progress, I begin to feel uneasy as to

In Barentz Sea and Queen Victoria Sea 79

getting our comrades on board and the dogs we had left behind. After remaining several days without moving, I can hardly believe that I am continuing my voyage in the right direction, but the anxiety I feel for my comrades and the dogs obliges me, although reluctantly, to stop the ship. Captain Cagni goes back in a launch through the channel through which we had passed, and after a few minutes he, too, disappears in the fog. Captain Evensen and I remain



THE POLAR STAR NIPPED BY THE ICE (SEEN FROM THE STERN)

on deck, waiting either till the launch returns or until the fog lifts and allows us to see those we have left behind. An hour passes while waiting, and the ice-fields close again. As we are impatient to go on, the whistle is sounded from time to time, in the hope of receiving some answer, but we hear nothing. I begin to fear that Captain Cagni had not been able to reach Lieutenant Querini with his boat, and I am on the point of steaming back as far as I can to look for them, when the fog lifts for a moment, and I see them all together about two miles away. It takes an hour

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to bring them up to the ship and get them on board, and when, at seven o'clock, we are again able to go forward, the favourable opportunity has passed, and we are obliged to stop where we are. The dogs have made me lose an advance of some miles, and henceforth I shall keep them on board until we arrive at our winter quarters.

We are enclosed as in a lake. To the north we can see another extensive ice-field several miles long, to the edge of which smaller fields are joined on. We must continue our advance along the larger field, and thus pass from one space of open water to another, breaking our way with the prow at those points where the smaller fields press upon the larger. At our present moorings we are sure of passing a quiet night. Shortly after going to bed the sound of persons running on deck makes me rush out of my cabin. A bear has come to greet us for the first time; it can be seen running away, followed by nearly all the crew. I see it disappear in the distance, and hear several shots, and then return to my cabin, weary and dissatisfied with my day's work.

August 4th.—On getting up I hear that the bear had been killed by Lieutenant Querini. Its flesh is given to the dogs to eat, for we have still too much fresh beef to care to feed on bear. Towards eight o'clock, as the horizon was tolerably clear, and the ice showed signs of opening out again, we made a further move. We can only see to a distance of three or four miles round the ship; the ice appears more broken towards the east, but towards the north and west it is quite compact. The captain has not much faith in Queen Victoria Sea: he is not satisfied with our position, and he does not look forward with pleasure to passing the winter in British Channel. I completely share his opinion on that subject. It would be a bad beginning to the expedition if we were to pass the winter

In Barentz Sea and Queen Victoria Sea 81

off a coast which has already been explored, and then travel in sledges through places which Jackson said were better suited for ships than for sledges. But what can be done? It seems impossible to pass through this channel in the present year. If we had at least a fine day to see to a distance all around us!

We remain motionless from half-past ten till two, waiting for the



THE DOGS ON THE ICE

movement of the ice. It is necessary to watch unceasingly, so as not to lose an opportunity of advancing as soon as we see that the ice-fields begin to recede from each other. At two o'clock we again begin to assail with our prow the point where the ice-fields touch, and we were stopped this morning, and with some success. We do not, however, make much progress, owing to the difficulties we

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encounter, and the slight feeling of discouragement which begins to come over us, and at half-past four we are again moored in another space of open water about half a mile from our position of this morning.

August 5th.—The fog continues both night and morning. Lieutenant Querini and the doctor are down on the ice, and go forward to see if there is any point at which the vessel can pass. We sight the *Capella*. As we lose sight of them, the sun appears slowly through the fog, and our horizon widens. Little by little the day becomes perfectly clear. The islands to the west are completely covered with ice; Eaton, Scott Keltie, and Hooker Islands can be made out towards the east; they are for the most part free from snow, and their coasts, which fall sheer to the sea, give them the same appearance as Northbrook Island when seen from the south. Some icebergs are to be seen towards the north in the direction of Cape Murray, and others are perceived near Cape Peterhead, but none to the east. I remain for some time with the captain in the crow's-nest to seek for some indication of free water far away towards the north, in the direction of Queen Victoria Sea, which might encourage me to push on towards that part. An attentive scrutiny only produces a disheartening result; nothing is to be seen but extensive ice-fields divided by narrow channels, through which it is now impossible to proceed. These channels trend towards the east; to the north the ice seems impenetrable, and the way by which we have come is closed up. A few days previously it had seemed to me that one day of fine weather might put an end to my indecision; the fine weather has come at last, and my indecision has disappeared, but only to leave me convinced that we cannot go any farther.

At breakfast we are all in very low spirits; the barometer has indeed risen, on account of the fine weather, but our spirits, on the contrary, have fallen very low. Towards the evening we try to spring

In Barentz Sea and Queen Victoria Sea 83

a mine of guncotton ; the lane to be opened should be about fifteen yards wide, but as the ice has been heaped up by the pressure of the fields, it is here about four feet thick. The mine makes a loud report, but gives no practical result ; we therefore give up the idea of employing this method, and shall wait to advance until the ice-fields open out.

The captain seems to have taken up his abode in the crow's-



OUR COMRADES COME BACK TO THE SHIP

nest ; for the last two hours I have seen him from the deck fixing his eyes repeatedly towards the same direction. Has he at last descried open water in Queen Victoria Sea ? Whilst I am getting ready to join him, he comes down hurriedly and points with his hand towards the north-east. On reaching the deck, he tells me that there is a ship near Scott Keltie Island. At first it seems to me impossible. I go up into the crow's-nest, and see that not only is there a ship in

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that direction, but that her sails are spread, and that she is under way, which is a certain proof that she is in open water that we cannot see, and of the existence of which we cannot even find a sign in the tint of the sky. The ship must be a whaler; since it is in that locality it must have got there easily, and it is, therefore, all the more humiliating to us to be thus stopped in the middle of the British Channel, whilst it would have been easy to arrive to the north of Eaton Island by another route. We must, at all costs, enter the open water which is to the east of us, in order to arrive at the same latitude as the whaler by the same route it has followed outside the ice. The ship we perceive must be the *Capella*, but on account of the distance we can only see its masts, and therefore cannot be certain.

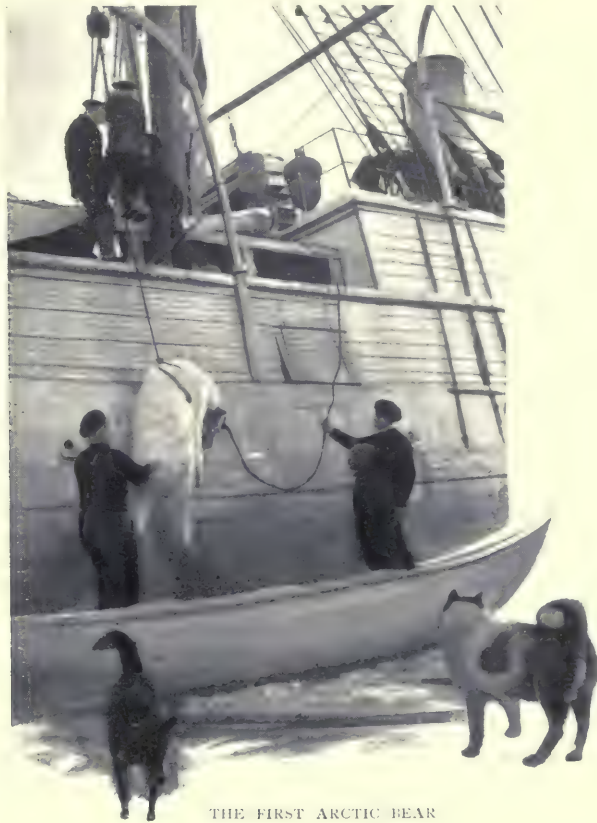
Towards five o'clock in the afternoon the ice-fields show signs of opening, and without losing time we attack with the prow of our ship the pressure-ridge which stopped us this morning. Thanks to our wounded pride, our dogged pertinacity, and the gradual opening up of the channels, we succeed, after about an hour's toil, in bringing the vessel beyond the point of pressure into another open space. A long channel leads from this in the direction of Eaton Island; beyond it we find a belt of thicker ice, through which we can only pass by gradually gaining a few feet at a time. Two hours after sunset we are six or seven miles nearer Eaton Island; the ice is beginning to hem us in once more, and we must stop. We profit by this delay to write our last dispatches. The ship in sight has been made out to be the *Capella*.

August 6th.—At nine o'clock, as the weather is as clear as yesterday, we resume our progress towards Eaton Island, between which and Hooker Island we can see the *Capella* under sail in the distance. The ice, which is less compact than yesterday, offers but slight resistance, so that we can advance rapidly. At twelve

In Barentz Sea and Queen Victoria Sea 85

o'clock we are a few hundred yards from Eaton Island, in open water which stretches away to British Channel to the north, and to the east of the island.

We steer towards the *Capella*, and when near it we signal to know if Wellman's expedition is on board. A launch, in which a



THE FIRST ARCTIC BEAR

man who has the appearance of an invalid is lying, with one leg stretched out, leaves the *Capella* and comes towards us. Although very dissimilar from the photographs which I had seen in the newspapers, I recognise Wellman. As the companion ladder is not in its place, we have to lift him on board. The doctor helps

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him into our saloon, where he is joined by his three companions—Dr. Edward Hofman, doctor and naturalist to the expedition; Mr. Baldwin, the meteorologist; and Mr. Harlan, the physicist. We question them eagerly, and learn that Wellman had met with an accident shortly before arriving at Crown Prince Rudolph Island; that the expedition was forced to return, as it had lost some of its provisions when pressed by the ice-floes, and that it had reached its highest latitude near the above-mentioned island. They inform us with deep regret of the death of the Norwegian, Bernt Bentzen, on Wilczek Land, during the winter. Lieutenant Querini and our doctor show them over the ship, and on seeing our dogs Wellman kindly places at my disposal those which he has still on board, but I cannot accept them, as I have already too many on the *Polar Star*.

Meanwhile, Captain Stökken, of the *Capella*, the father of our engineer, has also come on board the *Polar Star*. He is chatting gaily with Captain Evensen, and expressing his astonishment at the transformations undergone by the *Jason*. As he tells me that from the dark tint of the sky he is inclined to believe that the sea is open up to the spot where Nansen had wintered, I am impatient to go on, so as not to lose the advantage of a clear horizon on such a fine day. We and the Americans drink to each other's health—we wishing them a happy return to their country, and they wishing us a prosperous voyage—and the two ships sail away. The *Capella* steers southwards to return to civilisation, and we penetrate still farther towards unknown and solitary regions.

We steer for Maria Elizabeth Island. The eastern coast of British Channel seems less desolate than the western, and in many places is free from snow. We pass through strips of ice coming down from Allan Young Sound between Hooker and Koettlitz Islands. Few icebergs are met with; they are smaller than

In Barentz Sea and Queen Victoria Sea 87

those we found to the south of Northbrook Island, and not more than ten to fifteen yards high. British Channel is closed by the ice only in its western portion, from Eaton Island to the northern extremity of Northbrook Island, and as far as Cape Murray, whilst it is perfectly free to the east of this imaginary line. The thick fog, which came on in the north-west, which we enter about an hour after leaving the *Capella*, prevents us from making out Prince George Land and the other islands seen by Jackson in that direction.



DRAMATIS PERSONÆ

We continue to advance at full speed, while keeping a very careful look-out ; from time to time a violent concussion, which is felt all over the ship, shows us that during the fog we sometimes mistake a large piece of ice for one of smaller dimensions.

Our compasses are out of order. For standard compass we have Magnaghi's liquid compass, the regulation compass of the Italian Navy. In this the floating card has been made very light, so that pure alcohol can be used as the liquid, and thus all risk

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of freezing is avoided. At the stern we have a Thompson compass, which formerly belonged to the *Jason*, and until now has given satisfaction, but to-day we cannot even reckon on it.

When at a short distance from Koettlitz Island I do not feel reassured in this very thick fog. A white line is ahead of us, which is at first taken for an ice-field, but as it is seen to stretch to right and



WE FORCE OUR WAY THROUGH THE ICE

left of the prow, it is suddenly perceived to be the coast, and the vessel is brought to at a few yards from the shore. To keep away from Koettlitz Island we resume our course towards the west, but as we turn again to the north soon after, we find ourselves in the same situation, and thus we twice run the risk of being wrecked. Now that we are in open water, we must still continue to advance through the

In Barentz Sea and Queen Victoria Sea 89

fog until we find ourselves near the ice, and then select the route to follow as soon as the fog lifts.

August 7th.—We steam all night until about two in the morning, when we are stopped in foggy weather near Maria Elizabeth Island by thick ice ahead. The close ice-pack appears to extend up to the island, and when the fog lifts for a few moments we can find no means of going farther ; but we have already made considerable progress. A few



WAITING FOR CLEAR WEATHER NEAR MARIA ELIZABETH ISLAND

days ago I found it difficult to escape from British Channel, and now we have reached the same parallel of latitude as that where Nansen passed the winter. We are not, however, satisfied with this result, and our hopes are now directed, not only to Prince Rudolph Island, but even still farther to the north, to Petermann Land, which, it is to be hoped, exists, and is within our power to reach.

The fog is so thick in the morning and in the afternoon that we are obliged to remain motionless at the limit to which the open water extends.

At nine o'clock in the evening, by a light easterly wind, which we hail with joy as the forerunner of clear weather, the fog lifts somewhat, and shows us Maria Elizabeth Island, and the neighbouring headlands of Salisbury, Fisher, and MacClintock Islands. We steer at once so as to try to pass to the east of Maria Elizabeth

Island ; the channel seems free, and we enter it at full speed. The northern part of the island is completely covered with snow, but the most prominent capes of Salisbury Island are all uncovered. We steer for Cape Norway ; the two fjords to the east and the great glaciers in the distance are distinctly visible. On the mountains of Salisbury Island are seen verdant declivities, which suggest the idea of putting in there. We would wish to seek for the remains of Nansen's hut, but the bright weather and the open water urge us to proceed, and we do not even leave a depôt at this spot, as we at first intended. We pass outside the small islands situated near Cape Mill, and between them and Neale, Harley, and Ommaney Islands, and continue our journey rapidly towards the north. There is ice to the east of Maria Elizabeth and Ommaney Islands, and from the latter it trends away to the north, leaving towards the north-east a large belt of navigable water, with here and there some strips of ice coming from the channels between Jackson, Leigh Smith, and Karl Alexander Islands. The thick fog sets in again. Our single idea is to keep on our course without losing a minute, and to take advantage of this favourable moment to push on as far as possible to the north. Towards seven o'clock we sight land ahead, which, judging by the route we have followed, is probably Karl Alexander Island, and it obliges us to change our course to the west. Shortly afterwards we again steer towards the north-east, and crossing a rather broad belt of broken ice, we are again in open water. The horizon ahead is overclouded. After nine o'clock we expect every moment to sight Prince Rudolph Island ; but at mid-day we are obliged to lie to in the fog, unable to see the land, or even the ice.

We pass that evening and night in a dense fog. The next day the weather is clearer, and at intervals we can see a white land

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towards the south-east, but nothing to the east or to the north-east, where we think Prince Rudolph Island may lie. We begin to fear that we have gone past it. We take the height of the sun at mid-day on an ice-field and, to our great joy, the result of our calculations shows us that the *Polar Star* is in latitude $82^{\circ} 4'$. The land we see is, therefore, Prince Rudolph Island.

The *Polar Star*
reaches $82^{\circ} 4'$
N. lat.

After the *Fram*, which drifted as far as $85^{\circ} 47'$ N., and after the



CAPE FLIGELY, FROM THE NORTH-WEST

Alert and the *Polaris*, which reached, respectively, $82^{\circ} 27'$ and $82^{\circ} 16'$, the *Polar Star* thus takes the fourth place among the ships that have gone nearest to the Pole. Our vessel has reached the northern extremity of Prince Rudolph Island twenty-seven days after leaving Archangel, including five days passed at Cape Flora; and here I may remark that, if we had advanced into De Bruyne Sound instead of repeatedly attempting to pass by Nightingale Sound, we should have

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reached the same latitude whilst sailing always in open water, except for a few hours.

The *Polar Star* has thus with the greatest ease reached Emperor Franz Josef Archipelago, which in 1873 Payer had thought so difficult to approach, and has followed its coast as far as Cape Fligely.

CHAPTER V
Prince Rudolph Island

CHAPTER V

PRINCE RUDOLPH ISLAND

BEFORE leaving the position we had reached, we carefully observed the horizon, which was clear enough to let us see to a distance of twenty miles. To the north the sea was covered with ice, through which we might still have proceeded for a few miles, and to the south there was a wide expanse of open water. Prince Rudolph Island was the only land in sight.

The most northern land of Emperor Franz Josef Archipelago.

As we were more to the north and to the west than the point



IN TRAINING

reached by Payer, we were more favourably situated for seeing Petermann Land and King Oscar Land, which Payer thought he sighted from Cape Fligely on a rather misty day. Although I

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hardly expected to find them, yet, at times when I felt more sanguine, I had entertained a faint hope that they might perhaps exist, and that I could reach them with my ship, or at least leave a store of provisions there. These hopes had now completely vanished, and it was therefore necessary to seek an anchorage at Prince Rudolph Island. Silence reigned on board, but the joy caused by the arrival of our ship in such a high latitude might be read in the eyes of the crew. Since, after so many days of uncertainty, we had been able to pass through British Channel and reach Prince Rudolph Island without much difficulty, I was led to hope that, with good-will and perseverance, the other obstacles which that region where our undertaking was to be fully developed was likely to present, might also be surmounted. Since we had brought our ship as far as the most northern point of the archipelago, I felt confident that our expedition would continue to be equally prosperous.

A light breeze was blowing from the east, and the sky was overcast in that direction when at one o'clock in the afternoon we set
Cape Fligely. out to the south-east towards the island. After two hours and a half we were off the most northern cape of the island, which Payer had reached in 1873, and had named Cape Fligely.¹ While comfortably seated on the deck of the *Polar Star*, we viewed with profound interest the place where, twenty-five years before, Payer

¹The note left by Payer at Cape Fligely ran thus: "Some members of the Austro-Hungarian expedition to the North Pole have attained their highest point at 82° 5' N., after a journey of seventeen days from their ship, which is imprisoned in the ice at a latitude of 79° 51'. They saw along the coast a small extent of open sea surrounded by ice, and stretching to north and north-west towards lands which may be approximately reckoned to be sixty or seventy miles from this point, but it was impossible to determine how they were united to Prince Rudolph Island. On returning to the ship we all intend to abandon it and to return home. The state of the ship, which we have no hope of extricating from the ice, and the many cases of illness on board, oblige me to take this step."

and his companions, after undergoing great fatigues and privations, had planted the Austro-Hungarian flag. We felt the warmest admiration for the men who, conquering every obstacle, had reached such a high latitude, without giving a thought to their ship, which the drifting ice



CAPE FLIGELY, SEEN FROM THE NORTH, NEAR THE COAST

might carry away, or of the mode in which they might hope to make their retreat, which in the end was accomplished only by means of their boats.

Cape Fligely, which rises to 230 or 260 feet above the level of the sea, is crowned by a table-land, and was the only part of the island

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left free from snow. To the north-east a small, rocky buttress with a pointed summit projected into the sea. To the east and west of the cape the glacier, which covered all the northern part of the island, sloped gently to the coast, where it ended in an ice-cliff. To the east no trace could be discerned of Cape Sherard Osborn, nor of Cape Buda-Pesth, nor of the islands seen by Nansen.

We steamed on towards the south-east, until the ice-pack along the island checked our progress. The coast turned towards the south, tending certainly to join Cape Rath, which Payer had already seen. It was thus certain that Prince Rudolph Island was only a small island and that the latitude of Cape Fligely could not be $82^{\circ} 5' N.$ as Payer had stated,¹ since we had been obliged to sail about fifteen miles towards the south-east, from the point where our ship had lain that morning, to reach it. We then steered to the west, towards Cape Germania.

The coast was still formed by an ice-cliff, in some places twenty-five or thirty feet high, trending towards the west-south-west, and curving slightly inwards before reaching Cape Germania. This cape rises 300 feet above the level of the sea; its summit was then free from snow, and, seen from the north-east, it presented the appearance of a trapezium. We recognised Cape Säulen, so named by Payer from its two bare and rocky pillars—a striking feature in these regions, where the icy covering effaces all natural characteristics. After passing Cape Säulen we saw Cape Auk, and Teplitz Bay came in view.

Our first impressions of Teplitz Bay were not favourable. From

Teplitz Bay. Cape Säulen the coast trended towards the south-east, and consisted of a steep ice-cliff about thirty feet high; it was prolonged towards the east by a rocky beach which took

¹ The latitude of Cape Fligely was found later to be $81^{\circ} 50' 43''$.



DISSEMBARKING IN THE BAY OF TEPLITZ

up all the north side of the bay, and it turned again to the south with an ice-cliff, extending almost uninterruptedly as far as Cape Auk but varying in height. The rocks of Cape Säulen formed



CAPE GERMANIA, SEEN FROM THE NORTH-EAST

the northern boundary of the bay, and at the same time the extreme western point of the island. From south to west the bay was open to the pressure of the ice-pack; the western side of the island

was entirely covered with an immense glacier descending from the interior down to the coast, and the ground was visible only in a few places. The few living creatures consisted merely of some birds near Cape Säulen.

Seen from the south, the bay wore a more pleasing aspect ; its northern side, exposed to the south, was to a great extent free from snow, and some parts of it were level and rocky. On that side the coast was not ended by an ice-cliff, but by a gently sloping beach about 1,500 feet long. Along this beach was a belt of ice about thirty feet broad, which adhered to the shore and to the bottom ; and in touch with it was an ice-field several square miles in extent, which filled the bay, rising and falling with the tide, and therefore detached from the fixed ice along the shore.

The shape of the bay was not the best adapted to provide the ship with a safe anchorage for the winter, but it was the most northern bay of the Emperor Franz Josef Archipelago. As this was of the utmost importance for our future expedition on sledges, we were obliged to attempt to remain there. Though the bay was not protected by its situation, the ice-field might serve to guard the ship from pressure. But the ice was mostly from six feet to nine feet thick, and it would be difficult for us by means of our saws, which were only three feet long, or by blasting and the help of the prow of the ship, to prepare a dock sufficiently deep for it to lie in safety. Along the ice adhering to the shore, however, the ice-field was much broken up, and it appeared easy to cut a canal through that. On sounding through the crevasses, we found a sandy bottom at twenty-six or thirty feet, which became much deeper farther out. If we broke through the ice here, the ship could be moored close to the sloping strand, which would render it easy to land the stores, and the ice-field would serve as a barrier to keep off the pressure

from without. The width and thickness of this ice-field, which clung to the coast for a distance of several miles, led me then to believe that, if later on the ice-pack pressed it against the island, it would remain stationary.

On August 10th, by driving our ship many times against the ice, we succeeded in opening a channel about 580 feet long and sixty feet



CAPE SÄULEN, SEEN FROM THE SOUTH-EAST

wide. The ice, which was already crevassed at that place, broke up into large pieces under each blow of the prow; the water from the melting snow which was falling down the rocks along the shore swept them out to sea, and thus much facilitated the toils of our crew. By the evening the channel was completed, and the ship moored in the ice of the bay, with its bow towards the west.

We immediately set to work to prepare our winter's quarters in this

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locality. Though the fact that the season was not too much advanced, and that the sea was still open, tempted me to carry out some interesting explorations with the help of the ship, the ice-pack was always in sight, and I thought it more prudent not to leave, as, if I were surprised



THE ICE-FIELD IN TEPLITZ BAY, WITH THE CHANNEL CUT IN IT BY THE *POLAR STAR*

by the ice, I would run the risk of not being able to return to our anchorage. Since I was in the most northern bay that could be reached, it was my duty to avoid everything that could in any way imperil our future expedition on sledges, or increase its difficulties.

During the first week following our arrival the weather continued fine, with slight breezes, and the temperature above freezing point. The snow melted rapidly, and torrents of water fell from all sides into the bay. The water, flowing over the foot-ice along the strand, hollowed out a channel, which grew speedily broader. This prevented us from landing, and made it difficult to disembark our stores on the beach. Pools had formed all over the ice-field wherever there was a hollow; indiarubber boots had to be worn to avoid being

continually wet, and with so much water all around us it was almost possible to forget that we were on a frozen land.

The fine weather helped us in our work, and allowed us to take pleasant walks every evening in the neighbourhood of the ship. Cape Germania, Cape Säulen, and Cape Auk, which were free from ice and frequented by birds, were the limits of our excursions. The glacier, which covered all the island, descended into the sea to the north of Cape Germania, and to the south into Teplitz Bay. The part of the island free from ice to the north of the bay presented a succession of terraces, rising above each other and composed of *detritus*, with a few isolated rocks. Small glaciers had been formed on the slopes



THE SHIP IN TEPLITZ BAY

between one terrace and another, between the terraces and the sea, and in the hollows. At the time of our arrival these level places were quite free from snow, but their flora was very scanty. In this summer, and in the following, a few fungi, among which may be noted a new species of *ascochyta*, some briophytes, lichens,

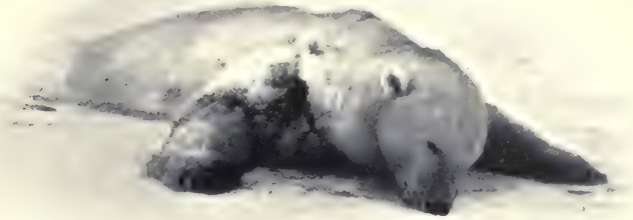
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and phanerogams,¹ were all the plants which we could collect in Teplitz Bay, at Cape Fligely, and at Cape Auk. The rocks, which for the most part are formed of basalts, are a proof that the island is volcanic, like all the others already known in the Emperor Franz Josef Archipelago. A piece of granite found in the neighbourhood of Cape Säulen, and some remains of reindeer's horns picked up in the same place, have given rise to the opinion that, if not Cape Germania, at least Cape Säulen and all the northern part of the island were once submerged. Almost all the way from Cape Säulen to Cape Auk the coast was formed by an ice-cliff, interrupted only, at that spot near which the ship lay, by the short stretch of rocky shore. Cape Auk, 580 feet above sea-level, quite free from ice, and with precipitous sides, formed the northern extremity of the bay. Karl Alexander Island, from its most northerly cape to Cape Brogger, could be seen from Cape Säulen, and Cape Clement Markham could also be made out in the distance.

Animal life, as I have stated, was not abundant. The birds most frequently seen were: The Fulmar petrel (*Fulmarus glacialis*, Linn.), the ivory gull (*Pagophila eburnea*, Gm.), the glaucous gull (*Larus glaucus*, Brünn.), a guillemot of a species closely allied to the black guillemot (*Uria mandti*, Linn.), and the little auk (*Mergulus alle*, Linn.). In the following year we also saw the kittiwake gull (*Rissa*

¹ For the zoological, botanical, and mineralogical collections made during the expedition by Lieutenant Francesco Querini and Dr. Achille Cavalli Molinelli, doctor of the first class, see Part II. of *Osservazioni Scientifiche Eseguite Durante la Spedizione Polare di S. A. R. Luigi Amedeo di Savoia, Duca degli Abruzzi*, 1899-1900 (Milan: Ulrico Hoepli). Thus:—Chapter I.—*Zoology*.—The reports of Professor Camerano, of Dr. Conte Tommaso Salvadori, of Dr. Carlo Pollonera, of Dr. Hermann Giglio-Tos, of Dr. Giuseppe Nobili, and of Professor Corrado-Parona. Chapter II.—*Botany*.—The reports of Professor Oreste Mattiolo and of Professor Saverio Belli. Chapter III.—*Mineralogy*.—The reports of Professor Giorgio Spezia, of Dr. Luigi Colomba, and of Dr. Giuseppe Piolti.

tridactyla, Linn.), the Arctic skua (*Stercorarius crepidatus*, Gm.), and the snow bunting (*Plectophenax nivalis*, Linn.). These, and two other species of skua (*Stercorarius parasiticus*, Linn.; *Stercorarius pomatorhinus*, Schal.), which we shot in British Channel, were the only birds we met with in the archipelago. We never saw Ross's gull (*Rhodostethia rosea*, Macgill.), though we sought it carefully. Seals were rare, and walruses still more so, but, on the other hand, the place seemed to be much frequented by bears. On the day of our arrival we killed a she-bear and two cubs. In the whole course of our voyage we killed thirty-seven bears, thirty-four in Teplitz Bay alone. Most of these were killed by Lieutenant Querini, an ardent sportsman and an excellent shot; he was always



A POLAR BEAR

ready, both by day and by night, to face the cold and the wind, if he had the chance of hunting one of these animals.

Bear-hunting is very easy. A bear sees and smells a camp long before man is aware of his presence, and hunger generally compels him to approach. It is not, therefore, necessary to look for him. Our dogs, which were so many, and wandered about freely all day,

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pursued every bear they saw. The larger he-bears were able to escape if they had only eight or ten dogs at their heels, but if they were attacked by a pack of thirty or forty, they were obliged to stop, and climb up on a hummock, or to range themselves against a block of ice by way of defence. We thus had time to come up and shoot them from a distance of a few feet. None could escape us. The dogs were sometimes wounded in the hunt, almost always by the he-bears, and rarely by the she-bears. They were so nimble in avoiding the bears' blows that their wounds were never serious, and the doctor's assistance was only required three or four times to sew them up, even later on, when they became more daring in their attacks.

We killed many she-bears, often accompanied by two cubs, which from their equal growth seemed to be twins. During the summer we mostly killed she-bears, and later on, during the winter and the spring, only males : some of these were of considerable size, measuring up to 9 ft. 5 in. along the back. We had very often bears' flesh to eat ; the best parts were the heart, the kidneys, and the tongue ; the rest was not equally palatable.

A bullet from a rifle of .303 calibre aimed at the shoulder, or at the forehead, was quite enough to kill a bear ; but if they were running away, several shots were required. We never found that the bear attacked us ; we always saw them make off in the opposite direction to that from which the shot had been fired. During all our expedition we used only Dum-Dum cartridges laden with cordite.

The dogs had been landed as soon as we had arrived. They were not only anxious to be at liberty, but this had become a necessity for them, after having been shut up in their cages on board for a month. As a single sailor could not watch so many dogs during the night, and as it was impossible to re-embark

them every evening, we were obliged to build new kennels on land to keep them separated from each other during the night, and to give them shelter in stormy weather. The doors of the kennels had hinges at the bottom, so that they could be raised up after the dogs had been driven in, and inner partitions separated one dog from another, so that they could not bite each other. It was at first a tedious and



THE END OF THE CHASE

difficult task to shut up the dogs every evening, but it became easier later on when they got their suppers in their kennels. We continued to give them fish, as on board, but we did not require to give them water, as the snow served to quench their thirst. By giving them their food in their kennels it was not only more easy to shut them in, but it prevented them from quarrelling

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and stealing each other's food while feeding; we could also be certain that they would all be equally well fed, and that nothing would be wasted.

The ways of these animals were very strange. They had strong likes and dislikes; when one was killed there was a general rejoicing; and if one were seen to go away from the others with tail and ears down, it was a sign that he had incurred the displeasure of his companions. The entire pack pursued him barking, and we had to interfere to separate them, and to rescue the unfortunate animal. No distinction was made between the strongest and the weakest; the females only were respected. Two or three of our dogs were thus torn to pieces by their companions, and we rescued many others from the same fate.

They showed little affection, and still less obedience; they feared only the whip and water; for in the intensely cold regions where they live, if they get wet the water freezes immediately on their bodies, and forms a cuirass which hinders every movement. The dogs, therefore, instinctively avoid running that risk. They barked readily at the sight of a bear, or of a bird, and often without motive. Sometimes at night one dog would set up a howl for a few minutes, which was then echoed by all the other dogs. The uproar lasted for some hours, led by the dog which had begun, until it stopped without any reason, as it had commenced. These noisy manifestations took place when they were left alone, and the presence of a man was enough to put an end to them.

On account of the calms and the changes of the wind, the pack had receded from the island, and approached it again without, how-
ever, reaching as far as the coast. After August 20th,
westerly and south-westerly winds brought it near to
Teplitz Bay, and on August 27th it began to make its pressure

First Pressure
of the Ice in
Teplitz Bay.

felt against the coast. A sound was heard like that of waves breaking on the shore, caused by the ice-floes being piled up one over the other. The ice-field driven by the pack turned round at



KENNELS ON THE ICE

the bottom of the bay during the night, thus closing up the channel made by the *Polar Star*, and driving the ship against the ice fixed against the coast, where she remained, heeling over about thirteen degrees to the right. When the pressure ceased, she remained in the same position. The next day the ice-pack again receded from the island.

This movement of the ice-field dispelled the pleasing illusion which I had entertained on arriving at Teplitz Bay. I had believed that if this ice-field were not immovable, it might, at least, offer some resistance; it had, on the contrary, shifted at the first impulse of the ice, and when the pack came back, it would move again. The ship was not in a secure position, but if we were to bring on board again the stores we had landed, and were to toil for several days till we were extricated from the ice-field where we lay imprisoned,

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to sail then to the south, even perhaps as far as Nansen Bay, it would not only very much increase the fatigues of our future expedition on sledges, but would be a very serious task, and might also endanger the ship. I therefore decided not to leave Teplitz Bay.

Towards the end of August the temperature, which by day was a few degrees below zero, had begun to fall during the night to Excursion to Prince Rudolph Island. -9° C. Even on August 20th new ice had begun to form alongside the ship and on the fresh-water pools, upon which, a few days later, we were all able to skate. Captain Cagni, having established on the fixed ice along the beach the hut which he had got ready at Christiania for magnetic observations and a field-tent for taking pendulum observations, gave himself up to these important researches.

The recent cold weather had hardened the snow, and we were thus able to undertake some expeditions with sledges to explore the eastern coast of Prince Rudolph Island, and to test the dogs. Until now the softness of the snow would have rendered these expeditions too fatiguing both for the dogs and for the men.

When we were at Archangel, Trontheim had harnessed the dogs abreast by separate traces attached to the sledge. This system, which had been followed by Nansen in his expedition, and is that usually employed by the Esquimaux and the Samoyeds, allows the dogs more liberty in their movements and utilises all their strength. It has, however, this disadvantage—that the traces get mixed up, and it requires continual and tiresome labour to put them again in order. To avoid this inconvenience, I decided when at Christiania to follow the method adopted by the Yakuts of the Lower Lena, who make use of a single long trace, to each side of which the dogs are harnessed by shorter traces, and as the latter are attached by swivels to the central trace,

they cannot become entangled. A bamboo pole was fixed beneath the trace to keep the leading dogs from being mixed up with those behind.

On the afternoon of September 2nd, I left the ship, with Lieutenant Querini and the guide Savoie, in a sledge drawn by nine dogs. We followed the coast at a distance of a few hundred yards, and pitched our tent on the first day near Cape Fligely,



BRINGING THE DOGS INTO THE KENNELS

and on the second at Cape Rath. From Cape Germania to Cape Rath the coast is formed by a vertical ice-cliff, which is interrupted only for some distance at Cape Fligely. This cape is formed by an extensive table-land a mile long, free from snow, and resembling that near Cape Säulen; some fossil remains found upon it have given rise to the opinion that, like the same table-land, it, too, had once been submerged.

From a height of about 290 feet above the sea, and in very clear weather, we observed the horizon attentively; it was the

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same place where Payer had thought he saw Petermann Land and King Oscar Land. We could make out nothing to the north or to the west, but towards the east we now saw Nansen Islands, which we had not been able to see from the ship a few days previously. To the north of the group were Eva and Liv Islands in line with



TRAINING THE DOGS

each other; to the south was Freeden Island and in the middle Adelaide Island. While I am convinced that Payer may have been deceived by the fog when he thought he saw Petermann Land and King Oscar Land, which do not exist, I believe, on the other hand, that he really saw Cape Sherard Osborn, and that this cape is nothing else than the northern point of Eva Island. The mistake made in marking the position of that cape can be explained by a deviation of the compass, in a locality where the needle is strongly affected by rocks which are mostly composed of iron ore.

At Cape Habermann the coast rises steeply to about 2,900 feet or so above the sea. The light westerly winds which had prevailed during the last few days had driven away the pack from Prince

Rudolph Island towards the east, and from Cape Rath to Nansen Islands; towards the south the open sea stretched as far as Archduke Rainer Island. On our third day out, as we were not able to continue our advance along the coast with the sledge, we were obliged to ascend the island, and to encamp on the ice at Middendorf, on the summit of Cape Habermann. Hohenlohe Island and Archduke Rainer Island were seen in the distance. On the fourth day, we encamped during a thick fog at Cape Brorok, while still remaining on the summit of the island. The part which is comprised between Cape Habermann and Cape Brorok, as well as the other islands situated more to the south of Northbrook, Bell, and Mabel Islands,



AN EXCURSION ON PRINCE RUDOLPH ISLAND

is high and precipitous, and free from ice. The fog was still very thick when we encamped on the fifth day in Teplitz Bay. We returned to the ship on September 6th, after a journey of about seventy miles.

The bamboo pole fixed under the trace was found to be

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inconvenient, as it was too unyielding. It also required that some one should walk ahead of the dogs, which naturally diminished the speed of our advance, and left the sledges without any attendant. The swivels were of no use; they only increased the weight of the harness and rendered it more liable to break. The dogs showed strength and endurance, and I felt more confidence in them after this trip than I had felt at Archangel, when I saw them in such a state of exhaustion.

Like the interior of Greenland, Prince Rudolph Island lies completely buried under one immense glacier, which descends to the sea in every direction except at a few points, such as Cape Germania, Cape Säulen, Cape Fligely, Cape Brorok, Cape Habermann, and Cape Auk. At some of these points, such as Cape Auk, Cape Brorok, and Cape Habermann, the coast is almost perpendicular, which prevents the ice from descending to the sea. At others, like Cape Fligely, Cape Germania, and Cape Säulen, the ice, stopped by a hollow, falls into the sea on each side of the headland, which thus remains uncovered. Moreover, wherever the snow can rest, there are glaciers which end at the sea in an ice-cliff, like that formed by the main glacier, so that it can be said that the entire coast, with the exception of a short extent of strand near Teplitz Bay, is formed by a vertical ice-cliff.

As Prince Rudolph Island is not very high, the movement of the ice is slow; in fact, we detected very few crevasses, never witnessed the formation of an iceberg, and when, in the months of March, April, May, and June, we set up a line of posts on the glacier, we could perceive no movement. Near the coast, and where the declivity is steep, there are crevasses which, unlike those of the Alps, are almost invisible; hence great care is required to avoid mishaps, which the most experienced guide cannot foresee or prevent.

During the summer, on those days when the temperature remains above zero, the snow thaws rapidly, and torrents of water flow from the glacier to the sea, hollowing out channels many feet wide. As the table-lands at Cape Fligely and Cape Germania, situated from 162 to 260 feet above the sea-level, are free from snow, we might believe that that is the limit of perpetual snow in this locality; but as at the same height the glacier is never to be seen without



TYPICAL ICE-CLIFF OF THE COAST OF PRINCE RUDOLPH ISLAND

a covering of snow, we might also come to a perfectly different conclusion.

The lines of stratification, which were observed at many points of the sea-front of the ice-cliff formed by the glacier near Cape Säulen and Cape Fligely, would seem to indicate that precipitation is greater here than thaw or evaporation, and on seeing the photographs of Teplitz Bay, Captain Payer was inclined to believe that the glaciation of the island had increased since 1874. He has often told me that in the district between Cape Germania and Cape Fligely he has walked over level tracts, free from snow, which are no longer to be found

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there, and there is now only one uncovered space, 3,000 feet in length, near Cape Fligely. None the less, even if, during the lapse of time between 1874 until now, the ice has increased on Prince Rudolph Island, there could be no doubt that, during our stay in the bay, the thaw and the evaporation had been greater than the precipitation. Also, a period of retrogression was perhaps then setting in, in its glacial state, which would tend to bring the island back to the same condition it was in when discovered by the Austro-Hungarian explorer.

CHAPTER VI
We abandon the Ship

CHAPTER VI

WE ABANDON THE SHIP

DURING my absence the ship had been righted, by means of some guncotton mines which had been sprung on the left side. The pack had again come up against the bay, and as the early frosts were beginning to bind the ice-fields together, we had greater hopes of passing a quiet winter. We prepare our Winter Quarters.

The aeronautic apparatus had been landed and put in order on the shore, so as to be ready for the coming spring. The deck had been covered with an awning from the main-mast up to the fore-mast, and on the side next to the bow. This was to be closed by a wooden partition crossing the ship from one side to the other. The dogs' provisions had been landed, and the lower deck had been partly cleared, that we might more easily get at the stores we wanted.

We had never made so many plans with regard to the work to be done in the autumn, to the expedition towards the north, and to our return home, as on the evening of September 7th. A few hours later all these day-dreams had vanished.

During the last few days light westerly winds had driven the Polar ice against the coast, and had kept it there, without, however, making its pressure felt. During the night of September 7th a light breeze set in from the south, and later on it blew more violently from the south-west. The ice-pack was The Ship is beset by the Ice on September 8th.

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gradually driven against the ice-field in the bay, which in its turn was pressed up against the fixed ice along the coast.

I was disturbed two or three times during the night by slight creaking noises, but towards half-past six loud reports coming from all sides, and sudden movements of the ship, which first heeled over to the left and then twenty degrees to the right, roused me completely. Before they ceased I rushed out on deck, half-dressed, to see what was happening.

The ice-field in the bay, driven by the ice-pack, had risen all around over that which lay along the coast, and had reached up to the kennels, against the doors of which some large floes had been piled up, thus preventing egress. When the dogs gave the alarm, the crew ran to extricate them by breaking the inner partitions and letting them out on the side of the land. A pressure-ridge had been formed along the coast with hummocks about fifteen or eighteen feet high. Under the strong pressure of the ice against the bow the ship had backed about ninety feet, and had risen at the same time on the ice where she remained, with her bow out of water, heeling over about twenty degrees to the left. Great slabs of ice had been raised against her side and stern while she was making her way through them. At the bow, all the rigging of the fore-mast had broken loose, and on the right side of the ship, which was exposed from the middle to the bow, when she heeled over, the outer planks of green-heart were seen to have been driven in to a depth of two and a half or three and a quarter inches for a length of eighteen or twenty feet, so much so that a hand could be passed between them. The ice had this time shown itself stronger than the ribs of the *Polar Star*, and as some damage like that visible on the right side might also exist on the left side, then under water, I gave orders to light the fires.

Whilst I was dressing, the engineer informed me that the ship had

sprung a leak, and that the water had risen to the floor of the engine-room. As it was pouring in fast, the pumps were immediately set going, to prevent it from rising, and to give time for steam to be raised to work the donkey-engine. The wind had gone down, and the windmill-pump acted only intermittently ; the level of the water had



OUR POSITION : A DISTANT VIEW

therefore to be kept down for about two hours with only the hand-pump. As it was not certain that the leak could be kept down by a single pump, and as any additional pressure of the ice might throw the ship on her beam ends, when, if the ice gave way, she would sink, we were obliged to land, with the utmost haste, the

stores for winter, and to secure the necessary materials for building a dwelling-house.

The rose-coloured illusions of the preceding evening had vanished, and there remained before me the gloomy outlook of a winter passed in this bay with but scanty resources, and of a retreat to be carried out with still more scanty resources in the following spring. There arose in my mind involuntary recollections of the unfortunate expeditions of De Long, Greely, and Franklin, which increased my present anxiety by the thought of the heavy responsibility the unknown future would bring.

When ordered to disembark the provisions, the crew, well aware of the gravity of the situation, set to work eagerly and without the slightest confusion. It was seven o'clock when we began to draw, partly from the fore-hold and partly from the middle-hold, and to throw on the ice to our left the tinned provisions, the clothing, and the field-tents; the petroleum was poured out provisionally into every available vessel—into washing tubs, buckets, and barrels. It was hard to work on board, as the ship heeled over so much, and the deck was covered with ice. Under these circumstances the advantage of having light packages was soon perceived, for the crew could hand them along from one to the other. The heavier cases had to be raised by pulleys, and once on the deck, it was difficult to bring them farther. With the exception of the two engineers, who were busied with the engines, and the four men who were working the pumps, all the others were employed in landing the stores.

At eight o'clock we sat down to table, dirty and excited; we took our breakfast almost without speaking to each other, and went back to work immediately.

The wind had quite fallen, and our single hand-pump did not suffice to keep down the water, which in the left stoke-hole had



LANDING THE STORES WHILE THE SHIP IS NIPPED BY THE ICE

already risen to the bars of the furnaces. The two engineers were working up to their ankles in water, and we were continually sending to know what the pressure of the steam was. When at last, about half-past eight, we heard the sound of the donkey-engine working, it seemed to us that our anxiety was about to enjoy a momentary relief.

The donkey-engine and hand-pump kept down the water, but,



ONE OF THE TWO FIELD-TENTS WHICH FORMED THE INTERIOR OF THE HUT

considering how we were situated, we could not hope to make it remain at the same level. Our crew could not work the hand-pump much longer; the donkey-engine alone was not enough; the windmill-pump could not be reckoned on; and the exhaust-pipe of the condenser could not act because the shaft of the propeller required to be first put out of gear, which could not be done, as it was already under water. We were, therefore, obliged to give up the idea of

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keeping the water below the fires, and we could only continue to use the hand-pump for a few hours while we landed the most necessary stores, after which we should abandon the ship.

The disembarkation continued all that day, with the exception of intervals for meals. At midnight we took a light supper, no longer in our saloon, but near the bow of the ship; our food had been prepared on the ship's forge, as the cook's galley had been taken to pieces and sent on shore.

As the ship still remained in the same situation, which had not become more dangerous, and as we had rescued all that was required to pass the winter, we began to disembark what would be wanted for the sledge expedition, so that if the vessel were lost we should still have the means of accomplishing the undertaking for which we had set out. The suction-pipe of the hand-pump then became partly obstructed, and, moreover, as it was very fatiguing work, it was set aside, and a smaller pump used which could be worked by two men; but this pump and the donkey-engine, which was still working, could not prevent the water from rising.

Daylight still lasted during twenty-four hours. A calm had succeeded the wind, and everything predicted a fine day. The ice had not stirred. The holds were open, the cases had been flung here and there, the lamps had been taken away from their places, the cabins were in confusion, and everything bore traces of the hasty work of the last few hours. It was sad to see by that bright daylight the state of our ship, which had hitherto been always kept in such good order. By six o'clock in the morning we had safely landed provisions for more than a year—clothing, tents, all that we wanted for lighting purposes, and all that was requisite for the sledge expedition. We then ceased to work the hand-pump, the water was allowed to rise and put out the fires, and after twenty-four hours of uninterrupted

labour, except during the short intervals for meals, the last case was landed. The Italian flag and my own flag were then hoisted at the stern and the main-mast, so that if the vessel sank they might be the last objects to be seen, and if she did not stir from the place where the pressure of the ice had driven her, their sight would sustain our hopes of raising her. The crew, which was worn out, then went below to take a well-deserved rest.



HOW THE HUT WAS CONSTRUCTED

When I got up at nine o'clock, Captain Cagni told me that there had been no change in the position of the ship, and that the water continued to rise. The ship, however, did not stir, either because she was resting on the ground or was merely fixed in the ice.

The day was bright and calm, without a cloud, but the sight round the ship was dreary.

What a change had taken place in less than twenty-four hours! I was still bewildered by the feverish toil of the preceding day, and could not be persuaded to believe that I should have to abandon the

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Polar Star, on the outfit of which so much care had been lavished. I walked several times round it, followed by the dogs; they had fasted for twenty-four hours, and were begging for food. I then went on board, and down into the engine-room. The water was rising slowly. The left furnace was already extinguished, as it was under water, and that on the right would soon be in the same state.

I was convinced that the ship must have been damaged on the left side as well as on the right. As the fires could not be lighted, it was hard to free the ship from water by any means whatever. It seemed probable that we could never make use of it again, and that to make our way home we would be obliged to retreat to Cape Flora on our sledges in the coming spring, or in our boats in the summer. This would be a very different matter from reaching the Pole, for we should arrive in Norway as shipwrecked sailors.

About ten o'clock the water, which had risen a few inches more, stopped at last.

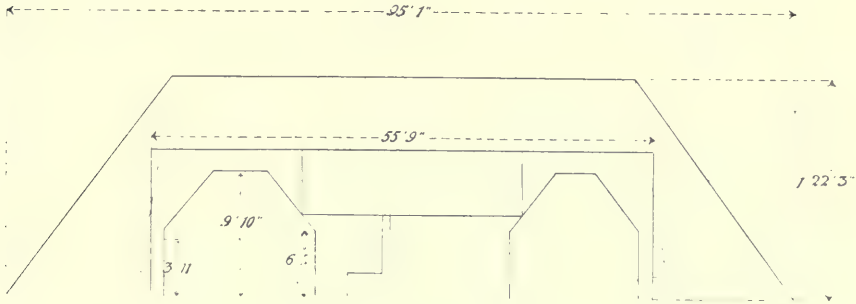
The heeling over of our vessel had rendered life on board uncomfortable; it would be difficult just then to raise her by blasting, which might also make her run the risk of sinking still more, whilst any further pressure of the ice might cast her on her beam ends, and oblige the expedition to abandon her completely. It would therefore, no doubt, be better to leave her and to take up our quarters on land, where we should be safe from any sudden danger, and we did not lack materials to build a house.

The expedition had been provided with two field-tents which would lodge the whole crew, though they alone would not suffice to protect us during the winter or to resist the violence of the wind, but by strengthening them with additional covers, also of canvas, so as to form air-spaces between them, a sufficiently high temperature

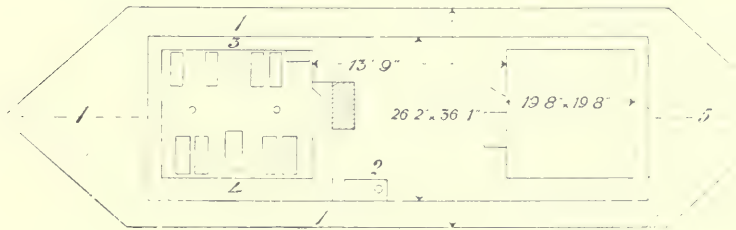


THE *POLAR STAR* AFTER THE ICE PRESSURE

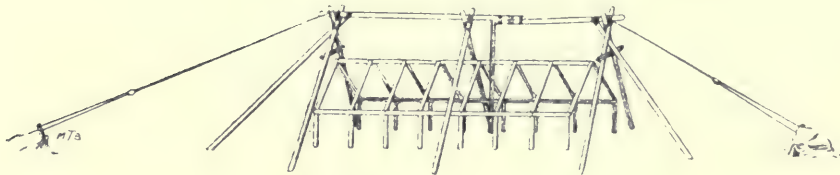
could be kept up inside, and if the outer covering were made of stronger sailcloth it would be able to resist the wind. The canvas awning which had stood on the deck, with the poles and cross-bars which formed its framework, was well suited to stand over the



VERTICAL SECTION OF THE HUT



PLAN OF THE HUT



FRAMEWORK OF THE HUT

field-tents, and with the spars and the sails of the ship, a third tent could be constructed which would cover the others.

We set to work at once ; Captain Cagni was the architect of our new home, and that night we slept under our tents.

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A week of uninterrupted work followed, in which we were much assisted by the continuation of fine weather. I relate it here as I then put it down in my diary:—

September 10th.—We begin by taking down the awning which had been put up over the deck; the sails are then unbent, the spars are lowered, and we carry everything we require from the ship to the tents, which are about 450 feet away. The ship has not stirred



THE KENNELS BEING DRAGGED UP ON THE BEACH

since, but at the highest tide the water rises to the sailors' quarters on the left side.

September 11th.—With the spars belonging to the boats, we get ready three sheers for the boom to rest on; the sails are stretched over it, and thus form the outer tent. The sails are fastened to the top-mast spars, which have been placed at the sides of the field-tents. By evening they are already in their proper places, but not yet sewn together. In the meantime we continue to disembark all that can

be of use to the sledging expedition, and begin to set in order the piles of stores which had been put on shore on the day when we were first crushed by the ice. We already begin to feel the discomfort of our new dwelling. As it is now covered in, the interior is darkened, and we are obliged to keep the lamps lighted.

The first day we had to use the forge for cooking, but now the kitchen is set up again, and it stands between the two field-tents. The only one who profits by our change of dwelling is the cook, who had previously to perform his duties in a small room, badly aired, and therefore always full of smoke.¹ It is not very pleasant, however, to have to cook in a temperature of seven degrees below zero, nor is it pleasant to dine in a tent with such a temperature. We have to stamp our feet continually on the frozen ground, and rub our hands, while hurrying over our meals that we may warm ourselves again by walking about.

September 12th.—The sails are now being sewn together, and it is trying work, although the weather is fine, for the men are obliged to come down frequently from the sheers and run about to warm themselves. Towards evening the work is ended. While the boatswain sews the sails together, the sailors and carpenters are making the two ends of the tent; these are formed of battens placed in a semi-circle on the ground, with their upper ends lashed to the

¹ Both petroleum and coal could be used in our kitchen. Not more than five pints of petroleum were required to give us thirty-four gallons of boiling water every day. Besides the great saving in fuel, the use of petroleum would have allowed of quicker cooking, and rid us of the discomfort of smoke. But a few days after leaving Christiania, we had to cease using petroleum and employ coal. The real consumption had proved to be more than ten pints a day, and there had been much loss by leakage. When coal was used, owing to the smallness of the room and the bad ventilation, not only the kitchen, but even our cabins, were filled with smoke every morning, and even up to the day on which the pressure of the ice occurred, this discomfort had not ceased.

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tops of the sheers. They resemble in shape the buttresses of the piers of a bridge. To strengthen the sheers at both ends, three of the six sets of tackle belonging to the boats are made fast to each, so



THE ENTRANCE TO THE TENT

that two are stretched in the direction of the length of the tent and four transversely. Our dogs have to be kept tied up all day, otherwise they would drive the cook to despair by gnawing at the cases of provisions ranged upon the snow.

September 13th.—One of the tanks, containing 187 gallons of petroleum, is landed, and carried up to the hut.¹ While the inner tent, which is to cover the two field-tents, is being set up, the canvas, which is to form the ends of the third and outermost tent, is put into its place. The inner tent is supported by the same framework as on

¹ Another tank was landed later on.



The Camp in Autumn.

board. The ground has to be levelled before the inner tents are completely put up ; it requires a good deal of labour and time to get rid of the large stones frozen into the ground ; they require to be



IVORY GULLS

hammered away, and the soil all round loosened with pick-axes. By evening the floor of our dwelling is levelled, and we can settle down there.

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September 14th, 15th, 16th.—Although during the night the temperature in the tent was -16° C., we all slept well. The fine weather, which facilitates our work, continues; the second tent is put up. When it served as an awning on deck, its sides were formed by the bulwarks of the ship; they are now formed of boards, for which we make use of those which had closed it at the end next the bow. As we have not wood enough to close both ends, we employ canvas for that purpose, and leave only a single communication with the exterior. The sails which form the outermost tent are now stretched over the top-mast spars, and the stones are cleared away from the sailors' field-tent as they were from ours, so that their beds can be put in their places.

September 17th.—After seven days' labour we take a rest to-day, and resume the life that we led on board. The principal part of the hut is already finished; some less important work has still to be done, but this can be performed more conveniently later on. In seven days twenty persons have been transferred from ship-board to land, and settled there in a dwelling made by the tents, the sails, and the spars, without causing any serious damage to the rigging of the ship.

Our work during the following days consisted specially in carrying provisions, coal, and clothing into the tent and its immediate neighbourhood, taking away everything that had been laid on the ice, and putting it in a safe place on the beach. The clothing was put into the empty space between the two inner field-tents on a shelf hung from the top. In the interval or passage between the inner tents where we slept and the first tent, were the tins of unsweetened milk and the wine which, being more liable to be spoiled by the cold, required to be kept in a comparatively warm place. As these tins were heaped up one against the other, they almost formed a wall, which helped still more to keep out the cold. As a further protection to prevent the cold air from

penetrating into the field-tents, bands of canvas were sewn to the sides of the field-tents, and bags of coal were laid on the part of these bands which trailed on the ground. The open space between the two field-tents was occupied on one side by the kitchen, and on the other by the bags and cases containing the clothing. We had taken down the partitions which had enclosed the sailors' quarters on board, and used them as flooring for the tents. The tents were warmed by two stoves, the chimneys of which passed through the three coverings until they rose above the boom, so that from whatever point the wind might blow they were sure to draw well. The canvas was protected against fire by plates of asbestos. The cases which held the provisions most likely to be consumed during the winter were placed between the second and third tents, thus furnishing additional shelter, and coal bags were laid down round the first tent. To guard still more against the cold, a vestibule was added to the outer tent, and thus made a third entrance to our dwelling, while other cases of biscuits and provisions were laid outside the tent, where they formed an enclosure in which were placed about thirty tons of coal. A hut for the smithy was built alongside this depôt by means of sails and cases. Lastly, the kennels, which had remained on the ice along the beach, were transferred to a short distance from our dwelling. These occupations took up our time until the end of September.

During the second half of this month the weather was mostly calm and fine, with some winds of short duration from the east. After the pressure of September the ice-fields between Cape Saulen and Cape Clement Markham to the south, and Karl Alexander and Prince Rudolph Islands to the east, had not stirred again, but beyond the bay, when the east winds blew, the pack was easily driven back, leaving a broad channel between the ice fixed to the islands just mentioned and the movable part of the ice-pack. The

The Birds leave
Teplitz Bay.

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temperature fell sometimes to -19° C., but the mean temperature was between -5° C. and -6° C., and therefore did not force us to make any change in our clothing. It rained on September 21st and 22nd, and the temperature rose again up to 3° C., which made the snow thaw. Some of the birds had already begun their migration to the south. The first to leave Cape Säulen in the early days of September had been the guillemots and the little auks ; there remained only the petrels, the glaucous and the ivory gulls, and they also left towards the end of the same month.

CHAPTER VII
The Last Days of Light

CHAPTER VII

THE LAST DAYS OF LIGHT

AS our ship, which we had abandoned after it had been seized by the ice, was the only means of our returning home in the following year, we had to consider how to save her. Part of the engines, the condenser, and the furnaces were under water, which had frozen to a thickness of about nineteen inches. First Attempts to extricate the Ship.

The ship had not changed her position, but had heeled over still more as the ice which had supported her had given way.

The water had first to be pumped out of the ship to enable us to find the leak on the left side, and this had to be mended as well as that which was visible on the right side; we had then to see if it would be possible to keep the ship dry, and if not, to protect the engines so that they might remain under water during winter without being injured. Such was the work before us. At that time I did not believe it possible, but Captain Cagni never despaired for a moment of being able to carry it out, and if it was accomplished, it was owing to his strong will and to his perseverance, which was never discouraged by any difficulty.

It has been seen that, on a breezy day, the pump worked by the windmill was able to lower the level of the water in the hold, but it acted so intermittently that it could not be reckoned on, and the hand-pumps alone were not enough. The water had been let out of the boilers on September 26th, lest it should damage the

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tubes when it froze, and it was therefore necessary to find some other efficacious means which could be employed for some days.

We then thought of a pump which we had brought to serve in the production of the hydrogen for inflating the balloons. It was a



UNDER REPAIR

double-action pump with two large discharge pipes, and calculated to produce a powerful effect. As it was worked by means of a small Field boiler connected with the generator, it was easy to make use of. The boiler and the pump were at first set up and made to work on deck in the open air, but the water quickly froze in the hose-pipes exposed on deck, and the boiler ceased to act. It was then taken down and placed under cover in what had been the cook's galley, where it was easy to maintain a high temperature by closing the doors and lighting the stoves.

As soon as we could reckon on the steady working of the boiler and the pump, we began to clear away the upper part of the ice in the engine-room. One day when there was a strong breeze the windmill-

pump was made to act ; it emptied out most of the water in the hold, and, with the help of the small boiler, the ship was completely freed. The engine-room was speedily disengaged from the layer of ice which had been formed there, by working at it from above and from below ; a great part of the ice which still adhered to the engines was thawed by means of burning balls of tow steeped in petroleum, and what remained melted away when the fires were lit.



LANDING THE COAL

While the engines were being put in order, the coal was removed from the left side, so as to allow the state of that side of the ship to be examined from the interior, and at the same time to lighten her. The provisions which still remained on the lower deck were landed along with the coal ; they were laid on the beach, and the coal on the

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ice which adhered to the shore alongside the ship. When the left side was uncovered, it was found to be but little damaged, and that only a few angle-irons had been slightly bent. The right side, on the contrary, showed for a length of thirty feet, about nineteen and a half inches below the beams supporting the lower deck, traces of the violent pressure which it had undergone. The inner planking had been driven in, and the angle-irons between the deck-beams and the frame timbers twisted by about four



THE LEAK MENDED

inches from their original shape. The pressure of the ice had not only damaged the spot immediately subjected to it, but it had dislocated every part of the vessel. The stanchions in the middle of the vessel had been separated from the deck-beams and the keelson by about four inches, and the upper and lower ends of the lateral

diagonals placed between the deck-beams and the frame timbers had also been detached.¹

As there were no signs of a leak to be seen on the left side, nor on the water-line, it was feared that the principal damage might have



THE SHIP ABANDONED

been caused at the bow. There was also some uneasiness about the propeller, but on cutting away the ice down to the level of the sea, the end of a blade could be seen, and with even that much it might be possible to return to Europe.

¹ When the ship was again floated, she never regained her original shape. On being docked on her return, it was found that the shaft of the propeller had been bent by one inch. The screw-post had also been moved from its position, in spite of the strong timbers between the keel and the hull, and had caused considerable leakage.

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As we could not find the leak, it was necessary to decide whether the hold should be still kept dry by means of the pumps, or whether the water should be allowed to fill it again. The hold could only be kept dry by wearing out the small boiler and the pump, which it would be more advisable to keep in order till wanted in the summer, and the hose could not have been used without subjecting the crew to very severe toil during winter. If, on the other hand, the water were allowed to rise again, only the boiler and the condenser could be in any way injured by the length of their icy bath. But it was almost certain that these important parts could be kept in good condition by closing up all their tubes with wooden plugs, and it was therefore better to leave the ship and allow the water to rise in the hold and in the engine-room.

The carpenter, meanwhile, with Petigax, the guide, had been employed in mending the outside of the leak on the right. He had cut into the outer planking of green-heart to a depth of about two inches at the place where it had been damaged. This was covered with tarpaulin, over which boards taken from the lower deck were fixed with long bolts. Although, when the work was finished, the outline of the ship's side was changed, since the pressure of the ice had distorted the shape of the frame timbers, the leak at that spot was stanchd. For fear, however, the ship might heel over on her beam-ends, two strong steel cables were finally stretched from the tops of the main-mast and of the fore-mast to the shore.

The work which had begun on October 3rd lasted till November 15th; it preserved the condenser and the boiler, and proved to us that the ship could still be of use if we could succeed in extricating her from the situation into which by the pressure of the ice she had been driven; it gave the crew some occupation for more than a month,



INTERIOR OF THE TENT

and again raised our spirits, which had been somewhat cast down by the events of September 8th.

In the meantime our hut had been made as comfortable as possible by bringing up to it from the ship whatever was most requisite.

In our tent we four had taken our places on the same side— Captain Cagni and the doctor at the ends, Lieutenant Querini and I in the middle. The Norwegian officers were on the opposite side, the two engineers in the middle, the captain and the mate at the ends. The table of our saloon was placed between the two engineers, and by day it served for our meals and our work.

Our Life in
the Tent.

While under canvas we followed the same order of the day as

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on board. We were called at seven, and as we lived in a common room, we were all obliged to rise at nearly the same time. The first breakfast was at eight ; work began after nine, lasted till mid-day, and was taken up again after dinner till five. Supper was at half-past six, and few of us sat up after ten.

Our mode of life was thus as monotonous as that of a school, where all are obliged to act in the same way at the same time. Our different occupations helped us to pass the day quickly enough, but we found the evening tedious. After some months, subjects of conversation had become rare, and in order not to repeat the same things, we spoke little.

The health of all the members of the expedition was excellent. We always lived in the open air, we slept in a dry and well-aired tent, we wore warm clothing, our food was wholesome, and we had fresh bear's flesh served out to us once or twice a week ; such were the causes of this satisfactory condition. We owed our good health



THE KENNELS DURING THE SUMMER

not only to the excellent quality of the preserved food, but also to our cook, and to his wholesome and varied cookery. His place was no sinecure. As he had to prepare two meals a day for twenty persons, as well as to make bread, he was kept busy from morning till night.



THE KENNELS AFTER THE SNOWSTORM

During a whole year, the days passed over without change or rest for him, and he had even more work to do on feast-days.

On November 4th the weather became bad, and a very strong wind set in from the east. The snow, which was whirled up and driven by the wind, made breathing difficult and rendered objects invisible at the distance of a few yards.

**A Violent
Hurricane.**

This was the most severe storm which we experienced during our stay in Teplitz Bay, and also the longest. It raged without ceasing for eight days. Our hut was not as yet covered with snow, and so had to stand the full force of the wind, which penetrated into the space between the first and second huts through the holes made at the seams in the canvas, and shook the entire framework, making a noise like that made by the sails of a frigate of former days. We could hardly hear each other speak, and considering that this entertainment lasted without interruption for eight days, it is easy to

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imagine how we rejoiced when we saw by the rising of the barometer that the end of the tempest was approaching.

Our dogs were exposed to very great danger in this storm ; when it began they had already been shut up in their kennels, as was usual every evening, but when, next day, we tried to bring them their food, we found that the wind had driven such a mass of snow round the kennels that they were nearly buried, and that we could not open



THE CAGE FOR THE INSTRUMENTS DURING SUMMER

the doors. That day we all had to work to extricate the dogs, and we passed a most unpleasant time in the dark, while the snow whirled round us and the wind continually extinguished our lanterns. A few minutes after the kennels were opened, they were completely filled with snow, so that the dogs remained without any shelter. Two or three of them were forgotten, and three days after one was discovered walled up in the snow, which had become as hard as ice, and would have been its tomb if we had not rescued it in time. After the storm

our hut remained half-buried in snow, the weight of which tightened the sails; it also reduced the extent of surface exposed to the wind, and rendered our abode very safe ever after.

The tempest of November 4th drove the ice-pack out to sea again, and left a vast stretch of open water between Cape Säulen and Cape Clement Markham, which, even at such a late period of the season, would have allowed us to sail up to Teplitz Bay. Later on, the dark tint of the sky towards the west showed us that this extent of water remained free from ice for a considerable time, as the wind



THE CAGE PROTECTED FROM THE DRIFT BY CANVAS SCREENS

blew without ceasing, with greater or less strength from the east or north-east, and thus prevented the ice-pack from again approaching the shore.

November was a windy month, and easterly and north-easterly winds predominated; on some days the temperature rose to -1° C., and we might have thought that we were in Europe instead of the Polar regions.

The Tempera-
ture. The Drift.
Our Clothing.

The snow never fell in large flakes, as we see at home, but was granulated, and hardened by the wind as soon as it fell, so that walking over it left no trace. It was carried by the wind like the desert

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sand ; under a light breeze it ran along the ground, but when the wind freshened, the level of the driven snow rose to the height of several feet, and if there was a violent storm, it was impossible to know if the snow which enveloped us fell from the sky or was carried by the fury of the tempest.¹ The snow did not lie evenly on the ground, but was piled up against every obstacle ; it filled the hollow places and did not stay on flat surfaces, which made it impossible to calculate how much had fallen. Whatever wind blew with the greatest force, made furrows in the snow answering to the point from which it came, and these furrows rendered the surface of the ice uneven.²

We continued to wear the same clothes as when on board, but instead of leather, we wore wooden shoes, or boots made of felt for everyday use, and *kömager* and *fnsko* for walking. Wooden shoes lined with sealskin and felt boots were warm foot-gear, and wore well, but they were not adapted for walking. On stormy days we put on over our usual clothes what are called wind-repellers, of stout duck, without any opening, and tied at the wrists and ankles to keep out the snow. For head-dress we all wore the caps used by whalers, which are provided with flaps to protect the ears.

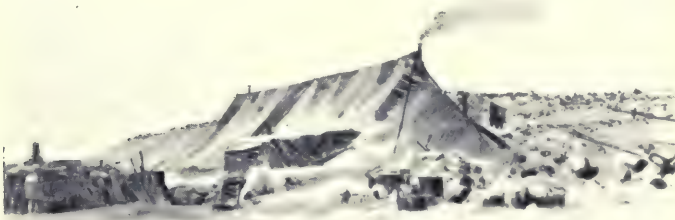
We soon began to find it difficult to make our registering instruments work. The cage which had been furnished by our Meteorological Office was very good for summer, but of little use in winter. The drift was heaped up on it and cut off the instruments from the outer air. It was thought that this drawback could be remedied by surrounding the cage with several rows of venetian blinds, which should

We find it difficult to continue to take Observations with the Registering Instruments.

¹ The snow carried along by a high wind is called "drift."

² The Esquimaux call these undulations *Sastrug*.

stop the snow and let the air circulate freely in the interior. They were, however, useless. The cage was then wrapped up in canvas, in which holes had been pierced with large needles, and finally placed in a hut made of the same sort of canvas. All these coverings, put one over the other, made the state of the instruments worse, instead of better. The snow got between them, and was piled up everywhere; it penetrated into the openings of the registering instruments, and stopped the clockwork. It soon rose gradually until it reached the same height as the outer hut, thus placing the instru-



THE FIRST FALL OF SNOW

ments as though at the bottom of a well. It was hoped at first that this would not often occur, but there were gales laden with flying drift so frequently, that we were obliged to seek various devices in order to be able to continue taking observations. When the weather was fine, we began to observe the stars, but later on our work was rendered very trying by the low temperature. It was impossible to handle the screws of the instruments while keeping our gloves on, and if we took them off our fingers were frozen. It was difficult to read the scales on the instruments, as our breath, in condensing, hid the divisions. The chronometers which had been placed in our tents showed remarkable

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variations in their daily movements. We were obliged to give up taking pendulum observations on account of the changes in the temperature of the tents, and as it was difficult to take magnetic observations with Schneider's magnetometer in the hut built for that purpose, since the temperature which prevailed there was low, that, too, had to be given up. It may, perhaps, be useful to remark here that instruments intended for the Arctic regions should be easy to manage, because many delicate operations which, in our part of the world, can be performed with the greatest ease, there become very difficult or even impossible.¹

The sun on October 15th had already set, but during the second half of October, and nearly the whole of November, there were still several hours of twilight every day. Stars of the first magnitude were visible at noon on November 3rd, and the others came out little by little. Then the Aurora borealis began to appear, and with more or less brilliancy lit up the sky thenceforth, during all the winter. As the tints on the horizon became gradually less intense, the time drew near when there would no longer be any difference between day and night. I find an entry in my diary on November 20th to the effect that, though at mid-day there is still a pale light on the horizon, there is not enough to cause any perceptible difference in the appearance of the surrounding objects. The Polar night had begun.

¹ For the scientific observations, see the various reports in the volume entitled *Scientific Observations*—viz., Chapter II., "Astronomical Observations," Lieutenant Alberto Alessio; Chapter VII., "Pendulum Observations," Professor Cesare Aimonetti; Chapter VIII., "Observations of Terrestrial Magnetism," Professor Luigi Palazzo.

CHAPTER VIII

The Polar Night and the Feasts of Christmas
and the New Year

CHAPTER VIII

THE POLAR NIGHT AND THE FEASTS OF CHRISTMAS AND THE NEW YEAR

WHEN the Polar night set in, it was lit up by the moon, and thenceforward our satellite gave us light enough, for a fortnight every month, to work and to walk about in. When there was no moon, we were in utter darkness. The feeble twilight, which was visible every day at noon, ^{The Polar Night.} became paler every day until in the first week of December it disappeared completely.

My companions and I were not struck by the transparency of the sky. As there was always snow suspended in the air like dust, the stars did not shine in calm weather, as I had often seen them shine in tropical regions, and even in our own country. The surrounding landscape, indeed, was very distinct, but that could be accounted for by the strong reflection from the ice.

The darkness was to last for about two months. There was plenty of work to be done both inside and outside the tents, and since it was impossible to make excursions in the neighbourhood, and we had no other exercise, we had to be content with walking to and fro between signal posts, over well-known ground, as had been the practice of those who had preceded us in the Arctic regions.

On calm and fine days, by the pale light of the moon these hours of exercise were almost pleasant ; but when there was utter

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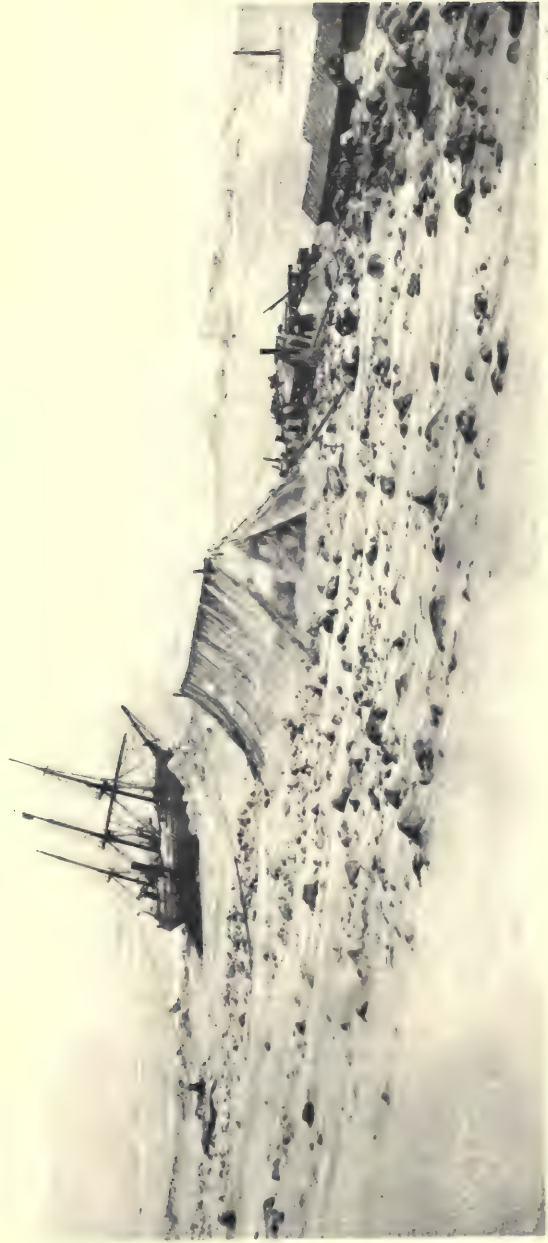
darkness, drift, and wind, with a temperature of -20° C., it required a strong effort of the will not to go back to the hut, but to bear with the discomfort of remaining outside for over an hour, unable to see more than a few yards, and with one's face stung by the driven snow.

We had been busied until now with the ship and the tent ; but henceforth, while the crew was getting ready the outfit for the expedition in spring, we had to note down the observations already taken, to work out the calculations, and with the help of the observations of other explorers which we collected from the books we had brought with us to draw up the plan of the expedition towards the Pole.

The time passed over quickly. As for me, I had set out with a well-stocked library, thinking that I should have much leisure for reading, as there would be no other occupation, but I ended by reading very little.

After the storm in the first days of November our dogs had no longer any shelter in bad weather, so they took refuge partly in our porch and partly in the instrument hut. Some remained in the open air, and though the dogs that were stronger could stand the exposure, the weaker would have soon broken down. It frequently happened when dogs had lain curled up for some time, and the heat of their bodies had melted the snow beneath them, that the water froze again, when their tails became fixed in the ice and they could not free themselves.

We then thought of sheltering the dogs in holes dug into the snow, which had been carried and heaped up by the drift which had nearly buried them a few days previously. All the crew set to work eagerly at this new undertaking, and with pick-axes and shovels they hollowed out two caves more than three feet high, many feet



Our Camp from the West.

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square, and ventilated by means of the wind-sails belonging to the engine-room. By the light of our lanterns these grottoes presented a fantastic appearance. The dogs were shut up in them; but with the help of their teeth and claws, they made a passage beside the doors and escaped. Our guides, like good mountaineers, persisted



A VIEW FORWARD

in their determination to keep them shut up; they, therefore, placed close to the door boxes of biscuits, round which they poured water. This, when it froze, made a wall in which the dogs' claws could open no breach. But it was all in vain, for the dogs then dug out, alongside the boxes, tunnels, which in some cases were from sixteen to nineteen feet long. At other times, by dint of incredible efforts, they

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made their way out through the wind-sails, the inner end of which was over four feet from the ground. As they surpassed us in obstinacy and cunning, at last we gave up the idea of keeping them always shut in, and left them free to take shelter in the caverns during bad weather if they chose.

Later on, their former kennels underwent another transformation. The partitions were taken away and they were changed into long corridors, in which the dogs were housed until the departure of the expedition.

The Italian Queen's birthday was celebrated on November 20th by the distribution of the gifts which Her Majesty had sent to me by

**The Italian
Queen's
Birthday.**

Count Oldofredi when I was about to leave Archangel.

When the mishap to our ship had occurred, the boxes had not been forgotten, for I attached great value to these memorials, which we highly prized, particularly at this time. One of these boxes had been opened on October 21st, and the presents so kindly sent by the Duchess Helena of Aosta distributed to the officers and sailors. Her Majesty the Queen had sent silver chains for the sailors, and various other trinkets for the officers—each gift bearing the name of the person for whom it was intended—an act of kindly courtesy which enabled me to gladden my comrades with memorials of Italy, which was so far away. The day was not very fine, for I read in my diary: “Stiff breeze from the north-east, which subsides towards six o'clock in the evening; temperature — 22° C.; the sky is clouded at times, the surroundings are lit up by the moon. Before dinner I take my usual monotonous walk before the tent for about two hours, dressed in a wind-proof coat.” But if our situation did not allow us much in the way of amusement, the thought that we were the first Italians who had ever celebrated the anniversary of our Queen's birth in so

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high a latitude, together with the memories of our distant country, which on such an occasion arose more vividly in our minds, were enough to inspire us all with an unwonted gaiety.



IN THE SAILORS' TENT

On December 15th I explained to my companions the plan of our sledge expedition, of which only the main outlines were known until then, and not the details. As on November 1st we still had had daylight for three or four hours, I had calculated that the sledge expedition would have been able to start from the hut in the second half of February, when it

Changes in the
Plan of the
Sledge Expedi-
tion.

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would have been possible to march for six or seven hours daily. Every day gained at our departure, without adding much to the hardships caused by the cold (for the temperature remains very low until the end of March), would have very much advanced the date of the return of the expedition; and I was positively determined not to let our return be delayed beyond the end of May. If the expedition was to carry provisions for ninety days, and to start on February 15th, it would be able to return between May 15th and 20th, and there would remain a few days to spare, if, for any reason, our arrival at Prince Rudolph Island were delayed.

I also drew attention to the changes which my provisional plan might undergo when it was carried out. By Dr. Cavalli's advice the daily rations had been definitely fixed at 2 lb. 13 oz. 13 dr. per head; this did not include the weight of the cases, but if they were taken into account, the total would be more than 3 lb. 4 oz. 14 dr., the weight which had been at first decided on. On account of this increase it was thought advisable to reduce the number of men in each detachment from four to three, while keeping the same number of sledges. At starting there would not be a man to every sledge; but, after a few days, as the provisions were consumed, the number of sledges would be equal to the number of men.

According to my original plan, I had intended to establish during the autumn depôts of provisions to the north of the place where we should pass the winter. But, since I had succeeded in reaching the most northern island of the archipelago, and as I did not believe that there was any land beyond it, it was no longer necessary to take that matter into consideration. I had also thought at first that the sledge expedition would have to return as far as 80° N., instead of to Teplitz Bay, which is in $81^{\circ} 47'$ N. For

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that reason I had changed somewhat the number of days in my definitive plan.

In starting, therefore, from Cape Fligely, the expedition was to be composed of three detachments of three men each; the first carrying provisions for thirty days, the second for sixty, and the third for ninety. A fourth detachment, acting as an auxiliary, was to enable the third detachment to march two days longer, making in all forty-seven days, and would also help the expedition on the first two days of its march. Nansen had taken with him a *kayak*¹ for each man, in order to be able to travel more speedily along the coast, and, if necessary, to reach Spitzbergen. I had several *kayaks* like Nansen's, which would hold one or two persons, so that I could have left some at different points along our route, in case we had not been able to sail as far as Prince Rudolph Island, and still have two remaining for each of our detachments. But on account of the place where we were passing the winter, I thought—and my companions agreed with me—that it would be enough to give two *kayaks*, each with room for a single person, to the two last detachments only, since it would be useless to give any to the first, as this would return in the month of March, and would not, therefore, want them. In the case of the last detachment, the one most likely to make use of these boats, they would only serve to cross the channels, and to send one or two men from the edge of the ice-pack to the camp on Prince Rudolph Island for assistance. Two of these canoes lashed together can support four men, and were, therefore, more than enough for these two purposes. As to the balloons, we all agreed that they could be of no use. On account of the accident which had happened to the ship, a part of the aeronautic outfit (that is to say, the small boiler and the

¹ The canoe of the Esquimaux. It is described in Chapter IX.

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pump) had been employed to free the ship from water ; another part (the iron filings) had been left in the water at the bottom of the hold, and could not be got out. Whatever else would have served to get the balloons ready and to inflate them, had been employed to build our dwelling place. Moreover, the state of the ice near Prince



DR. CAVALLI IN THE TENT

Rudolph Island required that some one should be continually near the sledges while on the march, so that there would be only one man left to attend to the balloons, and as wind is so infrequent in these regions, we could not hope to make use of them, or even to inflate them. If the ship had not been driven on shore, it might have been

The Feasts of Christmas and the New Year 167

of some use to inflate the balloons (and we should certainly have attempted it), but in the present state of the expedition, when there was still so much work to be done, it was useless to waste our time in getting ready apparatus from which we were certain that we could not derive any real advantage.

Although the Aurora borealis was visible nearly every evening, it was only now and then that it was so bright as to attract our attention. One of the most beautiful was that which occurred on the evening of December 1st. Nearly all the vault The Aurora borealis. of heaven was lit up by curtains of light, with folds undulating in all directions, some of which seemed to be moving at a considerable height. To the north-east, beyond a mountain, from whence the Aurora always began, the heavens were reddened as though by the flames of an immense conflagration. The light, indeed, was so strong that it lit up everything as though there were a full moon. The period of greatest intensity lasted for a couple of hours, and then the Aurora resumed its usual appearance.¹

The birthdays of Captain Cagni and of Lieutenant Querini, which occurred on December 16th and 18th, were We train the Dogs. celebrated by drinking many toasts to them. On December 19th we began to harness the dogs in order to train them, and to accustom those less docile to pull together with the others.

The first attempts were enough to make us despair. When a sledge drove away, the teams which remained behind were thrown into the utmost disorder. All the dogs wanted to follow it, and they became entangled in their traces by the bounds they made while trying

¹ See *Scientific Observations*, Part I., Chapter V., "Aurora borealis": report of Commander Umberto Cagni.

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to drag their sledges forward. Some dogs were very willing, but others only let themselves be dragged along by their comrades, and if they were beaten, they tried to turn round and bite. Others, again, as soon as the sledges stopped, began at once to gnaw the traces in order to escape. Even then we ascertained that when they worked willingly they could easily drag over level ground the weight of 617 lb. on which we had decided. After these trials we put a mark on the dogs which had worked best, in order to distinguish them from the others, and those which were less docile we harnessed with dogs not yet tried, so that all might be trained in the course of January.

We went out as usual on the afternoon of the 23rd. The temperature was about -2° C., and a light wind was blowing from the north-west.

We drove at a rapid pace towards the bottom of the bay; the snow was in a better state than on other days, and so we were able to travel more quickly than usual. As we advanced, the wind freshened, raising a slight mist, which hid the sledges and barely allowed us to see the lantern carried by Petigax, who led the train. After driving for an hour and a half, Captain Cagni, who was in front, stopped to allow the other sledges to come up with him. Just at that moment the wind began to blow more strongly from a different point, and the temperature fell quickly to -20° C. The traces left by the sledges on the snow, which were visible only in some places where it was softer, were soon covered up, and we found it difficult to ascertain our true position.

We started to return. Captain Cagni, who was in the first sledge along with Petigax, felt assured that the dogs would of themselves find their way back to the hut, but, after a few minutes, we realised that they had lost the track they made when on the

THE HUT BY MOONLIGHT



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journey out. The sledges then began to run with great speed, and it was evident that we were descending a rather steep declivity. How had we gone astray?—for whilst we believed that we were



OUR CHRISTMAS DINNER

on the ice in the bay, we were, on the contrary, on the glacier of the island.

I went forward with Petigax, but I had not gone thirty yards when I saw, by the light of the lantern, that the glacier ended abruptly. We shouted in vain to our companions to stop ; for the dogs, which

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saw Petigax's lantern ahead of them, rushed forward, and two sledges with their dogs, as well as Captain Cagni and I, fell from the glacier down to the bay, a fall of some twenty-three feet. The other sledges luckily stopped. Captain Cagni's first words, mingled with the howls of the dogs, alarmed me, but I was soon reassured. Neither of us was hurt. We calmed the fears of our companions, who from the glacier above us were inquiring anxiously about our safety, and waited till they rejoined us. Where were we?

The glacier was ended by a fall of several yards down to the frozen sea, except at the spot at the bottom of the bay which I had visited in my autumn excursion, where a gradual slope led from the island down to the ice-field. We must have gone up on the island exactly at that spot, but it was impossible to know if we were now to the right or the left of it—that is to say, in the direction of the bottom of the bay or towards the sea. A quarter of an hour elapsed, and the time seemed long, but at last, to my great relief, I saw close by me a flickering light, and the tall form of Petigax, who was preceding his companions and the sledges.

We relieved the sledges of all burden in order to facilitate our homeward journey, and leading the dogs, we tried to find a way out of the place we were in. Petigax went first, sinking every now and then up to his knees in some crevasse which he could not see. The wind put out his lantern continually, and in order to relight it we were obliged to stop and stand round it. In the direction which we took at first we found holes and crevasses, and were forced to retrace our steps. Owing to the darkness and the drift we could see nothing, and it was not easy to advance over such a rugged surface. We succeeded at last in extricating ourselves from the place into which we had fallen, and in finding more level ice, which was probably that of the bay. But our difficulties were not yet ended. We hoped, indeed, that we were

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trending in the right direction, but as we could see nothing, we could not tell whither we were going. The snow, driven by the wind, froze on our eyelashes, and to be able to keep our eyes open, we had to remove it from time to time with ungloved hands.

As we went farther away from the ice-cliff of the glacier, we felt still more the force of the wind, and as we had come out lightly clad, so as not to become too much heated whilst running after the sledges, we felt the cold very much.

I had already begun to fear that unless the weather changed we might be exposed to this storm for several hours, when the sky became clear overhead and the stars were to be seen. We then guided our course by a star which we recognised, and soon heard the distant sound of a bell, which showed us that our friends in the camp were uneasy about us, and making signals to help us on our way back. The drift carried by the wind was so thick that until we were close to the ship we did not see a lantern which hung at the mizzen-mast. Captain Evensen was getting ready to go and look for us, but our hardships were ended at last. We had only lost a dog, hurt by the fall, and left two sledges behind. I was already congratulating myself that our excursion had ended so happily when, on taking off my gloves, I was disagreeably surprised to find that the fingers of my left hand were partly frozen; so were also those of Captain Cagni's right hand. Our doctor was just then rubbing one of the ears of Gini, our cook, which was in the same state. Snow and water were immediately brought into the tent, and we rubbed ourselves for a considerable time, but, unfortunately, without restoring the circulation of the last joints of two of my fingers.

A violent snowstorm from the west raged all day on the 23rd. The force of the wind was such that Lieutenant Querini was not able to go to the instrument hut, which was hardly thirty yards away from

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the tent. He would have required to have been tied with a rope to get there. The storm made us lose all hope of finding our sledges again, and although we often looked for them, not only in winter, but also later on, in summer, our search was useless.

We celebrated Christmas with as much splendour as possible. In honour of the occasion we gave our tents a good washing, of Christmas and New Year's Day. which they stood much in need. When this was finished we felt as though the huts were no longer the same, and when we sat down to breakfast everything seemed beautiful, though this miraculous change had been brought about only by water. The gifts sent by Her Majesty the Queen and the Princesses Letitia and Helena, Duchess of Aosta, were put together to form a Christmas tree. The fir-tree was represented by our tent-poles, on which were hung a part of the presents, and with the handsomest of which we got up a grand lottery. The crew were invited into our tent, and we passed part of the day together. The feast ended in the evening by a dinner, with which the cook, although unwell, sought to make us forget the hardships of the season. We even had some pastry, made with the last remaining eggs, which, although frozen, had been well preserved.

In the last days of December the temperature fell to -35° C. During the night of the 27th, four days after our unlucky excursion, the pain in my fingers grew worse, and gave me no rest by day or by night. Inflammation had set in at the junction of the living and the dead flesh. My fingers were of a dark colour; the skin rose from the part which had been frozen, and formed blisters full of serous matter. They had the appearance of having been severely scalded. These pains lasted for three or four days, and then ceased; but my hand remained very sensitive to cold.

The beginning of the New Year drew near, and this feast, too,

The Feasts of Christmas and the New Year 175

was celebrated with the utmost enthusiasm. The doctor had the greatest share in promoting these rejoicings. Fireworks, consisting of rockets and fiery fountains, were got ready to welcome at midnight the New Year, which was to be the last of the expiring century. At midnight we fired salutes from our small gun; the sailors lit fountains of fire and sent off rockets, while piles of wood steeped in petroleum were burnt round the tent, and threw a white light on the surrounding ice. The temperature that night was bitterly cold (-31° C.), and made us return soon to the hut, to begin our first sleep of the New Year.

CHAPTER IX

The Polar Night and the Preparations for our
Departure

CHAPTER IX

THE POLAR NIGHT AND THE PREPARATIONS FOR OUR DEPARTURE

THE preparation of an expedition on sledges across ice demands much care, so that the weight to be carried may be reduced to a minimum, while, by judicious selection of rations and outfit, the members of the expedition may be enabled to resist fatigue, and live in a climate for which man is not adapted.

Equipment of
the Expedition
towards the Pole.

Two sorts of stores were to be carried on the sledges—those for



INTERIOR OF THE TENT

daily consumption, such as food for the men and dogs, and those which would not vary, such as *kayaks*, tents, sleeping-bags, cooking-stoves, arms, instruments, and changes of clothes.

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Dr. Cavalli, guided by the data furnished by Greely and Nares, had fixed our rations at 2 lb. 12 oz. 9 dr., as may be seen by the following list :—

	GREELY.		NARES.		OUR RATIONS.		
	Oz. ¹	Kilos.	Oz.	Kilos.	Kilos.	Oz.	Dr.
Biscuit	10'00	0'283	14'00	0'396	0'400	14	1'7532
Tinned Meat ²	11'00	0'311	4'00	0'113	0'250	8	13'0958
Pemmican ³	11'00	0'311	16'00	0'453	0'300	10	9'3149
Butter	2'00	0'057	—	—	0'100	3	8'4383
Milk	1'00	0'028	—	—	0'040	1	6'5753
Liebig's Extract	0'50	0'014	—	—	0'010	—	5'6438
Vegetables ⁴	3'00	0'085	2'00	0'057	0'030	1	0'9315
Italian Paste	—	—	—	—	0'050	1	12'2192
Sugar	2'00	0'057	2'00	0'057	0'040	1	6'5753
Salt	0'25	0'007	0'25	0'007	0'014	—	7'9013
Pepper	0'05	0'001	0'05	0'001	—	—	—
Coffee, Tea, and Chocolate ⁵	1'00	0'028	3'50	0'099	0'026	—	14'6739
Onions	—	—	0'12	0'004	0'005	—	2'8219
	41'80	1'182	41'92	1'187	1'265	44	9'9444
Alcohol	1'50	0'042	2'00	0'057	—	—	—
Stearine	—	—	3'00	0'085	—	—	—
Petroleum	—	—	—	—	0'180	6	5'5889
	43'30	1'224	46'92	1'329	1'445	50	15'5333

¹ The English ounce is equal to 0'0283 kilos.

² GREELY: Tinned meat, 7 oz.; salt meat, 4 oz. NARES: Salt meat. OUR RATION: Tinned beef cooked.

³ Pemmican is pulverised meat mixed with an equal or larger quantity of beef-fat, so that it furnishes at the same time the albuminoids, the azotates, and the hydrocarbonates necessary for man's food. It is easily cooked, and can even be eaten raw; it keeps well, and does not require to be hermetically sealed in a tin. It has, however, the drawback of not being always well suited to the digestive organs.

⁴ GREELY: Potatoes. NARES: Potatoes. OUR RATION: Desiccated vegetables (Knorr).

⁵ GREELY: Tea, chocolate. NARES: Tea, $\frac{1}{2}$ oz.; chocolate, 1 oz.; rum, 2 oz. OUR RATION: Tea, 3 dr.; coffee, 10 dr.

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The quantity of petroleum required to cook our food had been calculated from what Nansen had consumed. As we had the same cooking-stoves, and were to use them while exposed to the same temperature, the quantity which he had found sufficient ought to be enough for us. It had been fixed at 3 oz. 8 dr. for each man daily,



DR. CAVALLI PREPARES THE RATIONS

and thus brought up the weight of the daily ration for each person to 3 lb. 0 oz. 2 dr., without reckoning the weight of the cases. I made the mistake, at first, of looking on this weight as insignificant, but found, on the contrary, it augmented by not a little the weight of what we consumed each day. Nansen had reduced it to a

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minimum by carrying all the desiccated food in bags, and doing away with jars. With regard to many sorts of food which might be spoiled by changes of temperature, such as meat and condensed milk, we did not consider it safe to do without the cases; as to others, such as biscuits and Italian paste, we thought it would be better to keep them in boxes, lest they should be spoiled if the sledge which carried them fell into the water. Tea, coffee, sugar, and salt, in compressed tabloids, were put in little tin cases to prevent spoiling by the jolting of the sledges. The total difference between the nett weight of the provisions we carried and the gross weight of the same with their cases was about 14 per cent., and this difference brought the gross weight of each ration up to 3 lb. 9 oz. 13 dr.

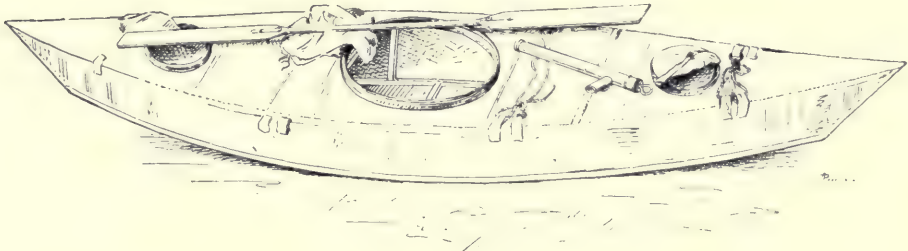
The dogs' ration of pemmican was fixed at 1 lb. 1 oz. 10 dr., which was a large quantity, but we thought it necessary for them on account of the long marches they would have to make. On weighing our dogs, we found that, if we slaughtered them, they would not furnish the twenty rations each on which, judging by Nansen's experience, I had thought at first that I might have calculated. In order, therefore, to have a certain number of rations over and above, it was settled that each dog slaughtered should be reckoned as providing only ten rations.

We had already begun in December to make experiments with regard to the packing of that part of our outfit which should form the dead weight to be carried on our sledges.

Our boats were *kayaks*, like those used by Nansen. They were built in the shape of punts, but their planking was replaced by canvas, carefully sewn, so as to render the boat stanch. They had also a canvas deck, with a hole in the centre, in which sat the rower, who thus had his legs in the interior of the *kayak*. The framework alone,

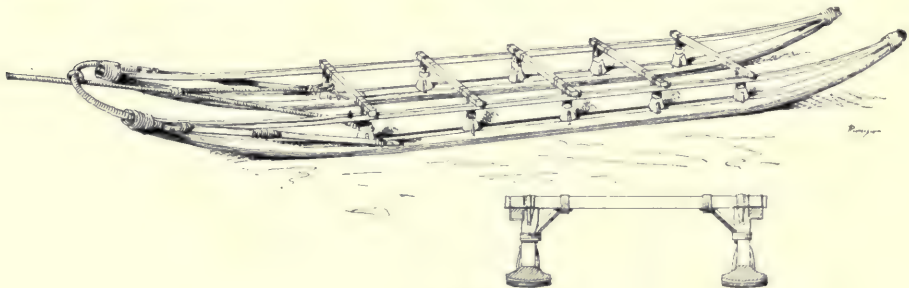
The Preparations for our Departure 183

on which the canvas was stretched, was of wood, and to make the boat light, it was formed of thin rods. The bottoms of Nansen's *kayaks* were slightly convex, but mine were flat-bottomed, so as to be more easily fitted on the sledges. Their greatest length was 11 ft. 7 in.,



A KAYAK.

their width 2 ft. 6 in., and their height 11 in. They were provided with a small sail, a pump to empty out the water, and a pair of oars with their rowlocks. Although these *kayaks*, being made of canvas and thin rods, had the drawback of being easily injured if they struck or scraped against a rock, they were still sufficiently strong,



A SLEDGE

and besides formed the lightest mode of transport known, and the most easily mended.

The sledges were after the model of those used by Nansen, and, like the *kayaks*, had been built according to his suggestions. They were 11 ft. 5 in. long, 1 ft. 6 in. wide, and $6\frac{1}{2}$ in. high. The

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runners were provided with a convex section, so that it might be more easy to turn the sledge; they were shod with plates of white metal, in order to slide more easily over soft snow, and wooden runners were strapped beneath them, to be used when crossing ice, or when the snow was granulated during intense cold. The foremost ends of the runners were joined by a bow, to which the trace was attached; no nails were used, but the various parts were lashed together so as to give more elasticity to the entire sledge. Nansen had used his bags of provisions to support and protect the *kayaks* on the sledges; but as I feared that they might be too easily wrenched off by the sharp points of the ice and their contents devoured by the dogs, I had provided aluminium cases, which could be placed on the sledges, and on the top of which the *kayaks* could be safely carried.

The runners were saturated with a mixture of pitch, stearine, and tallow, to render them more slippery and more durable.

When in Alaska, I had always used a rectangular Mummery tent, which could hold three persons, and was supported at the ends by two poles. I had our new tents made after the same model, but of larger size, so that four persons could sleep in them—three lengthwise and one crosswise. They were 9 ft. long, 6 ft. 5 in. wide, 4 ft. 11 in. high in the middle, and 2 ft. 11 in. at the sides. These dimensions had been so calculated that no space remained beyond what was occupied by the four persons. The tents were of silk, the bottom only of canvas. There were two bamboo poles, to which were attached six tent ropes, two front and rear, and four at the sides.¹

The single and double sleeping-bags purchased in Norway were

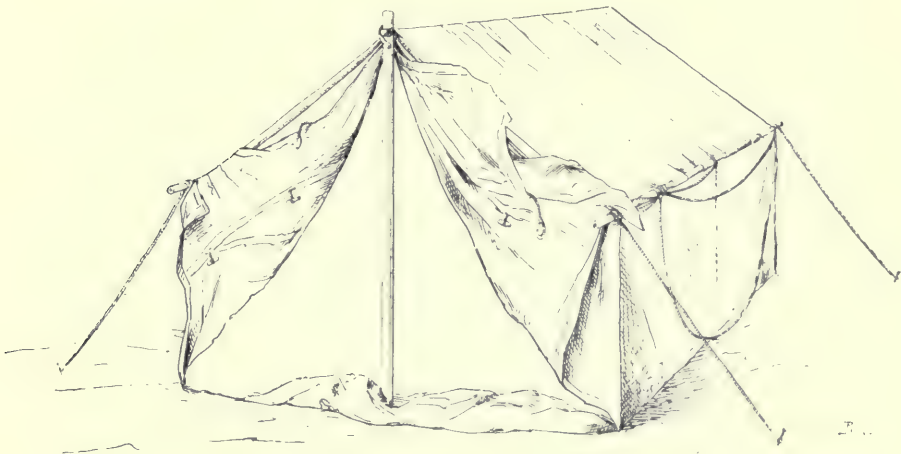
¹ This tent for four persons was again enlarged, so that the four might lie comfortably side by side, and leave room at the foot for the cooking-stove and the provisions.



Returning from hunting

The Preparations for our Departure 185

found to be too short ; we made others large enough to hold three or four persons comfortably, and long enough to allow them to lie at full length without exposing their heads beyond the upper edge of the opening, so that their shoulders were always covered. The flap which closed the opening, which was secured by three straps with buckles, was of ample size, and could thus prevent the cold air from penetrating into the interior. By making the sleeping-bags large enough to hold several men, a great saving in weight was effected, and there



A TENT

was an increase of warmth inside. These bags were lined with the same canvas as that employed to make the wind-repellers.

We had chosen lamps made on the *Primus* system, which burn petroleum; they are best adapted for an expedition like ours, and the most to be relied on. The cooking-stove was that designed by Nansen ; it was of aluminium, but the saucepans were of German silver. They were so light that we doubted whether they could stand much wear, and tested them over the fire for several days, until we

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were perfectly reassured. The table service consisted of a tin dish, a glass, and a spoon for each man, and were made so as to fit into each other, and be packed up in the inner saucepan.

For our arms we chose double-barrelled rifles of .303 calibre and 20 bore, with which we could fire both ball and small shot. As we could not hope to meet with much game in the months in which



A SLEEPING-BAG

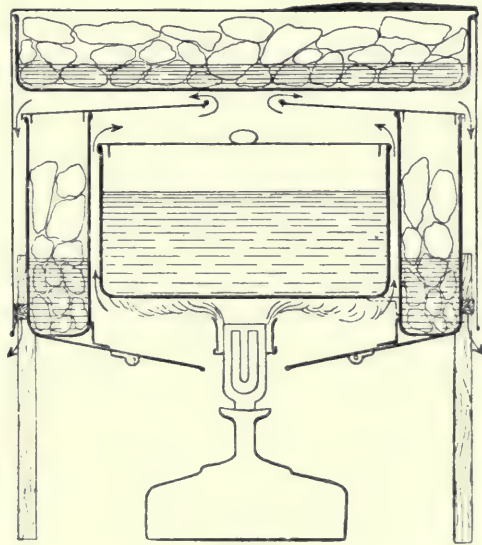
our expedition was to take place, we decided to carry only a few charges.

The cooking-stoves fitted exactly into the openings in the *kayaks*, where they were safely placed and well protected while travelling ; the *Primus* lamps, the scientific instruments, a few books and notebooks, the cartridges and everything else which we might require, such as string, needles and thread, were packed in a wooden box. Our instruments consisted of a sextant of aluminium, an artificial glass horizon, two ordinary thermometers, a maximum and a minimum thermometer, a pocket aneroid, and a surveyor's compass.

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We had also a stereoscopic telescope by Zeiss, and three pocket chronometers for the last detachment, two for the second, and one for the first. Besides these chronometers, each detachment had a good watch. A small medicine-chest contained the drugs most requisite for an expedition in case of accidents or illness.

The lightness and softness of camel-hair coats had led me to purchase some in England for the sledge expedition. On account of their great warmth, they had seemed to me preferable to the fur clothing we had previously worn, but we found afterwards that they heated the body too much while marching, and let it be chilled when halting, and the perspiration froze. For foot-gear we chose the *finskos* and the *kömagers*, which, along with two or three pairs of stockings



LAMP AND COOKING-STOVE

and some sedge grass for padding, kept the feet warm, and were very light.

As we had given up using the bamboo pole and the traces made in Norway, we made new traces of ordinary rope. To each trace were

attached eight shorter ones, two by two, four on each side, to which the dogs' harness was tied merely by a knot. Rings were fixed on the central trace, on a level with the heads of the dogs when they were pulling, and to which they were hooked on by a short chain, which also served to tie them up during the night. Our dogs' harness, like that made by other explorers, consisted of canvas collars carrying four strips of canvas, two of which passed between the animal's fore-legs and two along its back, where they were all united to the trace. Each sledge was provided with a small steel rope, with as many rings as there were dogs, to tie them to, at a distance of four and a half feet from each other, when we encamped. We were obliged to make larger hooks than those we had brought with us, so as to be able to hook the dogs to the traces and the steel ropes, and to loosen them again while wearing our woollen gloves.

Captain Cagni's forefinger was already nearly healed, but, in my case, it was found necessary to amputate the ends of my fingers.

I yield the Command of the Sledge Expedition to Captain Cagni. I was anxious that the doctor should perform the operation as soon as possible, that the wounds might be cured in time, but he delayed it, hoping to save the part which was not irretrievably lost. As he could not perform the amputation before the middle of the month, I began to fear that I should not be able to take part in the coming expedition. It would be impossible to make use of my hand, if my fingers had recently undergone an operation, and they would require to be dressed under a tent, which would be impossible while on the march. If under ordinary conditions it is awkward not to be able to use one's hand, in these regions, and in such a state of health, I should have been under the necessity of being continually assisted by others, which would have rendered me useless in a position where all of us, and especially those in command, were obliged to give a good

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example. Considering also that a sudden augmentation of the injury, or a second frost-bite, which might easily happen to a finger that had once been frozen, might oblige me to return to the hut, it is easy to see that I should be a source of anxiety for my companions, and might at any moment cause the failure of the



THE DOOR OF THE TENT AFTER THE STORM

expedition. Even on January 15th, when the doctor had not as yet informed me what he intended to do, I had told Captain Cagni that he was to take command of the expedition instead of me. I could not have entrusted it to a leader more gifted with energy and activity, more prompt at finding expedients,

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or endowed with greater moral and physical endurance. In giving Captain Cagni the command of the expedition, I left him free to take all the measures with regard to details which he might think best adapted to ensure success, while following the general lines on which we were both agreed. On January 18th nearly all the first joint of my middle finger was amputated, and ten days later a part of the fourth finger.

On the evening of January 12th a violent storm burst out, which lasted until the morning of the 14th. We could take no observations, as it was impossible to remain outside the tent.

**Our Tent is
buried under the
Snow. We can
hardly get out.**

It was the only time in the course of the winter when we could not go out to carry on our usual occupations, and were unable to take observations. While the storm lasted, our tent, although buried under the snow, was shaken by the force of the wind, and the whirling snow, beating against its sides, made a noise like the rushing of water through a conduit. When, on the morning of the 14th, we wished to go out, we found the door blocked up by snow, to a depth of ten or twelve feet, and were obliged to draw the snow into the porch and dig a way through it, which could let a single person pass out. Outside the tent the snow had been piled up to leeward of the different huts till on a level with them, and the roof of our tent rose only a yard above it. These gusts of wind, which lasted only a few hours, had prepared work for us for two or three days.

These snowstorms had obliged us to cease to protect our instruments with cages; we decided to hang them on a pole, and leave them always exposed to the air, as the wind would carry away the snow which fell on them. There was, at first, some trouble with the thermograph; but later on, when the larger openings had been closed with waterproof paper, and several tins of butter had

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been employed in filling up the clefts round the cover, it was able to act, even during the strongest winds; and, as it was free from snow all round, it always gave exact results. The thermograph, the two hair hygrometers, and the thermometers



THE SHIP AFTER THE STORM

were all hung on this pole, and remained there for the winter and the following spring until May.

On January 17th the temperature rose again to -6° C., and on the 9th to -2° C. To the north-west and south-west there were wide belts of open water, stretching almost all round the island; the sea could be heard breaking against the ice fixed along the coast; and, towards the west, we could not see by **Daylight returns.**

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moonlight the edge of the ice-pack. We were not much pleased to observe this open water, on account of the hindrance which it would prove at the beginning of our sledge expedition. January was, however, a cold month; and there were very few days on which the temperature rose. There was but little wind in the second half. As the stoves were kept lighted nearly all day in the tents, the temperature there was always between 15° C. and 16° C.; but at



THE PORCH OF THE HUT BURIED IN SNOW

night, when they were put out, it fell to 1° C. In the first tent the temperature, which by day rose to 10° C., fell at night to -5° C. or -6° C., and in the second tent to -15° C., while outside the temperature was -40° C. The consumption of coal, both for the stoves and for the kitchen, was never more than 33 lb. 3 oz. 2 dr. a day.

As the brightness of the twilight continued to increase, we

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harnessed the dogs to the sledges every day in order to break in the more stubborn, and to be able to select the best. The Polar night ended on January 21st; this joyful event coincided with the name-day of the King of Sweden, which we celebrated. On January 26th, between eleven and one, the sky was already bright enough to allow us to see what was around us, while walking on the ice. The horizon, as the sun came nearer to it, became lit up with different colours—greenish at first, and then red. These colours appeared towards morning in the east, followed the sun in its progress towards the south and then to the west. Although several days were still to elapse before the sun appeared, we could feel that it was slowly returning. The sea froze again in the last days of January, on account of the prevalence of calm weather and the low temperature, and we could see nothing from the summit of Cape Säulen but snow and ice both on land and sea.

On January 29th, which was my name-day, the tent was decorated with Italian and Norwegian flags, and as they fluttered in the breeze, and were lit up by the gradually increasing daylight, they filled my mind with emotion. But seeing them on land, beside our hut, and not on our ship, I could not but reflect that, in order to return home, we should have to find means to free the *Polar Star* from the ice in which she lay imprisoned.

CHAPTER X

Departure of the Expedition towards the Pole

CHAPTER X

DEPARTURE OF THE EXPEDITION TOWARDS THE POLE

LIGHT came back quickly, and the progressive lengthening of the days was very apparent to us after living so long in utter darkness. On February 8th the stars were no longer to be seen at noon. The aspect of the bay and of everything around us had changed. The hut, and the ship, which lay to the north of the bay, were entirely buried in snow, which covered also the porch, the carpenter's hut, and the kennels. Some passages leading from the door of our hut gave access to other places which were buried. The sea was everywhere frozen, and the recently formed belts of ice were easily distinguished from the rest, as they were perfectly level.

Aspect of Teplitz Bay. Captain Cagni's Excursion.

We worked energetically to fit out the expedition to the Pole; the sledges and *kayaks* were got ready on board the ship; the provisions, clothes, sleeping-bags, and tents in our hut. The sledges were loaded one after the other beneath the shelter of the magnetic hut; they were then dragged out and covered with tarpaulin until the time came for leaving.

The belt of open or hardly frozen water, which was often to be found to the west of the island, made us doubt as to whether on starting we could proceed from Teplitz Bay direct towards the north. If this belt were to stop the march of the expedition, it would be necessary to advance along the coast up to the point where the belt

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came to an end, so as not to delay the departure for some days, or even for some weeks. Since the ice drifted towards the west, we were almost certain that at Cape Fligely we should always find the ice-pack touching the coast, and, therefore, be obliged to follow the island, at farthest, only as far as Cape Fligely. The ice-cliff which ends the glacier rendered it impossible to descend everywhere, so Captain Cagni resolved to go with the guides, Petigax and Fenoillet, to examine it. He was away from February 12th to 14th, and enabled to ascertain that it was possible to descend from the glacier at many points along the coast between Cape Germania and Cape Fligely. He also tested our equipment by a temperature of -31° C. The sleeping-bag was found to be sufficiently warm, and there was plenty of food for the men and the dogs. As there was not as yet much light, on cloudy days especially, we could not see distinctly for more than six or seven hours. We decided, therefore, to put off the departure for some days.

While Captain Cagni was away, the dogs had been caught and tied in front of the hut, to be fed for some days on pemmican.

The Health of the Dogs. Some Varieties are Better than Others. During the six months we had passed in Teplitz Bay only thirteen of them had been lost. Six had died in autumn, and the seven others in winter ; some were killed by their companions, others by falling into a crevasse or by being buried under the snow in a storm. They had fought with each other frequently in the autumn, but very rarely in the darkness of the winter ; and though it was impossible then to watch them carefully, a fight could not have taken place even when they were at some distance, without attracting our attention.

We were glad to see our dogs again in as good a condition as they had been in the autumn, for they had become so thin during the winter that we had felt alarmed. This was on account of the intense

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cold, and because their dried fish had been so hardened by the frost that they could not eat it, whilst they had only frozen snow to quench their thirst ; it was also on account of the frequent storms, and perhaps, too, of the darkness. When they had been nourished on food which contained more fat, and was more easy to eat (such as Fedte-Grever's excellent tablets and Spratt's English biscuits), they were soon brought almost to their former condition. Although born in an intensely cold country, they were not insensible to temperatures below -30° C.



A TYPICAL TEAM

When it was very cold, they were often seen to raise their paws out of the snow from time to time, and to go about looking for straw or wood to lie upon. They often went up on the top of our tent to warm themselves round the kitchen chimney. Both while training them and in stormy weather, we had become convinced that the short-haired dogs resembling wolves, of the type described by Wrangell, were very much superior to the long-haired dogs of various races ; they showed greater resistance to the inclemency of the weather and greater strength when drawing the sledges. When there was a storm,

the hair of the long-haired dogs was filled with snow, which froze and formed a cuirass round the body, which prevented them from moving. This did not happen to the short-haired dogs, which were also more nimble, stronger, more willing and more strenuous when harnessed to the sledges, and also more courageous when hunting the bear.

While the Polar night lasted, the number of our dogs had been augmented by twenty-one puppies; seven more were born later, so that twenty-eight in all were born at Teplitz Bay; but, with few exceptions, those dogs born during the winter always remained small and of little use for draught.

Captain Evensen and the sailors, Hans and Ole, had been chosen to form the auxiliary detachment, which was to accompany the expedition for two days only, and would prove especially useful while crossing the belt of ice near the island, which, it was foreseen, would present difficulties to our advance. To facilitate the return of the detachments to the island, in case there should be belts of open water or of newly formed ice, it was decided to place an outpost at Cape Fligely, and the following agreement was made with the leaders of the detachments :—

On the twenty-fifth day after the departure of the expedition from Teplitz Bay, men should be sent to Cape Fligely to watch for the return of the first detachment, and to assist it. They would be provided with a good telescope and a boat. If the first detachment, when not more than eight miles from the north coast of the island, were to find it impossible to continue its journey, it would hoist some sort of a ball on its tent-poles tied together. When the men at Cape Fligely saw the signal made by the detachment on the ice-pack, they too were to hoist a ball, as high as possible, in some place where it could be easily seen, and where it might stand out against the island in the background. The same outlook was to be kept on the fifty-fifth day after

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the departure of the expedition, until the return of the second detachment, and on the eighty-fifth day until the third detachment came back.

We celebrated Captain Cagni's birthday in advance on Sunday, February 18th. We then met for our usual Sunday devotions, after which Captain Cagni, addressing me, saluted me in the name of all



ENTRANCE TO OUR TENT

present, and assured me that he and his companions would do everything in their power to achieve success. In reply, I expressed my regret at our separation, and my conviction that the expedition would end happily, since I saw that they were leaving fully resolved to overcome every obstacle and to endure every privation.

The 19th had been fixed for the departure. Contrary to our

hopes, there was to the west of the island a belt of ice too thin to bear the weight of the sledges. This belt, which in some places was as much as a mile and one-third wide, began at Cape Rohlfs, and, skirting the coast up to Cape Säulen, trended towards Cape Clement Markham. It would not have been prudent to attempt to cross it, because the ice was not thick enough, and moreover was intersected in every direction by channels. We were, therefore, obliged to give up the idea of starting from the bay towards the north, and to follow the coast to beyond Cape Rohlfs.

We began, then, that morning to send the sledges towards Cape Rohlfs. There was a breeze which at the temperature of -28° C. caused great pain to whatever part of the face was left uncovered. The dogs would not pull against the wind, and thus the ascent was most difficult and fatiguing. When some of the sledges had been dragged about twenty minutes' distance from the camp, we were obliged to leave them there and return to our hut; the rest of the sledges were brought up in the afternoon.

The fine weather of the previous day lasted during the night, and the temperature fell to -35° C. The place where the sledges had been left was about half-way up the ascent to Cape Germania, and another day's work was necessary to collect them together on the top of the cape. The guides, Petigax and Fenoillet, were left there along with the dogs to pass the night, while all the others returned to the hut. As the day was cold and calm, we felt sure that the ice along the coast would be thick enough next day to allow the sledges to cross it.

On the morning of the 21st, Captain Cagni, with the rest of his men, left the hut at an early hour to rejoin Petigax and Fenoillet, and I followed them shortly afterwards with the doctor and the cook. We found the expedition at the camp ready to start. The sledges were

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drawn up in line, with the dogs tied to ice-axes stuck in the ice before them. At Captain Cagni's word of command they set out. The snow was in good condition and the land sloped gently downwards. This helped their progress, and the sledges were able to advance at a short distance from each other, taking up a length of about 200 yards. As the descent became more steep farther on, ropes were put round the



THE MAGNETIC BOX

runners to act as brakes, and we walked on together, stopping every fifteen or twenty minutes to wait for the sledges. The expedition halted near the coast. What was for me the most painful moment had come at last. I shook hands with them all, and the intensity of the various emotions which I felt brought tears to my eyes. Then, as the train of sledges moved slowly away, we saluted each other once more, with the cry three times repeated of "Long live the King!" and my last sight of the expedition was when it halted near Cape Rohlfs.

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The temperature that day remained at about -35° C.; the weather was calm and bright, and, except for the cold, seemed most promising for the beginning of the expedition, which was marching away in perfect order. It was composed of twelve men, 104 dogs, and thirteen sledges, which, with their loads, weighed 617 lb. each; it had provisions for forty-five days for the last detachment, which, if it were able to return on May 20th, would have passed the three most favourable months on the ice-packs. The leader was capable, the men determined, it was not the first time they were about to face dangers and privations, and they were all eager to win for Italy the glory of first reaching the Pole. But I could not conceal from myself the difficulties of the undertaking. The future and the success of the expedition were now in the hands of God, who, by protecting them against mishaps, illness, and bad weather, and by helping them on their way, could enable them to reach the goal.

The Norwegians came back that evening. Andreas told me that they had lost sight of the expedition after it had crossed over a part of the belt of thin ice. That evening, although attentively cared for by my remaining companions, I felt myself overcome by a deep melancholy.

My first thought next morning was to ascertain what had been the lowest temperature during the previous night, and I was sorry to see that it had fallen to -43° C. Andreas had come back with the fingers of one hand slightly frost-bitten. Although not a doctor, I was already beginning to understand this sort of accident rather well, and I was glad to perceive that, in this case, no bad results were to be apprehended. We passed the day in putting our hut somewhat in order, as it had been neglected on account of the pressure of work during the last few days. The

**Unexpected
Return of the
Expedition.**

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absence of the dogs made the bay appear silent and deserted, and the desolation around us seemed intensified.

The same calm and the same low temperature prevailed on the 23rd. The breaking up of the ice, as it was driven against the coast,



DOGS IN FRONT OF THE TENT

made a noise which could be heard many miles away ; it was like the entrance of a train into a station, or the booming of cannon. If, in one way, this reassured me, since it would prevent channels from being formed along the island which might prevent the return of the auxiliary detachment, it made me also feel uneasy, as I feared the expedition might chance to be on some belt of newly formed ice subjected to pressure.

As I was walking before the hut, about six o'clock that evening, I heard dogs barking in the distance. I thought that it was Captain Evensen who was coming back, but there seemed to be a large number of dogs, and the sounds did not become more distinct, as would have

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been the case if they were advancing towards us. Nothing could be seen from the level ground where our hut stood, and thinking that I had been deceived by the echo, and that Captain Evensen had stopped for a few minutes to make tea and would soon rejoin us, I continued my walk. But Lieutenant Querini suddenly appeared, and, to my amazement, told me that the entire expedition had come back, and that he had been sent forward a little in advance of his companions, who were coming without their sledges, some of which they had left at Cape Germania, and others at Cape Rohlfs.

Lieutenant's Querini's few words surprised me very much, and I set out for Cape Germania with Andreas and Stökken. We soon met Hans, who was preceded and followed by dogs. On seeing the members of the expedition returning thus one after the other, I began to fear still more that something serious had occurred, which was being concealed from me; Captain Cagni had expressly arranged to send a man to announce his return before any of the dogs could arrive. At Cape Germania we found seven sledges with the dogs lying down about them, but, though we called repeatedly, we got no answer. Captain Cagni and his party had probably passed us by unseen in the dark, and we returned without delay to the hut, where, such was our anxiety, we arrived running rather than walking. To my great relief, I found at the tent Captain Cagni, the doctor, and Captain Evensen, all in good health. Captain Cagni had fallen into a channel, and was busy getting off his trousers, which had frozen upon him. The others were eating with a good appetite, and the sailors were doing the same in the adjoining tent. They were all well except Ollier, who had a toe frost-bitten. When I heard from Captain Cagni a brief account of what had happened, I congratulated him on the decision which he had reached, although it had been very painful to him

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to do so. He had brought back his men in good health, no part of the equipment had been lost, and the only consequence would be a delay of some days, after which the expedition could start again.

The three days which the expedition had passed on the ice-pack had shown defects in its preparation which required to be avoided before setting out again. About twenty days would be requisite to have everything in perfect order for this new departure, and better



A GROUP OF OUR FRIENDS

prepared than for the first. I therefore agreed with Captain Cagni to modify the plan of the expedition in accordance with this delay, for I looked upon it as absolutely necessary that all its members should be back by May 20th at the latest. As the departure was to take place on March 10th, the various detachments could no longer begin their return after fifteen, thirty, and forty-five days, as had been previously settled, but after twelve, twenty-four, and thirty-six days

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respectively, so that the entire duration of the expedition would be reduced to seventy-two days. The length of the march of the third detachment might be increased by two days, which would bring it up to thirty-eight days, and Captain Evensen could again accompany the train on its two first marches. As Captain Cagni was of opinion that it would be advisable to increase the number of the first detachment by one, in order to give more help during the first marches, the number of men forming the expedition was brought up to ten. As the engineer, Stökken, had expressed a desire to take part in the enterprise, he was chosen for the purpose. As a temporary arrangement, which Captain Cagni might vary as he judged fit while the expedition was on its way, the first detachment was composed of the doctor, Stökken, and the two younger guides; the two sailors were placed in the second, and the two other guides in the last.

We should have seen the sun on February 26th, but a light breeze from the north-east, which rose during the night and carried drift snow along with it, darkened the sky. On the 26th, 27th, and 28th, the wind set in strongly from the north-east, with drift snow, which made it painful to work out of doors, and I did not regret that the sledge expedition had come back. As the weather became fine again on March 1st, the sledges which had been left at Cape Rohlfs were brought to the hut. It was a bright, clear day, and we were able for the first time to greet once more the luminary which we had not seen for so long. The beautiful rosy tint which at noon that day was once more shed over the surrounding landscape, after so many months of darkness and of twilight or moonlight, made us experience an unwonted gladness. The colours of the sky that day seemed splendid. The sun, which was setting in a mist at the horizon, had taken a dark red

**The Expedition
leaves Teplitz
Bay.**

OUR CAMP IN THE SPRING OF 1900



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tint, and the stretch of sea still unfrozen, which was of a deep blue intensified by the surrounding ice and by the dark rocks of Cape Säulen, reminded us of the fantastic scenery of the stage. When the light returned, the birds (little auks and guillemots) arrived almost at the same time to bear us a greeting from inhabited lands.

During the following days up to March 8th, the provisions were once more packed on the sledges. The recent winds had formed a lake of open water extending from Cape Säulen to Cape Clement Markham. The low temperature of the last few days had



THE SLEDGES ON THEIR WAY TO CAPE ROHLFS

again frozen this belt, and on the morning of March 10th we hoped, judging by the thickness of the ice, that we might be able to cross it on the following day.

The expedition, composed of thirteen sledges, which were now laden with only 551 lb. and drawn by 102 dogs, set off on Sunday,

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March 11th; it was a fine and calm morning with a temperature of -28° C.

Near Cape Säulen, the expedition left the ice which was fixed to the island and crossed over to that, about four and a half inches thick, which had been formed on what had been a few days previously a belt of open water. Just then there was a slight movement in the ice,



THE SLEDGE EXPEDITION READY FOR DEPARTURE

tending to detach it from the coast and to form small channels, of which only the most recently formed were not frozen. Those which had been opened some hours before our departure were already covered with a thin crust of ice, which could only be distinguished from that which was thicker by its greater whiteness. As the water froze, the salt separated from it on the surface, and produced an efflorescence which looked pretty, but hindered the progress of the sledges, and being very wet under foot, immediately soaked our shoes.

As the sledges advanced over the ice, they were obliged to change their course every minute to avoid the larger channels as well as

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the belts of thinner ice, which, though it might have borne the dogs, could not certainly bear the weight of the sledges. The dogs which drew the hindermost sledges tried continually to keep up with the leading sledge by the shortest way, and if the men were not able to come up in time to turn them aside, they rushed upon the dangerous places which the first sledge had avoided. The sledges were twice in danger, but owing to the speed at which the dogs dragged them across the weakest spots, the ice luckily resisted, though it bent under their weight.

Captain Cagni was at the head with the sledges which formed



THE SLEDGE EXPEDITION CROSSING THE PACK

his detachment; he was followed by Lieutenant Querini and Dr. Cavalli, who came last. We marched thus in file for a distance of about twenty yards over ice which was continually moving under our feet. A man walked before the dogs of the first sledge; others walked beside the sledges which followed and pushed them on. On reaching the

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old ice, we had to turn to the south-west to find a spot where it would be easy to get on it, and I assisted at this first struggle with difficult ice. If the whole ice-pack were similar to that we had already crossed, it would be an easy matter to reach the Pole, both on account of the speed with which the journey could be performed, and because the smooth ice would not damage the sledges. On the rugged ice-pack, however, two guides armed with ice-axes had to precede us, to level



GRASSO, THE DOG GIVEN BY DR. NANSEN

the surface where it was most broken up, and we were forced to follow a winding path to avoid the places where it was impracticable. The sledges were often overturned while crossing those uneven stretches of ice, and the men obliged to raise them up, or else the runners remained caught among the sharp points of the ice. The sledges were, therefore, frequently and easily damaged, and our way was lengthened by the continual zig-zags our guides were obliged to make

Departure of Expedition towards the Pole 215

in order to find the best places. It was then that I left my companions, bidding them good-bye one by one.

Captain Cagni and I took leave of each other with heartfelt words, which expressed our sincere and mutual good wishes of soon meeting again after a successful expedition. I felt that this time our parting was definite, and that I could not see him again until many weeks had elapsed, on his return from the most severe trial he would have to undergo in all his life. If it had not been always easy to live together in the limited space of the same tent, at that solemn moment no memory of slight misunderstandings ruffled the tranquillity of our minds, or rendered the last clasp of our hands less affectionate.

The sledges then went on ; the doctor was the last to salute me, and the convoy disappeared among the tall hummocks. Gini and I climbed a mound of ice to see the convoy once more as it proceeded on its way. Just now it was they who had saluted us ; this time we saluted them, and from far away the cry of "Evviva," three times repeated, replied to our cheer. It was the last farewell. We lost sight of the convoy shortly after.

CHAPTER XI

Long and Painful Expectation of the Return of
the First Detachment

CHAPTER XI

LONG AND PAINFUL EXPECTATION OF THE RETURN OF THE FIRST DETACHMENT

OUR return to the hut was very sad, as it had been some days previously. My mind was troubled by the same thoughts, the same discomfort of being separated from my companions, and anxiety with regard to the hardships which awaited them. As I was absent-mindedly walking, I did not perceive a recently formed channel; the ice broke, and I fell into the water. My boots, trousers, and jacket immediately became stiff, and on reaching the tent I had to be helped to take off my frozen clothes, which had begun to thaw in the warmth, and were drenching me. Some hours later, about two in the afternoon, the others came back.

The Reason for
my Diary.

Our daily life was thenceforth filled by a single thought—the return of our comrades; and as a record of this time I think it will be well to repeat here what I wrote in my diary, and also mention the observations which were then taken, so as to give an exact idea of the state of the atmosphere and of the ice in the neighbourhood of the island, as well as of our ideas and of the measures which we took at that period.

March 12th.—A calm day without wind; temperature -22° C. The ice-pack is moving slightly near the island; it tends to recede from the land and to form small channels here and there. On

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returning to the hut we see a large bear, which, as it is not disturbed by the dogs, comes close to our dwelling. Andreas and Christian get near and kill it. A screen is put up at the south side of our instruments to keep them in the shade. I develop the negatives taken when the expedition left; they are the first instantaneous photographs taken this season.

March 13th.—We still have the same calm weather and clear sky of the previous days. A coloured halo is seen round the sun for the first time. In the morning, only the lower half is visible, but in the course of the day the sides rise till they meet above. The halo showed only a single circle, and two mock suns were faintly visible on a line with its horizontal diameter.

I visit Cape Germania and Cape Säulen with Andreas, and ascertain that it is impossible to reckon on being able to see to a great distance. When the weather is clear, and the sun is shining, the shadows cast by the hummocks form dark spots, which cannot be distinguished from a train of sledges. The ice continues to move slightly, with a tendency to open out, but sledges could still travel over it. We return to the hut without having sighted the sledge of the auxiliary detachment, and are therefore much surprised when Captain Evensen returns that evening at six. He informs us that the expedition is progressing safely; that the dogs are going on very well; that the sledges are not breaking down; that the cold is not felt too much; and that the daily marches, although impeded by many pressure-ridges, have been fairly good.

March 14th.—It is the birthday of His Majesty the King. I should have preferred to celebrate it with all my comrades; as it is, I am the only Italian in my tent, and Gini the only Italian in the sailors' tent. We can all, at least, however, celebrate the feast in our hearts if not outwardly. The Norwegians

**The King of
Italy's Birthday.**

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join us, for they always take part in our feasts, as we take part in theirs. In the evening the temperature again falls to -37° C.; and at night sounds of ice-pressure are heard near Cape Säulen. The weather is still clear and perfectly calm.

March 15th.—The cold continues, and at night reaches -39° C. The ice-pack again comes gradually nearer to the island, breaking



A PRIZE

and raising up the freshly formed ice. The moon shows a halo, with a fine cross in the centre.

March 16th.—Still the same weather—fine, calm, and cold. The tide-gauge, which had been set up on the beach during summer, can no longer be used, as it is now covered by ice. I place another gauge on the edge of the fixed ice, on the line which separates the fixed from the floating ice. A sight put up in the neighbourhood enables me to make sure that the pole remains steady. Observations

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are taken every hour by each of us in turn, beginning on the following day.¹

March 17th.—A fine, calm day like the preceding, with a cloudless horizon. The sun sets at six, and from the summit of Cape Säulen no land can be made out towards the west, though, if there were any, this would be the most favourable moment for seeing it. The sailors begin to set the deck of the ship in order by clearing away the snow which had been piled up there.

A creaking sound has been heard all day along the line which separates the fixed ice from the movable ice, caused by the equinoctial tides.

March 18th.—The continuation of fine weather up to to-day must have allowed the expedition to advance, and the pressures coming from the west show that the ice-pack has either remained steady or has had a slight movement towards the east. To-day, there is a fresh easterly wind with much snowdrift. When the wind sets in steadily, the temperature rises several degrees. What makes the temperature rise?

The open water which must certainly exist to the west of White Land when the east wind blows, may have a share in raising the temperature. So might have all the winds from an easterly direction, which, before reaching us, pass over land and, consequently, over belts of open water. The temperature, therefore, ought not to rise when the wind blows from a westerly direction. But, on the contrary, we have always observed that it does during these winds.

If the phenomenon occurred only along the land, and not in the Arctic Sea, it might be easily explained. During the Polar night the earth is the sole source of heat. As there is no radiation

¹ See *Scientific Observations*, Part I., Chapter III., "Tidal Observations," a report by Lieutenant Alberto Alessio.

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through the ice, the air which rests on the earth on calm days must take the temperature of the ice little by little, and become exceedingly cold. When a wind sets in from the surrounding ice-belts, the cold air lying over the land becomes mingled with that which lies on the ice-fields, which ought to have a higher temperature on account of the open channels, and because the ice is thin in many places. The expeditions which have passed a winter on the



A SENTRY!

ice have also observed the same fact ; and, contrary to what might have been expected, we, too, have found the temperature on the ice-pack colder than that on Prince Rudolph Island. The sea, therefore, is not the principal cause of this increase of temperature. It is only by many further observations that we can learn to what it may be attributed.

It is difficult to take observations with the tide-gauge, as the well in which the pole stands is filled by a large quantity of snow

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driven by the wind. Each time that we examine it, it requires about ten minutes to clear this away.

March 19th.—It was impossible to observe the tide-gauge last night; the wind was so high and the drift so thick that a lantern could not be carried to show the way. The porch of the tent was again filled with snow during the night, and in the morning we had to work hard to get out. The wind is still blowing at nine, but the drift has ceased. The temperature has risen to -22° C., where it stays. We stretch a rope from the hut to the tide-gauge, to guide us in any state of the weather, and allow us to take observations without interruption. The officers' saloon on board, which was always so well kept, has now from sheer necessity been changed into a sort of tannery. Christian has established himself there with our bearskins to rid of fat and get ready for tanning.

March 20th.—The wind is blowing intermittently, the drift is sometimes light, and sometimes so thick that we can see nothing around us.

March 21st.—The day is calm, not cold—there is no wind; the temperature is -24° C. A large channel, caused by the wind of these last two days, can be seen extending from Cape Säulen to Cape Clement Markham. The crew begin once more to clear the snow from the ship. The anemometer and the anemoscope, which had been left on board during winter, are set up on a little scaffolding placed on the top of the second tent.

March 22nd.—Another fine day without wind. Although the temperature is -26° C., I begin to feel for the first time the warmth of the sun, which until now had only given us light. Fresh ice is being formed on what was yesterday open water. Several little auks and guillemots are to be seen near Cape Säulen. The snow is thawing for the first time along the side of the tent which is



Position of the Ship in the Bay of Topletz in March 1907.

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exposed to the sun, and trickles down into the interior of our second tent.

March 23rd and 24th.—The sky is clear, and the barometer does not move; the wind is blowing in slight gusts from every point of the compass. The afternoon of the 24th is calm. It is still bright at ten o'clock at night. In a few days we shall again have daylight for twenty-four hours.

March 25th.—According to the plan agreed upon with Captain Cagni, the first detachment should return to-day. This evening, in our cabin, we discuss the question of what latitude it may have reached. If the weather on the ice-pack was like what we had in Teplitz Bay, its march must have been stopped, at most, on the 18th or the 19th. We may, therefore, suppose that, if the ice did not present too many obstacles, the detachment must have made good progress.

With the return of calm weather and a clear sky, the temperature falls again to -30° C. Light breezes blow from the north. The ice-pack has once more moved up the coast. These movements of the ice, towards the east in the early days of the month up to the 18th, towards the west on the 18th and 19th, and now again to the east, have probably not made the first detachment deviate much in longitude. We go to bed at a later hour, as we take advantage of the fine evenings to remain out of doors chatting together, though the temperature is still between -25° C. and -30° C.

March 26th and 27th.—Calm weather and bright sky. The atmosphere is clear, and the ice-pack close up against the coast. The instructions for those who are to wait at Cape Fligely for the return of the various detachments are On the look-out at Cape Fligely. now changed. It was agreed between us that the group of helpers is not to be at Cape Fligely on the twenty-fifth, fifty-fifth, and

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eighty-fifth day after the departure of the expedition from Teplitz Bay, but on the twentieth, the forty-fourth, and the sixty-eighth. I therefore decide on going to Cape Fligely to-morrow with a boat.

March 28th.—The sledge on which the boat has been fixed with clamps made by the carpenter, is a strange and particularly heavy load for the seven dogs left behind with us—four females, and three of the more stubborn males. We leave at eight in the morning for Cape Germania, whence, instead of going down directly towards Cape Rohlf's, as I had done the first time that I went to Cape Fligely, I go on along the upper part of the island. The weather is fine; there is no wind; the temperature is very low (-32° C.). We do not, however, feel cold while walking, and what is still more strange, though the sun is right in front and low down, it does not hurt our eyes. After sending back, about eleven o'clock, the men who helped us, I go on towards the north, with Andreas and Hans. From the summit of the island, about 1,141 feet above the level of the sea, the immense plain of closely packed ice which surrounds us can be seen. Nothing could be more favourable for the return of our companions, and I say, jestingly, that our excursion is useless, since the first detachment will arrive at the hut in the course of the day, or to-morrow. After a short rest, we go on about twelve o'clock towards Cape Fligely, which we reach after eight hours' march. We stop here, intending to look out next day for the best place to put up the signal agreed on. In the evening the temperature falls to -36° C.

March 29th.—There is no wind, and it is cold. The weather is splendid, and the ice-pack is close up to the coast. I have slept for the first time in a sleeping-bag of reindeer-skin, with the temperature at -34° C. I can bear the cold, but I am still more convinced that I did well not to take part in a long expedition in my present state. As I can only use one hand, I require to be helped by my companions to

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get into the sleeping-bag, to put on my shoes, and to dress. Although my hand is bandaged and covered with two gloves, wrapped in a sling lined with down, which is covered by another sling of reindeer-skin, I suffer continually from cold, and am obliged to warm my hand over the lamp.



CAPTAIN EVENSEN

The sledge, the boat, and tent are brought a little to the east of Cape Fligely, to the top of a ridge covered with snow, at a height of about 293 feet above the level of the sea, whence there is a view which extends from east to nearly due west. As the detachment will come from the west, and the coast from Cape Fligely

to Cape Germania trends nearly towards the west, they will probably touch land first at Cape Säulen, or at Cape Germania where we are also watching for them continually. We carry the boat close to the little promontory and leave it at the foot of the rock.

We then get ready a dwelling-place, so as to be able to stay on that cape exposed to every wind. Thinking at first of the grotto for the dogs, hollowed out of the snow during winter, we try to make something of the same sort; but we cannot find snow sufficiently deep, whilst to dig into the ice to form a similar shelter would demand too much time. At the spot where we have set up our tent, the snow has been drifted by the wind to a depth of one foot. We excavate in this snow, space large enough to hold the diameter of the tent, and we work into the ice so that the tent may be half buried. We then build a wall round it with large blocks of snow, on which we lay the sledge and the spare oars of the boat, and cover them with snow. We thus put up a hut like those of the Esquimaux, but with this difference; they place the blocks of snow in a circle, and make each course project beyond the lower one, till they meet at the top, while we make use of the sledge and the oars to support the roof of our hut. The hut is finished on March 30th, and the door is made to look to the north, so as to be completely sheltered from any wind. Inside this house of snow we place the tent, which will prevent the water from trickling down upon us from the walls. Near the house is placed the pole on which the ball is to be hoisted; it will stand out distinctly against the glacier. The weather is still fine and calm, the ice-pack close up to the coast, and the temperature varies between -25° C. and -36° C.

March 31st.—The weather is like that of the preceding days. Nansen Islands are again seen faintly in the distance. At night there is wind and drift from the south.

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April 1st.—The bad weather continues, the wind blows from the south and then from the west, and there is a fall of snow. As the temperature at night rises to -17° C. in our hut, we find ourselves comfortable.

The wall of snow enables us to have a higher temperature than if we had the tent only, and at our meals, when the cooking-stove is lighted, we can take off our gloves. The dogs come at night to lie



CAPE FLIGELY, AS SEEN FROM THE HIGHEST POINT OF THE ISLAND

in the porch at the door, to seek shelter from the drift, and make so much noise that we have more than once to send them away. The driven snow penetrates into the tent, and in the morning we can hardly leave it. The wind has formed a channel about 200 yards wide. Towards evening the mist increases, and we cannot see farther than a mile. The comrades we expect have most certainly been unable to stir.

April 2nd.—The wind still continues, and in the evening, after a few hours, shifts to the south-west. To-day, however, is finer than

yesterday. We carefully examine the edge of the ice-pack, without perceiving any trace of the first detachment. The ice-pack near the island does not stir, but only the smaller ice-floes formed in the channel. Strange to say, the temperature rises during the day to -5° C. While walking near the level summit of the cape, Hans sinks into a den inhabited by a she-bear. The den is hollowed out of the snow and communicates with the exterior only by a small opening, through which Hans, taking up a good position, fires, and kills the beast. We then come up, and enlarging the opening of the den, drag out the bear, and two little cubs, hardly larger than cats, which are immediately killed by striking them on the head with an axe.

April 3rd.—The wind blows steadily from west-north-west, with a drift which shuts out everything. As we cannot leave the hut, since there is nothing to see we pass nearly all day in the sleeping-bag. It is impossible to stay still in the hut outside the sleeping-bag; our hands and feet are frozen. We are obliged, therefore, in this delightful place either to keep moving or to shut ourselves up in our sleeping-bag. Towards evening it clears up for a moment and the wind falls; we then see that the ice-pack has again come up to the coast, at which I am much pleased.

April 4th.—The wind continues to blow from west-north-west. The evening is calm. The ice to the north of the island touches the coast.

April 5th.—This is the last day for which the first detachment has provisions. They must certainly have economised their rations **We feel Uneasy about the First Detachment.** during these last few days when they must have been unable to advance. I feel most uneasy with regard to the petroleum. It is true that they were provided with a large quantity, but it may have been all consumed, and in that case, although they might still have provisions, they would find themselves



THE HUT AT CAPE FLIGELY

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in a difficult situation. I cannot understand how the detachment should not have been able to reach the island during the fine days we had up to April 1st; it is true that on the 1st, and on part of the 3rd and 4th, it could not have made long marches.

As the day is very clear, we distinctly see Nansen Islands towards the east. This transparency of the atmosphere gives me hope that even though the first detachment might be still far away from the island, it would perceive and be able to reach it.



THE POLAR PACK

The sky becomes cloudy again towards evening, and a light wind sets in from the south, which opens out another channel, from 200 to 300 yards wide, along the northern coast of the island. There is a fall of snow in the evening.

April 6th.—The morning and evening are moderately fine, with a light wind from the north-west, and snow in the afternoon. Towards Cape Rohlfs the ice is closely pressed against the coast. Ice is being formed in the channel along the island, and though we watch the ice-pack next the coast for several hours continuously, we can detect only

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a very slight movement. No birds are to be seen. We search in vain with the telescope. As the channel is only 500 yards wide, we could certainly see our friends if there. We give the flesh of the bear we killed to our dogs, which relish it very much. We had thought of cooking the cubs, but as neither of us is a good cook, we must deprive ourselves of this dish, and continue to make our usual soup, into which we put all the food-stuffs we have, which, with our good appetite, we always find excellent. Hans makes lamps with bears' fat, which we light in the evening; they warm our hut a little, but they fill it dreadfully with smoke.

April 7th.—A fine day with light breezes from the north-west and north-east. Nothing can be seen on the horizon. I begin to feel anxious about the first detachment. Although the doctor is well accustomed to take observations and make calculations, it is the first time that he has to make land, and this under difficult conditions, which might embarrass and make it hard for him to ascertain his position if he has gone far away from the island. The illness of one of the party may have retarded the march and thereby caused delay, but surely for fourteen days they must have been on their way. Andreas remarks that Captain Cagni may perhaps have made some change in his plans, and have kept the first detachment some days longer with him. I do not think that such a change is probable, and I feel certain that if he has varied his plans, it has been by sending the detachment back a few days sooner rather than later.

As this evening we have provisions remaining for only two more days, I decide on returning to the hut to-morrow morning, and on sending Captain Evensen and Ole on Monday to take the place of Hans.

April 8th.—It is a fine bright day, rather cold, with light breezes from the south-east. I leave the tent with Andreas at seven

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o'clock, and walking quickly along the coast, we reach the hut at mid-day. A part of the ice-pack touches the island, and in many places it is possible to pass from it on to the shore. We find everybody at the hut very uneasy, and the news they can give us is not more comforting than ours. The ice-pack remained touching the coast from Cape Säulen to Cape Rohlfs until April 1st; it went away from it on the 2nd and part of the 3rd. It was again and almost always in contact with the coast on the 4th, 5th, 6th, 7th, and 8th, and on the 3rd, 4th, and 5th there had been considerable pressure.



SKINNING A BEAR

April 9th.—The weather is alternately cloudy and bright, with snow from time to time, but no wind. The temperature has risen to -12° C., with light breezes from the south. The ice is up to the coast on the south side of the island, but with this wind

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there must certainly be a small channel on the north side. I see a stormy petrel for the first time. Besides our dogs, we have at the hut two little bear cubs, which were also found in a den near Cape Germania. They are bigger than those killed at Cape Fligely, and we keep them alive for some days in the carpenter's hut, but they make such a noise that we are obliged to kill them.

April 10th.—I feel still more anxious about the first detachment. I now fear that not only it is lost, but that some misfortune has happened to the whole expedition. The first high wind a few days after their departure may have caused some mishap; or does the delay of the first detachment mean that the whole expedition is coming back together?

John is suffering from a swollen face. My medical knowledge can give him no relief, though the doctor, before leaving, handed over to me not only all his drugs, but also books and instructions in case of necessity. At night the snow fell in large flakes, and as there is no wind, there is a layer of four inches in the morning. In the evening the wind shifts to the west, and at night the temperature fell from -12° C., as it was in the morning, to -34° C. At six o'clock Hans returns to the hut.

April 11th.—A fine, clear day, with a temperature below -20° C., and light winds from the north-west and north. I am glad of this change of weather, and that the wind has gone back to the north, as it will delay the melting of the snow, and drive the ice-pack to the south, which will help the return of the first two detachments. The ice-pack is now in contact with the island.

April 12th.—The men are resting, and they will do the same to-morrow, which will be Good Friday. The day is cloudy, with southerly and south-westerly winds. A narrow channel is formed along the coast. The high temperature of the last few days

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has softened the snow, and in walking, one sinks in it up to the ankle.

April 13th.—Cloudy weather, with light breezes from the south and south-west. A little sleet and a little drift snow. The temperature rises again to -4° C. Is this the beginning of summer? To the west and north of Cape Säulen the ice-pack is in motion; a channel is being formed along the coast.

April 14th and 15th.—There are still light winds from the south and south-west; the sky is cloudy. The temperature varies from -13° C. to -4° C. The snow becomes soft with this rise of temperature, and one sinks still more deeply in. The stormy petrels are seen in greater numbers, and, for the first time, I see the snow on the windlass of the ship trickling in the sunshine. Water is trickling down everywhere in the interior of our hut. We pass Easter Sunday very sadly.

CHAPTER XII

Return of Dr. Cavalli and Commander Cagni

CHAPTER XII

RETURN OF DR. CAVALLI AND COMMANDER CAGNI

APRIL 16th.—A cloudy day, with snow and south-easterly wind. The temperature rises to -8° C. Captain Evensen returns from Cape Fligely in the evening, as I had told him to do. The south-easterly winds of these last days have opened a channel which extends from Cape Clement Markham in the south as far as Cape Fligely.

Unexpected
Return of the
Second Detach-
ment with Dr.
Cavalli.

April 17th.—Light winds from the north. The fog is so thick in the evening that we cannot see the ship from the hut. Water is beginning to flow in the tents and on the boxes of provisions stacked in the passage; they are, therefore, taken away and put in a dry place on level ground. I see an ivory gull for the first time.

April 18th.—At six o'clock in the morning I hear John call out several times: "Cardenti has come back." While dressing hastily in my anxiety to question him, I also hear the names of Dr. Cavalli and Savoie. Our anxiety is ended at last. The first detachment has returned. But why is Cardenti with it, and how did Cavalli get a *kayak*? Did the second detachment give him one? Have the two detachments come back together? I hasten out of the tent before I am quite dressed, and before greeting Cardenti, I ask him: "Of what detachment are you?" "The second," he answers; "the first, consisting of Lieutenant Querini, Stökken, and Ollier, left Commander Cagni on March 23rd, and we left him on the 31st."

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Alas! my soul had for a moment entertained some hope, but these few words fill it again with grief. I then read a note from the doctor. He writes on the 17th—that is to say, yesterday—that on the 15th (Easter Sunday) he was near Cape Säulen, but was unable to get up on the island, and that he had dispatched Cardenti with the *kayak*, to ask me to send a boat for him. We dug a canvas boat from out of the snow; it is in excellent condition, though it has lain without shelter all the winter. We put it on a sledge, harness the seven dogs we have at the hut to it, and all leave immediately for Cape Germania. The ice-pack has receded about 300 or 400 yards; its edge is very much broken up. It is moving slightly towards the east, so that the doctor must have been carried towards Cape Rohlf's. His camp is hidden by the hummocks, and we cannot see it from the glacier. An hour goes by. We feel anxious till at last we see one, and then two, persons moving about on the ice. It is they, and they, too, have seen us. Captain Evensen and Christian leave at once in the boat to meet them.

Meanwhile, I make Cardenti tell me how he passed the night. He had been sent off while the ice-pack was still near the land, and had steered his *kayak* towards the island, with the intention of getting up on the glacier, which ends there in an ice-cliff from three to four yards high. Wishing to take advantage of a crevasse which opened out on the sea, he left his *kayak* and tried to creep up it, but the current carried away the *kayak*, and when he found himself in the crevasse and uncertain of being able to climb it, he was obliged to work for fully two hours, cutting his way through the ice with his axe.

He then went towards the bay, but as he could not find in what direction this was, he turned towards the highest part of the island. Next morning he saw in the distance the masts of the ship, and reached

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the hut after being all night on foot. It was only a man of his great strength who could have withstood such fatigue.

After the short interval necessary for packing up the tent, we see the boat on its way back with three persons, eight dogs, and a part of the equipment. On reaching the shore, we greet it with three



OVERHAULING THE SLEDGES

cheers, which are repeated as we clasp the hand of our excellent doctor, whom we all love, and hail with joy after thinking that he was lost. A second boatload brings over Savoie and the remainder of the equipment, and we are back at the hut by eight o'clock. Cavalli, Cardenti, and Savoie, although very slightly thinner, are in excellent health. So are the fifteen dogs which they have brought back. There is rejoicing

in our hut. After so many anxious days, it makes me feel a momentary gladness to welcome back one of the detachments. The doctor's return dispels, at least, the gloomy thought which had distressed me more and more these last few days, that the entire expedition had met with some disaster. But I am still more convinced that Querini's detachment must have met with some serious mishap.

I pass the evening with the doctor, in a long conversation about Cagni and Querini. The doctor had left the former in excellent health on the morning of March 31st, proceeding towards the north with forty-eight dogs and six sledges. On taking leave of the doctor, Cagni had given him the following note for me:—

“The cold still continues, and it is no slight hindrance to us; it appears, moreover, that during these last days the ice-pack has drifted towards the south, and that we are in a very low latitude. For three days, however, we have found the way easier: there are wide, level tracts, and only few pressure-ridges, which are easily crossed. I do not, therefore, despair of doing something. I shall advance for twenty days longer, and, if necessary, for a couple of days more, should the success of the expedition depend on it. The doctor will explain to you the reasons why I go on with four men and six sledges. I think that I shall advance thus more rapidly. I again repeat to your Royal Highness that I shall do everything that lies in my power and as much as my strength will permit, without wilfully endangering the lives of my men. The health of all of us is excellent.”

In his advance towards the north, Cagni had made some changes in the programme of the expedition, according to which the first detachment, consisting of four men, was to turn back fourteen days after their departure from Teplitz Bay—that is to say, on the morning

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of March 25th—and the second detachment of three men, twenty-six days after their departure—that is, on the morning of April 6th. Instead of this, the first detachment, consisting of Querini, Stökken, and Ollier, was sent back on the morning of March 23rd with pro-



LIEUTENANT QUERINI, THE ENGINEER STÖKKEN, AND THE GUIDE OLLIER

visions for ten days ; and the second detachment, consisting of Cavalli, Cardenti, and Savoie, on the morning of March 31st, with twenty-four dogs and food for eighteen days. I shall not dwell here on the reasons for these changes, which Captain Cagni explains in his report. I merely repeat that at the time of their departure the organisation of the

detachments was purely provisional. It was left to Captain Cagni to give them their definitive formation, and to send back any one of the members of the expedition before the others, according to the general ideas laid down in the first chapter of this book—that is to say, that, as he advanced towards the north, he should select those who showed most endurance and seemed most capable.

I had left the hut to stay at Cape Fligely on March 28th, eighteen days after the departure of the expedition from Teplitz Bay, as had been settled. Lieutenant Querini should have reached the island ten days at most after leaving Cagni—that is to say, on April 2nd at the latest. He and his two companions had left the expedition about forty-five miles from Prince Rudolph Island, which was still visible to the south, two days before they turned back; and the fine weather from March 25th to 31st ought to have assisted their return.

The second detachment had sighted Prince Rudolph Island to the south on April 8th—that is to say, twenty-nine days after leaving Teplitz Bay. The fact that Dr. Cavalli was on the meridian of the island shows that during that time and in that neighbourhood the position of the ice-pack had not shifted much. While returning to the hut from the highest latitude he had reached, the doctor had travelled eighty-nine miles in sixteen days, a daily average of over five miles, and there is no reason to suppose that Querini did not do as much.

If it was discouraging to find that the first latitudes of which observations were taken did not correspond to our expectations, I feel convinced that it was due partly to a movement of the ice in the contrary direction, and partly because at the outset the daily marches may have been a little exaggerated. As the march was directed towards the north-north-east, and the ice-pack moves more easily in those parts from east to west, it is more probable that this movement

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was towards the south-west, which would retard the progress of the expedition towards the north, and keep it on the meridian of Teplitz Bay. The first observations of the island taken by the doctor confirm this supposition. Querini must therefore have been carried towards the south-west. Supposing, moreover, that the illness of one of the party may have delayed their march, and that the bad weather and the south-easterly and south-westerly winds which prevailed after April 12th may have stopped the drift of the ice-pack to the south



THE NORWEGIAN HANS

and driven it to the east, the first detachment can, at most, have been carried to the meridian of the Nansen Islands.

Calculating, therefore, from the distance covered by the expedition, the information collected by Dr. Cavalli, and the observations made in the neighbourhood of the island, it is very difficult to come to a conclusion as to what might be the best direction in which to send a search expedition. It seems to me useless to send one to the south, for if they went in that direction and have not yet reached us, they must have been carried very far, and they will go on to

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Cape Flora. It is useless also to seek towards the west and the north, where the ice-pack is much broken up and always in motion, and where the horizon is very much circumscribed. There only remains White Land, towards which it is possible that they may have been carried, or to which they may have gone, mistaking it for Prince Rudolph Island, and from which they have not since stirred. The supposition does not seem probable, but as it is the only one on which I can act, I decide on sending an expedition towards that island, and give the command to Andreas. Dr. Cavalli, Cardenti, and Savoie express a desire to form part of it, but it seems to me that after their fatigues they require absolute rest.

On April 19th, 20th, and 21st the ice generally remained close to the island, the weather was fine and calm, and the temperature varied between -15° C. and -29° C. The calm weather and the cold have caused the open water near Cape Säulen to freeze, and the birds have disappeared from that locality. On the morning of the 22nd, Andreas, accompanied by Hans and Ole, sets out with two sledges, sixteen dogs, food for twenty-six days, and a folding canvas boat (that which brought back the doctor), to enable him to cross the canals more speedily. I have instructed him to march towards Nansen Islands for twelve days, but if by that time he has not reached them, or is still far away from them, he is to come back.

Towards evening I go with Cavalli to Cape Säulen. Owing to the calm weather of the last few days, and the light breezes from the west, the ice-pack is again in contact with the coast. To the south of Cape Säulen can be seen a pressure-ridge, which is certainly from seven to eight yards high. I can clearly see how impossible it is to travel with sledges over such ice. In a recently formed pressure-ridge the blocks of ice, which are piled up one over the other, and rise almost vertically from the surrounding ice, present such sharp points and

A POLAR BEAR



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projections that a man finds it difficult to cross them, and a sledge requires to be lifted over. The sun is already so high that when we return to the tent it warms us, and allows us to remain outside for more than half an hour, though the temperature is -22° C.



NEAR CAPE FLIGELY

April 23rd to 26th.—The ice is still in contact with the coast. The warmth of the sun causes some difference to be felt between day and night. The wind blows from various points ; it is sometimes strong, sometimes light.

End of the
Intense Cold.

We begin to get our tent ready for summer. It is deeply buried

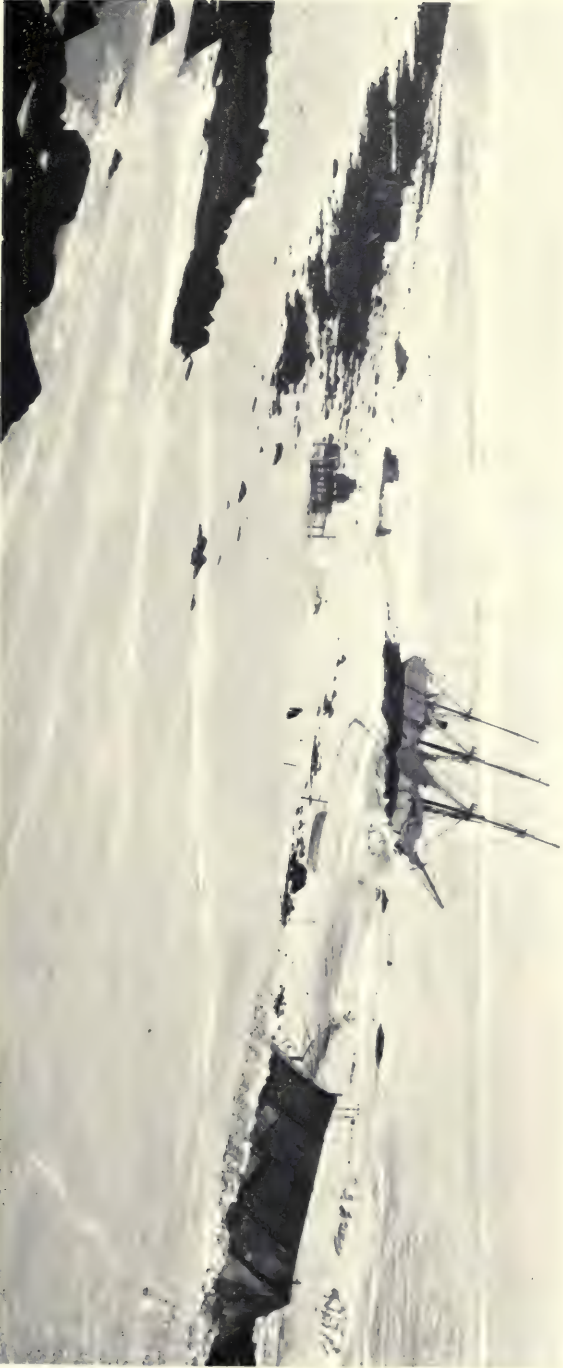
in the snow, and, unless removed, when the thaw comes the water will fall into it as into a well. The snow must, therefore, be cleared away from the ground which lies at a lower level than the tent, so as to allow the water to run past it and flow away. Near the door the snow has been heaped up to a height of three or four yards, and will require much work to remove. On the evening of the 25th a solar halo is visible. These atmospheric phenomena have never been strongly marked or completely formed.

The cold has been gradually diminishing during these last few days, and the end of winter seems to be drawing near. On April 26th the temperature at night was -35° C., and since then it has risen slowly.

On the 27th light easterly winds drive the ice-pack away from the island. On the 29th a stiff breeze sets in from the south-east, which at night increases to a storm, and reaches more than forty-five miles an hour. On the morning of the 30th it shifts to the north-east, and has still the velocity of a hurricane. The drift is again so thick that we cannot stay outside the tent, and the weather continues thus without interruption until May 1st. It is terrible weather for the search expedition, for, as it is in the neighbourhood of the island, it must have been exposed to the same storm. Wide belts of open water are being formed to the west and south-west. The snow has been hardened by the wind, and is in good condition for walking on. On account of the open water to the west of the island, the temperature rises to -9° C. on the evening of May 2nd, and on coming out of the tent one experiences a real sensation of warmth.

Changeable weather with south-westerly and north-westerly winds drive the ice-pack once more against the coast, and keep it there until May 9th. The temperature rises gradually, and fine weather and the absence of wind soften the snow.

THE SHIP AND HUT, SEEN FROM THE WEST



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The snow had been nearly all cleared away from before our tent ; but the last storm brought more, so that our work has been of no use. I could never have believed that the snowdrift could cause so much annoyance. Ever since last September until now, the slightest breeze has always raised the snow ; and this, lifted up and carried by the wind, has penetrated everywhere, and covered up everything lying outside the tent. The wind and the drift overwhelm in a short time what has cost us hours and days of toil. We are now lifting the boxes of provisions out of the snow,



ROCKS OF CAPE SAULEN

where they lay buried, and carrying them up to a high rock, where they will be kept dry. The sunshine is so bright that we are obliged to wear spectacles.

May 9th.—The thermometer rises for the first time to -1° C. On board our ship, the snow lying on the windlass and on everything painted black is thawing. The wind sets in from the north-east ; it

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lasts all day, accompanied as usual by snowdrift, and makes a new channel to the west. Yesterday we put our instruments back into the meteorologic cage to protect them from the influence of the sun, and they now suffer from the same drawbacks as before.

The wind goes down on the evening of May 10th. It has done more to harden the snow than the temperature. Andreas, Hans, and Ole return at half-past seven in the evening. We are glad to see them again, but grieve to learn that they have found no trace of our companions. The mate has carried out my orders, and has come back on the twelfth day, after marching for eight days over ice which was very much broken, and having been hindered from advancing for four days by the stormy weather at the end of April and the beginning of May. They had covered about two-thirds of the distance to Nansen Islands, and had gone nearly as far as a belt of open water which the last tempest had formed to the west of these islands.

Twelve days of actual marching might have brought the expedition to the islands, and five or six days more should have been spent in exploring them; on the whole, the expedition would have required about a month. I had added to the sledges a folding canvas boat, which is more convenient than a *kayak* for crossing narrow channels, but as the season was advanced, I ought to have left it aside, and given the expedition a larger amount of provisions. The loss of three men rendered me perhaps too cautious, and unwilling to risk others. On the other hand, I felt more and more convinced that men who were short of provisions, and who knew that they were in the neighbourhood of the hut, could have easily reached Teplitz Bay from Nansen Islands in eight or ten days; and that if our unfortunate companions had not come back, it was not because they had gone to those islands. I therefore gave up making any further attempt to search for

I give up all further Attempt to seek for the First Detachment.

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the missing detachment. It was not in our neighbourhood, or it would have reached the hut ; if it were far away on the ice-pack, we could do nothing to help it ; if it were more to the south, it must already have gone on towards Cape Flora.

May 11th to 18th.—The ice-pack is very much broken up. Channels appear everywhere near the island. The ice-fields are not of great extent—300 or 400 yards at most. The channels between them are full of lumps of ice and half-melted snow, so that it is impossible to make use of a boat, and very difficult to cross with sledges. The ice-pack is continually moving ; the westerly winds drive it against the island, and the

The Look-Out at
Cape Fligely.
The Ice-Pack
near the Island
is in a Bad State.



ANOTHER VIEW OF THE ROCKS

easterly winds drive it away. The weather is almost always cloudy ; it makes me feel uneasy for Captain Cagni, who will find it difficult to take observations and to sight the island. The snow is, however, still good for walking on, especially after a windy day.

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To the left of the ship some water has trickled down between the side and the ice, and formed a small pool. To the right, the snow is being cleared away down to the level of the water. The doctor sees for the first time an Arctic sparrow (*Passero polare*).

May 19th.—Dr. Cavalli, Andreas, and Cardenti set out for Cape Fligely, with provisions for ten days, to look out for Cagni's return. From Cape Germania I examine the surroundings every day with a telescope. Light westerly winds bring the ice-pack close to the island again. The sky is still cloudy and there are often fogs. The sun is seldom visible.

May 22nd.—This evening we kill four bears, an entire family—a he-bear, she-bear, and two large cubs. After killing the she-bear and the cubs, we had gone away, leaving Gini (the cook) and two sailors to guard our quarry, when the he-bear came up unexpectedly. The cook only was armed, and his companions prudently withdrew, but Gini luckily killed the bear with a single shot.

On the evening of the 22nd, a wind set in from the east which lasted till the morning of the 25th, and formed a stretch of open water along the coast extending to seven or eight miles from land.

May 26th.—According to Captain Cagni's letter, he ought to be already on his way back, for thirty-seven days have passed. He has still provisions for three days, but afterwards must subsist, until June 10th, on what he may have been able to economise. During these last few days the sky has been always overcast, and this, with the mistiness of the horizon, would have prevented him from seeing the island and even from taking observations. If he is to the west of the island, he cannot, under present circumstances, reach the hut. It would be necessary to send a launch along the edge of the ice-pack to look for him. But is that possible, for the sea will certainly freeze?

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To my great relief, the wind sets in from the north, and it will, I hope, soon bring the ice-pack back to the coast. Cavalli returns at five o'clock from Cape Fligely. The ice-pack is now only a few hundred yards distant from Cape Fligely and Cape Rohlfs; but several channels are visible between Nansen Islands and Prince Rudolph Island.



TRAVELLING OVER SOFT SNOW

May 27th.—Ice has again been formed during the night where yesterday there were stretches of open water. What I foresaw is now taking place, and at this moment a launch would run the risk of being imprisoned in the newly formed ice, which, on the other hand, is not strong enough to allow a man to walk on it. A launch is, however, got ready with provisions for ten days; but I am convinced the north winds, which are shifting round to the west, will bring the pack up to the island, and render it unnecessary to send it.

I leave in the evening with Savoie for Cape Fligely. Northerly winds set in, and last during the fifteen days that I pass at Cape Fligely. The ice-pack is driven against the coast, and again closed up, so that it is in a fit state for sledge travelling. It is moving

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slightly to the west, but to the east of Cape Fligely, as far as the eye can reach, it is not. The ice which is in motion moves along a line drawn from Cape Fligely to the most northerly of the Nansen Islands.

The fog hardly ever lifts. In twelve days I have only been able twice to take an observation at noon. It thaws for the first time on June 10th, and water is seen flowing on the level ground near our tent,

This is how we pass our days. We rise at nine, breakfast about ten, dine at six in the evening, and at nine get into our sleeping-bag to sleep until the next day. We turn our telescope first towards one side of Cape Fligely, and then towards the other, passing entire hours in careful observation, so as to be certain that nothing which is within reach of our sight can escape us. When under the tent, we often talk about our comrades, and although we do our best to keep up our spirits, we do not succeed in overcoming our painful anxiety. It is not a very gay life, but, at least, we now live without physical suffering, which was not the case in March. The cooking is excellent, although Cardenti and Savoie sometimes forget to put Liebig's Extract into the soup. The reindeer-skin sleeping-bags are very warm with the present temperature; we can sleep in them undressed without feeling cold, and can thus keep the bags always dry. The slight inconvenience of having to run about now and then to warm ourselves is nothing when we think of the time when, to bear the cold, we were obliged to take violent exercise almost continually, or else to get into the sleeping-bag, close up every opening, and stay there, even when we did not want to sleep.

I have given to this post the name of *Eldorado*, and I find one day that the men have given to the hut the name of *Columbia*, and that they all prefer to live at *Columbia* than at *Eldorado*, with

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the exception of Cardenti, who is glad to stay there, or who at least says he is, and repeats continually, "Who can be better off than we are?" On this point I do not agree with him, for I think that there are many other places where one might be better off than on this desolate headland, in a house built with snow, where the only tranquil moments are those passed in sleep, because we then cease to feel anxious as to the comrades for whom we are waiting.

It is now June 10th. According to our calculations, Cagni's resources must be exhausted by this time. When he separated from the second detachment he had forty-eight dogs and provisions for twenty days' further march towards the Pole, and forty days' return. His rations would come to an end on May 26th; but he said that by economising them he might make them last until June 10th. But that day has now come, and he has not appeared. Unless he has found means to procure food by hunting, he must be in a very difficult situation. I have full confidence in Captain Cagni's endurance, in his perseverance, and in his talent for surmounting obstacles, but there are limits to everything.

What can have happened to him to thus delay his march? Has the strength of the dogs been exhausted? Savoie and Cardenti have the greatest confidence in those animals, as they had ^{Anxiety with regard to Cagni's Return.} forty days' experience of them, and the fact that the dogs of the second detachment came back in excellent condition, and were ready to start off immediately for another march, is a proof of their endurance. It is true that in other expeditions these animals have sometimes been suddenly attacked by a malady similar to rabies, which carried them off very soon. It does not, however, seem to me probable that this mishap can have happened to Cagni, because, if that were so, we too should have had some case of that malady among the dogs staying at the hut.

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Has he been attacked by scurvy? The advance of the English expedition of 1873 was checked by the outbreak of this malady, among a crew which, before its departure, had been certified by the doctors on board as being in a perfect state of health. The disease appeared with great intensity, after a few days only of the exhausting life they led while on the ice. Cagni and his men were still in excellent health twenty days after they left; but who can tell whether sixty days more of fatigue may not have developed the same malady in them? Although from the outset I had taken precautions against scurvy, by following the example of what had been done on board the *Fram*, I could not feel perfectly safe, since, even at the present day, doctors do not positively know to what cause it is to be attributed. They are all of opinion, especially after the latest expeditions in which salt meat has not been used, that this disease may be ascribed to the use of such food; but this is only a supposition, and the real cause is still unknown.

Some accident may have happened to some member of the detachment, and perhaps to Cagni himself, thus depriving the expedition of the only person capable of ascertaining its position.

But may he not have been prevented by fogs and bad weather from taking the observations he requires for his guidance?

As our stores of food and petroleum were nearly exhausted on June 10th, I decide on returning to the hut with my two companions. We go along the coast, in order to bring back a boat which had been abandoned near Cape Rohlfs, and reach the hut after a march of four and a half hours. We find many changes there. The thaw has necessitated the removal of all the boxes which formed the carpenter's shed; they have been carried up to rocky ground, where the shed was rebuilt. To the south of our tent the snow has been cleared away, so that as it melts the water may run

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down to the sea. Though the snow is soft, the inside of the tent is perfectly dry.

The launch is always kept in readiness to put to sea. The doctor tells me that, on the day after I left, the north-west wind had driven the ice-pack up to the coast, and thereby rendered it useless to send out a boat. The ice-pack is now more closely pressed against the coast than ever during the last month.

I explain to the doctor my opinion of our present situation. It is time to think of saving our ship, and Cagni has not returned. What ought we to do? I believe that we ought now to begin to try to extricate the ship. I have reflected much on the matter during the long hours I passed in my sleeping-bag at Cape Fligely. It would not be of much use to pass a second winter in Teplitz Bay waiting for Captain Cagni. A sledge expedition to White Land to search for him could only be undertaken in autumn, and during summer we could only explore Queen Victoria Sea with our launches in the neighbourhood of Prince Rudolph Island. Now, if Cagni has reached either of these places, he must have the means of reaching by some way or another either the hut or Cape Flora. If I left some men here, and brought the others home in the ship, those who remained would be less able to help themselves, and a smaller crew would have more trouble to bring the ship back. The most sensible plan seems to be to bring back the whole crew, leaving a sufficient store of provisions at Teplitz Bay and Cape Flora, and to send a ship to Cape Flora next summer. We shall leave Teplitz Bay at the end of July, and if Cagni has not returned by then, we may be almost certain that he is no longer to the north of us, that we must look for him in the direction of the south, and that we can do so more easily by means of the ship.

While the doctor and Andreas go back to Cape Fligely, we set

to work to extricate the ship. The ice, which is about four feet thick, is first of all cleared away from the engines and the hold. The latter is easily freed from water by means of the small boiler, just as we did last autumn. Our operations then, though, were carried on very slowly, as the water froze in the hose, but now there is nothing to stop them. As the ship adheres to the ice, there is less leakage than formerly, and once it is freed, two or three hours' pumping will suffice to make the hold dry. The furnaces, which were completely filled with ice, are also cleared; it is rather hard work, and to get on more expeditiously we again make use of petroleum and coal.

The ice in the bay shows no cracks, and the bay still presents the same appearance as in winter. The snow has become soft, and one sinks in it up to the knee; but the thaw has not yet liquefied it. We are now in about the middle of June. The ice-pack has been driven up against the coast by the continuance of westerly winds.

It has been my custom to go every day to the top of Cape Germania and examine with a telescope the immense expanse of frozen sea. The softness of the snow lengthens the journey so much that I lose half the day. I am beginning to make use of *ski*, and becoming accustomed to this sort of skates; but I find that, though on level ground they can help a skilful person, they cause a loss of time when one is on an uneven surface, such as the ice-pack, and especially when following a sledge. While the snow is hard, the *ski* are a hindrance to any sort of work; and as a loaded sledge does not go quickly, the *ski* are not of much advantage when travelling. They might, on the other hand, be useful when the snow is soft towards the end of spring, but then an expedition would still have its dogs, which cannot go over snow into which a man sinks.

The ice-floes are small and thin. There are channels everywhere; it would seem as though this ice had been formed late in spring in the

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neighbourhood of the island. No large ice-fields are visible. The ice-pack appears to be almost motionless ; but if an easterly wind sets in, it is driven away from the coast in a few hours.

There have been fogs and calm weather during these last few days. The ice-pack remained in contact with the coast until the 17th, on which day it receded and left a vast expanse of open water to the west of the island. On Sunday, June 17th, we see for the first time a



ARRIVAL OF CAGNI

Brünnich's guillemot (*Uria Brünnichi*), and Hans finds the eggs of the blue gull among the rocks of Cape Säulen, which are the first birds' eggs we have found this season. After the blue gull, the first to lay their eggs were the little auks, on June 28th.

On June 19th Dr. Cavalli returns from Cape Fligely. A small channel has been formed. The ice-pack is intersected by channels, and has been driven a little to the north of the island. I leave towards evening for Cape Fligely, and shall stay there till the end of the month, after which I shall give up that position.

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Though the snow is soft, we can still advance at a moderate speed, but it should be remarked that we have with us a sledge laden with only 220 lb. On arriving at *Eldorado*, we find our hut half destroyed by the thaw, but that does not matter much now, as the weather is generally calm. A light north-westerly wind drives the ice-pack again up to the coast. We pass the 22nd enveloped in a dense fog. The weather is dark and foggy on the morning of the 23rd, but becomes brighter towards evening, with a northerly breeze. We take advantage of it to examine the horizon. That evening we return to our tents later than usual, and while making our soup, hear our dogs bark.

Captain Cagni returns.

We think at first that a bear is approaching, and hasten out. What is our surprise when we see in the distance a sledge coming rapidly towards us! As for some time I have not been accustomed to hear good news, my first idea is that some accident has happened at the hut; a fire, perhaps, or some one has fallen dangerously ill. But all my fears vanish when Andreas calls out: "Cagni has come back!" and when I ask: "With his companions?" "Yes, and he has reached 86° 34'." Cardenti and I give a cheer. All my anxiety is dispelled by the joy I feel at the return of our comrades, who have gone to the highest latitude yet reached.

We load the sledges, and about half-past eleven leave for the hut, where we arrive at five next morning. The sound of my voice awakens Captain Cagni, who hastens out, and we greet each other again after being separated for 104 days. If my anxiety has not quite disappeared, the return of four of the persons whom I thought lost and the success obtained by Captain Cagni procure for me a short interval of real happiness.

CHAPTER XIII

Captain Cagni breaks the Polar Record. Is it
Impossible to reach the Pole?

CHAPTER XIII

CAPTAIN CAGNI BREAKS THE POLAR RECORD. IS IT IMPOSSIBLE TO REACH THE POLE?

CAPTAIN CAGNI, Petigax, Fenoillet, and Canepa had the appearance of having suffered much, but the last-named less than the others. Although their strength had been much reduced by want of sufficient food, they were not exhausted. The seven dogs which survived seemed much worse; some of them were merely skin and bone. The only part of their outfit they had brought back that was still capable of being of any use, was their tent, and this had been mended. The framework of the *kayaks* had been broken and their canvas torn, so that they could not be used unless a week were spent in mending them. The sledges which remained had been mended with pieces of other sledges. All that was left of their cooking utensils was the outer covering of the stove, a saucepan which had been mended, and the plates. The *Primus* lamp had been replaced by a pot, in which dog's grease had been burned for the last few weeks. The sleeping-bag had been thrown away, and only the thick canvas lining kept. Their clothes were in rags.

Appearance of
the Men and
State of the
Equipment of
the Third De-
tachment.

The health of the men during the march had been excellent; but Cagni had had the forefinger of his right hand frozen for the third time, so that the doctor now deemed it necessary to amputate a part of the bone. The dogs had given proofs of endurance, and none of

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them had died of disease. Their number had been reduced to seven, as some of them had served to feed their companions, and even the men, too, in the last few weeks.

Captain Cagni had marched towards the North Pole for forty-five days, from March 11th to April 24th. When he saw how difficult it would be to reach the same latitude as Nansen, he did not allow himself to be discouraged by the first marches, which were so trying; but he thought that if he sent the two first detachments back to the hut before the time which had been agreed on, he might be able to push on towards the north for some days longer by means of the provisions which would be thus economised. He was in this way able to reach $86^{\circ} 34' N.$ lat., and could even have got back to Teplitz Bay (while still living on the rations which he had brought with him) if the drift of the ice-pack had not carried him away to the west. Both Cagni, as leader of the detachment, and those who followed him are worthy of being recorded in history for the courage which they displayed, not merely while under the influence of a momentary enthusiasm, but with an admirable perseverance for many consecutive days.

Although the difficulties encountered by the first two detachments, which were a shorter time on the march, were fewer, they were still such as to demand men of exceptional courage and force of character to surmount them. The fact that all the members of the expedition performed their respective duties so well, even those which were less important but not on that account less difficult, renders them all equally worthy of my admiration and of my gratitude.

Cagni's march has surpassed all those hitherto made on the ice of the Arctic Ocean at a distance from land. Reckoning the miles in a straight line from Teplitz Bay to the most northern point reached by the expedition, and from thence to Ommaney Island, we find

The March performed by Captain Cagni.

Captain Cagni breaks the Polar Record 271

that Cagni travelled 601 miles in ninety-five days. Adding to that the distance between Ommaney Island and Prince Rudolph Island, it gives a total distance in a straight line of 637 miles, covered in 104 days,¹ without any help from depôts. This march may be divided into three periods: from the departure from Teplitz Bay (March 11th) till the second detachment was sent back (March 31st); from March 31st to May

Observations
with regard to
any Future Expe-
dition towards
the North Pole.



A FRIENDLY PAIR

15th; and from May 15th till the return to the hut. While during the first and last of these periods the average distance travelled every

¹ The entire distance travelled, measured by the trace on the map, is 753 miles.

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day was only five miles, in the second period it was over ten. Nansen's speed, which was at the rate of five miles a day at the utmost, has therefore been surpassed and brought up to ten miles a day by Cagni's expedition, which, moreover, was able to perform the same daily marches as Nansen, while it was crossing the rough ice near the island at its departure, and after the thaw on its return. But Cagni's march shows that this speed is not sufficient to enable a train of sledges to cover the distance between Emperor Franz Josef Archipelago and the Pole within the short space of time in which such a march can be accomplished. The rate of ten miles a day, at which Cagni was able to travel only during that portion of his journey when the ice was in an exceptionally favourable condition, ought to represent the rate of the average march during a period of a hundred days. Should we therefore give up all hope of reaching the Pole?

It would be useless to repeat the attempt by following the same plan. It would, at most, be possible to push on a few miles farther towards the north, if the ice on the Arctic Ocean was in an unusually favourable state; but the results would not afford any compensation for the fatigue and the privations undergone. While following, therefore, the invariable plan of setting out from some point on land, and not from a ship drifting in the ice, on account of the reasons put forth in the first chapter of this work, it will be necessary to find some other method of shortening the distance which has to be travelled with sledges. What I should recommend would be to sail along the western coast of Greenland to the north of Kennedy Sound, where it ought to be possible, under favourable conditions, to go to a still higher latitude than that reached by the *Alert* off Grant Land.

I think it likely that the ice which presented such great obstacles to the sledge expedition Markham attempted to undertake to the north of Grant Land, was not very dissimilar to that which

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hindered our sledges from advancing in the neighbourhood of Prince Rudolph Island. I do not here allude to the greater or lesser thickness of the ice-fields ; but to the difficulty of travelling over a rugged surface.

The weight of the load carried by the sledges should not be calculated according to what the men and dogs can draw, but



EQUIPMENT OF THE THIRD DETACHMENT

according to the limitations imposed by the unevenness of the ground over which the march must be performed. On ice in the neighbourhood of land, the weight of the load, together with that of the sledge, must not be over 550 lb, otherwise, after a few days' march, the sledges would be broken and unfit to serve, or it would be necessary to unload and make a level way for them.

It should be remembered that no matter from where the start may

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take place, there will always be a belt of very difficult ice in the vicinity of land. This may be easily understood if it is considered that, when the wind is from the land, the ice-fields are driven away from the coast; and that they are again driven back to the land when the wind is from the sea, and when they become piled up one over the other at their weakest points, which are those formed by the belts of new ice. This belt of rugged ice, as was observed when Cagni's expedition set out,



THE NAMES BY WHICH WE CALLED THEM:

Moro. Messicano. Pantalone. Terésa. Sacripante. Piccin. Orlando

may be looked upon as extending about 120 miles from the coast. In any future expedition the crossing of this belt will form a special period of the journey. During this time, which will also prove the coldest, several men must be employed to clear the way wherever it may be necessary; warmer sleeping-bags and an equipment made of stronger materials should be taken, and larger rations given out. In a word, the preservation of the outfit and the comfort of the men should be the first consideration. It would seem that when this belt is passed, the ice becomes comparatively better; I say comparatively, because the lesser obstacles also depend much upon the weather, both before and during the expedition. This second period will be totally different from the first. The advance should be made with a few picked men,

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several dogs, well trained during the first part of the expedition to drag the sledges and selected from among the strongest and most docile, and the equipment should be lighter. An expedition which should start about February 20th, to cross the frozen sea in the direction of the Pole from a latitude such as has already been reached in that locality by a ship ($82^{\circ} 16'$) might find itself on March 10th, after travelling for twenty days at the same rate as Cagni (five miles a day), in 84° N. lat., and upon ice which, being far from land, may be supposed to be level and easy to cross. From this point a detachment composed of as many men as Cagni's, but carrying provisions for eighty days, and furnished with more dogs and sledges than he had, should push on quickly towards the north at the rate of ten miles a day. If they did not reach the Pole, they would at least



MESSICANO

come very near it, and then, returning to 84° latitude, land on the northern coast of Greenland. They might find there depôts of equipment and fresh provisions, and even in the months of June and July, when it is difficult to travel over the frozen sea, they could rejoin their ship by coming down along the land.

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Leaving aside, therefore, the obstacles presented by the ice, which are the same in both places, Greenland possesses the following advantages over Emperor Franz Josef Archipelago. The funnel formed by the northern opening of Robeson Sound and Grant Land to the west, and Greenland to the east, must stop the movement of the ice towards the south in spring, when the expedition would be on its way towards the north, and would thus prevent the drift which reduced the length of Cagni's daily marches so much, especially during the period of the expedition.

Emperor Franz Josef Archipelago forms a triangle, with its summit towards the north, and is therefore difficult to find ; and what happened to Cagni, who, because he went past this point when coming down to the south, had therefore to travel a greater distance, might also happen to any detachment that wanted to reach the camp on Prince Rudolph Island. This danger does not exist in Greenland, as the ship or the camp from which the expedition towards the Pole would start would be situated to the south of any other land, and even if the expedition deviated from its course when returning, it would easily find the camp by following the coast.

There were several defects in our equipment which it may be well to state here, together with the changes which seem most advisable.

**Defects in our
Outfit.**

The sledges were sufficiently high from the ground, and strong enough to carry a weight not greater than 550 lb. The runners were broad enough, but I think that the under-runner is useless. As the expedition was not to return later than the end of May, it was not necessary to take off the under-runner and use runners shod with white metal to enable the sledge to slide better. On the other hand, the under-runners, which are made of a thin slip of wood, break very easily when on hard ice, and allow the entire weight of

the sledge to bear upon the runner, from which the white metal plating is soon worn off, thereby losing the advantage derived from this addition, and weakening the sledge. I think that if these white metal covers were done away with, and the runners made stronger, the weight of the sledge would be reduced, and its strength increased, while its speed would not be diminished. The aluminium boxes placed at the bottom of the sledge are not of much use. It is more convenient to make use of sacks, which do not weigh much more, and



SACRIPANTE AND TERESA

can be mended. As the flat-bottomed *kayaks* fitted perfectly well on to the boxes, it was easy to pack them, and they were sufficiently seaworthy to be of use in crossing the channels. We did not all agree as to whether it was better to carry this Esquimaux canoe, or a plain folding boat of canvas, which we had, on the model of the James folding boat, but lighter.

As two *kayaks* weigh 110 lb., and a boat weighs 131 lb., canoes might be made of the same weight as two *kayaks*, which would

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have the advantage of being able to cross a channel more easily, and of not being so liable to be injured by blows. For my part, I am convinced that after a long journey a folding boat would be equally torn, and be in the same state as Cagni's *kayaks* when he came back. The sole advantage of a boat or a *kayak* is the help it gives when crossing a channel, but considering that Cagni never used his *kayaki*, and that the doctor could very well have done without them, as when he was starting he had not the courage to take one, there would be a saving of 110 lb. if they were left aside, which would represent some days of food and, in my opinion, would be more useful than either *kayaks* or boats.

Sleeping-bags like ours can still be much improved. Wrangell



MORO

used a double bag in his expeditions; I would advise doing the same, and not seek to economise any weight in this part of the outfit, so as to be able to bear the intense cold in spring. It would, moreover, be better if, besides the double bag for three or four persons, each one had his own. The outer bag should be made in

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such a way that, when the season is more advanced and less inclement, the inner bag might be taken away and only the outer one used. I do not know how to avoid the humidity which exists in all sleeping-bags. It has two causes : the condensation of the breath in the



PICGIN

interior of the bag when the men get into it and closed every aperture, and the snow brought into the bag on their clothes and melted during the night by the rise of temperature. This latter cause of discomfort can be remedied to a certain degree by taking great care to brush one's clothes before entering the bag, and by making use of overalls; as to the former, it is impossible to avoid it as the bags are now made. It is impossible to sleep with the head exposed ; it is necessary to close every aperture to keep off the cold, and then the breath is condensed. Any one who thinks seriously of organising an expedition should go to some cold country, such as Siberia, to make experiments with different sorts of bag, and make changes in them on the spot. In this way, I am certain that the comfort of the members of an expedition could be much increased.

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The cooking-stove designed by Nansen is, without doubt, that which best utilises the heat of the combustible employed, and the *Primus* lamps are the quickest that exist. The speed with which a meal can be cooked is of great importance, as it allows the men to take refuge as soon as possible in their sleeping-bags, and thus put an end to the hardship of remaining exposed to temperatures for which their bodies were not created. They could not go to bed before eating, as the bags would be saturated with water after a few days, on account of the steam which condenses in the tent during meals, and is so dense that the men cannot see each other. The saucepans must have very thick bottoms, otherwise, if they are filled with snow or ice while the temperature is low, the strong flame of the lamp might burn them before there was water enough to cover the bottom.

The tents we used were easily put up, and sufficiently strong for a journey of that length.

The clothes should all be of wool and very closely woven, as well as the vests worn next the skin; they should not be hairy, so as not to catch the snow. The jackets should open in front, and not be made like a smock-frock, for the latter when frozen cannot be taken off without help. The clothing worn during the march was more than enough to meet all the variations of temperature of those regions, and we all agreed in preferring it to furs. Instead of the wind-repellers, I would suggest a light flannel coat, which could be taken off before getting into the bag, and should be always worn when on the march. It would hinder transpiration, and would keep the clothes underneath it dry and free from snow. The best shoes are the *fnskos*, but they must be very wide, so that they can be put on over several socks and with sedge-grass padding, even when they are frozen. They should be specially made, for those

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that are bought ready made are adapted only for the Finns, who have very small feet. Over the knitted helmet should be worn a



ORLANDO

woollen cap, covering the head well; it will keep it warmer, and prevent the helmet from getting wet, which is very important, as it has to be worn day and night. When wearing this helmet, the

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mouth should always be left uncovered, otherwise the breath would condense on the wool, and soon form a mask of ice which might easily cause frost-bites. A strap of woollen stuff fixed to one side of it, which can be placed over the nose at will, is the best protection for the nose and for the cheeks. The best gloves are very thick woollen gauntlets, wide and long, so as to cover the entire hand.

Aluminium instruments are not suitable, as they are easily spoiled. I think it well to be furnished with an artificial mercurial horizon, as it is difficult to level a glass horizon when the temperature is low. A skilful observer can always take observations, even with a small artificial horizon, and the trifling quantity of mercury which has to be carried cannot weigh more than two pounds at most. The greater rapidity, ease, and certainty of the observation are advantages which compensate for the slight increase of weight. Pocket chronometers, if properly carried, are not injured by shocks or changes of temperature ; but it is indispensable that they should go for more than forty-eight hours without being wound up. The bearer should always carry them hung from his neck, beneath his clothes and next his skin, so that they may be protected against jolting.

The ice-axes, without which it is impossible to cross the ice-ridges, are also an important part of the outfit. The wood and the steel must be very carefully selected, otherwise they are broken after a few days' march.

The harness for the dogs had been well prepared, and worked well.

Our rations were excellent and plentiful. It is well to have a small surplus, as thus the ration can be diminished if necessary, and the provisions made to last longer, while the men are kept in good health. More milk and butter might be allowed at the outset, and less pemmican in proportion ; in this way the ration would be more

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varied, though the weight would be the same. Seventeen ounces of pemmican was a very large ration for the dogs, and, indeed, strictly speaking, an expedition might travel while giving them only 10 oz. 8 dr. ; but it should be observed that the endurance shown by our dogs at the end of the expedition, when they had no other food than the dogs we killed, was, without doubt, chiefly owing to their



PANTALONE

having been well fed at the beginning. In any future expedition the dogs' daily ration should be fixed at sixteen ounces of pemmican, which, in case of necessity, will allow their existence to be prolonged.

In these expeditions the guides were of the greatest use. There are many who still believe that they can serve only in their Alpine regions. I remember the astonishment I caused in America by

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bringing guides from the Alps for the ascent of Mount St. Elias. The state of the places through which a guide is continually passing

**The Use of
Alpine Guides
and of Sailors
in a Polar
Expedition.**

changes from year to year, sometimes from day to day, and the guide does not ascend to the summit of a mountain by the same path, but by various ways among the *séracs* of a glacier, the crevasses of a high table-land, or the rocks of a cliff, according to the state of the ice, of the snow, or the rock. The guides are therefore accustomed from their youth to



DOGS BROUGHT BACK TO ITALY

observe attentively and decide prudently, and the active life as well as the dangers which they encounter in following their trade give strength to their bodies and fortitude to their minds. The same gifts are often put to the trial at sea, although for other reasons, and to form the expedition I had, therefore, chosen men from the Alps and sailors, giving the preference, however, to the former, on account of their knowledge of ice.

The greatest care should be given to the choice of the men and dogs. One should not start for these expeditions unless with

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persons who have given proofs of their moral and physical capacity. Only those who are in a state of perfect health should go on an Arctic expedition. The illness of one man may cause the loss of a detachment, or the failure of an expedition; and, moreover, it is only the absolute obedience of all the men (not the blind obedience of persons who do not know what they are doing, but the obedience inspired by the sense of duty and of confidence in their chiefs) which can allow the leader to come to decisions he would otherwise find it very difficult to carry out.

The order for the dogs ought to be given in time. When they are collected in Siberia, those of inferior quality should be put aside, and only those selected which seem the strongest and to have the most power of endurance, otherwise they are an embarrassment, both on ship-board and, later on, when travelling with the sledges.

If an expedition which is getting ready to undertake a long march over ice is not composed of men who are already very well acquainted with the Arctic regions, it ought to make frequent excursions in winter, not only to test the outfit, but also to accustom the men to the life which they shall have to lead. Once they are on the march, it is difficult even for the most active and intelligent leader to look after his subordinates continually, and so make everything go as he would wish. The men should be convinced how necessary it is that each one should take the greatest care of his personal outfit and clothing, as after the departure it will be impossible to replace anything that may be spoiled or lost. It is also necessary on setting out, having been in a state of inaction for so many months, that the work should be increased little by little, so as not to put too great a strain at the beginning on the strength of the men composing the expedition, as they are already

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weakened by the intense cold, and the first nights they have passed sleeping out of their usual beds.

The Polar regions admit within their limits only well-prepared and resolute men, and they are terribly severe towards those who go there carelessly and trusting too much in their strength.

CHAPTER XIV
A Polar Summer



CHAPTER XIV

A POLAR SUMMER

AFTER Captain Cagni's return, the tent and ship were decorated with flags for several days. Sadness had given way to joy, and these days of material repose for the detachment just come back were for us days of moral repose.

My anxiety was now at an end. The ship had to be extricated from the ice as soon as possible. There was no longer any hope that, after so many months, the first detachment might still be found to the north on White Land. The fact that, in a much more advanced season, Cagni, although much exhausted, was able to reach Teplitz Bay from Harley Island, was the clearest proof that, if Querini's detachment had succeeded by any means in reaching the island discovered by Nansen, or any other land within the distance covered by Cagni, at a time when the season was more favourable, he would certainly have been able to return to the hut.

The wind ought now to have set in from the east, to drive the ice-pack away from the shore and leave the bay free once more. We were at the end of June. The sun was beginning to sink, after having reached the highest altitude. We had already remarked that, with the latter days of August, navigation as a rule came to an end in this locality. We had therefore only two months to extricate the ship and bring her at least as far as Cape Flora.

But there came long periods of calm, alternately with winds from

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every point of the compass. The sea was as much covered with ice at the end of June as it had been at the worst times during our stay, and the bay was in the same state as during winter. Although the snow was soft everywhere, it did not form those streams of water which last



HARD AT WORK

year ran alongside the ship, and encouraged me to hope that by their means I might be able to free her. If it were not for the temperature, we might think that we were still in April or in May.

The ice had been cleared out of the ship ; the engines were in good order ; and she was ready to leave. She was at 180 yards from

the edge of the ice in the bay, and not only required to be righted, but to be got out of the ice by which she was shut in. If the ice in the bay had not turned round under the pressure of the ice-pack, and built up against the coast an ice-ridge at the very point where the ship's bow had opened a channel, the ice which had been formed during winter would not have become very thick, and would have gone to pieces, or we could have broken it up with the ship's bow or by blasting. But, after the pressure, the ice-field in front of the ship had obtained in some points a thickness of five yards; it would not, therefore, melt during the summer, and we should even find it difficult to break it up by blasting.

July 5th marked the beginning of summer. Since the end of June, a few streamlets had been trickling here and there, and on the level ground above the place where we had pitched our tent, a small lake had been formed, which froze and thawed

Our Tents in
Summer.



THE HUT DURING SUMMER

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according to the temperature. On July 6th the temperature was above freezing point all day, which caused a rapid thaw. Water began to flow on all sides, with a deafening noise, which we found pleasant. The fifteen days following were really like summer ; there was neither wind nor fog. It was very agreeable to work out of doors,



THE SIESTA

and we could believe that we had been transported to another land. It rained for the first time on July 11th.

We feared that, during the thaw, the water might penetrate into our tent, but as the upper part was still buried in the ice, it protected us by turning the water aside and making it flow on either side of the hut. The small quantity of water which got into the tent ran out, and left the floor of our dwelling dry. The temperature of the hut became so warm that we were obliged to make as many outlets as possible to air it. When the temperature was from five to seven degrees above freezing point, we could lie for hours comfortably

stretched against the outer tent without feeling the cold, and it was there that we always met in our leisure moments. But, if the sun was hidden by a cloud for a few minutes, we were reminded that we were in the Arctic regions. On rainy days we remained under the first tent, where, by opening and raising up the sides, we could enjoy the air without getting wet; for we avoided, as much as possible, staying in the inner tent, where we continued to burn petroleum lamps.

In July, after a week's rest, Cagni and those of his detachment



COMMANDER CAGNI TAKING OBSERVATIONS

set to work again. He re-commenced taking pendulum observations, this time in the carpenter's hut, where, as the temperature was always the same, they could be taken with precision. The magnetic observations were also taken up again in their special hut, but were interrupted later on, when the hut was carried away by a rush of water.

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We had been struck last year by seeing how quickly ice melted when water flowed over it, and we therefore thought of making use of water to free the right side of our ship. Two channels were dug to bring the water coming down from the glacier alongside the ship. One of them, which formed a cascade, was named *Niagara* ; the other, which was wider, was named the *Amazon*. The doctor had undertaken to supervise and direct the construction of these canals, on which we had founded great hopes.

We cut Channels
in the Ice to
extricate
the Ship.



THE MAGNETIC BOX FALLEN IN THE WATER

These torrents, changed into canals, caused us sometimes some uneasiness, especially on rainy days, when the water overflowed and sought to reach the sea by the shortest road, instead of following the longer way, which we had dug out with so much toil. At first these canals produced no great effect, but later, towards the end of July, they wore away the ice, as we had seen last year.

The snow was thawing quickly, and here and there appeared the bluer tint of the ice. The kennels, which were still buried in the snow

when Cagni came back, were now almost quite uncovered. It was fatiguing to walk on the glacier, as one sank in the snow up to the knees, and it was the same wherever there was an extent of



THE MAGNETIC BOX IN PERIL

thin ice covered with snow, with, moreover, the danger of going through the ice. Wherever the ice formed a hollow without any cracks, there were pools. We were again in a land streaming with water, just as last year. From Cape Säulen to Cape Clement Markham

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the ice-pack receded from the shore, or came back, according to how the wind changed. But the ice-fields between Karl Alexander and Prince Rudolph Islands did not move, or give signs of moving, and, on July 15th, there was only to be seen a small channel a few yards wide, which during all the winter had been hidden by the drift, and was now visible when the snow which had covered it thawed.



OUT SHOOTING

It was an agreeable distraction for us to look for eggs in the nests around us. The first eggs collected were given to the doctor to be preserved. Later on, we thought of procuring some for the kitchen, and made excursions for that purpose to Cape Auk. When out walking we shot little auks and guillemots, whose flesh helped to vary



View of the Bay of Toplice, July 15, 1900.



our food. We also tasted, but without much liking it, the flesh of the ivory gull.

The fine weather came to an end on July 20th, and from thence-



BRINGING THE MAGNETIC BOX TO LAND

forward the sky was again almost always hidden by frequent fogs, with rain and snow at intervals. The Arctic summer was already at an end, and autumn rapidly drawing near. We had a



THE RETURN FROM CAPE AUK

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banquet to celebrate the day on which last year we had reached Emperor Franz Josef Archipelago. The pleasure we then felt, on arriving in an Arctic land was now changed into a totally different feeling, so that, when we touched our glasses together, we drank to our speedy departure. Twelve months passed on those shores had been enough to bring about this change.

The following table may give some idea of the temperature at Teplitz Bay during the year we spent there :—¹

TEMPERATURES.

MONTHS.	AVERAGE.	MAXIMUM.	MINIMUM.
	Deg. (Cent.).	Deg. (Cent.).	Deg. (Cent.).
1899.			
August	— 1'84	+ 6'9	— 7'3
September	— 5'34	+ 5'2	— 16'5
October	— 15'92	— 2'0	— 28'0
November	— 18'75	— 7'4	— 26'4
December	— 17'74	— 12'3	— 22'2
1900.			
January	— 19'87	— 2'4	— 37'5
February	— 29'65	— 18'4	— 42'9
March	— 28'97	— 19'4	— 40'5
April	— 19'14	— 3'5	— 35'4
May	— 9'57	— 2'5	— 17'9
June	— 1'34	+ 3'1	— 7'1
July	+ 2'32	+ 11'0	— 2'4
August	+ 3'09	+ 6'6	0'0

¹ See *Scientific Observations*, Part I., Chapter VI., "Meteorological Observations," report by Professor Giovanni Battista Rizzo.

CHAPTER XV

The Ship is set Free



CHAPTER XV

THE SHIP IS SET FREE

WE had been making preparations to extricate the ship from the ice since the spring. The snow had been cleared away from her sides, and as we foresaw that we should require to do some blasting, we had got ready a drill to sink holes in the ice.¹ We could not as yet know if the *Polar Star*, which had been driven towards the shore by the pressure of the ice in the autumn, was resting on the bottom or on ice. It was most important that we should know, that we might decide what should be done. We, therefore, for this purpose sank holes in the ice round the ship to find its thickness, and found that on the right side, next the coast, both at the bow and at the stern, it was 17 ft. 10 in. thick, and to the left, next the sea, from 9 ft. 9 in. to 16 ft. 3 in., with water beneath it. There was no fear, therefore, of the ship being stranded.

Difficulty of
righting the
Ship.

The first of the two canals which brought water to the ship ended at the stern, opposite the propeller well ; the second, to the right, at the bow. Some of the water which ran through the canal next the

¹ We had forgotten to take one on leaving Christiania. The drill which we made at Teplitz Bay was composed of a screw, which pierced the ice, and carried on the top two cutting edges of the same width as the cylinders which held the gun-cotton. A long pole with a handle, worked by two men, made the screw turn in the ice, and the cutting edges made the hole, which, in two hours, was sunk to the depth of sixteen feet. The crushed ice was taken out with a ladle from time to time, so that it should not prevent the screw from biting into the hard ice beneath.

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stern flowed along the right side of the ship till it met the water brought by the canal next the bow, and some of it passing through the opening of the well, and round the rudder, flowed along the left side, and fell into the sea through the clefts in the ice. Some of the water ran also in front of the ship towards the sea, along the line



ON DUTY

dividing the fixed ice from the movable ice-field, and hollowed out a channel which, in some places, was more than a yard deep.

The aspect of the ice-field had been very much changed in the last few days ; the ice-field was becoming detached from the ice fixed to the shore ; the crevasses which existed already were being enlarged, and others appeared. Whether because the thawing of the snow on the ice-field had allowed it to rise, or because the ice-field had receded, the steel cables, which we had made fast to the shore during winter, and had always been tightly stretched, were now slack at high tide.

To set the ship free it was necessary to carry out the same

operations as last year, except that the action of the bow had to be replaced by blasting. A channel had to be dug, beginning at the outer limit of the ice-field, up to the stern of the ship, and passing along her left side ; the ship would then slide on the ice fixed along the coast, and right herself, or if a mine were sprung under her right side, she would become loosened with a violent shock from the hollow in which she rested. This operation would have been easy if the ice



POSITION OF THE SHIP

which adhered to Prince Rudolph and Karl Alexander Islands had receded. But on July 15th it not only had not moved, but gave no sign of moving ; and the season was already so far advanced that it was to be feared, if we did not move under the pressure of a high wind, we might not have been able to do all that was necessary to open the canal and set the ship free in time. We had less than a month

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before us. Our longing to return home made us attempt to right the *Polar Star* in the place where she lay.

It was a long and tedious undertaking to right the ship without first clearing away the ice on the side next the sea, for it had not only to be broken, but also removed from the left side, so as to let the ship slide down into the water. As the ice was very solid, and could not open out when it was blasted, it was necessary to break it up into small pieces, so as to form a large pool, and the pool should be freed from these pieces of ice either by dragging them out by ropes and pulleys, or by sending them down to the sea by the canals alongside the ship. The amount of cubic yards of ice which would require to be thus taken away was very great. Could we hope to succeed?

As from this point we shall have to allude frequently to mines, it will be well to describe our materials. We had 437 lb. of gun-
The Ice-Field
is Mined. cotton in hexagonal cakes, weighing ten ounces each. Ten of these cakes formed a mine, and we had therefore enough for sixty-four mines. They were placed in strong bronze cylinders, hermetically sealed by a cover which screwed on, and was pierced to receive a plug, carrying the wires for the electrical current. This plug was of indiarubber, and tightened by a screw which completely closed the case.

Some of these guncotton cakes were thoroughly soaked in paraffin; the rest had it merely on the outside. To ignite them we had a Siemens machine, and an ordinary pile as well. We had also a very small quantity of blasting powder and ordinary gunpowder. We had enough tin cylinders, holding 8 lb. 12 oz. of powder each, to furnish thirty-five of these mines.

Not being certain as to the effect of mines on ice, we began by placing one of guncotton at thirty-two feet from the ship, where the ice was fourteen feet thick. When it exploded the ship was much shaken,

CANAL TAKING WATER TO THE SHIP



but the ice was merely starred. As the effect was so slight, we saw that we should have to diminish the distance from the ship if we wished to form a pond of open water alongside of her. On the following days, other mines, charged with only eight cakes of guncotton, were tried to the right of the ship at a distance of from nineteen to twenty-six feet. These were placed on the rocky bottom and in the ice fixed to the shore,



THE CANAL OPENING AT THE POOP

but when they exploded they merely made a well two yards in diameter. We then placed two mines in the same hole in front of the ship, beneath ice which was 14 ft. 6 in. thick, and not resting on the bottom. They were fired together, and shook the vessel very much, but the only result was to bring the ice to the surface. Three other mines were placed round the ship, which are marked on the annexed plan by the numbers 6, 7, 8, without producing any practical result. These

mines so shook the ship as to make us fear that it might sustain some damage, but they produced very little effect. When placed under ice from nine to sixteen feet thick, they only cracked it slightly, and when on the ice at the bottom of the sea, they made a well, it is true, but so small in diameter that to make a small lake round the ship would require more charges than we possessed. Eight had been spent in these attempts apparently without any result; we had only fifty remaining,¹ and it would be necessary to use these slowly, so as not to be without any when the season should be more advanced.

As we saw how difficult it would be to continue to employ the same method, and as the channel at the boundary of the ice-field had become wider, we tried a mine of guncotton under the ice near its edge, where it was about thirteen feet thick. As it was a spot where the ice might be able to move a little, at least in one direction, we could hope that the mine would detach a large piece. But though it was put at five or six yards from the edge, it did not break it. As the ship was about 180 yards from the edge of the ice-field, all the charges we had would not suffice to make the canal in this fashion. The result of our two attempts was discouraging. The work was, therefore, suspended for a time, and we resolved to wait another week to allow the temperature to rise higher and have some effect on the ice.

In the meantime we continued to sink holes in the ice to the left of the ship, to place a chain of thirteen mines, marked on the plan by the numbers 9 to 21, which were to be exploded three by three. They were sprung on the 21st. The ship was so violently shaken that all the doors were torn off their hinges; but even then she did not move, and the ice showed only the usual cracks. We had

¹ Six had been spent in the preceding year.

POSITION OF THE MINES



Gun-cotton Mines.

- 1 - under ice 14 ft. 8 ins. thick at 33 ft. from the ship (a full charge).
- 2 - at the bottom, in ice 9 ft. 10 ins. thick, at 36 ft. from the ship (a charge of only 8 cakes).
- 3 - at the bottom, in ice 9 ft. 10 ins. thick, at 19 ft. 8 ins. from the ship (the same charge)
- 4 - 5 under ice 14 ft. 8 ins., sprung together. The bottom was at 19 ft.
- 6 - at the bottom, in ice 8 ft. 9 ins. thick, at 8 ft. 1 in. from the ship.
- 7 - at the bottom, in ice 11 ft. 9 ins. thick, at 8 ft. 1 in. from the ship.
- 8 - under ice 8 ft. 9 ins. thick, the bottom being at 19 ft.
- 9 - under ice 14 ft. 8 ins. thick.
- 10-11-12-13-14-15-16-17 - under ice 10 ft. 9 ins. thick,
- 18-19-20-20A - under ice 8 ft. 9 ins. thick.
- 21 - at the bottom, in ice 11 ft. 9 ins. thick.

Gunpowder Mines.

- 22-23-24-25-26-27 - in ice 8 ft. 9 ins. thick, at 4 ft. 10 ins. from the surface, at 4 ft. 10 ins. from the ship.
- 28-29-30-31-32-33-34-35-36-37-38 - in ice 10 ft. 9 ins. thick, at about 6 ft. from the surface, and at 4 ft. 10 ins. from the ship.
- 39-40-41 - in ice 14 ft. 8 ins. thick, at about 8 ft. 1 in. from the surface.

- A - Foremast.
- B - Mainmast.
- C - Mizzenmast.
- D - Ice adhering to the shore.
- E - Ice 14 ft. 8 ins. thick.
- F - Ice 11 ft. 10 ins. thick.
- G - Ice 8 ft. 9 ins. thick.
- H - Coal.

THE HISTORY OF THE COUNTY OF MIDDLESEX



THE HISTORY OF THE COUNTY OF MIDDLESEX
BY
J. H. COOPER, ESQ.
OF THE BARRS AT THE MIDDLE TEMPLE
AND
OF THE COUNTY OF MIDDLESEX
IN PARLIAMENT ASSEMBLED
BY VIRTUE OF AN ACT OF PARLIAMENT
IN THAT BEHALF PASSED IN THE SEVENTH YEAR OF THE REIGN OF
HIS MOST EXCELLENT MAJESTY KING GEORGE THE THIRD
IN THE YEAR 1772
AND
BY VIRTUE OF AN ACT OF PARLIAMENT
IN THAT BEHALF PASSED IN THE SEVENTH YEAR OF THE REIGN OF
HIS MOST EXCELLENT MAJESTY KING GEORGE THE THIRD
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only twenty-two charges left, and our work did not seem to have made any progress.

The ice-field next the islands gave no sign that it was about to move, and it was therefore, thought, advisable to continue working



GULL (*Stercorarius parasiticus*)

round the ship. But there all our charges were being spent without producing any result. It seemed better, therefore, to attempt to reconstruct the channel leading from the outer part of the ice-field towards the inner, making use of the small channel which ran along the bay-ice to carry away the broken floes. There could not be the

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slightest doubt that that was the best method of freeing the ship ; but every time that we tried to break up the ice in that direction, the results were so trivial as to dissuade us from seeking to attempt it. On July 29th and 30th eight charges of gunpowder and one of guncotton were exploded at the end of the channel ; but after about eighteen hours' work, only six or seven yards of ice were broken off. There was also another matter still more serious. The guncotton had been sent to me from the manufactory in four cases, three containing guncotton mixed with paraffin, and one containing some of the same sort of guncotton, together with sixty cakes of cotton without paraffin, to be used for igniting the charge. Half of these cakes were already pierced to receive the detonators, the others were not. When the former sort were spent, Andreas, while charging the mines, asked me if it mattered which sort he used, and I, without thinking, erroneously replied that it was all the same. In order not to keep all the cases of guncotton open, the cakes intended for lighting were used as ordinary cakes, and after all these attempts we were left with only a small quantity of guncotton mixed with paraffin, and without the means of igniting it. I felt very uneasy on learning this, as I feared that, in consequence of my absence of mind, we might be unable to leave the bay. What ought we to do ?

If we continued to make the channel from outside towards the ship, we might bring it, by means of the few remaining charges, up to within a few yards of her, and then have no way of extricating her ; while, on the other hand, if we raised her up by springing mines of guncotton and powder, and set her afloat, we might still have some hope of working our way out, with the help of the engines and the bow of the ship.

On August 1st an easterly wind drove the ice-field between

Karl Alexander and Prince Rudolph Islands about 200 yards from the coast, and, at the same time, formed in the south near Cape Auk a broad channel through which the ship ^{The *Polar Star*} _{is floated.} could easily have passed. Another channel was opened between Karl Alexander and Hohenlohe Islands. The sea was at last once more



RETURNING FROM SHOOTING

free from ice, and we could foresee that if the wind were to continue for a few more hours, the bay would be brought back to the same state that it was in last year. As the ice-pack had gone away out of sight, it was a sign that the open water round Emperor Franz Josef Archipelago extended as far as it did last year. We were already at the beginning of August, we had worked hard, and had achieved nothing. Should we, then, have to pass a second winter here, and lose the *Polar Star*?

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We again began to sink mines round the ship with febrile activity. Three mines of powder were placed at 4 ft. 10 in. from each other, and 4 ft. 10 in. from the ship, in the large floe next her stern, between her side and a crevasse. These mines



LAYING THE MINES IN THE ICE

at last detached a large block of ice, which was broken up into smaller pieces by small charges of powder, which were again broken up with pick-axes. We thus formed the first lake of open water which should afterwards help us in our work. The broken ice was driven with poles into the channels alongside the ship, to be carried away to the sea, and as these channels were only 1 ft. 7 in. to 1 ft. 11 in. deep, the ice required to be splintered into very small pieces. On

August 2nd and 3rd the same method was employed, until the ship's stern and left side up to the middle were freed from ice.

There were so many of these floating blocks of ice that, to get rid of them, we put up sheers to raise the largest with ropes and pulleys, worked by the ship's windlass. It was not easy to hoist these enormous blocks of ice. They sometimes slipped from their slings, and fell back into the water with a loud splash. The work had to be interrupted from time to time, as when the blocks were



A MIRROR OF WATER ALONGSIDE

piled up they left no room to use the sheers, and a small sledge was therefore made to carry them away to a distance of thirty or forty yards. All this took up much time, and though the sheers were of no slight help in quickly clearing away the ice, the greater part of this very fatiguing work was done with the help of pick-axes.

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We all worked with ardour ; we could not afford to lose a day, as speed might perhaps decide whether it would be possible for us to return home that year. The work, with a short rest for meals, lasted from eight in the morning till seven in the evening, and sometimes till ten. As the largest pieces broken off by the smaller mines were lifted up with the sheers, the crew smashed up the remainder and drove them down the channels, which were thus doubly useful ;



GETTING OUT A PIECE OF ICE

they carried away to the sea the fragments made by blasting, and they wore away quickly the ice alongside the ship, as they had done in the previous year.

If the number of mines could have been increased, the work would have progressed more rapidly. But we had now only a few charges remaining. Hence, when one was exploded, we worked for several hours with pick-axes in the hole which it had made to bring the smaller pieces of ice to the surface, as, when they were taken away, the

larger pieces could rise in their turn. Dr. Cavalli was indefatigable at this work. He sometimes sat in the launch for hours struggling obstinately with small projections of ice; and when these were broken, large pieces rose to the surface, without requiring any more mines, and struck the launch with such violence that it was in danger of capsizing. The pressure of the ice as time went on piled blocks up under



THE *POLAR STAR* RIGHTING HERSELF

the ship; there were thus large masses lying one over the other with water between them, which sometimes caused an erroneous idea that all the ice had been taken away, whereas some still remained adhering to the ground and under the keel. Although the work was most fatiguing, the incidents which occurred now and then made the time pass rather quickly. The men fell with their pick-axes on the large blocks of ice as they floated up. Then, as they were broken to

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pieces, their centre of gravity was changed ; they began to sway, and at last turned over, ducking those upon them.

Although the charges of guncotton could not act for want of the detonating cakes, we tried to ignite them by every means. But the result was so discouraging that I resolved to use them no more, but to work only with the help of gunpowder and pick-axes.

By continuing on the 6th, 7th, and 8th, to sink mines near the ship at intervals of two or three yards, and by working with pick-axes for several hours after each mine was sprung, we succeeded in forming an open pool about four or five yards wide on the left side of the ship, which reached as far as the shrouds of her fore-mast. The ship was, therefore, held only by the ice at the bow.

On August 8th, eleven months had elapsed since the *Polar Star* had been abandoned, and on the afternoon of that day, after a mine had been sprung, the ship was seen to move and right herself slowly. The sight caused general enthusiasm. It was the reward of the fatigues of the previous days ; we had regained possession of our ship, and the success of this part of our work filled us with hope for the future.

On the two following days, the 9th and 10th, we continued breaking the ice which still remained round the bow, in order to form a dock large enough to allow the ship to move and to carry out, with the help of her bow and her engines, the work hitherto done with powder and the arms of the crew. Two or three mines cut away about ten yards of ice at the bow, but here the work became harder, as the lower part of the ice was less broken up in the places where no guncotton mines had been sprung. We then found that these mines, which had seemed at first to produce no results, had shattered the bottom ice ; and that, where none had been sunk, it took twice as much time to advance a few yards. The

**The Ship is
extricated from
the Ice-Field.**

entire ice-field along the coast had receded, driven by the easterly winds, and only 180 yards from the ship there was open water, which could be seen from the upper part of the beach, stretching as far as the eye could reach. This, for us, who were constrained to remain imprisoned, was like the punishment of Tantalus. On the evening of August 9th we had but five charges remaining. There were only ten yards' length



MAKING A CANAL TO LIBERATE THE SHIP

of water in front of the ship, which were not enough to allow her to move and bring her weight to bear upon the ice. Every possible means had been discussed to procure some new explosive. The rockets and the cartridges of the Very lights had been opened, and we had even tried experiments on the ice with sulphuric acid, but without any result.

That day a stiff breeze set in from the east, and, on account of the force with which it drove the ice towards the open sea, there never had

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been such a favourable opportunity for making the channel from the outer part towards the cleared space. We took advantage of it to make a last attempt with a guncotton mine, into which five detonators were placed, one for every two cakes. The attempt succeeded. While the crew continued to break up the ice round the ship with their pick-axes, the mine was sprung near the edge of the ice which filled the bay. This time, great was our surprise, for the report of the mine was followed by the rumbling noise caused by all the snow-ridges, which came down, while the ice was broken in every direction round the mine for about fifty yards, and came up to the surface.

All the men stopped working, and we immediately felt that our labours were nearly ended. If these fifty yards of ice had been blasted by a single mine, we might be able to bring the canal up to the ship with a few more, and, as the wind was in our favour, it would carry the broken ice out to sea without any effort on our part. It was then six o'clock in the evening. We went to supper, and then set to work again. Three more mines were enough to break the ice up to thirty yards from the ship, and it was speedily driven away by the wind. A last block of ice, thicker than the others, still separated her from the open water. A mine was sprung in it at half-past one in the morning, in the hope that it would complete the channel, but it did not produce as much effect as had been expected, and merely opened a deep cleft in the ice. The work was therefore suspended, to be taken up again next day, and we hoped that during the night the wind and the tide would clear away the ice-field.

What we wished for occurred while we were taking a slight repast. Not only the ice in front of the ship, but also that to the north of the bay, driven by the wind, moved out to sea, taking with it the ship, which was held only by a small anchor. There was no danger of her being wrecked, but she might be carried far away from the bay. We

immediately ran headlong, just as we were, some in slippers and some in shoes, to get on board before the ship got far from the beach, and ropes were thrown on shore, which were made fast to the rocks astern, and she was safely moored. All the ice round us, from the bottom of the bay to the sea, had moved away and left a splendid natural harbour at the place where we had undergone so many hardships. We returned



READY TO RETURN

to the tent after this stirring event, and that night rested peacefully, for we were now certain that nothing could hinder us from leaving, as the way was open, and all we had to do was to put on board the necessary provisions, the coal, and whatever else was wanted. We had, indeed, to make haste to depart, as there was but little time before us. In these last few days the sea had begun to freeze round the ship, as had been the case last year.

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That day was Sunday, and we rested. The next day (August 13th) we substituted the spare rudder for the one we had used. On the morning of the 14th we loaded a part of the coal which Departure from Teplitz Bay. had been landed. I do not think that what we left on the beach will ever be found, as it had been put near the edge of the ice adhering to the shore, in a place where, during summer, the flow of water will drive it little by little into the sea. In the afternoon we made ready to bring the ship near the tent, in order to put provisions and the rest of our equipment on board, and to be ready to start as soon as the wind should set in from the west and threaten to cut off our retreat. But when we tried to move the ship, we found that she was stuck fast; for the tide was low, and the coal, which had been stowed away at the stern, had made the keel rest on the rocks. We had, therefore, to wait till the tide rose to again float the *Polar Star*, and, when the engines began to work, we had the satisfaction to see her strike against the ice in the channel, and come to her moorings a few hundred yards from the hut. Although the ship had suffered from the pressure of the ice, she was still sound. We felt as if we were already in Italy, and we did not even think how difficult it would be to reach Barentz Sea. That same evening we left the tent for good; our beds were brought on board and put into the quarters newly fitted up by the carpenter.

On August 15th, whatever remained in the tent, such as clothing, cooking utensils, etc., was embarked. In the afternoon provisions for eight months were taken. The work went on quickly, as the vessel was now moored in a place where the boxes could be put on board without requiring to be loaded on the launches and then unloaded.

I had intended remaining only the next day in order to take on board the sails and the spars of the tent, which would be of the utmost



Allen & Co. 2

We liberate the Ship with mines

use to us in case the ice were to prevent us from reaching Cape Flora, or the engines were to break down.

At six o'clock, the day, which had been cloudy, was followed by a splendid evening. A light breeze from the south-east had quite cleared the horizon. The continuity of these easterly breezes made me feel sure that our way to the south was open, and a steady wind would enable me to go forward even if I were to meet with ice. I therefore decided on leaving the bay. At half-past one in the morning of



LEAVING THE BAY OF TEPLITZ

August 16th everything was ready, and we steamed slowly away from the shore, giving three cheers as we turned round the ice of the bay, which had held us so long imprisoned. But the sound of our voices recalled sad thoughts to our minds. Indeed, at that moment the memory of our comrades who were not going home with us was more vivid than ever. We had lost almost all hope of ever seeing them. Our looks turned towards the north, where, far away beyond the open water, it was only too probable that the ice hid the tombs of the brave

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Querini, of the zealous Stökken, and of the faithful Ollier—tombs which we should never be allowed to see, for the Arctic Ocean was a jealous custodian of its secrets. May the day at least be not far off when the mystery of the Arctic regions shall be revealed, and the names of those who have sacrificed their lives to it shine with still greater glory—the day when a small band of men, subduing these inhospitable and repellent lands, shall avenge all the past sacrifices and the lives so sadly lost in this obstinate struggle, which has lasted for centuries!

We left some clothing packed up in boxes, a gun and some cartridges in the carpenter's hut, as well as provisions enough to support more than twenty persons for over a year, together with some things which belonged to the *Polar Star* but had not been brought back to the ship, as they were not absolutely wanted on board, such as petroleum, coal, and a launch. Of the dogs which remained, we took away with us only the strongest and those which had taken part in the sledge expedition. All the others were killed with the exception of the eight which we had spared (four males, two females, and two puppies born during the winter). They might, however, have been able to live for a long time by means of the provisions which lay scattered about, and might also, perhaps, have been of use to our comrades.

CHAPTER XVI

Our Return to Cape Flora. Our Arrival in Norway

CHAPTER XVI

OUR RETURN TO CAPE FLORA. OUR ARRIVAL IN NORWAY

IT was a beautiful morning; there was no wind and the horizon was rather clear. We therefore hoped to be able to go speedily towards the south. The ice-pack was far away on the horizon, and around us, to north, south, and west, there was open water, as there had been last year, and perhaps even more, though the season of calms or of winds chiefly from the west had now gone by.

During our stay on Prince Rudolph Island we had remarked how easily, both in summer and in winter, the ice receded towards the west in the space between Cape Säulen and Cape Mill, when the wind blew from the east. Jackson in his sledge expeditions had found belts of open water to the south of Cape Mill; we therefore supposed that, from British Channel to Cape Fligely, Queen Victoria Sea is always, or almost always, navigable in the summer. The general drift of the ice in the Arctic Sea to the west, and the wind, which is generally from the east, are the causes of this open water. The drift thins out the ice-fields of the belt between Cape Fligely, Cape Mary Harmsworth, and British Channel, and enables the wind to drive easily towards the west the vast masses of ice in contact with the islands. Thus may be explained the fact which I have often observed, that while to the north of Cape Fligely the ice-pack had only a slight movement, to the west of Prince Rudolph Island it moved away to the horizon in a few hours.

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Our ship went on but slowly, as she still dragged with her large pieces of ice sticking to her side from the bow to the middle. They dropped away from the hull little by little, and our speed increased until it again reached six knots an hour. Gradually, too, the bay where we had lived for twelve months vanished from our eyes. First the rocks of Cape Säulen disappeared, then Cape Auk and Cape Brorok, while to the south we sighted Cape Clement Markham.

The channel between Hohenlohe and Karl Alexander Islands was open, but the ice was not drifting from the channel towards the west, as was the case last year, which was a sign that to the east of Prince Rudolph Island the ice-pack was not as yet broken up. On approaching Karl Alexander Island we made out distinctly Cape Felder, seen by Payer in his first voyage, and Cape Brogger, seen by Nansen. A fog shut us in when we had got past Cape Brogger; but we held on the same course until towards eight that evening, when we sighted Ommaney Island through the mist.

Passing between Ommaney, Harley, and Neale Islands and the coast, we steered for Maria Elizabeth Island, intending to pass between it and the coast, as we had already done in the preceding year, but when we came near it we found that our course was stopped towards the east by ice. On the other hand, the ice-pack had this year gone away from the island. We changed our course to that direction, and held on towards the south in Queen Victoria Sea, which was free from ice.

A stiff breeze had set in from the south-east, and our horizon was bounded by mist. From time to time belts of ice were crossed, which did not stop the progress of the ship. Towards
**Drifting in
British Channel.** eight o'clock in the evening we had left Queen Victoria Sea behind us, and sighted through the fog the northern coast of Prince George Land. The water seemed more open towards the

west, and, as it was impossible to see very far, we followed the direction which allowed us to advance most easily. But when we were at the height of Cape Murray, the sky suddenly cleared ; we discovered that we had entered a funnel, and, according as the



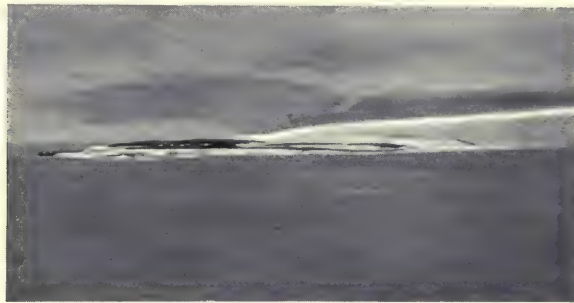
ONE OF OUR DIFFICULTIES

distance became more clear, we saw all British Channel barred by the ice.

It was impossible to steer to the west towards Alexandra Land. To the east were to be seen a number of lanes through the ice ; and though from the crow's-nest it was not easy to form a decided opinion, it seemed more advisable to continue to advance through the part of the channel by which we had passed in the preceding year, and which this year also seemed more easy. We therefore steered towards the east. The night had become very clear, which was very helpful to us

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as our course was continually checked when we were sailing from one channel to another. These were anxious moments, and our eyes were fixed on Captain Evensen, who spent weary hours in his post at the mast-head seeking to ascertain the best direction to follow. Just as we began to fear that we could advance no farther, it revived our hopes to hear the order given to the engines to go ahead. We thus



OUR LAST GLIMPSE OF CAPE SAULEN

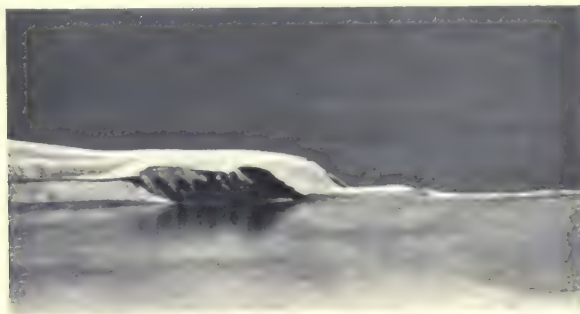
came about four o'clock to Eaton Island, where we were again enveloped in fog, but remembering that the year before we had found open water in this locality, we thought that we had got over all our difficulties. The lanes here were wider, and open water was probably before us. We went ahead at full speed, as we were certain that we had left the ice behind us, but after going a short distance we were again stopped. We were not as yet in open water, but only in a very large channel.

We waited all the morning in the fog, hoping that it would lift. When the distance became clear, we beheld a most discouraging sight. We were in a narrow channel off Hooker Island; British Channel to the south, and Barentz Sea beyond it, were covered with ice. A ship could not now sail where last year there had been open navigable water.

The wind had again set in steadily from the south-east; it made

the ice-pack drift to the north-west, and we retreated slowly with it towards Eaton Island. There was a stiff breeze all night, which fell in the morning, and then blew gently from the north. The ice then ceased moving, and a few hours later began to move again to the south-east. We could not be mistaken. We were at the mercy of the ice, which, in its turn, was at the mercy of the winds.

We passed the 18th and 19th in a small expanse of open water near Hooker Island. The place was full of life; bears, white dolphins, narwhals, and seals afforded us some distraction in our prison. We saw a bear hunting a seal; the bear followed the edge of the ice-field, hiding itself as much as possible, so as to be able to spring on the seal and seize it when it came near enough. The bear approached, little by little, to within fifty yards of the ship, without perceiving that several of us were watching its movements with as



CAPE AUK AND CAPE BROROK

much attention as it watched those of the seal; and when it least expected it, we shot it.

On the evening of August 19th, as the weather turned out brighter, and the open water where we lay became more extended, we pushed on as far as we could to the south towards Cape Barentz. It was a splendid night lit up by the sun, and we saw around us Hooker, May, Etheridge, and Northbrook Islands. As it was then

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calm, the ice-fields were somewhat distant from each other, and the ship could advance slowly in the direction of Cape Barentz.

Four hours of continuous effort brought us six or seven miles nearer to Northbrook Island. Captain Evensen's great experience was of much use to us. From the crow's-nest he selected at a glance, from among so many channels, that by which the ship could pass, examining them one by one till he could perceive a long stretch of open water. He made the ship cross continually from one side to the other ; he stopped the engines, backed them or sent them full speed ahead, to break up small ice-floes, to force a way through them, and not remain shut in. Ships of short build, with slanting bows and powerful engines, are the best for this purpose. They can be more easily handled in a small space, are better adapted for



THE ICE IN BRITISH CHANNEL

breaking the ice, and if they cannot shatter it by striking against it, they rise upon it and break it with their weight. But even strongly built ships and powerful engines can only make their way through the open ice-pack ; when the pack is closed, there is nothing for it but to wait patiently, taking care not to lie in an unsafe position, where there might be danger of encountering the shock of two ice-fields.

The power which is latent in an ice-field, either when it is exercising pressure or when resisting pressure, is nothing in comparison with that of masses of ice in motion. It is only by unceasing and intelligent watchfulness that mishaps can be avoided and a ship directed on her course.



A WHITE DOLPHIN

Although from the crow's-nest no open water could be seen to the south of Northbrook Island, we felt certain that if we reached Cape Barentz we could also reach Cape Flora. But towards midnight we were surrounded with ice on all sides, and could not stir.

Our situation was very unsafe, especially with a ship the sides of which had already been weakened. Everything requisite to enable us to march to Cape Flora in case of necessity, such as provisions, tents, petroleum, clothes, arms and cartridges, were placed on the deck

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so as to be at hand in any emergency. We remained thus from the 20th to the 23rd, drifting with the ice towards the north-west. On the evening of the 23rd there set in a stiff south-west wind, which was the worst of all winds for us, as it meant drifting quickly towards the north and greater pressure from the ice-fields, which, being squeezed between the islands and driven by the wind, would naturally become piled up at the entrance to the channel. The ice then began to drift towards the north-west, and about seven in the morning we were only two or three miles from Eaton Island. The ship was drifting towards three large icebergs stranded to the south of the island. The wind was blowing, snow was falling from time to time, and the ice, which was in motion on all sides, was pressing on the vessel. It was an anxious situation; and, keeping the fires lighted and the pumps manned in case the water rose in the hold, we held ourselves in readiness for whatever might happen.

The icebergs were three in number, standing at a few hundred yards from each other in the shape of a triangle, the middle one being the nearest to us. If we were carried against one of these colossal masses, we should be stopped and the side of our ship exposed to the pressure of the ice-pack, which was drifting with considerable speed towards the north. The ice-field, along with which we were drifting, was stopped at a few hundred yards from the nearest iceberg, but all the ice near us continued on its way northwards. Large and small ice-floes swept along rapidly past the sides of the *Polar Star*. It was a magnificent spectacle, but it rendered us uneasy. The loss of the vessel in the midst of this moving ice would have been a real disaster. For about an hour, by keeping the engines working, we held the ship up to the ice-field, against which it had been in contact until then, in the hope of finding protection from it; but this could not last long. When Captain Evensen saw the ice-floes passing thus alongside the



AGAINST AN ICEBERG

ship, he thought of bringing her in among them and, while following them, trying to avoid the iceberg with the help of the engines. When he came to suggest this manœuvre, I remained undecided. I, too, was aware that we could not stay long where we were, but in my opinion it would have hastened our destruction if we put ourselves in the power of this ice which was moving so rapidly. As I could not, however, suggest anything better, and as I saw that if we did not exert



THE DRIFT IN BRITISH CHANNEL

ourselves we should be soon upon the iceberg, I told the captain to carry out his plan. He then, taking advantage of the momentary formation round us of a space of open water, while the ice-field was breaking up in all directions under the pressure of the iceberg, brought the vessel by a rapid manœuvre into the midst of the moving ice-floes. As they were less closely pressed together than they seemed to be, we were able to move away from the iceberg, and, carried along by the ice-floes, we soon left it behind us. We could just make out the second iceberg through the fog, and we steered so as to avoid it ; we succeeded in doing so by keeping the engines constantly working, and

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then entered a stretch of open water which extended almost a mile to the north of it. We then moored the ship to the iceberg, and went to take some rest for the first time for more than seventeen hours. We were now protected by the icebergs which had caused us so much anxiety.

The wind subsided during the night. The following day was very fine, but our position was no longer safe, for as the wind had ceased to drive the ice to the north, it filled the open water in which we had taken refuge. Towards evening the ice began to move southwards, and a large ice-field which was carried by the current against the ship struck her violently, and made her heel over about twenty degrees. The blow was, luckily, abaft the beam, and the pressure made the ship glide forwards, thus freeing her from this dangerous situation. But other ice-floes were pressing on around us and were threatening to shut us in. We had therefore to let go our steel cable, leave the small anchor on the ice, and hasten away from the iceberg at full steam. A moment afterwards it was surrounded by the ice on all sides.

We tried in vain that evening to reach Hooker Island, and look for an anchorage there, where we could wait till a favourable wind enabled us to come to Cape Flora, and we had to return to the only space of open water which was still in British Channel between the icebergs and Eaton Island. We passed a part of the night trying to avoid the pressure of the ice and making every effort not to be carried away to the north. As long as the weather was bright, we succeeded in accomplishing both our purposes, but when a fog came on, our task became impossible. We drifted away towards the north and sought for Eaton Island for some time without knowing where it was. When at last the fog lifted for a moment, the pale light of morning enabled us to return to the island, to the only place where there was

open water, and where we were at least sure of not drifting away. There we remained on the 26th and 27th.

Our position was very insecure, and during these two days there was a continual succession of alarms. The ice in British Channel near Eaton Island was in a state of perpetual unrest, and floated past the sides of the ship at the rate of one or two miles an hour. Ice-fields with a surface of several square miles, borne on by the current, grated



THE DOGS ON THEIR WAY HOME

against the ship. Some of these did not exercise any pressure ; others, which met some obstacle, turned round, and struck the sides of the *Polar Star*, driving her up against the coast. In one of these pressures against an iceberg which was near the beach, our ship met with some injuries to the wheel of the rudder and to the taffrail, which had no important results, but which made us dread that at any moment some much more serious mishap might occur.

I was already beginning to believe that, against my will, Eaton

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Island might prove to be our second winter quarters. The wind had set in from the north, yet, in spite of my hopes, no channel was opened towards the south, and without some channel, how could we reach Cape Barentz? Masses of ice now drifted towards the south, with only a momentary delay in their progress, while on the previous days, when there was a calm, they had moved to north and south alternately, according to the tidal currents, which are very strong on the eastern side of the channel. This uninterrupted drift of the ice showed that it was moving out into Barentz Sea, and that to reach Cape Barentz we ought to try to get into the ice and let ourselves drift along with it. If the drift went rather quickly, we might be able to accomplish the twenty-five miles between Eaton Island and Cape Barentz in two or three days. The defect of this plan was, that if the wind veered to the south instead of continuing to blow from the north, we should be again driven back into the channel and probably be forced to pass the winter there. Our position, however, at Eaton Island was so insecure that it was better to leave it; for in the neighbourhood of Cape Flora we were sure of finding a refuge if any misfortune happened to us in the midst of the drifting ice.

On the evening of the 27th we brought the ship into open water, to the west of the same island in the direction of Miers Sound. The wind was blowing from the north, and as the barometer was rather high, we hoped that there would be no change of weather. We then began a strange mode of travelling. The wind had freshened on the 28th, and on going on deck at mid-day I was not a little surprised to see Eaton Island on the horizon, while the northern end of Northbrook Island, which could hardly be made out on the previous evening, now rose high and distinctly. The ice-floes were certainly moving more quickly than I could have believed. It seemed at first as though the drift would have brought us into Miers Sound, but after having carried

us to the south-west on the 28th and during the following night, it made us follow the coast of Northbrook Island.

We advanced rather rapidly on the 29th and the same night, without the slightest pressure, always driven by northerly winds, which were sometimes strong and sometimes light. Though we did



ON OUR WAY TOWARDS EUROPE

not travel very fast, we made more than eight miles a day, and when, on the evening of the 30th, we were near Cape Barentz, we could feel certain that if the wind continued to blow from the same point, we should reach that cape on the following day. We passed an anxious night. A change of wind would mean that when just on the point of reaching our goal we should be again driven back into the channel, and

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be unable to leave it, and compelled to pass another winter in those regions, in a worse condition than in the previous year, and perhaps even lose the ship. We felt so uneasy that we came up on deck several times during the night. There was no sign that the north-west wind was going to fall, and we drew nearer and nearer to Cape Barentz. When morning came, we saw the ice-pack in Barentz Sea stretching away out of sight to the east and to the south. To the west, along Northbrook Island, the sea was quite free up to ten miles from land.

Since the previous evening we had tried to advance gradually towards the open water near the cape, by taking advantage of every moment when the ice was less closely packed; and on the morning of the 31st, after keeping the engines working for several hours, we reached it. Our troubles were ended at last, and our return home, which had been hitherto so uncertain, was now only a question of days.

We went on quickly towards Cape Flora. On arriving there, we felt agitated by the hope that we should find our lost comrades, and that some whaling vessel might have left dispatches.

Cape Flora.
The Last Ice.

The rocks were now more free from snow than they were last year, and the crowds of birds and the verdure of the level ground where the huts stood made the place seem very beautiful in comparison with Teplitz Bay. A boat was sent on shore, but we could not find the slightest indication that our unfortunate comrades had ever been there.

Since leaving Teplitz Bay, I could no longer cherish the illusion that the missing detachment might be at Cape Flora, but I had still a faint hope that in some unexpected manner they might have been helped to reach this spot, where was the only depôt of provisions in the Emperor Franz Josef Archipelago. Five months had passed us since March 23rd, when our comrades had separated from the expedi-

tion. They would most certainly have reached Teplitz Bay if they had touched land at the northern part of the archipelago ; or Cape Flora, if they had been carried away towards Alexandra Land ; or, what is very improbable, towards Wilczek Land. If one considers that Jackson, accompanied by one man and five dogs, was able, in the month of May, to reach Cape Flora from Cape Mary Harmsworth in eighteen days, and that this cape is the most westerly of the group, it is evident that if our comrades had touched Alexandra Land, or Albert Edward, Harmsworth, Salisbury, or Hall Lands, which are comprised within the same radius of eighty miles, they would have been able to push on as far as Cape Flora. They could not have lived for five months upon the ice-pack with the provisions and the dogs which they had, and if any unusual movement of the ice had carried them to the south towards Alexandra or Wilczek Land, they would have come there in the month of April, when the frozen channels and fiords would have allowed them to advance quickly to Cape Flora.

The only conclusion, which seemed, indeed, to be inevitable, was that they probably never reached Emperor Franz Josef Archipelago, from which they were only forty-five miles distant. It is useless to attempt to seek why they failed to return. I have believed from the first that the disappearance of that detachment was owing to some accidental cause, but as it is very difficult to make any suppositions regarding it, I shall not attempt any.

We were much pleased to find in Jackson's hut a packet of letters brought by the *Capella* on July 13th. We all received good news ; the latest newspapers were eagerly read ; while I went with Captain Evensen to the summit of the mountain, to see what might be the best direction to follow towards the south. From Cape Barentz, the white line of the ice-pack was seen stretching towards the west at more than ten miles from the coast. From Miers Sound and Nightingale Sound

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there issued strips of ice floating away to the south. From the colour of the sky, this ice seemed to be impenetrable towards the south and south-east. Towards the south-west, on the contrary, the very dark tint of the sky at the horizon was an indication that in that direction there were vast belts of open water.

We landed clothes and beds for the missing detachment, which would also find the provisions left in the preceding year, which were sufficient to feed twenty men for eight months ; we also left letters to state that a ship would be sent out in the following summer, and on the same evening we continued our journey, which had been interrupted for a few hours by this stoppage. We passed through the strips of ice which came out of Miers Sound and Nightingale Sound, and then at the height of Cape Grant we changed our course to nearly south-south-west, which soon took us away from the coast, while we met only a few ice-floes. The weather had then become cloudy, and rain and fog followed each other at intervals. Towards seven o'clock on the following morning the ship began to pitch slightly, and this movement, which gradually became stronger, was a sign that we had got clear of the ice-pack.

Ice could still be seen from time to time to the west ; sometimes near to us and sometimes far away out of our course, which was now directed to Cape North.

On September 2nd stormy weather had set in from the west, and we had belts of ice again in our neighbourhood. It would have been easy to cross them, if the weather had been clear and calm ; but, enveloped as we were in a fog, with a tempestuous wind which caused a heavy sea, and in a pitch dark night, it was no easy matter to find our way to the south. That day we had tried to cross one of these strips in that stormy sea, and we had found ourselves in the midst of huge masses of ice which at one moment rose on the waves as high as

the deck, and at another sank into the depths of the sea ; tons of ice struck us on all sides, and for some time we were very uneasy. The ship was stopped on entering this strip of ice, and we were subjected to the blows of these floating masses, which made our propeller run some danger. On escaping from this difficult position and getting



OUR ARRIVAL AT TROMSØ

back into open water, we did not forget the lesson we had received, and we went on that evening with great circumspection, lest we should again meet with a similar adventure. It was the last farewell of the ice-pack, and it was for all of us our last sleepless night. We followed the strip of ice towards the east, looking for an opening which might allow the ship to cross it, and from ten at night till nearly two next

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morning we drew near the ice every now and then, only to go away from it again. At last, about two o'clock, we entered a belt which was tolerably practicable, and, after crossing it, we were again in open water. The storm subsided towards morning, and as the light returned, we saw nothing but the sea round us as far as the horizon.

The rest of our voyage was easy, and we came in sight of the rugged mountains of Norway on the morning of the 5th. We all felt sad on seeing again the continent of Europe, as we thought more of the news we had to communicate than of that we were going to receive. The letters we had found at Cape Flora had reassured us with regard to all who were dear to us, but in a few hours our telegrams would spread both joy and grief. Near the anchorage of Hammerfest a ship, the *Hertha*, came to meet us. I recognised on board the Cavaliere Silvestri, who was the last to bid me good-bye when I left, and was now the first to greet me on the part of my distant country. Alas! it was not to greet me, but to make known to me a death. A cruel destiny had wounded my dearest feelings on the same day that my heart was grieved to be obliged to inform three families that their gallant sons had disappeared.

Going on to Tromsø, I sent from thence on the morning of the 6th the following telegrams to His Majesty the King of Sweden and Norway, and to His Majesty King Victor Emmanuel III. :—

“TO HIS MAJESTY KING OSCAR, STOCKHOLM.

“The *Polar Star* has arrived. Captain Cagni has reached 86° 34' N. lat. I deeply regret the loss of the Norwegian Stökken, and of two Italians who formed part of the sledge expedition, and did not return to the ship. The help afforded me by the Norwegian members of the expedition augments my sympathy for the Norwegian



Meeting between "The Polar Star" and "The Bay of Hammerfest".

people. May your Majesty deign to accept the homage of the members of the expedition."

"TO HIS MAJESTY KING VICTOR EMMANUEL III.

"The *Polar Star* has arrived, and goes on to Tromsö and Christiania. She passed through British Channel last summer, went beyond Cape Fligely in Prince Rudolph Island, and came down to pass the winter in Teplitz Bay, in $81^{\circ} 47'$ N. lat. On September 8th a strong pressure of the ice crushed the ship, and caused much leakage. Being unable to keep down the water, we abandoned the ship. We built a hut on the shore with the spars, the sails, and the tents, in which we passed the winter very well. At the beginning of the year the ends of two fingers of my right hand were obliged to be amputated on account of frost-bite. I left the command of the sledge expedition to Cagni. It set out on February 20th. The intense cold forced it to return after two days. It left again, under Cagni, on March 11th, and was composed of Querini, Cavalli, the engineer of the ship, two Italian sailors, four guides, thirteen sledges, and 104 dogs. Three Norwegians helped them for the first two days. The first detachment, composed of Querini, the engineer, and a guide, was sent back after twelve days' march, and never returned to the hut. The second detachment, composed of Cavalli, a sailor, and a guide, was sent back after twenty days' march, and arrived at the hut in excellent health on April 18th. Cagni pushed on to the north with two guides and a sailor until April 25th, and reached $86^{\circ} 34'$ N. lat. A strong drift of the ice and the want of food made the return of this detachment difficult and laborious. For several weeks it fed on its dogs, and reached the hut on June 25th, after passing 104 days on the ice-pack. Petermann Land and King Oscar Land do not exist. The *Polar Star* was held up by the ice, and did not sink.

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A faint hope of saving her had made us undertake at the end of autumn whatever measures were most necessary to repair her ; they were continued in July, and after many efforts I succeeded in floating her on August 8th. We left Teplitz Bay on the 16th. We were blocked up by the ice in British Channel for fourteen days. We reached Cape Flora on August 31st, and Hammerfest to-day. Querini was sent back by Cagni while still within sight of Prince Rudolph Island. The weather was cold, but fine, during the following days, the ice was in contact with the coast, and everything was exceptionally favourable to his return. It is with great grief that I must suppose that his loss and that of his two men must have been caused by some accidental mishap. The steadfast courage and determination manifested by the leader of the sledge expedition and by all those who composed it, in spite of immense hardships, assured its success, and acquired fresh glory for our country, by making its flag wave at the highest latitude which has hitherto been reached. All present are in excellent health. May your Majesty deign to accept the loyal homage of all the members of the expedition."

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